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COAL AGE

With which is Consolidated The Colliery Engineer

DEVOTED TO COAL MINING AND COKE MANUFACTURE

ISSUED WEEKLY

VOLUME XIII

January 1 to June 30, 1918

McGRAW-HILL COMPANY, INC.
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COAL AGE

With Which is Consolidated
The Colliery Engineer

INDEX TO VOLUME XIII

January 1 to June 30, 1918

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COAL AGE

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MUTUAL CAPITALIZING

IN ALL HUMAN AFFAIRS today there is a mighty trend toward mutualism. It is stronger and more resistless than any other single force in the world at the present time.

WHEN the United States drew the sword against frightfulness, her captains of industry were among the first to pledge their loyalty. The atmosphere of misunderstanding between the Government and "Big Business" was dissipated in a day. In its place came the light of a clearer understanding, which showed the mutual interdependence of all classes of industry. Both employers and employees are coming to see that they and their fortunes are indissolubly linked together. Both are getting the vision of a nation that stands for all a man can hold dear, and that depends on their united labors for regular and increased production.

IN THE LIST of such industries coal mining stands first. With his own boy "Over There," the miner, superintendent or manager can see in a ton of coal the making of shells and other munitions, without which his boy is helpless.

THAT PARTY—employer or employee—who retards the progress of any kind of essential business now by reason of unfair pay, unjust treatment, or by strikes, will come squarely before the great tribunal of public opinion; and that court will not be slow in rendering its decision when it remembers the millions of "Our Boys" who are either in or on their way to the trenches in France.

MINING MEN OF AMERICA,

are you fully alive to your responsibilities? Are you awake to the necessity of capitalizing every resource, every circumstance and every condition for the benefit of America? Are you alive to the fact that the best kind of capitalizing is the mutual kind? How can it be done?

First: By remembering that the interests of employer and employee are identical. Profits and earnings are no longer the first consideration, but coal for the country's needs. There should be an end of operators' and miners' representatives rushing to Washington to press their respective claims. Instead there should be hundreds of mining concerns sending telegrams to the president or to the Fuel Administrator, signed by the company and by the men pledging continuous operation for the period of the war.

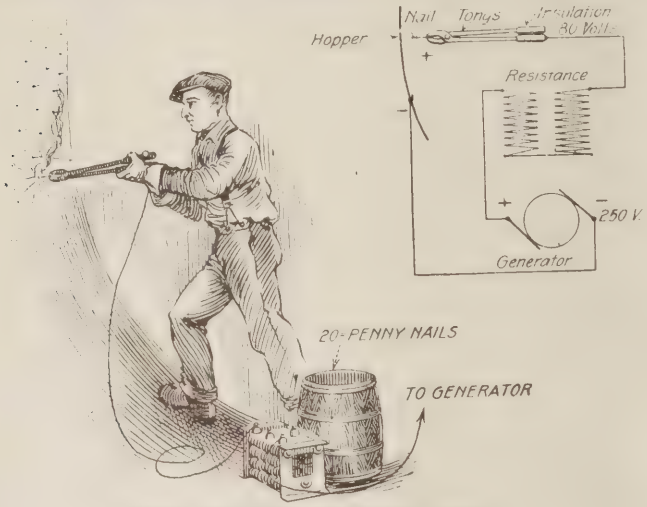
Second: By individual acts showing appreciation of your duties. How? By putting into actual practice, as nearly as you can, the Golden Rule. Every single act that you perform to bind your men more closely to you is an act of mutual capitalization. The same thing is true of the miner. The time for each and all of us to show a full measure of loyalty to company and nation is here. Your boy, as a soldier, is part of a great military machine, and for the period of the war has practically laid aside his individualism. Can you do less here at home? Can you stay off the job for a day when the loss of each hour's tonnage means a round of cartridges less for the boy "Over There."

THE TIME HAS COME for the mutual capitalization of every coal-mine company in America. Without a clear understanding of this fact, our industry may unintentionally contribute to the lengthening of the conflict. Prussianism must be banished; America's coal men must play their big part wholeheartedly.

IDEAS AND SUGGESTIONS

Homemade Arc Welding Outfit

The Clearfield Bituminous Coal Corporation, of Clearfield, Penn., recently found it necessary to weld wire nails to the inside of a steel hopper at one of its plants. Steel lath were to be fastened to the nails and covered with 1½ in. of cement. Not desiring to purchase an arc welding outfit to do this work, the company's electrician got busy and made one from material he had at hand, this consisting of two pieces of copper



HOW THE WELDS WERE MADE

wire, a pair of blacksmith tongs, insulating tape and a resistance.

The negative wire was fastened to the steel hopper and the positive wire to the blacksmith tongs, and in order to secure the proper voltage a resistance was placed on the positive wire. The voltage being 250 direct current, it was necessary to reduce it to about 80 volts. The handles of the tongs were well insulated. The operator then picked up a tenpenny nail and held it to the side of the hopper, an arc being produced that welded the nail solidly to the side of the hopper.

Imagination and the Engineer

BY E. LLEWELLYN
Lansford, Pennsylvania

It may sound, to the young, rather prosaic to suggest that a cultivated imagination is an absolute essential to a successful engineering career. However, the successful engineer will readily confirm the foregoing statement, and the fair-minded reader will readily acknowledge that all engineering projects which have been successfully completed in a very large measure owe their creation to someone who saw clearly, in his mind's eye, the benefits to be derived from the materialization of the image of his cultivated imagination.

It will readily be conceded that the unimaginative technical man does not, as a rule, attain a position of prominence in his chosen field; and it is largely due to the fact that he is usually content with the world as he finds it. He sees no way of reducing the cost of production of the world's necessities, neither does he see, in his mind's eye, any means of improvement, or refinement, in the production of the product of which he is, in part, a producer.

It may be well to emphasize here that in placing on the market any given product the social labor of many men is required. And in the production of coal the labor of the uncouth, unlearned laborer of a foreign tongue is united with that of men from our foremost seats of learning. Together, they apply their social labor to supply one of the absolute necessities of present-day society.

ENGINEER IS CALLED UPON TO SOLVE MANY PROBLEMS

On the shoulders of the trained engineer of today rests the burden of solving the intricate problems, which are becoming more and more intricate, incidental to the economical production of coal. It is his lot to devise ways and means of applying the labor of the untrained worker so as to obtain more efficient service. Furthermore, to him is assigned the problems of eliminating unprofitable labor, through the introduction of labor-saving machinery, as well as the task of introducing refinements that will enhance the market value of coal.

A survey of the progress made in the production of coal since the inception of the industry reveals many improvements and refinements that have resulted either in reducing the cost of production or in enhancing the market value of the product. And a careful study of their improvements will reveal the fact that they owe their creation to the cultivated imagination of someone who was dissatisfied with conditions as he found them.

A technical man who does not think that the present mode of producing and preparing coal embodies all the refinements and economies that are possible, and who is also given to cultivating his powers of imagination, holds within himself the essentials of a successful engineer. He has but to study conditions as he finds them, and, as he is given to much thought, the logical result is the materialization of an idea that adds to the value of the product or the reducing of the cost of production. Moreover, he enhances his own personal fortune and his services are in greater demand, simply because he has exercised the faculties which all men possess, but very few have wisely chosen to use.

Too often the young engineer is prone to say that "it is all very well to point out ideas, the materialization of which has effected large economics in the production of the world's wealth, but today everything is refined or standardized, and the avenue of opportunity is closed." Right here is where the man who is given to cultivating his powers of imagination sees the further refinement, the further economies that are possible, and gradually rises above the army of men who are "content with things as they are."

It may be pertinent to suggest that before you attack the next task that you are assigned—it matters not in what particular branch of engineering work you are engaged—try to picture in your "mind's eye," in the quiet of your room, the means you will employ to complete successfully the work in hand. Analyze your proposed method of doing the work; ask yourself if it is not possible to improve the usual mode. Try to picture in your "mind's eye" the completed task; ask yourself, "Will it meet all the requirements that are expected of it?" Your superior may ask you, "Why not beat him to it?" The engineer who uses his "mind's eye" to solve the daily problems that beset him, be they large or small, to him will ultimately be assigned the task of solving the great problems, the solution of which requires the mind of a masterman. Mr. Engineer, cultivate your powers of imagination!

As evidence that the coal industry contains a few problems the solution of which will require the powers of imagination of trained technical men, the following are a few thoughts that may be pertinent:

Further refinements in the preparation of coal; reducing breakage of coal in the course of preparation. Further improvements of coal jigs, so that they may become absolutely automatic. Better designed breaker machinery, for the purpose of eliminating the present large friction load. The training of mine employees, so as to effect the reduction of the present day very large cost of maintenance of breaker and allied machinery. Further reasearch work in the mines, to ascertain if possible the most economical size that coal should be sent from the mines to the breaker. Less expensive methods of purifying acidulous mine water for boiler use. More efficient storage-battery locomotives. Less expensive methods of constructing concrete supports and structures. The standardization, in every large coal company, of boiler-room protection, so as to effect more efficient generation of steam and lower cost of upkeep.

Dumping Mine Refuse

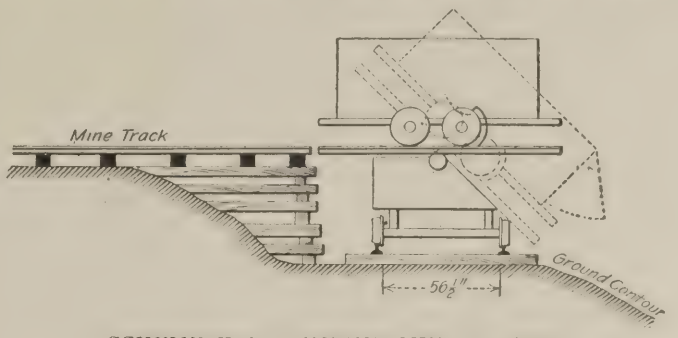
By J. A. Smith
Albert, West Virginia

The accompanying sketch shows a simple arrangement for dumping mine waste where the mine opening is but a short distance above water level, and where the usual type of slate dump would not be advisable because of the expense of moving it ahead at frequent intervals. The distance that the slate track is above the general surface level is often so small that the dumping of a few cars would fill the space. The sketch shows how one company overcame this difficulty.

A short track for cars loaded with refuse was laid with a crib 4 ft. or over high, under its end. At the bottom of the crib another track was put in at right angles to the first. This lower track should be at least of standard gage, or more, in order to permit of the truck moving thereon to have a base sufficient to steady the dump. This lower track can be extended in either direction on a level grade around the contour of the hillside.

In the case above mentioned, a truck was built upon this track with its top platform level with the top of the ties under the slate track, and a dump securely mounted thereon. A car loaded with slate coming from the mine is run out over the slate track onto this dump. The truck is then run in either direction, dumped, and brought back into position, the mine car being pushed back onto the slate track.

When the space below the track is completely filled, the track can be swung out to the edge of the fill and



SCHEME FOR DUMPING MINE WASTE

dumping again started. If there is likelihood of more than one car of slate coming out at one time, it will be best to have two tracks extending to the edge of the crib, one for the loaded cars and the other for the empty ones. There is no necessity of extending the crib, as the truck track can be brought out to the edge of the fill by curving the rails near the crib.

Put It Up to Uncle Sam

The railroad fails to deliver coal cars, and a loud outcry comes from the mine; but how about the mine force: Is it ready to do its part when the cars reach the siding? Are the tracks leading to the tipple promptly freed of snow? Are the switches and frogs duly shoveled, salt-sprinkled and swept clean? Are the necessary snow fences erected to make such shoveling less onerous?

The duty of every mine manager is to fill railroad cars as soon as they are run on the siding, and to keep private sidings reasonably clear of snow. For this purpose, organization is needed. Some attempt should be made to get even the miners to help. If some of these men cannot be attracted to this unpleasant but necessary work, a right principle has not been instilled in them.

Then again, are the pipe lines at your mine kept free of frost and the pumps prevented from freezing? Are your airways and shafts kept free of ice? Too often a superintendent regards a severe frost as some inexplicable phenomenon which he was entitled not to anticipate. A high stage in the river, creek or run which destroys a bridge and so shuts off railroad cars, mine cars or supply wagons is regarded as an unfortunate disposition of inconsiderate Providence, whereas the outcome was to be looked for and should have been guarded against.

As good citizens we should be forearmed against these untoward happenings. The total loss of a bituminous mine might injure the output of the United States only inconsiderably, but a mine that inconsiderately receives its allotment and for some reason or other fails to fill it is doing the nation a great disfavor, for it is holding cars idle which another mine would fill if those cars had been pushed into its siding. Put it up to Uncle Sam all the time. Don't let him give you the cars and then fall down when he puts it up to you.

Anthracite and Bituminous Coal Storage

BY HORACE GOLDSTEIN
299 Broadway, New York City

SYNOPSIS — *The storage of coal between the mine and the point of consumption acts as a safety valve for one and a flywheel to the other. The means employed in the storage of anthracite is radically different from that employed for bituminous, since the behavior of the two in storage varies widely. In storing bituminous, care must be exercised not to pile the coal too deep.*

THE coal pile located somewhere between the mine and the boiler room is a safety valve to the consumer and an equalizer to the producer. Without the storage pile, it would not be economical to run the mines at a reduced rate when the demand for the coal is small, as is the case in the summer; and neither could the mine produce sufficient coal to take care of the winter demand except under heavy stress and decreased efficiency.

The price of coal in the summer is usually such that it pays the consumer to lay in a goodly supply to take care of part of the winter demands, and to carry a sufficient amount in storage to tide over strikes, storms and other interruptions in delivery.

All coals are shipped to any of three places: (1) Direct from the mine to the consumer for his immediate needs; (2) direct to the consumer to be stored closely adjacent to the boiler house, or in the storage plant located between the mine and the boiler house; (3) to a central storage where the producer allows the coal to accumulate in large quantities against a demand rate greater than the rate of source supply, or until a favorable market presents itself.

Except for small plants, there are few cases where no provision is made for coal storage of some kind or other. Location of buildings, yard space, fire insurance, etc., have considerable bearing on the amount of coal carried directly at the plant. In some cases it has been known that the consumers have made arrangements with local fuel dealers whereby these dealers carry in their yard a certain amount of coal which is always subject to the call of the consumer. Different arrangements for paying for this privilege have been agreed upon, and the cost thereof is often called a "premium on coal-supply insurance."

Coal-storage systems can be divided into two main classes—anthracite and bituminous. Anthracite coal is comparatively easy to handle; it flows readily and can be piled to any desired height. Bituminous presents problems which require extra attention, and arrangements must be made to suit the particular case in question. Bituminous coal will not flow as readily as anthracite; the lumps are many times larger, requiring larger and heavier equipment, and there is always present the danger of fire from spontaneous combustion. Coal of this kind has been known to fire when piled only 6 to 8 ft. high. It has also been piled 35 to 40 ft. deep without firing, but in cases of this kind it is always advisable to keep the coal moving in and out of storage, so as not to give it much chance to heat.

Any handling equipment for bituminous-coal storage should be arranged so that any portion of the coal pile can be removed without interfering with the rest of the storage. This will permit the digging out and turning over of the coal as soon as heating occurs, and by doing this fires are prevented. With apparatus thus designed, the fires, when they occur, are easily handled and are not a source of much annoyance or loss to the owner. With little care one can observe the coal pile heating and can relieve the situation without any serious results. Oftentimes coal is turned two or three days or even a week after heating becomes noticeable. The following table gives the capacity in tons of 2000 lb. for conical and rectangular piles for both bituminous and anthracite coal:

TABLE I. CAPACITIES OF COAL PILES

Conical Piles						Rectangular Piles		
Bituminous Base Angle = 36 Deg. Tons (2,000 lb.) = $H^3/20$			Anthracite Base Angle = 27 Deg. Tons (2,000 lb.) = $H^3/10$			Bitum. Base Angle = 36 Deg. Tons per Ft. = $H^2/30$	Anth. Base Angle = 27 Deg. Tons per Ft. = $H^2/20$	
Height Ft.	Diam. of Base	Tons (2,000 lb.)	Height Ft.	Diam. of Base	Tons (2,000 lb.)	Height, Ft.	Tons per Ft.	Tons per Ft.
5	14.3	6.2	5	19.7	12.5	5	0.83	1.25
6	17.1	10.8	6	23.6	21.6	6	1.2	1.80
8	22.8	25.6	8	31.5	51.2	8	2.1	3.20
9	25.7	36.4	9	35.4	72.9	9	2.7	4.00
10	28.6	50.0	10	39.4	100.0	10	3.3	5.00
12	34.2	86.4	12	47.2	172.8	12	4.8	7.20
15	42.9	168.7	15	59.1	337.5	15	7.5	11.20
18	51.4	291.6	18	70.8	583.2	18	10.8	16.20
20	57.2	400.0	20	78.8	800.0	20	13.3	20.00
22	62.9	532.4	22	86.6	1,080.0	22	16.1	24.20
25	71.5	781.2	25	98.5	1,562.0	25	20.8	31.20
28	80.0	1,097.6	28	110.3	2,200.0	28	26.1	39.20
30	85.8	1,350.0	30	118.2	2,700.0	30	30.0	45.00
35	100.1	2,143.7	35	137.9	4,280.0	35	40.8	61.20
40	114.4	3,200.0	40	157.6	6,400.0	40	53.3	80.00
50	143.0	6,250.0	50	197.0	12,500.0	50	83.3	125.00

The storage of anthracite coal can be divided into two systems—conical piling and rectangular piling. Fig. 1 shows a unit element of the conical storage system. As usually arranged for open-air storage, this consists of two trimmers or stocking-out machines, as shown, and one reloader located between them. A storage plant is made up of a number of these groups, and the individual elements can be of the same or varied capacities. With this arrangement it is practicable to put up a plant for storing any desired amount of material. The groups

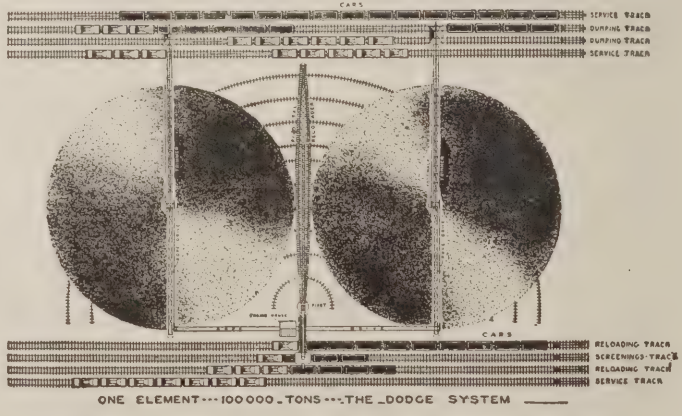


FIG. 1. UNIT OF CONICAL STORAGE SYSTEM



FIG. 2. STOCKING-OUT AND RECLAIMING MACHINES OF THE CONICAL-STORAGE SYSTEM

usually have a capacity of 100,000 to 120,000 tons each. The coal which is received from the mines is dumped into hoppers beneath the railroad tracks and conveyed to the trimmer conveyor, which stores it in a conical pile. In handling anthracite coal, care must be taken to minimize the breakage. Breakage in this kind of coal is a decided loss. All the coal reclaimed from storage is rescreened, and the smaller sizes are sold for less than the larger, while the fines bring very little. Tables II and III give the percentage of breakage in the different kinds of coal for different heights of fall. A careful study of these tables will show the desirability of eliminating degradation as far as possible.

The trimmer conveyor is of the scraper flight type, and is clearly shown in Fig. 2. The bottom of the trough for the carrying run of this conveyor is of the movable ribbon type. The coal which is received from the cars is scraped along the trimmer truss and forms a small pile at the foot similar to that shown under the second trimmer in Fig. 2. The steel ribbon serving as a bottom for the trough is advanced with the ascending apex of the coal pile. This avoids a drop and effectually prevents degradation. The coal discharged from the trough rolls down the side of the pile already formed. This method does away with all dropping of the coal, and has proved to be highly efficient.

A large storage plant of this type which has been in use for some time has a capacity of 480,000 tons, and is divided into eight piles, four on each side of a central railroad system. Each pile has a capacity of 60,000 tons, and the conveying system is capable of stocking out 1800 tons per day of 10 hours, for each of the inclined conveyors, or a total capacity for storage of 14,400 tons per day. For replacing the coal in cars, each reloader has a capacity of 2500 tons per 10 hours, and as there are four reloaders, the reclaiming capacity of the plant is 10,000 tons per day.

The reloader is a long horizontal conveyor, which is pivoted at one end and moves on circular tracks on the ground. The flights of the scraper line come in contact with the outer edge of the base of the pile, since the side of the conveyor trough is open toward the pile, as is seen in Fig. 3. The coal is thus drawn to a central point, taken up an incline, and loaded into cars.

The coal is passed over shaking screens at the head of the inclined conveyor before delivery to the cars. Fig. 3 shows the operator at the pivot of the reloading

TABLE II. BREAKAGE IN DROPPED COAL

Detailed Percentage of Smaller Sizes Resulting from Various Heights of Drop

Size of Coal Dropped	Drop in Feet	Egg	Stove	Nut	Total Prep.	Pea	Buck.	Rice and Barley	Total Small	Total Breakage
Broken	10	3.65	2.11	1.63	7.39	0.77	0.82	1.05	2.64	10.03
	20	8.18	5.51	4.34	18.03	1.92	1.74	2.33	5.99	24.02
	30	10.96	3.58	2.33	16.87	1.34	1.08	0.98	3.40	20.27
Egg	10		7.72	2.40	10.12	0.82	0.87	1.46	3.15	13.27
	20		8.38	4.10	12.48	2.18	1.81	2.36	6.35	18.82
	30		13.39	4.91	18.30	2.09	1.61	2.25	5.95	24.25
Stove	10			5.98	5.98	1.67	1.21	1.12	4.00	9.98
	20			6.26	6.26	2.33	1.84	2.43	6.60	12.86
	30			12.66	12.66	3.53	2.25	3.07	8.87	21.51
Nut	10					4.91	2.52	1.48	8.91	8.91
	20					5.07	2.83	3.26	11.16	11.16
	30					8.63	4.00	3.69	16.32	16.32
Pea	10						5.37	1.38	6.75	6.75
	20						6.47	3.10	9.57	9.57
	30						11.44	5.63	17.07	17.07
Buckwheat	10							3.38	3.38	3.38
	20							6.26	6.26	6.26
	30							6.13	6.13	6.13



FIG. 3. RECLAIMING CONVEYOR OF THE CONICAL-STORAGE SYSTEM

conveyor, the scraper taking the coal from the base of pile, and the inclined conveyor taking the coal to the tower for screening and delivery to cars. Fig. 4 shows the arrangement of the machinery at the point of discharge to the cars

Rectangular Piling of Coal

For rectangular piling, a single trimmer conveyor, as shown in Fig. 5, is supported at its base or foot by a traveling truck, its upper end resting upon a track laid on a long girder which is supported by heavy columns and held securely by guy ropes. This trimmer receives the coal from a series of bins built under the railroad trestle, which runs parallel to the trimmer runway. The discharge from the trimmer to the storage is arranged with a ribbon trough bottom, and the pile is thus formed with a minimum of breakage. The trimmer may be moved from bin to bin, and this results in the formation of a solid pile of coal.

In the particular case illustrated, the pile is 83 ft. high at the apex, 342 ft. wide at the base and 1244 ft. long. The capacity is 400,000 tons and may be increased by merely extending the storage area and the trimmer runway. For reclaiming the coal, two reloaders are used (mounted on straight parallel tracks) one on each side of the central overhead runway. These reloaders supply two scraper conveyors which run in a longitudinal underground tunnel; these in turn deliver to a transfer conveyor, and the coal is thus carried to the reloading tower, where it is screened and sized for car delivery.

Fig. 6 shows a "hillside" storage plant. Here the coal is received on a trestle and is discharged through chutes direct to the inclined storage floor. When this storage has received all the coal which will flow to it by gravity, the coal is next diverted from the hoppers to the foot of an electrically-operated traveling cantilever trimmer conveyor, which elevates it and completes the storage pile. The retaining wall at the bottom of the slope is fitted with gates and chutes for reloading. Plants of this nature are the exception, and the location of both discharge and loading tracks as to elevation and centers are such in this particular case as are rarely obtained.

The rectangular pile, in order to secure the large capacities referred to, cannot avoid mixing the different sizes of coal at the junction points of the piles of the various kinds. With a storage pile of about 360,000 tons, the storage cost per ton is somewhat lower than it would be with six 60,000-ton conical piles. The cost of equipment for the rectangular pile can safely be figured, including all material and labor, under normal conditions, at about 90c. per ton, based on the maximum capacity; whereas the six-pile conical system of equivalent capacity will cost about 98c. to $1 per ton. The cost of land, grading, surfacing, drainage, power plant and railroad-track system are included in the foregoing figures. The two systems can briefly be compared as follows:

A. For stocking out, the capacity of the conical system is six to eight times that of the rectangular system, depending on the number of piles. The reloading is

TABLE III. BREAKAGE IN DROPPED COAL

Percentage of Sizes in Undersize Screened Out from Screened Coal

Original Size of Coal	Egg %	Stove %	Nut %	Total Prep. %	Pea %	Buck %	Rice %	Barley & Dirt %	Total Small %
Broken	85.5	7.5	3.5	96.5	1.0	0.9	0.8	0.8	3.5
Egg		84.3	13.2	97.5	1.1	0.8	0.3	0.3	2.5
Stove			90.0	90.0	5.3	2.1	1.7	0.9	10.0
Nut					84.0	8.0	6.8	1.2	100.0
Pea						89.7	8.1	2.2	100.0
Buckwheat							92.2	7.8	100.0

Average Per Cent. Sizes in Undersize from Dropped Coal

Original Size of Coal	Egg %	Stove %	Nut %	Total Prep. %	Pea %	Buck %	Rice %	Total Small %	Total All Sizes %
Broken	42.0	20.6	15.2	77.8	7.4	6.7	8.1	22.2	100.0
Egg		52.3	20.2	72.5	9.0	7.6	10.9	27.5	100.0
Stove			56.0	56.0	17.0	12.0	15.0	44.0	100.0
Nut					51.2	25.7	23.1	100.0	100.0
Pea						69.7	30.3	100.0	100.0
Buckwheat							100.0	100.0	100.0



FIG. 4. DISCHARGE FROM CONICAL SYSTEM TO RAILROAD CARS

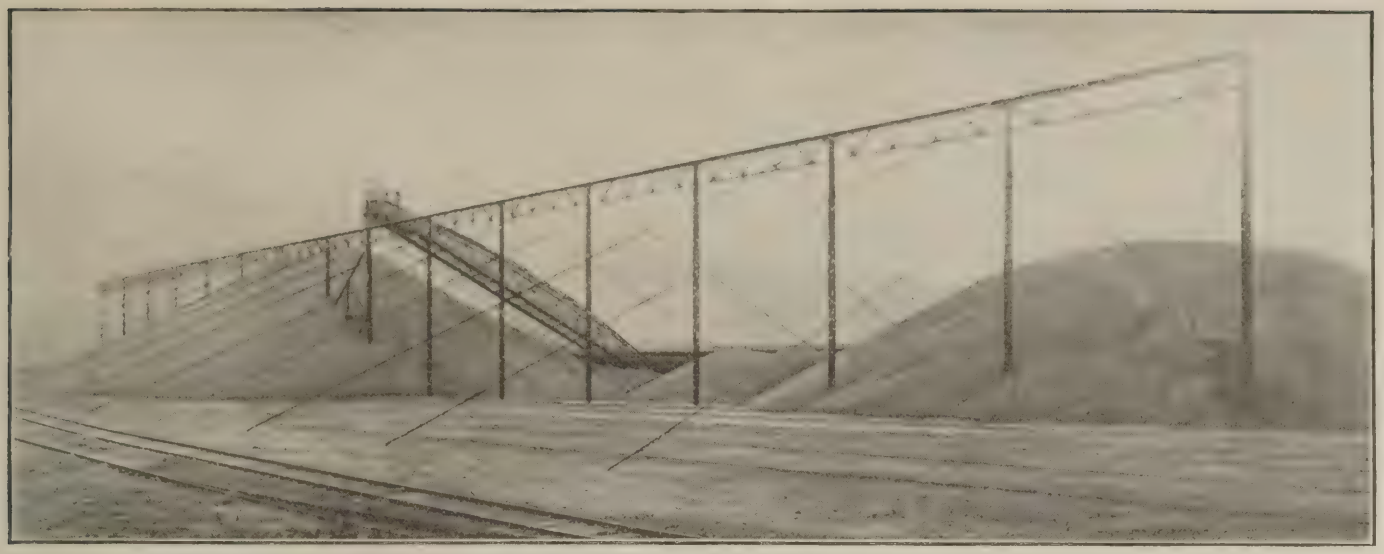


FIG. 5. THE RECTANGULAR SYSTEM OF STORAGE PILING

three to four times faster with the conical pile than with the rectangular.

B. In the conical system each size of coal is separate and can be handled with equal convenience, while in the continuous or rectangular plant the coal must be mixed at the junction to get full capacity.

C. With the conical system no planning is required for placing the coal at the proper location, while considerable foresight must be exercised for the rectangular storage.

D. The conical storage presents mecnanical advantages, such as that no structural steel is in contact with the coal; there is no machinery in tunnels under the storage; and the danger of coal avalanching against the runway columns is eliminated.

E. The conical system requires longer tracking space for both empty and full cars for the same storage capacity.

F. For extending the tonnage of the rectangular storage, little additional expense is involved; the runway, storage space and tunnel conveyors are the items which must be extended.

G. The operating expense of a conical system is higher than that of the rectangular system. In the latter a goodly portion of the coal which is reclaimed flows to the tunnel conveyor by gravity, and the number of conveying units for both stocking out and reclaiming is less.

Most of the large anthracite coal-storage plants which have been erected in the last ten years or more are of the conical type. The greater capacity and flexibility of this storage system warrants the extra expenditure in the initial cost.

Bituminous Coal Storage

For storing bituminous coal, many different kinds of apparatus are used, the type to be chosen depending largely upon the location, the method of receiving coal, the ground space available, etc. It must always be borne in mind that the height of the pile is limited, and

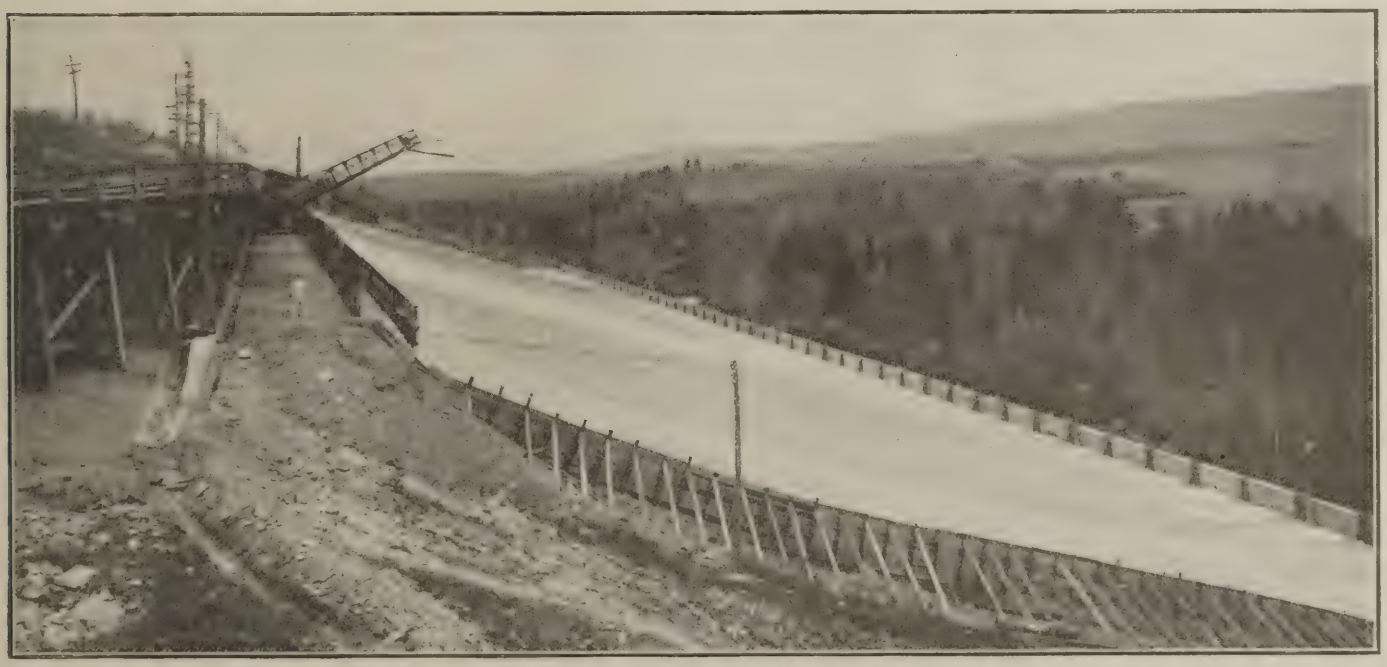


FIG. 6. A HILLSIDE COAL-STORAGE PLANT

for first-class storage installation the machinery must be such that the coal can always be reached under any and all conditions.

A simple and flexible method of stocking bituminous coal for inland storage is with a long-radius locomotive crane traveling on a circular track. The coal is discharged to a hopper and is then taken by the crane bucket to the storage pile immediately adjacent to the circular track.

Cranes for this purpose have been made with 80-, 100- or 110-ft. radius booms, and the coal is usually piled about 25 ft. high. This system is the simplest kind of storage for large quantities of bituminous coal and combines low initial cost with low expense of operating. Often more than one circular pile is made by a single crane, and the storage can be indefinitely increased by adding more trackage and hoppers.

The large capacity in tons per hour of the circular system is made possible because the tracks are so located that the crane bucket can always be brought over the track hopper without making the crane travel. The traversing speed of all cranes is slow, and the movement in this direction should be avoided as much as possible. The circular storage is designed to minimize the travel of the crane and to utilize its slewing or rotating action. The covering up of the circular tracks with coal gives a maximum capacity for a given area and height of pile, but if this is resorted to some of the coal is out of reach of the crane, and this feature is not to be recommended.

Bridge tramways are usually employed where the coal is unloaded from vessels, but the same apparatus can be used to unload from a central railroad hopper. Four electrically operated bridge tramways for handling bituminous coal on a dock are shown in Fig. 7. Each of these has a clear span of 295 ft. and an overall length of 506 ft. Two of the bridges are equipped with 3-ton buckets and two with 4-ton buckets. The run-of-mine bituminous coal is unloaded from vessels and delivered either to storage or through a reloading hopper at the front of the tower of the tramway, to the box or open cars for reshipment. Reclaiming the coal from the stock pile to the cars is accomplished by similar bucket delivery to the reloading hopper. The coal in storage here has been piled as high as 45 ft., but it is not allowed to remain stationary for any length of time.

Fig. 8 shows a bridge tramway arranged so that the bridge can swing over a circular area, thereby commanding a large storage space. This kind of storage can be effected on any fairly level piece of ground having railroad connections. Loaded cars discharge into a track hopper located at the center of rotation, and the

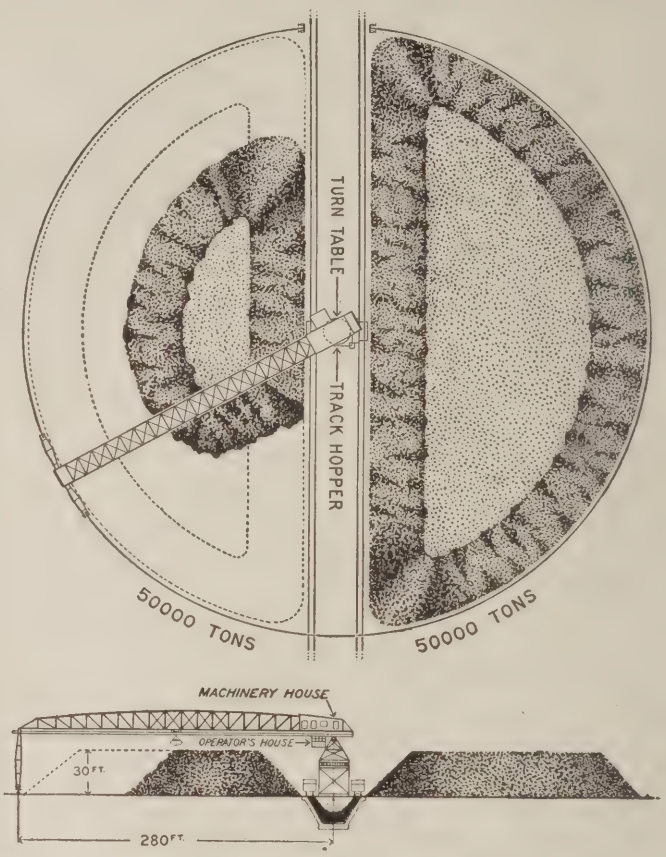


FIG. 8. DIAGRAM OF SWINGING BRIDGE COAL STORAGE

coal is taken therefrom by means of a clamshell bucket and discharged to the storage area. The capacity of the pile so formed is limited only by the span of the bridge and the depth to which the coal can be safely piled.

The labor cost of putting coal into and taking it out of storage has been shown in several instances in normal times to be less than 2c. per ton. With a span of 280 ft., 100,000 tons of coal have been piled, using an arc of swing of the bridge of 340 deg., the coal being



FIG. 7.- ELECTRICALLY OPERATED DOCK TRAMWAYS FOR STOCKING AND RECLAIMING COAL



FIG. 12. GENERAL VIEW OF SWINGING BRIDGE STORAGE PLANT

piled 30 ft. deep. All of the coal in this system is tributary to the bucket and can be taken from one point in the storage area to another, or directly to the hoppers or cars.

In still another system of storage coal is unloaded from boats or barges by means of unloading towers, bridge tramways or locomotive cranes, and then delivered to a cable-car system, which discharges the coal in the storage space beneath the trestle. From this point the coal is picked up by long-radius cranes similar to those referred to above. Coal is reclaimed from the storage by these cranes and delivered to a traveling hopper on the car trestle, and thus returned to the cars of the cable system. The coal from the cable system is reloaded either direct to railroad cars or to barges for reshipment.

For a coal storage plant of any kind, whether large or small, the local conditions and requirements must be studied. Each installation presents problems which should be carefully weighed and considered before the method of handling and storing is finally decided upon. It will be found economical to consult an expert in such installations, as it is only by long experience and careful study of problems of this kind that the best arrangement can be secured.

What Constitutes "Storage" of Coal?

By A. L. H. Street
Attorney at Law, Minneapolis, Minn.

It was recently unsuccessfully sought to bring a coal dealer under the New York Compensation Act, so as to fix liability to the dependent and surviving relatives of an employee who was fatally injured while trimming coal in a storage pocket, on the theory that the dealer was engaged in an industry covered by group 29 of section 2 of the act, "storage of all kinds." (In re Roberto, 167 New York Supplement, 397.)

Apparently, there was no negligence attributable to the employer in this case, and claimant sought an award under the Compensation Act, which creates a limited liability for accidents arising in the course of employment in the industries covered by the law. The Industrial Commission allowed an award on the theory that a dealer in coal bought and held for resale must be deemed to be engaged in "storage." In reversing the Commission's decision, the Appellate Division of the New York Supreme Court said:

"I am unable to see how this award can be sustained, unless we are prepared to hold that every merchant and country storekeeper in carrying his ordinary supply and stock of goods is engaged in the storage business. . . . It is true that the employer was conducting a large and extensive business, but it is not the size or magnitude of the business which is controlling, but the manner in which it is conducted. The method pursued by this coal dealer was precisely that which exists in the ordinary coal yards of the cities and villages of the state. If a merchant purchases a stock of goods in excess of his immediate requirements and holds the same for an advance in price, or for any reason does not expose or offer the same for immediate sale, he perhaps to that extent engages in the storage business within the meaning of group 29. But if his stock of goods is on hand for present sale, I cannot think that such stock of goods is being stored merely because the thrift and prudence of the merchant prompts him to have on hand a sufficient supply to meet the most pressing demands which may be made. In this case it has been found that if the market was right the employer 'would store in the summer coal for their winter supply, which coal would be sold in winter.' Perhaps to that extent and in that respect the employer was engaged in storage within the meaning of group 29. But that need not be determined, because it has no application or relation to this accident. . . . There can be no contention that the employer at that time was carrying a larger supply than the immediate demands and requirements of the business made appropriate. There was not on hand a single pound of coal which the employer would not have sold at any moment to any customer in the usual course of business.

During 1911, with a production of 500,000,000 tons of coal, there was wasted or left underground in such a condition that it will probably not be recovered 250,000,000 tons of coal. This coal could be partly or wholly saved by more careful mining methods or preparation.

Why and Wherefore of the Coal Shortage*

By J. D. A. MORROW
General Secretary, National Coal Association

THERE is an old saying that if you want to be popular, you shouldn't tell your troubles to people. I have the highest respect for that ancient dictum, but we all of us recognize the fact that there is a serious situation in respect to coal in this country today, and it appeals to me that it is a situation in which the people generally are entitled to know about the facts. So I hope you will take what I say not as an evidence of an effort to tell you the troubles that are burdening the coal industry today, but as a word of explanation, giving you an understanding of the causes of your difficulty in getting any coal at times and at other times in getting the particular coal that you need.

I want to read first, as a sort of introduction to what I have to say, a few telegrams that I have here. The first one is from Kansas City:

Twelve companies report 225 cars short today. Seventy-five hundred and fifty tons' loss. Thirteen mines are idle all day, four idle part of the day. This shortage situation is not improving.

Here is a telegram from Indiana, from the secretary of an association there that embraces the mines in that state:

Car shortage, 141 cars; tons lost, 12,100.

Here is one from Somerset County, Pennsylvania:

Report for 12 companies a total loss of 8500 tons.

Here is one from eastern Ohio, the mines that serve directly the great industrial manufacturing territory of Cleveland, Akron, Youngstown:

Thirty-five mines reported this association with railroad capacity of 722 cars received on Monday, the 10th, only 242 cars, causing a loss of 24,000 tons from these mines alone.

That was on Monday, which normally is the best day in the week; the railroads have had a chance over Sunday to accumulate some cars. On Tuesday a telegram from the secretary of that same association reads like this:

Forty-four mines reported this association with railroad capacity of 956 cars, received Tuesday, the 11th, only 270 cars, causing a loss of 34,300 tons from these mines alone.

Here is one from the Fairmont district of West Virginia; this also relates to Monday, presumably the best day in the week:

Out of a total of 120 mines in Fairmont Clarksburg region, reporting today, 55 of them received nothing in the way of cars and are closed down completely. Total tonnage all mines reporting loss today amounts to 33,600 tons.

Here is a telegram received last night, the same territory, Clarksburg, Fairmont, West Virginia:

Out of a total of 121 mines in Fairmont, Clarksburg region, reporting today, 49 of them received nothing in the way of cars and are closed down completely for today. All mines reporting today will close, a total of 33,700 tons' loss because of car shortage and car space.

Here is a telegram from the Pittsburgh district:

Ten hundred seventy-two cars short. Reduction below capacity, 53,700 tons.

Here is a telegram from the Pittsburgh district the following day:

Nine hundred cars short. Reduction below capacity, 40,-250 tons. No improvement.

That gives you an index of the conditions that the coal operators face in their efforts to produce coal to supply the domestic and industrial needs of this country. It goes without saying that a condition of that kind cannot be permitted to continue. The National Coal Association Committee on Transportation went to the Fuel Administrator the day before Thanksgiving and laid the situation frankly and fully before him and said:

The time has come for action. We have talked with one body after another in Washington for six weeks, and we have got nothing but courteous conversation in response; we need something more than that.

Dr. Garfield had been laboring with the same situation in the same way that we had, and he also had been receiving the same kind of responses, perhaps a little more courteous, but not any more effectual in relieving the situation. On that day he wrote a letter to the Chairman of the Committee of Priority, asking for preference in the supply and priority in the movement of cars for coal and coke. No order was issued in response to that letter. No order went into effect until yesterday. At that time Priority Order No. 5, issued by authority of Judge Lovett, did become effective, and that order in plain, unvarnished English is a gold brick. It does not add one car to the supply, nor will it add one car per day to the movement of coal cars. It does nothing, speaking practically, now except to define the situation that has existed for weeks. It makes no change whatever in the situation.

Here are the telegrams setting forth the conditions that must be remedied if mills and factories in this country are to run, if guns and shells and munitions and ships are to be turned out, if houses are to be kept warm. Why, at the first of this week, in the City of Detroit, wealthy people were going around with buckets and wheelbarrows to get a few pounds of coal. It wasn't a question of tons in Detroit, it had got down to pounds. You will have that same situation in other cities if this sort of thing isn't stopped. The coal operators have done all they can do, the Fuel Administrator has done all that he can do, it takes frank recognition of the situation and it takes decisive and immediate action. Otherwise we will have a coal shortage in this

THE primary cause of the coal shortage is transportation, or, rather, the lack of it. It is a long-standing trouble. We have lived with it now for a year. It has been taken up by coal men with railroad operators within that time quite frequently, within the last three or four months almost weekly. The gravity of the situation has been presented in every angle that a coal man could think of to present it. But to date there has not been any effective action to relieve the situation; instead, it is hourly growing worse.

*An address delivered before the Editorial Conference, Washington, D. C., Dec. 13, 1917.

country that is not a coal shortage in the sense that we have ever had it before. We will have people freezing to death because they can't get coal within thirty and forty miles and fifty miles of the mines. There is no excuse, gentlemen, for that sort of thing.

Now, what I say may be interpreted in a certain sense as criticism. If so, you may take it in just that sense. These are simply the facts that we are trying to put before you. We don't wish to appear in the light of criticizing the railroads—we know they have had their troubles, enormous burdens, they have done a great deal in trying to measure up to that situation—but in the classic order of George Monroe, be that as it may, they have failed to measure up to the situation. I think it is perhaps due in part to traditional railroading. Let me define what I mean by "traditional railroading."

Heretofore there has always been an abundance of coal, there has been plenty of coal under movement. Accordingly, operating officials of railroads have got into the habit of giving cars to everybody else first, before they were given to the mines, and have moved everything else on the road before they moved coal. One day this summer, in the Conway yards of the Pennsylvania Railroad of Pittsburgh, there were 343 cars of coal loaded, classified, ready to move to Cleveland and Ashtabula. It was all slack coal. On Monday afternoon, 48 hours later, there were 337 of those same cars standing right there in that yard. Now, that didn't mean that nothing had moved between Pittsburgh and Cleveland and the Lake Front, thousands of tons of freight had moved between Pittsburgh and the Lake Front, but no coal had been moved. Everything else had been moved except coal.

We have tried to say to these railroad men for weeks—for months, in fact—"You can't treat coal that way and get by this winter." But they wouldn't wake up to the fact that we were telling them the truth. They seemed insensible of the change in conditions. Possibly they couldn't do any better than they did, but if so, I submit to you that someone else must do better than they have done.

These are the salient facts of the coal situation today as I have given them to you. The coal operator and the Fuel Administrator are doing all they can to relieve the situation. They need your assistance and your understanding of the situation, your pressure for decisive and effective action.

Mr. Morrow Discusses Several Features of the Coal Situation

Question—I'd like to ask just a little more information about Priority Order No. 5.

Answer—Priority Order No. 5 sets up several different classes of commodities which are to receive preference in supply and in movement. First at the head of the list is railroad fuel. As I said, this order did not change the existing condition, it merely defined it Railroad fuel comes No. 1 on the list. Doubtless that's all right—I am not quarreling with that at all; the railroads have always furnished cars first to the mines that were to be used in loading railroad coal. If the railroads don't have coal, nothing else will get coal, nothing else can move. That portion of the existing situation is, therefore, defined.

Then you have, following down the list of priority, perhaps not in the exact order I mention, but this will serve as an indication, coal for byproduct plants, etc.; you have coal for munitions plants and companies making supplies for the Government, billed direct to the Government agencies. All those preferences must be O. K.'d by agents of the War and Navy Departments. Then you have Government supplies for the Allies, which are billed not directly to the United States Government, but to concerns that are manufacturing or handling goods for the Government. There again that priority order must be O. K.'d by the departments down here. And down fifth in the list I found coal for domestic purposes. You find coal for ordinary industrial use put in along with a great number of other commodities which are the commodities that already have had preference on the railroads because of the blue envelopes, because they were already preferred classes of freight, and for other classification reasons. Coal comes in that category, and even there doesn't receive any additional preference in cars. It gets their only preference in movement, and gets it along with all these other commodities that have all the time enjoyed it.

We figured this thing out; we took the classification commodities on the railroads and compared them with the commodities listed in Judge Lovett's order, and found that it covered 85 per cent. of the freight that moves, that the railroads are now conducting 85 per cent. of the freight they are handling, or are attempting to handle, and it is very useless, under conditions of this kind, to undertake to get the preference for coal out of a situation of that kind, that we must have.

Now, there is no material change in that situation except that it is nailed down hard and fast to priority or to No. 5. There have been some improvements in this respect. Those blue envelopes that were handed out some time ago so generously down here were one of the causes of the transportation tieup on a lot of railroads. That was one of the faults that the Coal Association took exception to. They insisted that there must be a change in that, and I am glad to say that the celebrated No. 22, which made it possible for the Army Department and for clerks in various other departments just to hand out these blue envelopes indiscriminately, has been withdrawn, and in place of it, another has been issued saying that preference of that kind can still be obtained, but it must be sanctioned by some one responsible official in these different departments. It is operated now on that basis. But this change in the physical conditions of the operation of the roads has taken place in the meantime. We kept saying over and over to the roads: "You are operating now under almost ideal weather conditions" (October and November were splendid), "some day a blizzard will hit you people and the thermometer will go down and your operating efficiency will drop over 20 per cent." It has dropped.

There has been no change in this preference or priority which even begins to make up for that 20 per cent. of loss of efficiency. That's the situation that we are facing right now.

Question—I'd like to ask Mr. Morrow just what he meant when he said the time has come for action. Do you mean that a new priority order—I mean, can relief be brought about through existing conditions?

Answer—Yes; it can. If you would give for a brief period of time in a year, priority of movement to the coal that is now standing under load, just simply say this to the operating officials of your railroads—and Judge Lovett has the authority to say it—"Move coal, and do that for three, four or five or six days," you would relieve the immediate pressure for coal. Then give these mines a preference in the supply of cars for 30 days and conditions would be righted. The coal mines today normally require about 350,000 cars, open-top cars; there are some box cars, they load quite a little coal in box cars—we will say 350,000 railroad cars altogether. There must be an increase of about 20 per cent. in that number of cars for a short time to tide us over the immediate difficulty. Now, if 70,000 additional cars are put into this business, in the coal business, it would restrict the movement of freight in other lines, it would restrict the car supply to those other lines. But, gentlemen, I submit

that you had better have the restriction. If that doesn't happen, mills and furnaces will be restricted anyway, because they will not have coal to run with. Now, you can take your choice; you can shut down your plants because you haven't got coal, or you can curtail your production because you haven't got quite enough railroad cars. But you will be able to run at that curtailed figure for a time, and we will get past the immediate crisis, for that is exactly what it is. Now, that is the thing that I meant when I said "immediate, decisive action" could be taken that would relieve this situation. We have asked for that thing, and we need your help in getting it.

Question—Are there sufficient cars for the handling of coal while those cars are kept in motion, or is there an actual shortage of cars so far as mines are concerned?

Answer—Primarily, it is a difficulty of movement. If the movement of coal were speeded up, it would very materially help the supply of cars, but it would be necessary in a brief time to have an added supply of cars for the mines. There are approximately—I may be a little wrong on figures—1,000,000 open-top cars in this country. And, as I said a moment ago, something like 350,000 of those cars would be in the coal business. That leaves a pretty good percentage of cars for other business, and if you took out 70,000 there would still be quite a supply of cars available for other business.

Understand, it is primarily right now difficulty in movement. The roads are not able to get their freight through. Why, passenger trains are coming in here anywhere from four to five hours late. When that is so, what do you suppose is happening to freight trains?

Now, the roads are having plenty of trouble with their engines—something that they are not responsible for. Their shop repairmen have been drafted in large numbers, so that they have not been able to keep up the efficiency of their operating equipment as heretofore. That has been one of their troubles that they have not been able to overcome.

Not Enough Locomotives to Meet Demand

Another thing that is causing trouble (we might just as well talk frankly here) is the fact that a large part of the output of locomotives has been going abroad. That is very generally known. That has made it extremely difficult for the roads to get the additional equipment that they need, or to replace engines that necessarily have been of old design.

I understand that right now there are locomotives that were built for the Russian Government that are standing here, and nobody knows when they will go to Russia, if ever. Gentlemen, I submit that those locomotives can do a great deal more toward winning the war if used here in the United States instead of in Russia. It would take a long time to build the engines we need on our roads; and I think we need a clear understanding by those who are in authority—not an understanding, but a readiness and willingness to take decisive action. We don't need understanding so much any more; it ought to be clear to everybody by this time. What we need is action.

Question—I'd like to ask if the Food Administration got very much relief in the way of extra cars from priority No. 2.

Answer—That's the order that took cars from the road-building material men, and that sort of thing. Theoretically, they ought to have got some cars, but practically the thing worked out just like the pooling has worked out; when the pool was established covering some 20 tons of coal, I remember we sat down to figure out how many railroad cars that would free, would make available, and one of the conditions on which the coal men went into that pool, or they thought it was one of the conditions, was that those extra cars would be kept in the coal business. Well, no doubt the pooling freed the cars, statistics show that, but there isn't a coal man in the territory that supplies the Lakes that could put his finger on any increase in car supply that resulted from it.

Now, when they put in the pools at tidewater ports, the same sort of examination of the situation there indicated a material saving of cars, and doubtless it made a material saving of cars, but that saving was instantly dissipated as far as the coal situation was concerned, because the cars went into other lines of business on account of the distribution. If you will pardon a minute's digression there, let me explain what I mean by that.

Coal men have a fixed rate. You operate a coal mine and an agent of the railroad will inspect that mine and decide that it is capable of producing, say, a thousand tons a day. In other words, that mine is given a rating of 20 cars a day. Other mines are rated in a similar way. In general, I think the rating is fair. We don't particularly quarrel about that. There is no effort on the part of the railroads at all to discriminate or confuse that rate, but the fact remains that a rating is fixed. Now, in times of car shortage, cars are distributed to coal mines on a percentage basis, a percentage of your rating is furnished you. If your mine is rated at 20 cars, and you take a division that may require 2500 cars to furnish the mines on that line with sufficient equipment for a day, if there are only 1500 open-top cars available for distribution to those mines, the mines would get what is known as a 60 per cent. car supply. That is, they would get 60 per cent. of the mine rating; and a mine rated at 20 cars would get 12 cars, and all the others would get cars in the same proportion. Now, that limits strictly the number of cars that can come into the coal business. On the other hand, the number of cars that go to industrial plants is not so limited. Theoretically it may be, but practically it is not. Those plants do not have a rating fixed as the coal mines do. They order cars, and the order is the thing that is discounted; and the alert traffic manager merely increases the order when he knows there is a shortage. Many of those plants, too, are located on more than one railroad. That means that in time of shortage of cars they can get cars from both roads, so that in general the industrial plants are able to take care of these shortages of cars better than the mines. So that while order No. 2 has freed cars in the mining districts, they have very soon got out into other lines, because of the operation of those things.

In Lighter Vein

Attention of Dr. Garfield

A proprietor of a steam laundry in Louisville, Ky., boasted the other day of how he had robbed the coal shortage of its terrors. It was during the period of zero weather and deep snow and gas failure in Louisville, when almost everybody wanted coal at one time. Everything that could haul coal was pressed into service. Many families warmed their homes by coal taken there by basket, bag and automobile. Coal-laden mule-drawn wagons were to be seen on every street headed for somebody's empty coal shed. Many of them went past the laundryman's coal-less place before he achieved the idea. Then he acted. He took a post at the window. Presently laboring mules pulled a ton and a half of coal into sight. He rushed out and flagged the negro:

"I've got 50c. and a big drink of whisky for you," he said, "if you drive into my alley and dump that coal into my bin."

"Like to, boss," said the negro, "but I dassen't."

So the laundryman explained that all the colored man had to do was to go to the telephone, call up the coal man's office and explain that his mules were plumb beat out and could'nt go a step farther, and to wind up by saying: "There's a fellow here says he'll take the coal."

It was a measly thing to do, of course, but it worked; not once, but many times, and it worked with friends of the laundryman to whom he passed the tip. "Fifty cents and a drink of whisky" on a zero day is almost all a negro coal-wagon driver wants to hear about.

Anthracite Coal Stripping—II

By THOMAS F. KENNEDY
Scranton, Pennsylvania

SYNOPSIS—*After the proposed stripping area has been thoroughly prospected, the economic stripping limits must be determined. The economic ratio of overburden to coal may be calculated from the cost per cubic yard of excavating the overburden, the market price of the coal per ton, the desired margin of profit per ton of coal and the cost per ton of mining and preparation.*

AFTER the prospecting question has been thoroughly studied, the next important step in the stripping problem is the determination of the economic stripping limit. A preliminary general study of the problem should be made by the transitman in charge of the survey of the proposed stripping area. This survey should include the location of boreholes, cut stones and property lines, fence lines, tracks, waterways, probable dumping areas for overburden and all topographical features hinging upon the stripping.

If the surface of the prospected area has a uniform contour and holes are drilled approximately every 50 ft., elevations on each hole should suffice for the calculation of the quantities; otherwise, in addition to the elevation on each borehole, the area should be cross-sectioned every 50 ft. From the field notes taken, the survey is then plotted. For quantity calculation purposes the scale of the plan should be either 1 in. = 25 ft. or 1 in. = 50 ft., the choice of the scale depending upon the extent of the stripping area. Alongside of each borehole plotted, the section of that borehole should be shown. Cross-sections plotted to a scale of 1 in. = 10 ft. show the characteristics of the overburden and the coal measures. These sections enable the engineer to study the problem more thoroughly. After a careful study of the borehole sections, the approximate outcrop of the coal bed is then delineated upon the plan.

To Define Economic Stripping Limit

The question of establishing the economic stripping limit is next in order. To determine this limit no well-defined rule can be followed, because each stripping proposition has its own characteristics. The most important factors affecting the limit are the margin of profit, quantity of coal, character of overburden (whether clay or rock), transportation and preparation of coal and disposal of overburden, methods of mining the coal and removing the overburden, interest on capital invested and depreciation of plant, labor conditions and engineering services. From an approximate calculation of the quantities of overburden and coal, the engineer, after studying the foregoing factors, decides what would be reasonable costs per cubic yard for excavation of overburden and mining and preparation of coal per ton. Knowing the market price of coal and the desired margin of profit, the ratio of overburden in cubic yards to one ton of coal can be determined from the following equation:

$$X = \frac{A - B - C}{D}$$

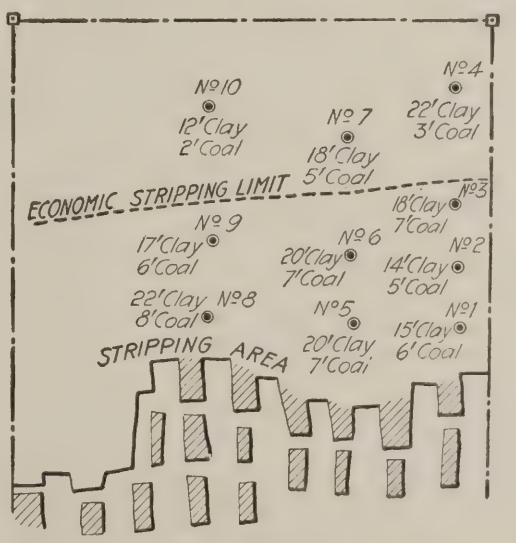
in which

X = Number of cubic yards of overburden to one ton of coal;
D = Cost of excavating 1 cu.yd. of overburden;
A = Market price of coal per ton;
B = Margin of profit per ton of coal;
C = Cost of mining and preparation per ton.

The market price used in the above equation may be the operator's price direct to the consumer or the retailer. Another factor that may enter into the equation is the transportation or freight charges and other incidental expenses.

It can be seen that the ratio of overburden to coal depends primarily upon the market price, margin of profit, the cost of mining and preparation of one ton of coal and finally the cost of removing one cubic yard of overburden. With the overburden to coal ratio known, the question of defining the economic stripping limit is in order.

In determining the economic stripping limit, I have compiled the accompanying overburden-coal ratio table



PLAN SHOWING PROSPECTIVE STRIPPING AREA

for the various thicknesses of overburden and coal. The table is based upon the principle that one long ton of coal (sp.gr. = 1.378) in the solid, contains approximately 0.96 cu.yd., or by removing equal volumes of overburden and coal, it is necessary to remove 0.96 cu.yd. of overburden for one ton of coal. Considering then the thicknesses of overburden and coal equal to one foot for equal volumes, the ratio of overburden in cubic yards to one ton of coal is 0.96.

By studying the table, it can be seen that for a constant thickness of overburden and a variable thickness of coal the ratio is inversely proportional to the

thickness of the coal, while for a constant coal thickness and a variable depth of overburden the ratio is directly proportional to the overburden thickness. The figures in the left column show the overburden thicknesses in feet, while the top row shows the coal thicknesses in feet. The remaining figures show the overburden-coal ratio of the number of cubic yards of overburden to one long ton of coal.

The table is compiled for coal thicknesses of from 1 to 15 ft., overburden thicknesses of 1 to 65 ft. and sumed. It will be assumed further that it is profitable to remove 3 cu.yd. of overburden to extract one ton of coal. The overburden coal ratio is thus 3 to 1. The plan on the preceding page shows the prospected area of a stripping under consideration.

Referring to the plan, No. 1 borehole shows 15 ft. of overburden and 6 ft. of coal. With a ratio of 3 to 1 and a coal thickness of 6 ft., the table shows that it is profitable to remove any overburden of a thickness up to and including 19 ft. No. 2 borehole shows

OVERBURDEN-COAL RATIO TABLE FOR DETERMINATION OF ECONOMIC STRIPPING LIMIT

$$\text{Ratio} = \frac{\text{No. Cu.Yd. Overburden}}{\text{Per One (Long) Ton Coal}}$$

Overburden Thickness, Feet	Coal Thickness—Feet														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0.96	0.5	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2	1.9	0.96	0.6	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
3	2.9	1.4	0.96	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2
4	3.8	1.9	1.3	0.96	0.8	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3
5	4.8	2.4	1.6	1.2	0.95	0.8	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.3	0.3
6	5.8	2.9	1.9	1.4	1.1	0.96	0.8	0.7	0.7	0.6	0.5	0.5	0.4	0.4	0.4
7	6.7	3.4	2.2	1.7	1.3	1.1	0.98	0.8	0.8	0.7	0.6	0.6	0.5	0.5	0.4
8	7.7	3.8	2.6	1.9	1.5	1.3	1.1	0.96	0.9	0.8	0.7	0.6	0.6	0.6	0.5
9	8.6	4.3	2.9	2.2	1.7	1.4	1.3	1.1	0.99	0.9	0.8	0.7	0.7	0.6	0.6
10	9.6	4.8	3.2	2.4	1.9	1.6	1.4	1.2	1.1	0.96	0.9	0.8	0.7	0.7	0.6
11		5.3	3.5	2.6	2.1	1.8	1.5	1.3	1.2	1.1	0.96	0.9	0.8	0.8	0.7
12		5.8	3.8	2.9	2.3	1.9	1.7	1.4	1.3	1.2	1.0	0.96	0.9	0.8	0.8
13		6.2	4.2	3.1	2.5	2.1	1.8	1.6	1.4	1.2	1.1	1.0	0.96	0.9	0.8
14			4.5	3.4	2.7	2.2	2.0	1.7	1.5	1.3	1.2	1.1	1.0	0.97	0.9
15			4.8	3.6	2.9	2.4	2.1	1.8	1.7	1.4	1.3	1.2	1.1	1.0	0.96
16			5.1	3.8	3.0	2.6	2.2	1.9	1.8	1.5	1.4	1.3	1.2	1.1	1.0
17			5.4	4.1	3.2	2.7	2.4	2.0	1.9	1.6	1.5	1.4	1.3	1.2	1.1
18			5.8	4.3	3.4	2.9	2.5	2.2	2.0	1.7	1.6	1.4	1.3	1.2	1.2
19			6.1	4.6	3.6	3.0	2.7	2.3	2.1	1.8	1.7	1.5	1.4	1.3	1.2
20				4.8	3.8	3.2	2.8	2.4	2.2	1.9	1.7	1.6	1.5	1.4	1.3
21				5.0	4.0	3.4	2.9	2.5	2.3	2.0	1.8	1.7	1.6	1.4	1.3
22				5.3	4.2	3.5	3.1	2.6	2.4	2.1	1.9	1.8	1.6	1.5	1.4
23					4.4	3.7	3.2	2.8	2.5	2.2	2.0	1.8	1.7	1.6	1.5
24					4.6	3.8	3.4	2.9	2.6	2.3	2.1	1.9	1.8	1.7	1.5
25					4.8	4.0	3.5	3.0	2.8	2.4	2.2	2.0	1.9	1.7	1.6
26					4.9	4.2	3.6	3.1	2.9	2.5	2.3	2.1	1.9	1.8	1.7
27					5.1	4.3	3.8	3.2	3.0	2.6	2.3	2.2	2.0	1.9	1.7
28						4.5	3.9	3.4	3.1	2.7	2.4	2.2	2.1	1.9	1.8
29						4.6	4.1	3.5	3.2	2.8	2.5	2.3	2.1	2.0	1.9
30						4.8	4.2	3.6	3.3	2.9	2.6	2.4	2.2	2.1	1.9
31						5.0	4.3	3.7	3.4	3.0	2.7	2.5	2.3	2.1	2.0
32						5.1	4.5	3.8	3.5	3.1	2.8	2.6	2.4	2.2	2.0
33							4.6	4.0	3.6	3.2	2.9	2.6	2.4	2.3	2.1
34							4.8	4.1	3.7	3.3	3.0	2.7	2.5	2.3	2.2
35							5.0	4.2	3.9	3.4	3.0	2.8	2.6	2.4	2.2
36							5.0	4.3	4.0	3.5	3.1	2.9	2.7	2.5	2.3
37								4.4	4.1	3.6	3.2	3.0	2.7	2.6	2.4
38								4.6	4.2	3.6	3.3	3.0	2.8	2.6	2.4
39								4.7	4.3	3.7	3.4	3.1	2.9	2.7	2.5
40								4.8	4.4	3.8	3.5	3.2	3.0	2.8	2.6
41								4.9	4.5	3.9	3.6	3.3	3.0	2.8	2.6
42								5.0	4.6	4.0	3.7	3.4	3.1	2.9	2.7
43									4.7	4.1	3.7	3.4	3.2	3.0	2.8
44									4.8	4.2	3.8	3.5	3.3	3.0	2.8
45									5.0	4.3	3.9	3.6	3.3	3.1	2.9
46									5.1	4.4	4.0	3.7	3.4	3.2	2.9
47										4.5	4.1	3.8	3.5	3.2	3.0
48										4.6	4.8	3.8	3.6	3.3	3.1
49										4.7	4.3	3.9	3.6	3.4	3.1
50										4.8	4.4	4.0	3.7	3.5	3.2
51										4.9	4.4	4.1	3.8	3.5	3.2
52										5.0	4.5	4.2	3.8	3.6	3.3
53										5.1	4.6	4.2	3.9	3.7	3.4
54											4.7	4.3	4.0	3.7	3.5
55											4.8	4.4	4.1	3.8	3.5
56											4.9	4.5	4.1	3.9	3.6
57											5.0	4.6	4.2	3.9	3.6
58											5.0	4.6	4.3	4.0	3.7
59												4.7	4.4	4.1	3.8
60												4.8	4.4	4.1	3.8
61												4.9	4.5	4.2	3.9
62												5.0	4.6	4.3	4.0
63												5.0	4.7	4.3	4.0
64													4.7	4.4	4.1
65													4.8	4.5	4.2

Sp.Gr. Coal = 1.378.

ratios of 5 to 1 for coal thicknesses of 1 to 12 ft. and 4 to 1 for remaining coal thicknesses. From the foregoing principle, the table may be worked out for any desired coal and overburden thicknesses or ratio.

For any other specific gravity this table of ratios may be used by applying the ratio of the new specific gravity to the one used in the table. The greater specific gravity gives a greater ratio, while a smaller one gives a smaller ratio.

To show the application of the table, a problem in determining the economic stripping limit will be as- 5 ft. of coal and 14 ft. of overburden, so that with a ratio of 3 to 1, the table shows that it is profitable to remove overburden up to and including 16 ft. No. 3 borehole has 7 ft. of coal and 18 ft. of overburden, so that 21 ft. of overburden might be removed profitably. No. 4 borehole has 3 ft. of coal and 22 ft. of overburden, but the table shows that with a ratio of 3 to 1 only 9 ft. of overburden can be stripped profitably. The economic stripping limit then lies somewhere between No. 3 and No. 4 boreholes. This limit is found by interpolating as follows:

There are differences of 4 ft. of coal thickness between No. 3 and No. 4 boreholes and an overburden thickness of 4 ft. It is assumed that the coal thins out gradually from borehole No. 3 to borehole No. 4 and likewise the thickness of the overburden increases gradually. By interpolation midway between the boreholes, there are thicknesses of 20 ft. of overburden and 5 ft. of coal, so that with the ratio of 3 to 1, the table shows that only 16 ft. of overburden can be removed profitably. Again, by interpolation, one-fourth the distance between the boreholes, there are thicknesses of 19 ft. of overburden and 6 ft. of coal, and the table shows that 19 ft. of overburden can be removed profitably to mine the 6 ft. of coal, so that the one-fourth point between the boreholes locates the economic stripping limit. The same principle is followed out in locating other points upon the stripping limit line.

In determining the location of the stripping limit, of the overburden, the slope of excavation should be considered. General practice allows 1½ and 2 to 1, slope for clay and sand, and ½ and 1 to 1, slope for solid rock or shale.

(To be continued)

Some Interviews

This One with a Mining Town Parson

On the last day of my campaign for pledges toward the soldiers' Y. M. C. A. fund, I had the most interesting and suggestive interview of the campaign. Could I have had the benefit of it in the beginning of my canvass, my efforts would undoubtedly have borne better fruit.

The speaker was a mining camp preacher whose promised salary was so small that the earnings of his son, a trapper-boy, alone insured credit at the company commissary. As a matter of fact, the parson rarely collected to exceed one-half of the amount promised him by his flock.

Knowing all this, I had decided not to ask him for a pledge; but I ran across him unexpectedly in the timekeeper's office and felt that I might embarrass him if I ignored him in the presence of the timekeeper.

To my question, "Would you like to make a contribution?" he promptly replied, "Most certainly; isn't this my war?"

One remark led to another, until finally he gave me this: "Do you know, I believe that we cannot win this war until every last man realizes that this war is a personal matter and that as such it requires maximum personal effort; by effort I do not necessarily mean sacrifice.

"Ask the next man that you meet to tell you what he has done to help win the war, and you are more than apt to embarrass him; he may not be a slacker, slackers are not in the majority by any manner of means, but somehow he doesn't seem to understand that the things that he might do could affect the result of the conflict. 'What possible effect could one or two more tons of coal have on the final result, anyway,' he says to himself if he is a coal miner; and men in the other occupations have similar views.

"The inability of the average man to realize the importance of his 'bit' toward the successful conduct of the affairs of his town, his state, his country, and his world, is positively pathetic. Preachers have always realized this, but the war is bringing it home to many other men; before the end it will probably be brought home to all men.

"Take the 'white slave' evil, or the liquor evil, or the curse of grafting politicians, for illustration. How long could any of these things exist if every one opposed to them would make some effort to stamp them out? Ninety per cent. of our population, at least, are bitterly opposed to these things, and that 90 per cent. could easily stamp them out for all time in a few weeks if they made the effort; still year after year these evils continue to take their frightful toll. Mr. Average Man shrugs his shoulders when he sees them mentioned in his paper and then promptly turns his attention to the next column, and the thing passes from his mind.

"And in that way Mr. Average Man is helping to win this war up to the present time; he pores over the press dispatches, sighs, shrugs his shoulders, and then goes about his business.

"I have talked to our mine superintendent, to our office men and to our miners, and they all admit that the war is a terrible thing; still they don't act as if they realized that it is such a terrible thing. Of course, when their sons begin to come back maimed and crippled, while still others go to the land 'from whence no traveler returns,' things will undoubtedly be different; but in the meantime what a price to pay for indifference.

"There is one consolation; think of the kind of government we will have when this war makes everyone realize his personal responsibility toward his city, his state and his country, a thing that teaching and preaching have both failed to do."

Correspondent "Over There" for McGraw-Hill Papers

Robert K. Tomlin, Jr., managing editor of *Engineering News-Record*, sailed recently for France to serve *Engineering News-Record*, and the other papers of the McGraw-Hill Company, Inc., as special correspondent at the front. Mr. Tomlin was graduated from Harvard University in 1907. During his college course he served for two summers as assistant in the surveying and railroad field engineering of the Harvard Engineering Camp at Squam Lake, N. H. After graduation, he entered the employ of the Pennsylvania R.R. on the tunnel work in connection with the Pennsylvania Station in New York City. He left this work to go to the New York Board of Water Supply, and was stationed with the Northern Aqueduct Department at Poughkeepsie, New York.

His journalistic experience dates from March, 1909, when he became assistant to the editor of the *Engineering Record*. He was subsequently made associate editor, in charge of the municipal and sanitary field, and in 1913 was promoted to managing editor. When *Engineering News-Record* was formed last April by the consolidation of *Engineering News* and the *Engineering Record*, Mr. Tomlin was made managing editor.

Wastes of Coal in the United States

With the hope of quickening the campaign for the conservation of fuel during the war, and in order to get the problem generally before those who are immediately interested, the Bureau of Mines has reproduced an article by David Moffat Myers, member of the American Society of Mechanical Engineers, on "Preventable Waste of Coal in the United States; with a Consideration of Alternative Methods of Its Elimination." This article was presented at the annual meeting of the Society in New York, Dec. 4 to 7, and is here published in part.

AS A means of far-reaching economy, the Government of the United States should at this time apply intelligent and direct-acting efforts to the conservation of fuel at the industrial plants which are responsible for its greatest consumption. It is unnecessary here to show proof that coal is wasted in vast quantities in the boiler furnaces of many plants, to feed which it is mined and distributed at a high and ever-increasing cost of labor and material.

The mining and distribution of coal have been placed under the supervision of the War Coal Board in order more nearly to meet the crying needs in these directions, to use the railroad facilities more efficiently so that the present car shortage may be minimized to the greatest possible extent, and to apportion the coal in quantity and to uses deemed most expedient.

While this organized effort to bring about efficiency in the production and distribution of coal is being made, no parallel measures have been adopted to bring about a normal and practicable efficiency in its use. The hundreds of large plants which are consuming fuel wastefully, in many cases more wastefully and carelessly than ever before, are directly and needlessly causing a large fraction of the existing car shortage. They are overloading the already strained capacity of the railroads; they are rendering slower and more difficult the transportation of food and other vital commodities, and in short they are simply counteracting the measures of efficiency in production and distribution which have elsewhere been established.

Preventable Waste of Fuel

The preventable waste of fuel in the boiler furnace of one steel mill amounted to 40,000 tons per year, which at $5 a ton would cost $200,000. This was a comparatively modern plant. The efficiency of boilers and furnaces in a 14-day test was 55 per cent. The load factor was unusually favorable to high efficiency and could readily be raised to 70 per cent. or over. This is only one example, and there are many more extreme cases. In one hand-fired plant the evaporation was raised from 6 to 9 lb. in a few days of instruction, and continuously kept close to this higher mark with the help of coal and water measurements which were inaugurated. The saving was due exclusively to instruction and consequent better operation.

The saving or wasting of one-fourth of the coal consumption of any industrial plant depends entirely upon the efficiency of its operating management. Let me emphasize that this fraction of the consumption relates exclusively to the boiler plants—that is, the production of steam—and does not include the large economies possible in distribution and use.

For well-known reasons the boiler plant offers the more lucrative field for producing economies, and these with a minimum of alteration in physical equipment. Under present conditions a plant which carelessly operates at an efficiency of 40 to 50 per cent. receives from the Government the same consideration in the delivery of coal as the one whose efficiency is 70 to 75 per cent. This obviously is unfair as well as wasteful. The Government hands over, say, 200,000 tons of coal a year to a plant owner, but asks for no account as regards its consumption, nor any questions as to the amount of steam it is made to produce. There is nevertheless an equivalent amount of steam this fuel is capable of generating, and it can and should be made to produce that quantity.

Conservation Methods

The object of this paper is to open a discussion which it is hoped will ultimately lead to the formulation of definite recommendations of means for the reduction of the present great preventable waste of fuel in our industries; to direct such means principally toward the elimination of that portion of the present waste which is due to faulty, careless and uninformed operation of plants; to forward these recommendations to the proper governmental authorities as an official communication of this society, and to offer to the Government the services of the society for the organization, furthering, and, as far as possible, the execution of the plan which may as a consequence be adopted.

In general, there are two plans of operation worthy at least of consideration. One might be termed the autocratic method. This would involve the use of authority to compel coal consumers to execute such measures of economy as the proper authorities might prescribe for any given case. Limits should be set as to expense to the user. Such limits might be in terms of a percentage of the present yearly coal bill. Alterations to be directed chiefly, as previously implied, to purely operating improvements. Many objections would probably be made by consumers against this plan, but once in effect the majority would no doubt realize its pecuniary advantage to themselves. But its tendency may be too strongly opposed to democratic principles.

The other plan would be largely an educational one, in which patriotism and efficiency would furnish the motive forces required.

The teaching must be accomplished with the utmost simplicity and directness. Above all it must be in such form as to be readily comprehended and applied. This is a big task, but these things should and can be accomplished.

The requisite information must reach the owners and managers of industries, and there must be simple instruction sheets for the engineers and firemen. The vital importance of daily accurate records of coal and

water must be taught and information given regarding practical appliances for automatic measurements of both.

Blank forms might be sent in advance to plant owners in order to be advised by them, first, whether they would be willing to coöperate with a governmental organization offering to assist them in reducing their coal consumption, and second, to obtain such data as to size, type, equipment, operation and fuel consumption of the plants as would enable a classification which would permit a Government board of experts to send such instructions as would include the information needed for any one class of plants.

This work would be greatly aided by a staff of experts ready to visit plants when so requested by owners and make investigations and recommendations and keep in touch with the progress of economies. Included in such a staff should be men intimately familiar with practical operating economies whose duties would be the delivering of lectures or talks, which should be planned so as to reach directly not only managers and owners of the industries, but also the chief engineers and firemen of the boiler plants. This feature of the plan, by itself, would undoubtedly result in great savings.

The United States Bureau of Mines has for a number of years engaged in obtaining and disseminating scientific information regarding the mining and consumption of coal, and the results of the work have been of great value to technical engineers who are able to use and apply it. It is evident that we now require an extension of the idea of education, but in such form as directly to affect the men who run the boiler plants of our country, for in their hands is the saving or wasting of one-fourth of our fuel supply.

Six hundred million tons of coal were mined in the United States in 1916. If we assume only one-half of this to have been used for our industrial boiler plants, then a quarter of the coal used under boilers amounts to 75,000,000 tons per year. It is worth while to save this fuel by preventing its waste. This quantity of coal represents the use of 1,500,000 fifty-ton freight cars.

Individual Price Differential

At the present time there is considerable agitation on the part of some interests in the coal trade against the differential of 75c. allowed the individual shippers above the company prices for anthracite coal at the mines, as fixed in the Presidential orders of Aug. 23 and Dec. 1. The chief objectors are the retail dealers. They have now been able to convince the fuel committee of one city to such an extent that this committee has made an appeal to the National Fuel Administration for the repeal of this differential.

The chief argument of the retail men is that the differential prevents uniformity of retail prices. But the question at once arises, When did the retailers become such sticklers for a standard retail price? In ordinary times in most of the larger cities there has always been a wide variation in prices, according to the locality in which the dealer was located. This was particularly so in those cities where the price-cutting element among the retailers had for years prior to the present stressful times made the matter of a uniform price absolutely impossible.

Now, as to the independent shippers there are many reasons why an increased price is justified, important among which is the fact that most of their operations are on property owned by the larger producing companies and leased on a royalty per ton basis. The coal beds on this land are usually thin and difficult of operation, and for that reason the larger companies are satisfied to have them operated by individuals rather than go to the expense of taking out the coal themselves. Thus it can readily be seen that in addition to the royalty, the individual operator is put to the further expense of difficult and costly mining.

Then, again, many of the individual operations are now no more nor less than mines that have been abandoned years ago by the companies as unprofitable, yet are still made to produce a fair tonnage by "robbing" pillars. This, in addition to being dangerous, is also expensive, and an expense which must necessarily be added to the cost price of the coal.

Operate at a Loss in the Summer

In normal times the individuals operate practically at a loss in the summer time, when the demand for coal is at its lowest ebb, and in order to keep going are compelled to market their output at prices much below those of the companies, taking a chance of recouping their losses by selling coal at a premium in the winter season, when certain sizes are in strong demand. Even under this method of operation there have been years when the individuals have barely come through with a clean sheet on the proper side of the ledger. Many of them in the past have been enabled to offset their losses by handling bituminous coal on a brokerage basis and thus utilizing their sales forces in carrying two lines. Now this is all a thing of the past, as there is no bituminous coal to be had by the independent houses.

Another factor that enables the big companies to sell at a lower circular price than the independents is the immense and rapidly increasing tonnage of washery coal being sent to market by them. This is all coal that was thrown away years ago as waste, yet is marketed today at the full circular price. Money derived from its sale is thus practically clear profit with the exception of the labor cost entailed in sizing it for market. All this material was mined years ago, and its cost was actually covered in the sale of marketable sizes at that time.

Coming Meetings

American Wood Preservers Association will hold its annual meeting Jan. 22-24, 1918, at Chicago, Ill. Secretary, F. I. Angier, Baltimore, Md.

United Mine Workers of America will convene at Indianapolis, Ind., Jan. 15, 1918. Secretary, William Green, Merchants National Bank Building, Indianapolis, Ind.

National Retail Coal Merchants' Association will hold a convention Jan. 8 and 9 at Auditorium Hote, Chicago, Ill.

American Institute of Mining Engineers will hold its annual New York meeting Feb. 18 to 21, in the rooms of the society, 29 West 39th St. Secretary, Bradley Stoughton, New York.

Explosives Regulation Sign

War legislation is daily adding to the complexity of duties of the average American at our mines and in our industrial plants. Section 16 of the new Explosives Act stipulates that all premises whereon explosives or ingredients of explosives are stored shall be plainly and conspicuously marked with a sign reading "Explosives, Keep Off."

Special emphasis is laid on the fact that this act applies to all ingredients of explosives as well as to the



explosives themselves. Failure to comply with the conditions is severely penalized, and inspectors are instructed to enforce the provisions strictly. The illustration shows a danger sign made by the Stonehouse Steel Sign Co. These are handled by the Mine Safety Appliances Co., of Pittsburgh, Pennsylvania.

The sign is made of steel and is in black, red and white. It has been approved by the Explosives Department of the Bureau of Mines as meeting the requirements of the Explosives Regulation Act.

Christmas at Glen White, W. Va.

Christmas joy and good will came in huge chunks to the residents of Glen White, W. Va., on Christmas Day. By the time the clerical force and delivery wagons of the E. E. White Coal Co. had finished their happy labors, not a family in the pretty mining town was without a fat turkey, all the necessary adjuncts, and a snug bit of cash to spare.

As has been its custom for years, the company presented each family with a turkey, all the children with candy, nuts and fruit, and this year added to the generosity for which it holds an enviable reputation by presenting each employee with a brand new five-dollar bill, together with a cash bonus of one dollar for each year of service with the company. The cash bonus was the fourth paid out this year and netted some of the oldest employees nearly a half hundred dollars.

Prominent in the celebration of the Christmas anniversary were entertainments in both the white and colored departments of the public schools. The dedication of a handsome church completely finished and equipped, with up-to-date heating and lighting facilities, presented by the company to the congregation of the First Baptist Church (colored), was a fitting testimonial of the good will of a generous coal-mining company to its numerous loyal and faithful employees. In order to do their part toward relieving the national coal shortage the employees of the E. E. White Coal Co. were idle on Christmas Day only. They resumed work on the morning of Dec. 26.

The E. E. White Coal Co. was by no means alone in the generosity shown toward employees. Many operators, both in the anthracite and bituminous fields, in additions to turkeys and other good things made gifts of clothing to needy ones.

Some Figures on Coal Movement

Recently compiled tables showing the number of loaded coal cars from mines on the Norfolk & Western Ry. disclose some interesting comparisons. It is the opinion of men familiar with conditions in that region that the large falling off is due more than anything else to the inability of connecting lines to handle properly the cars delivered to them. This is particularly true in the West, where yard and other facilities have not been expanded to keep up with the increase in traffic. It follows also that the shortage of sidetracks and of motive power on the Norfolk & Western itself has had its bearing. Only a small part of the difficulty is due to any shortage of labor at the mines in question. The figures are significant:

EQUIVALENT CARS (100,000 LB.) OF COAL LOADED ON NORFOLK & WESTERN RAILWAY

District	Comparison of First Eleven Months 1917	1916	1917 Increase	1917 Decrease
Pocahontas	303,736	323,688	.....	19,952
Tug River	81,465	92,639	.....	11,174
Clinch Valley	26,150	28,768	.....	2,618
Kenova	16,510	20,681	.....	4,171
Thacker	95,890	99,608	.....	3,718
Total	523,751	565,384	.....	41,633

Decrease, 41,633 equivalent cars = 2,081,650 net tons.

Apportionment of Freight to Coal

Experience has shown that in the United States the normal balance in transportation which brings about a maximum of production with maximum economy occurs when out of every 100 tons of originating freight approximately 56 tons are unmanufactured mineral products and 44 are manufactured products, foodstuffs and other commodities, and when of the 56 tons of mineral products 35 tons are coal. Of these 35 tons of coal the railroads themselves consume about 12 tons.

The present balance of transportation is a great reduction in the proportion of the cars furnished for the transportation of coal. The railroads, however, are consuming their full quota of coal, so that while under favorable and natural conditions 35 tons of coal would be moved, out of each 100 tons of freight, there is now being moved very much less coal. The entire coal shortage is thrown upon the industries of the country and the domestic users, who, instead of having a coal supply equal to two-thirds of the total coal movement, are reduced to a small and continually diminishing ratio, and this in a time when every effort is being made to stimulate the industrial effectiveness of the nation.

The commission believes that the coal industry is paralyzing the industries of the country, and that the coal industry itself is paralyzed by the failure of transportation.—*Federal Trade Commission.*

Dodson Coal Co. Not to Renew Lease on Morea Colliery

With the close of the year 1917, the 30-year lease of the Dodson Coal Co. on Morea Colliery, with an annual shipment of 250,000 tons, expires, and the colliery is being taken over by the New Boston Land Co. It will be operated in conjunction with the New Boston Colliery as one operation.

The taking over of this colliery by the New Boston Land Co., closely allied with the Mill Creek Coal Co., operating the New Boston Colliery, is the sequel to a controversy covering several years.

The New Boston Colliery lies to the east of the Morea Colliery in the same basin, and when the workings of the former were driven west they were extended right up to the line dividing the two leases, leaving no barrier pillar east of the line.

About the first of the year 1910 the east gangways of the Morea Colliery were approaching this same line, and the late John Curran, then district mine inspector, gave orders to leave a barrier pillar of 300 ft. on the west side of the line. The Dodson Coal Co. claimed this to be a hardship and a big loss to them and contrary to the mine laws, which required a barrier pillar to be left in each side of a dividing line. Mr. Curran took the case into court and had an injunction issued refraining the operators from driving workings that would reduce the barrier pillar to less than 300 ft. This injunction has never been dissolved, but now that the two collieries are to be operated as one, the danger of the one being allowed to fill with water will not be renewed and the coal left in this pillar will probably be recovered.

The personnel of the organization in charge of the collieries is announced as follows: General manager, J. E. Jones; general superintendent, Frank E. Patterson; inside superintendent, William Thomas; inside foreman, Daniel Brennan; outside foreman, Louis Greis.

The lease of the Dodson Coal Co. in the Morea Colliery expires with the close of the year, and the operation is being taken over by the land owners, the Delano Land Co., and will be operated by them in conjunction with the New Boston Colliery adjoining.

The surrender of this lease by the Dodsons is the sequel to the lawsuit brought by them against the Delano Land Co. for the recovery of losses claimed by the former on account of the ruling of the courts upholding the mine inspector in his decision requiring the Dodson Coal Co. to leave intact a barrier pillar of 300 ft. between the workings of Morea and New Boston Collieries.

Putting Coal on War Basis

United States Fuel Administrator Harry A. Garfield, testifying before the Senate Subcommittee investigating coal conditions, made the following statement:

The coal year of 1917 was well under way before the Fuel Administration was created. The distribution of the coal output, which was largely under contract for delivery during the year, had already been arranged on a peace-time basis. It was necessary that these peace-time arrangements should be so altered as to meet the war demands. But it was quite as necessary that no action should be taken which would throw the entire fuel situation into chaos.

President Wilson, in announcing his original schedule of prices for bituminous coal, recognized this condition and said that there will be no immediate wholesale interference with contracts already made.

Prices were at their highest when most of these contracts were made, and up to date there has been but a small proportion of the coal output available for distribution outside of these contracts. Many contracts, of course, have run out, but a large majority of the coal mined is still sold under contracts running until Apr. 1, 1918. The Fuel Administration found it was in dire need of "free coal" to distribute to important Government plants, to public utilities and institutions and domestic consumers.

The distribution department of the Fuel Administration, starting with the small amount of "free coal" available as the difference between contracts and the output of various mines set out to meet this emergency. Many of the coal operators offered their aid. In many cases the plans of the Fuel Administration have diverted coal at Government prices from mines which were unable to deliver under contracts calling for a much higher price.

The Fuel Administration has undertaken to so direct the peace-time arrangements of the coal industry that they will temporarily meet the war emergency. Many of the steps taken in this direction are wholly temporary and of an emergency nature. They are designed to carry the country through the present winter with the least possible distress.

We are not putting into effect plans which will place the entire coal industry on a war basis. These plans will be wholly effective beginning with Apr. 1, 1918, when the present coal year will come to an end.

In this connection the Fuel Administration is establishing a zone system of distribution. Under this zone system the output of a given coal field will be assigned generally to a given consuming territory. It will be arranged that the producing field and its consuming territory shall be connected by the shortest possible transportation distance. This will eliminate, so far as possible and practicable, all cross-hauling of coal on the way to market and will tend to relieve transportation conditions.

Legal Department

INDIANA MINE SAFETY REQUIREMENTS—The statutory duty of Indiana mine operators to cause loose coal, slate or rock overhead to be taken down or secured is limited to travel and airways and does not apply to miners' working places. (Indiana Appellate Court, Peacock Coal and Mining Co. vs. Crawford, 117 Northeastern Reporter, 504.)

INJURY TO CONTRACTOR'S EMPLOYEE—A coal company, having awarded a contract for the mining of its coal at a fixed price per ton and on condition that the contractor should attend to roof propping and the taking down of drawslate, is not liable for injury to an employee of the contractor for injury due to a fall of slate, although the injured employee was paid directly by the company, such payments being made for the account of the contractor and being deducted from money due him on his contract. (Kentucky Court of Appeals, Lyttle vs. Rex Coal Co., 197 Southwestern Reporter, 1070.)

SUITS AGAINST NONRESIDENT CORPORATIONS—A coal company organized under the laws of another state, maintaining no office or agency in West Virginia, was not doing business in the state through the mere fact that it operated its own barges and boats along the Ohio River from Pittsburgh to Cincinnati and other lower points, so as to render its captain subject to service of process in a suit against the company while in West Virginia waters. Nor did the fact that perils of navigation may have compelled the captain to temporarily take refuge along the West Virginia shore render him subject to service of such process. (West Virginia Supreme Court of Appeals, Hayman vs. Monongahela Consolidated Coal and Coke Co., 94 Southeastern Reporter, 36.)

SNAPSHOTS IN COAL MINING



MARION STEAM SHOVEL AT WORK ON DELAWARE & HUDSON CULM DUMP

This shovel is moving nearly 20,000 cu.yd. of material per month and is owned by Porter Bros., contractors. At the time this photograph was taken the thermometer registered 5 deg. above zero. Some cold!



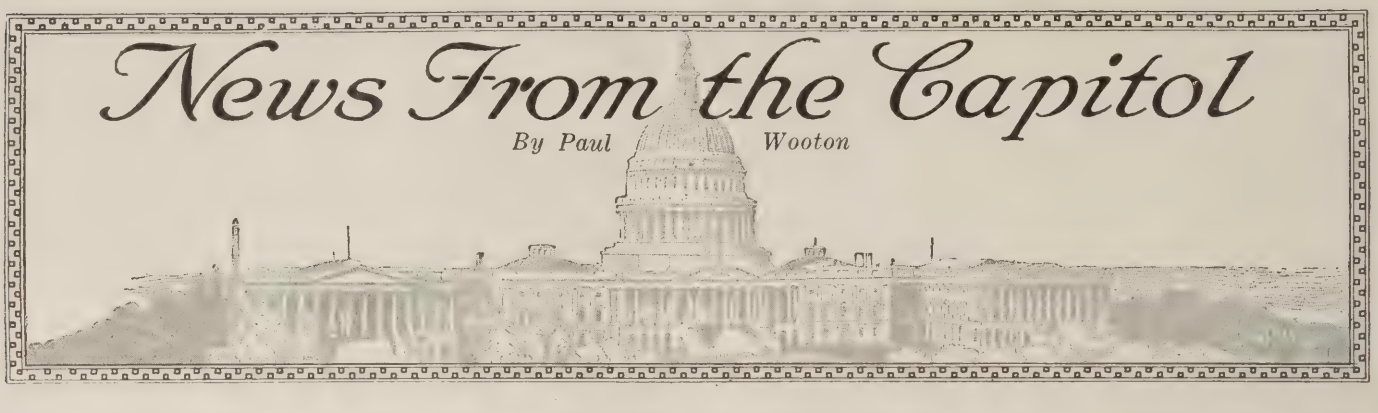
THAWING FROZEN CARS OF COAL TO HELP RELIEVE THE SHORTAGE

In addition to the difficulties of transporting fuel on account of the rail congestion intensified by the recent snow and very cold weather, the Fuel Administration has had to contend with frozen coal, which must be thawed out before it can be dumped from the cars. The thawing process consists of forcing live steam through pipes and hose that extend into the heart of the frozen mass





VIEWS OF THE KAYN MINE OF THE LICK BRANCH COAL CO., AT COXTON, HARLAN COUNTY, KENTUCKY
Above—A string of empties returning to the mine. Below—The tipple and incline



[*Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Metropolitan Bank Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 703, Metropolitan Bank Building, Washington, D. C., while at the capital.—Editor.*]

Weekly Production Statistics

The depression in the bituminous industry caused by prolonged cold weather continued during the week of Dec. 22. The total production of soft coal (including coal made into coke) is estimated as 9,917,145 net tons. This, although a substantial recovery when compared with the preceding week, was still 10.8 per cent. below the output during the week of Dec. 8. The average production per working day was 1,652,858 tons, as compared with 1,638,513 tons during mid-August, at the time of the coal strikes in Illinois and Southern Appalachians. Beehive coke reflected the recovery in the entire bituminous industry. The total production during the week is estimated as 545,433 net tons, an average per working day of 90,906 tons. This was still 10.4 per cent. below the production during the week of Dec. 8. Shipments reported by the nine anthracite carriers amounted to 36,060 cars, an increase of 4382 cars over the preceding week. The production of anthracite, however, was still 11.3 per cent. below the mark set during the week of Dec. 8.

For the country as a whole the week's production amounted to but 57.7 per cent. of the full-time capacity. The cold weather and snow increased the losses attributed to each one of the principal causes of lost time. The toll exacted by mine disability rose from 3.9 to 6.2 per cent. of the full-time capacity. Losses due to labor shortage and strikes, although amounting to but 3.7 per cent., reached the highest point recorded since the week of Nov. 3. Losses attributed to car shortage were the highest reported since the weekly bulletins were begun, says E. E. Lesher, of the United States Geological Survey. Thirty and eight-tenths per cent. of the full-time capacity was reported as lost on account of lack of cars at the mine mouth.

Beehive coke operations in the Connellsville and adjacent districts of Pennsylvania, during the week of Dec. 22, exhibited a partial recovery from the extreme depression of the preceding week. The plants reporting produced 56.8 per cent. of their capacity in coke, as rated by the railroads, compared with 49.5 per cent. during the week of Dec. 15. Twenty-nine and six-tenths per cent. of the full-time output was reported lost on account of a shortage of coke cars. The unusually high losses attributed to lack of cars were undoubtedly due in large measure to the burden imposed upon the railroads by the snow and cold weather.

Demand Efficient Distribution

Sharp criticism of the Fuel Administration has arisen over the shortage of coal in New York harbor. Interference with the regular movement of coal for bunker use resulted in the holding up of shipping equivalent to many round trips of a single vessel to Europe. Responsibility for the shortage seems to be shared by several of the factors involved, but many contend that the Fuel Administration should have made such an occurrence impossible at a time when full efficiency of shipping is of such transcendent importance. This and similar instances have given rise to an insistent demand for more efficient direction of the Fuel Administration's division of distribution. The experience of the last several months is held to show that a lack of foresight exists when such situations are allowed to become acute. Steps taken in time not only would prevent situations of far-reaching seriousness, but, it is said, would avert the disturbing element of drastic action which has to be taken when all reserves of coal are exhausted.

To See That Orders Are Filled

One of the direct results of the Senate probe into the coal situation was the hurrying toward operation of the Fuel Administration's plan to divide the entire country into consuming and producing districts. The appointment of D. R. Lawson, of Fairmont, W. Va., as the deputy distributor for a district in West Virginia, is the forerunner of the appointment of other deputy distributors. Mr. Lawson will have charge of a producing district consisting of Barbour, Braxton, Gilmer, Harrison, Nicholas (Gauley district of Baltimore & Ohio R.R.), Lewis, Marion, Monongalia, Preston, Randolph, Taylor, Upshur and Webster Counties. As the activities of this distributing office will likely be the same as in the other nineteen producing districts, there is unusual interest in the following instructions issued to Mr. Lawson for the conduct of his office:

1. On receipt of requests for fuel from state fuel administrators and on receipt of requests and orders for fuel from the United States Fuel Administrator, to allot such requests and orders to individual shippers and mines in the above-named area as equitably as possible, and with a view to securing prompt compliance with such orders without undue hardship to individual shipppers.

2. To report to the United States Fuel Administrator in detail on each request received from state fuel administrators and describe the action taken, including the name of the shipper or mine to which the request or order was allotted.

3. To arrange with each individual shipper and mine in your district for daily notice to you of production, working time, car supply, shipments, contracts and free coal.

4. To compile reports of production, working time, car supply, shipments, contracts and free coal and to report such figures to Washington in totals at the close of each business day, beginning at once. Forms for reporting this information will be forwarded to you as soon as prepared.

5. To comply with all instructions issued by the United States Fuel Administrator governing the conduct of your office and to recommend to the United States Fuel Administrator, from time to time, any changes in practice which might result in more efficient administration.

Contracts to Be Regulated

In order that in 1918 the whole coal output, including the coal which the mines had contracted to deliver, shall be under the direct and effective control of the Fuel Administration, an order has been issued regulating the terms of all contracts for the future delivery of coal. The order makes it plain that all contracts for the sale of coal or coke are subject to cancellation by the President or by the Fuel Administration acting by his authority.

The order limits contracts by providing that no contract shall call for the delivery of coal or coke over a period of longer than one year, and the order directs that the year period thus allowed shall terminate not later than eighteen months from the date the contract is made. Contracts must be placed at the prices fixed by the President and the Fuel Administration, and must provide that the coal or coke affected by the order is subject at all time to requisition or diversion by the Fuel Administration.

Contracts made under this order will not be recognized if they involve "Railroad cross-hauling of coal, except in the case of gas coal or coal to be used for byproduct purposes." This provision will eliminate one of the transportation difficulties now confronting the Fuel Administration, and will insure the movement of coal from mine to consumer along the shortest possible transportation lines. The order is here reproduced in full, as follows:

The United States Fuel Administrator, acting under authority of an Executive Order of the President of the United States, dated Aug. 23, 1917, appointing said Administrator, and in furtherance of the purpose of said order and of the Act of Congress therein referred to and approved Aug. 10, 1917, hereby orders and directs that under further or other order of the United States Fuel Administrator and subject to modification hereafter from time to time and at any time, the following regulations are established relative to contracts for the sale of coal and coke. A coal or coke operator or producer may, in accordance with these regulations and not otherwise, make contracts for the sale of coal mined or produced, or of coke produced or made, by him with any consumer or other person including jobbers.

1. No such contract shall provide for the delivery or supply of coal or coke over a period longer than one year; and such period of one year shall terminate at a date not more than eighteen months from the date of actual execution of the contract.

2. Every such contract for the sale of coal shall provide that the price of any coal delivered thereunder shall, with respect to each shipment of coal under such contract, not exceed the price at the mine as fixed by the President, or by the United States Fuel Administrator under authority of the President, and in effect at the date of such shipment from the mine.

3. Every such contract for the sale of coke shall provide that the price of any coke delivered thereunder shall, with respect to each shipment of coke under such contract, not exceed the price for coke as fixed by the President, or by the United States Fuel Administrator under authority of the President, for the kind of coke specified in the contract, and in effect at the date when such shipment of coke leaves the point at which it is produced or stored.

4. Every such contract shall provide that the same shall be forthwith cancelled and of no further binding effect upon either party thereto, upon receipt of a request or an order from the United States Fuel Administrator for such cancellation, and that in case of such cancellation neither party to the contract shall be under any further liability to the other thereunder and that neither shall have any claim against the United States Government by reason of such contract or the cancellation thereof.

5. Every such contract shall provide that coal or coke deliverable thereunder shall be subject to requisition by the United States Fuel Administrator, including under the term requisition the right to divert such coal or coke to any other party than the purchaser named in the contract; that such requisition may be made at any time during the continuance of the contract and prior to actual receipt and unloading of the coal or coke so requisitioned, at the point of ultimate destination, by the person entitled thereto under the terms of the contract; that such requisition shall be made at the going Government price at the date of shipment from the mine of the coal so requisitioned or of the shipment of the coke so requisitioned from the place of production or storage thereof, and without other or further liability of the Government to either party to the contract than the payment of such price and freight, so far as either party to the contract may at the time of such requisition or diversion be liable for such freight payment.

6. A jobber may make contracts for the sale of coal or coke owned by him, or to which he is entitled under contracts made by him with operators or producers in conformity with these regulations, at a price not exceeding the purchase price paid or payable by such jobber for such coal or coke under the limitations of the foregoing paragraphs numbered (2) and (3), plus such commission as may, at the time of the shipment thereof from the mine where such coal is produced or from the place where such coke is made or stored, be the then permissible jobbers' commission. All such contracts by jobbers for the sale of coal or coke shall conform to the provisions and requirements in the foregoing paragraphs numbered (1), (4) and (5).

7. Every coal or coke operator or producer and every jobber shall send within ten days of the execution of any contract by him a certified copy thereof to the United States Fuel Administrator at Washington, D. C., marked "Attention of Legal Department."

No contract may be made, or will be recognized as valid, by the United States Fuel Administrator, which involves railroad cross-hauling of coal, except in the case of gas-coal or coal to be used for byproduct purposes.

Oral contracts for the delivery or supply of coal or coke will in no cases be recognized by the Fuel Administrator as valid or binding upon either party thereto and are prohibited.

All and any contracts for the sale of coal or coke are subject to cancellation and termination at any time by the President or by the United States Fuel Administrator acting under authority of the President.

THE LABOR SITUATION

General Labor Review

It is not unnatural that the substitution of a nine-hour or longer day for an eight-hour day in the anthracite region meets with some opposition from the mine workers, though some are even now, and have for some time, been working long hours of overtime. It has been generally contended that men in nine hours can do no more than in eight, and fallacious figures have been advanced to prove it. Under normal conditions it is probably true that the shorter day is nearly long enough for a man to do his most effective work, but given the larger incentive of patriotism a bigger stint for a short while can be secured by longer working hours.

It is interesting to notice the reason given for opposing the longer working day. The mine workers do not say that eight hours is enough for any man to work. They realize fully that it is their duty and their patriotic pleasure to work as many hours as will best promote a large production. It is a loyal reason they give for the shorter day. The mine workers, we read, "believe the increased work day would hurt the coal tonnage more than help it."

Long Day Would Increase Tonnage 10 per Cent.

A. B. Jessup, the manager of G. B. Markle Coal Co., has addressed himself to meeting that argument. He says that the introduction of the nine-hour day would increase tonnage 10 per cent. Mr. Jessup says his firm needs 500 miners and laborers and 250 to 300 outside men, but cannot get them though it has plenty of work, rents are low and houses are on hand for all who want them.

He also says that there has never been any trouble from car shortage at the Markle mines. It is true that cars are scarce in the latter half of the week, but the collieries and breakers are operated regardless of that condition, for all the mines have storage bins into which the coal is dumped and from which the coal is loaded as soon as cars are available. In a vote of the locals in the Hazleton region the mine workers declared against the proposed increase in length of day. President Kennedy seems to be in full sympathy with the men of his district. He declares that if the long day would produce more coal the railroads could not handle it, and the production would demand more timber and supplies than could be secured.

Miners Seek Bonus for Working on Funeral Days

The Wyoming Valley mine workers have shown such a generous comprehension of the needs of the time that one wonders how a piece of news like the following can be justified by facts:

"Two thousand mine workers at the South Wilkes-Barre No. 5 Colliery have notified company officials that they will take time off to attend the funeral of any of their fellow union workers unless the company makes an extra cash settlement with the families of the mine workers who meet death while at work."

The mine workers' families are already compensated in case of death, and there is a provision in the mine workers' contract that they work steadily so long as work is provided. This recent demand is therefore little else than blackmail and not at all worthy of the Wyoming mine workers. If they are not satisfied with the compensation provided, let them seek legislation in accord with their ideas.

Apparently this is the view of the Lehigh & Wilkes-Barre Coal Co. Various mine workers' organizations in the Wyoming Valley have consented to send only delegations to all funerals, leaving the main working force free to give its services to the company. They are now asking $100 as a reward for doing nothing more than complying with their contract and supplying the coal which the necessities of the nation imperatively demand. They want pay for their work and pay again for being willing to perform it.

Women Are Entering Mine Clerical Service

Seven women and girls have been appointed to clerical work at the Cameron Colliery by Superintendent William Auman. Mrs. Cora Van Gasken furthermore has been made weighmistress at the same mine. The Cameron colliery is the property of the Susquehanna Collieries Co., a subsidiary of the M. A. Hanna Co., of Cleveland, Ohio. The mine workers used to be averse to women employees, but under the present circumstances they are withdrawing their objection.

The supply of cars in the bituminous region has fallen off deplorably by reason of the snow, according to a report of the United States Geological Survey, just received. In the Hazard field, Kentucky, in the week ending Dec. 15, the tonnage was reduced to 66.4 per cent. of capacity, 65 5 per cent. being the loss due to car shortage. Northeastern Kentucky failed by 64.9 per cent. of reaching full capacity, 60.9 per cent. being the shortage due to lack of cars. Somerset County, Pennsylvania, came third with 55.7 per cent. of capacity, 52.5 per cent. being chargeable to insufficient car delivery.

Unfortunate Effects of Mine Disability

But when the railroads are blocked with snow the mine tracks are also similarly encumbered. Cold weather breaks and freezes pipe lines and as a result power houses are put out of commission. The mine-disability percentage rose in Indiana to 15.7 per cent. and in the Arkansas "anthracite" district to 18.6 per cent. Illinois also lost 9.9 per cent. from mine disability. Pennsylvania with its long outside haulages suffered severely, western Pennsylvania losing 8.6 per cent. of capacity from mine disability and the Panhandle 8.7 per cent.

Labor shortage and strikes except in Illinois, where it caused a loss of 10.1 per cent. of capacity, had little effect on the coal output. Nevertheless the tonnage of bituminous coal for the week fell from 11,118,181 tons to 8,438,549 tons, or 446,605 tons a day. As the miners worked well the sad condition of the output is put squarely up to the railroads and the weather.

Work Sunday and Keep Christmas Day In South

The miners of the De Bardeleben Coal Co. at Sipsey worked on Dec. 23 although that day was Sunday. The men at that mine are ready to make every sacrifice for the needs of the country. Every man in the mine has joined the Red Cross. Dr. George R. Stuart has been addressing the mine workers, urging them to their best endeavors, and Dr. A. C. Williams has addressed the colored employees. Milton H. Fies, resident manager of the company, has always had a lively interest in the material welfare of his men. As a result of his strong sense of social service his men have also a disposition to do their utmost in the present crisis.

Coal miners of Texas and Oklahoma, acting on the suggestion of Fuel Administrator Garfield, that little time be lost because of the pressing need for coal, worked during the holiday season. Miners of Oklahoma and Arkansas placed a request before the union authorities and also before the authorities of the state, asking that they be permitted to work on the Sunday before Christmas so that they might make holiday on Christmas Day and yet not lose a day's work. Their request was granted, and more than half the miners of the fields labored on Sunday as on any other day.

John Wilkinson, president of District 21, United Mine Workers, has suggested to P. A. Norris, State Fuel Administrator for Oklahoma, that a general conference be called at once to include representatives of the Oklahoma railroads, coal operators and coal miners to discuss ways and means for relieving the coal shortage. Mr. Wilkinson will present a proposal for the establishment of shipping zones which will eliminate the waste of transportation facilities in overlapping shipments. His plan will be fully explained at the conference, and it is expected that action will be taken on it.

At a conference in Fort Worth, Tex., attended by coal-mine operators and miners of Texas, all differences in wages and working conditions were adjusted and all danger of a strike in this state was averted. The contract and working conditions adopted in the central competitive fields were approved, the contract being in line with recommendations of the Federal Fuel Administrator.

State Fuel Administrator Crossley of Missouri announces that he will appoint a war fuel board for the state, to be composed of two coal-mine operators and two miners, with himself as the fifth member. Its particular function will be to smooth out differences between operators and miners. He says that he will also appoint a war committee for each mine, on which operators and miners will be represented.

Fight About Penalty Clause Continues

It was somewhat surprising that Frank Farrington succeeded in retaining his office as president of the mine workers of the Illinois district at the recent reëlection, but he did so by a substantial majority. Despite his many excellences as a leader of the mine workers and his sterling integrity, there were not a few who opposed him for his support of the automatic penalty clause.

In a recent statement he takes a firm stand in its favor and condemns the disloyal members of the union who find fault with it. He says:

"As for the penalty clause, we have no apology to make for having signed it. No loyal member of our union need fear it. It is necessary to protect the integrity and good name of the United Mine Workers of America against the assaults of the fanatics and enemies who would disgrace and destroy it.

"More than 28,000 members of our union are now in military training camps preparing to defend the democracies of the world against the onslaughts of a ruthless military autocracy, and more will follow in a short time. As never before the nation needs coal to forge the equipment and furnish the means necessary to give them a fighting chance, and a fighting chance is what the loyal members of our union are determined that they shall have."

The statement is in part a reply to a circular issued just before the recent election, charging that Farrington and other named officers were entirely responsible for the automatic penalty clause. This statement was signed by a name that is alleged to be fictitious. Mr. Farrington says that those responsible for the issuance of the circular did not have the courage to affix their names to it and stand sponsor for it so it is obvious that they knew the charge was not true.

The automatic penalty clause is to be invoked for the first time in the central Illinois field by the Springfield District Coal Mining Co. against the 375 miners who struck at the Woodside mine near Springfield against a new system of life checking. W. B. Jess, president of the company, says that fines will be assessed against the men. The men have returned to work under protest on the assurance of Stephen Sullivan, district board member, that their complaint against the new system will be taken up by the state officials of the union.

The system to which the men object is in the interest of their safety, but they do not like it because it enables the company to keep a stricter check on them and makes it more difficult for the miners to "knock off" work ahead of time. Under it each miner is required to hang his card in the office on leaving the mine. At the close of the day the cards will show whether any men have been left in the mine and if so a rescuing party will be sent below.

It is certain that the men will resist the infliction of the automatic penalty. They are laying the foundation for such resistance now by claiming that instead of striking they were locked out by the company on their refusal to comply with the new order.

Operators and Men Must Cooperate

Wallace Crossley, Missouri fuel administrator, has announced that he will submit to the Missouri Coal War Board some production problems which he thinks should be solved. One of these is the practice of the United Mine Workers of charging a man $25 to become a member of the union. This keeps many men from entering the mines.

He declares that the failure to provide an equal turn of cars due to the lack of a proper turn bulletin or to the carelessness of the mine foreman is the cause of much loss of tonnage. He urges that a larger output would be obtained if machines were operated by more efficient methods. Time is lost because the coal is not cut, this failure being due to a false economy or to ill-chosen methods of the machine foreman. In other cases machine men and miners lose time because machines are not repaired. This may be due to lack of men and facilities for repairing the machines or to a lack of parts on hand. Again, when the machines are repaired they are sometimes not delivered, as they should be, to the men who are waiting for them.

Sometimes a loss of output results from failure to take coal away from the mines on account of the bad roads. At other times coal-car shortage is to blame or inadequate hauling equipment. Tonnage is reduced also by the bad air in the mines, the system of circulating and regulating the air current being often inefficient and inadequate.

Production would be increased if the miners would cease to abuse the lay-off privilege, if they would stay on the job till their eight hours were completed, if they would not shut down the mines for funerals which, after all, they do not attend, and if they would continue working on election days and holidays of questionable importance, the observance of which the contract forbids. Again, they quit work after starting it if some slight accident to the equipment occurs, which a few minutes would repair, or if some slight grievance arouses them, which grievance should be adjusted without a shutdown as the agreement demands. Many an hour is lost and many a ton fails to be dumped because the committee and the mine foreman waste time in excessive wrangling.

Low Wages to German Miners

The following figures are derived from the *Deutscher Reichsanzeiger*, and they show that the wage of the German mine worker, though largely increased since the war began, is much smaller than that paid in the United States. The high cost of living must make these wages little better than starvation:

NET EARNINGS OF GERMAN MINE WORKERS PER SHIFT IN SECOND QUARTER 1917 WITH INCREASE OVER SECOND QUARTER IN 1914

	Miners and Trammers		Other Underground Workers		Surface Workers	
Mining District	Net Earnings	Increases Per Cent.	Net Earnings	Increase Per Cent.	Net Earnings	Increase Per Cent.
Coal Mines:						
Upper Silesia	$1.87	60.0	$1.31	54.9	$1.17	51.2
Lower Silesia	1.36	41.3	1.19	42.1	1.00	32.5
Dortmund	2.39	61.6	1.59	47.3	1.53	45.8
Saarbrucken (State Mines)	1.95	60.4	1.50	51.8	1.44	55.6
Aix-la-Chapelle	1.92	47.9	1.39	20.5	1.29	30.6
Lower Rhine (Left Bank)	2.30	56.5	1.72	43.9	1.53	44.7
Lignite Mines:						
Hallé	1.42	42.0	1.25	45.7	1.20	43.8
Rhine Left Bank	1.63	46.5	1.45	37.8	1.49	52.1

These are the wages paid to men, not women, be it understood. Perhaps they are not the best of workmen, because many of the best men have been called into the service of the army. How a man can live on $1 a day in Lower Silesia with prices as they are, much less how he can raise a family, is a riddle insoluble. Even the Dortmund wage of $2.39 paid to miners and trammers, though larger, is inadequate.

FLOYD W. PARSONS, *Editor* JAMES T. BEARD R. DAWSON HALL FRANK H. KNEELAND

EDITORIALS

McGRAW-HILL COMPANY, INC.—JAMES H. McGRAW, *President*

Leave Well Enough Alone

NEWS comes repeatedly from Washington that Fuel Administrator Garfield desires to take over the coal mines of the country. If the taking over of the mines would increase production, no one will object, but it is hard to see how matters can be improved.

The mines are able to produce all the coal the nation demands. There has been an unprecedented increase in the capacity of the bituminous mines since the European war began, yet even before the war the mines had such a large output that restriction of production was seriously considered in the interest of the public.

The trouble with the coal supply in the bituminous regions is that the Government railroads cannot remove the coal as fast as the mines produce it. Let the Government, if it can, apply itself to that problem. It will take some years to solve, for the condition of the railroads has been getting out of hand during the long years of Government restriction, so that much work must be accomplished to undo the harm the Government has already done.

The Government explains that its inability to tackle the various problems presented to it is due to the large expansion of the work demanded of it. The explanation is good and is accepted as excusing most of the shortcomings. But that is no reason why we should be willing to put an efficient and adequate business in the hands of the Government. Do we wish to have the Government excuse itself by saying that in mining, as in other matters, it embarked in a new business and one larger than it was organized to handle, and therefore it fell down under the load of it?

There is absolutely no good reason but a labor reason for Government control and, just now, at least, there is only a remote possibility of labor trouble. Never were the mine workers so disposed to work harmoniously and never have they spoken so clearly against Federal control.

The existence of cross-hauling might be advanced as a reason, but this can be corrected at once by breaking present contracts, which can be done, if it be desirable. as well with, as without, Government ownership. New contracts and sales involving cross-hauling can, as in Great Britain, be prohibited.

Breaking Records

NOTWITHSTANDING the many sore spots in our industrial life that have been brought to light by recent investigations, the people of the United States, as a whole, in their war preparations are breaking all records and setting a pace that other peoples will find it difficult to maintain. Statistics covering our many lines of national effort are not public property, but we know enough to be certain that the nation's accomplishments are in keeping with our reputation as a progressive people and that they are not something of which we ought to be ashamed.

In 1916 the coal mines of America produced a record tonnage. This year our coal and coke output will exceed the 1916 production by upward of 60,000,000 tons. The history of agriculture in the United States this year will provide a similar story. Never before did we produce in the aggregate so much material of food value. The production of steel products this year will reach a tonnage not dreamed of before the war started.

In going to war with America, Germany boasted that this country could add very little to the resistance opposed her by the Allies. How far she was wrong in this conclusion will soon be evident to her. Little by little the vanguard of the American offensive is approaching the German lines. Although separated from us by the broad expanse of the Atlantic Ocean, the Teutons will soon be in contact with a war machine superior to the one she has herself been so long in building.

The number of ships in the war construction program of the navy is 787, including some ships that have recently been completed. This is considerably more than twice the total number of ships in commission on the day war was declared on Germany. In the past year the navy has expanded from 68,000 enlisted men to more than 260,000, including marines, reserves and others in service. In January, 1917, there were 4500 officers. Now there are more than 15,000 officers. The authorized war personnel of the British navy is 276,000. The personnel of the German navy at the beginning of the war was about 80,000.

To prepare its recruits for work at sea, the navy has had to expand enormously its facilities for training. The capacity of its stations and special schools for this purpose has been increased from 6000 to 113,650. Men are being trained in a number of highly specialized trades as well as in the duties of sailor and gunner. The work of a modern army is complicated, but the tasks that have to be performed by the crew of a ship are still more varied. The naval training camps naturally are smaller affairs than the great army cantonments. But one of them, the Great Lakes station, near Chicago, has accommodation for 17,000 men. The new Hampton Roads operating base that has risen almost overnight on the deserted grounds of the Jamestown Exposition has room for 10,000 recruits. The number of naval stations of all kinds has been increased from 130 to 363. The number of employees at regular navy yards in the United States has grown from 35,000 to over 60,000. Counting civilians as well as sailors, the total naval establishment numbers about 340,000 men.

At the beginning of the year there were 300 naval vessels of all types in commission; now there are "many more than a thousand." Ships that were laid up in the navy yards because there were not men enough to man them have been refitted and manned and sent to

sea. Scores of speedy yachts and power boats have been taken over from private owners, to be set at work searching for submarines.

In the past eighteen months Congress has appropriated for naval purposes $1,905,410,930. This is more money than was spent on the navy in the entire period from 1883 to 1911—the first 28 years of the existence of the "New Navy." And that period includes the years of rapid naval expansion that followed our war with Spain. Expenditures for all naval purposes at the beginning of 1917 were at the rate of about $8,000,000 a month. Now they are $60,000,000 a month. The navy is managing a huge system of radio stations. It has taken over all the stations in the United States and the insular possessions. It has recently placed in operation at Pearl Harbor, Hawaii, the most powerful wireless station in the world.

Trebling the number of ships in commission has made necessary great increases in stocks of naval supplies. New warehouses have been built at a total cost of $10,000,000. The largest of these is eleven stories high, 360 ft. long and 180 ft. wide, and contains sixteen acres of storage space. Seventy 3000-ton steamers could be loaded from its contents. It cost $1,200,000 and was built in six months.

The navy has fourteen times as many flying boats as it had at the beginning of the year, and thirty times as many men in its aircraft forces. It has built its own aircraft factory in Philadelphia. Ninety days after ground was broken for the plant, the keel of a flying boat was being laid. Five private plants are devoting their entire resources to navy aircraft work.

Last spring the United States Aviation Corps had less than 200 airplanes; now a fleet of 22,000 planes is being built. When war began there were 75 aviators in Uncle Sam's service; at the present moment 10,000 aviators are being trained.

Before any real fighting airplanes could be turned out, a new American industry had to be created. How well this has been done is evident from the fact that instead of the two companies that were manufacturing airplanes when the war started, we now have more than 100 great factories turning out liberty motors, or producing parts that will go to the creation of a vast fleet of fighting airplanes. Just what this will eventually mean is evident when we remember that the automobile factories of the United States produced 4,000,000 automobiles of the 4,700,000 such machines produced in the whole world.

It takes six months to make a flier, and the French tell us that it costs the government $25,000 to produce a finished aviator. This unavoidable condition may make us a bit slow in getting into the thick of the fight; but if it is true that England is now building at least one plane for every plane being built by the Germans, and that in 1918 Great Britain alone will outbuild the Germans two to one, then the final entrance of America into the battle will surely bring about Germany's speedy defeat.

Uncle Sam is not perfect, and his worthy sons will go on slipping up here and falling down there. However, the nation as a whole is breaking all previous production records, and it need not be doubted that the ultimate outcome will cause us to feel proud of our American citizenship.

One Standard for All

A SOLDIER in khaki and a slacker in civilian dress sat down to lunch in a chophouse. The soldier called for a "cocktail." "Oyster cocktail?" queried the waiter. Whereupon the soldier answered, "No"—very gruffly. The slacker didn't call for an alcoholic appetizer, but if he had he could have obtained it. The waiter's question to him would not have been "Oyster cocktail?" but rather "Manhattan or Bronx?"

Now why this preference for the slacker? Why deny to the fellow who is serving his country, and who may shortly lay down his very life for it, the pleasures granted to the man who is not serving it? The soldier has given up his position; he has surrendered his freedom of action for the greatest of ideals, and there is no reason why others who have not been so generous should not give up with him all that limits their capacity to serve in the rear as he serves at the front.

It is the old story. We say that the man who performs an essential service should be curbed. The soldier, the sailor, the munition maker, the shipbuilder and the miner should be sober; and the others, whose lives are less fruitful or fruitless, or fruitful only in sorrow, pain and waste, shall have their liberties uncurbed.

The railroads and the mines render the American people essential services; therefore curb them, harass them, strictly limit their profits and direct their operations. This is not reasonable. It is time to put a measure of control on everyone. It is time to cut off some of the luxuries of life, and liquor is one of these. It is time also to cut off all harmful industries that turn night into day and simple joys into heaviness.

We have got to make this war mean something to the civilian as well as to the soldier—to make the man who serves war indirectly give as much as he who girds the soldier for the fray. Let there not be two standards, one for the soldier and one for the slacker, or one for the worker in an essential industry and another for the loafer or for the worker in a needless occupation. Sobriety, steadiness, purpose—we must all have them, we must have them all.

For this is democracy; it is universal service. We have no room in America for the needlessly unfit, for addled brain, unsteady feet and nerveless hands. During the war, at least, let us be sober.

If we quote from Kipling "When it comes to slaughter, we must do our work on water," let us not limit it to the man in the fray or to the soldier in uniform behind the lines, but to every man, whether he makes a gun, or the steel of which the gun is made, or the coal by which the iron is smelted, or the pick by which the coal is dug, or the food by which the digger is kept fit for his purpose. As far as sacrifice and sobriety are concerned, the public should know of no civilians.

EACH American soldier in France requires thirty ship tons of transportation annually to keep him an efficient fighter. This means thousands of trainloads of supplies that must be hauled to Atlantic ports. Not a car can move nor a ship cross the Atlantic unless there is coal to fire the boilers. Men of the mines who lay off or lend themselves to a strike today are perpetrating a despicable crime against patriotism.



You can't work *all the time* —but work *when you can*

THE Government has taken over the railroads. Whoever helps the railroads is helping Uncle Sam. If the cars are late in the morning, don't be grouchy; if they don't come at all, try and bear it as best you can. Remember, it's Uncle Sam's railroad, and he is trying his durndest to run it so that every one will have work.

AND when the cars are placed remember your country wants you to pitch in and load coal and not quit till the cars are ALL loaded, even if you are going to be idle next day. If you don't load those cars, Uncle Sam wants them for those who will, and he will not leave as many next time. Keep your working face full of coal so that you won't have to dig coal when the mine is running.

DISCUSSION BY READERS

Power to Drive Shaker Screens

Letter No. 1—My attention has been drawn to the comparison that J. J. Kienberger has made, *Coal Age*, Nov. 24, p. 905, between the formula I suggested for determining the horsepower of a shaker screen, Vol. 9, p. 609, and that given by W. H. McGann, on page 368 of the same volume.

It will be observed that these two formulas are identical except the coefficient. Both show that the power to operate a shaker screen varies directly as the weight, the cube of the speed of the driving shaft and the square of the length of stroke.

The coefficient, in my own formula, was made large enough to indicate the commercial horsepower of the engine or motor required under the varying conditions of: (1) Poor lubrication of the screen rollers or the driving shaft; (2) overloading of the screen, which is frequently liable to occur in practice; and (3) to give sufficient reserve power for increasing the speed temporarily, should this be required; or to provide against a drop in steam pressure or line voltage.

These are practical considerations in coal mine work, and this is why I said that the formula I gave would yield good results and be entirely safe. In a particular case, however, with favorable conditions, a motor of less power than that given in my formula could be used with safety.

R. G. LAWRY, Assistant Engineer,
Chicago, Ill. Roberts & Schaefer Co.

Bossing and Being Bossed

Letter No. 4—Referring to the question of "Bossing and Being Bossed," one must acknowledge that the situation, today, is a peculiar one. Managers and superintendents, in some cases, find it difficult to secure men who are willing to undertake the responsibilities that go with the acceptance of a position as boss in a coal mine.

During the past year, conditions at the mines have changed wonderfully in this respect. Men who once would have jumped at the offer of a position as mine manager (foreman), or even assistant, are found unwilling today to accept either position, under any conditions. Money appears to be no inducement, for the simple reason that they do not care to be burdened with the responsibility of securing the necessary labor for operating the mine, at this time when men are so scarce.

Indeed, a mine manager (foreman) today might rather be called a "persuader," as there is more persuading done now than bossing. Under present conditions, it is difficult to get sufficient daymen—drivers, motormen, trackmen and timbermen. Everyone wants to dig coal.

The newcomer is willing to take shiftwork only long enough to get some miner to take him in as a "buddy," so that he can gain the two years' experience necessary to secure a miner's certificate. Great difficulty is found in drilling these new men for the work they have to do, and the boss must exercise much patience with them or he will lose them and they will go elsewhere.

No one can blame this rush of men to "dig coal." We all want to make as much money as we can. The fact that companies do not care to pay more than the scale price for shiftwork makes it difficult to secure men for this purpose and hold them. But, everybody cannot dig coal; someone must do the other work, or the mine will stop running. It is this task that confronts a foreman today and makes his position difficult.

Herrin, Ill. OSTEL BULLOCK.

Blacklisting to Prevent Mine Accidents

Letter No. 2—Referring to the recent suggestion of James T. Reynolds, *Coal Age*, Dec. 15, p. 1028, allow me to say that the blacklisting of men found guilty of unsafe practices in the mines might cause trouble with the miners' union, and this coal operators generally will wish to avoid. Companies often concede matters of lesser importance from the fear of precipitating a strike among their men. Many a foreman will hesitate to punish an infraction of the mine rules, preferring to overlook the matter rather than incur the ill-feeling of the miner. Foremen know that many miners will gather up their tools and quit rather than pay a fine for an act of carelessness.

This calls to my mind an effective method that was in use by coal operators in France. I believe that the same method, if adopted here, would go farther toward compelling miners to obey the rules and regulations of the mine than the method of blacklisting suggested by Mr. Reynolds. The method proved a success in France, where a miner's record was well known and, in order to secure work at any mine, he was obliged to keep his record clean.

PROTECTIVE AGREEMENT AMONG OPERATORS

An agreement existed between all coal operators binding them never to employ a man who failed to show his record book. He must carry his book with him when making an application for work. The book gave the man's name and description, showed at what mines he had worked and the nature of his employment, together with the dates when he started and quit. The reason for the man's quitting was given and the statement was signed by the mine foreman.

When a man applied for work at a mine he was asked for his record book. This was examined by the foreman, who was thus able to tell exactly what work the man had done and what satisfaction he had given the foremen who had previously employed him. If the report was satisfactory and the man was given work, his book was deposited in the files of the company.

A company would have no right to retain a miner's book, in order to hold him in its employ. It was agreed, however, that when a miner desired to quit, he must give the company three days' notice before doing so. Likewise, the miner was to be given three days' notice by the company if discharged.

One advantage of the record book was that a man who had been driving a mule could not claim that he was capable of running a machine, timbering, or doing other work with which he might be wholly unfamiliar.

The record was also a strong incentive to a man to obey the rules and regulations of the mine where he was employed, as failure to do this would be noted by the foreman in his book and spoil his chances for securing another job at any mine where he might apply. Realizing this fact, a miner always thought twice before disobeying orders.

The book also had a tendency to keep men at work in the same place and destroyed their desire to keep moving about from one mine to another. It was a custom, also, that a miner when joining another local must not only show his transfer card, but produce his record book before being accepted as a member.

Bad Practice in Shooting Down Roof

In my opinion the adoption of this scheme or a similar one would render mine work much more secure than it is at present. An incident that occurred in the mine where I worked, not so long ago, shows the need of men being fully acquainted with the work they must perform. In this instance a company man was sent to shoot the roof down, in my room, in order to provide material for packwalls.

After drilling the hole, the man went for his powder, cap and fuse. Being an old miner, I was much surprised to see him return with three sticks of dynamite, which he laid on the ground. Then, inserting the fuse in the cap, he proceeded to secure it by hammering the edge of the cap with a piece of rock, on the rail. It did not take me long to get on the other side of a car that was standing near-by.

To my question, "Where did you learn that trick?" he replied, "Well, do you think I never fired a shot before?" Pushing the powder back into the hole, he inserted the primer with the fuse attached and closed the mouth of the hole with a piece of old rag, after which he fired the shot. In all my experience as a miner, I had never seen such a shot fired.

The man listened to my explanation of how such a shot should be charged and fired, and then went on his way laughing, as he had other shots to fire in other places. I wonder that the man is still living. The incident, however, may have done him some good, as I saw him, a few days later, going his rounds with a tamping bar in his hands.

In closing, let me say in regard to the record book mentioned previously, that a miner when leaving a mine in good standing had written in his book over the signature of the foreman, *"Libre de tout engagement"*; which translated is "Free of any obligation."

Peru, Ill. GASTON LIBIEZ.

Letter No. 3—I heartily agree with James T. Reynolds when he says that mine accidents "are chiefly the result of carelessness on the part of miners," *Coal Age*, Dec. 15, p. 1028; but I doubt very much whether the method suggested by him to prevent the occurrence of such accidents would have the desired result.

Every person interested in coal mining would undoubtedly welcome any method that could be adopted that would effectually reduce the number of mine accidents due to carelessness. I believe that drastic action, in one form or another, should be taken against any and all persons who neglect or refuse to perform the work in which they are engaged.

Such action, however, should not be of a nature that would drive men from the mine and leave them to seek work in other industries where they would still be careless and prove a menace to the men working with them. In my opinion that is what the method suggested by Mr. Reynolds would accomplish.

Blacklisting and the Federal Law

If the blacklisting of careless workers was possible, it is still a question whether the law of the United States would permit any action on the part of coal operators that would prevent a man from securing work at any of their mines. An operator certainly has the right to discharge a man who fails to perform his work in a satisfactory manner or disobeys his instructions or violates the mine rules or mining law of the state.

Allow me to suggest that the Bituminous Mine Law of this state, under which our mines are operated, provides for the punishment of any person or persons violating the provisions of the act or the safety rules of the mine. The law makes it a "misdemeanor" for any person to work in an unsafe place knowing it to be unsafe, except for the purpose of making it safe. In the absence of the mine officials, each miner must judge of the condition of his place and it then becomes his duty, under the law, to safeguard himself.

Not American in Principle, Other Methods More Effective

My opinion is that to blacklist a person for an offense is not truly American in principle. Rather let the mine foreman penalize a miner for carelessness or disobedience. Talk the matter over with him and tell him that the offense must not occur again. If the act is repeated, however, suspend the man for a stated time; be firm; do not fuss with him about the matter. Men will respect a foreman more for such dealing, and it will prove more effective than any blacklisting of careless employees.

An experience of 38 years as a miner convinces me that the man working at the face is not the only careless person employed in and about the mines. The same principle holds true in all industries; carelessness is a human frailty, and it would be difficult to know where to draw the line in blacklisting.

It is true that much has been said and done with the aim of reducing the number of accidents in mines; and much good has been accomplished in this direction, although the results are yet far from satisfactory. As far as my observation and knowledge go, 90 per cent. of the men employed in our mines heartily favor the safety-first movement.

In several districts I know, the miners' local has voluntarily pledged its support to the mine foremen, in enforcing safety regulations in their mines. This

shows that the men themselves are interested in reducing the accident list.

The showing of moving pictures, illustrating how accidents occur in mines and how they may be avoided, has proved effective and is a step in the right direction. Probably nothing that has been attempted has interested the men more generally, in the matter of safeguarding themselves, than these motion pictures, which bring the facts before them in a forcible manner that is not soon forgotten.

In conclusion let me say again: "Enforce the mining law and maintain strict discipline, in the mine, by compelling obedience to the mine regulations and instructions given the men in the performance of their work. Penalize all men who disobey instructions or go contrary to the mine rules. Let the foreman use tact, however, in dealing with such cases.

Where a man violates the mining law, report the case promptly to the mine inspector of the district, who is authorized by the law to take action against the offender. By the use of such methods, I believe, the most good can be accomplished. A MINER.

Punxsutawney, Penn.

Letter No. 4—There is much truth in the remarks of James T. Reynolds, *Coal Age*, Dec. 15, p. 1028, regarding the necessity of adopting effective measures to overcome the carelessness of men working in the mines. The illustration that he gives of the man who scoffed at the safety-first movement and remarked that "men will do as they d—— please, anyway," is a common experience with every mine foreman.

Such an attitude on the part of a miner and such a response, or a similar one, to the instructions given him by a foreman, cuts very deep and affects different foremen in a different manner. Instructions in regard to safety are always given by a foreman with a sincere desire to make the work safe, both for the man's own sake and for the protection of the lives of every man in the mine. While some would be angered by the reply of the man and retort in a similar manner, the majority of foremen will let the remark pass and move on to the next place, only to return in a short time to see that the necessary work has been performed.

FOREMEN OFTEN SEVERELY TRIED BY MINERS

In any event, however, there is no doubt that the patience of foremen is frequently severely tried when they feel that their own lives, as well as those of others, are endangered by the attitude of such men. At times, the remark received acts as a damper on the foreman, which he strives to overcome in giving the needed instructions to men in other places.

There is no doubt but something should be done to reduce the number of accidents due to carelessness, though the method of blacklisting suggested by Mr. Reynolds does not appeal to me as the best course to pursue to accomplish this end. I want to urge a more thorough inspection of mines and the maintaining of stricter discipline, by the punishment of those who disobey instructions or disregard the mine regulations and rules for safety. The punishment should be such as to place all careless workers in a class by themselves. The penalty need not be severe, but should be of such a nature that it will be for the man's interest to avoid doing the same thing a second time.

Violations of the mining law should be promptly reported to the district mine inspector, whose duty it is to prosecute the guilty party by entering a complaint against him. A man who has paid the expenses of a prosecution in court once will not care to incur the same obligation. A court should give its aid to the mine inspector in the performance of his duty under the law, to enable the speedy conviction of the man for the alleged violation of the mine law, and the guilty party should be fined so that he will not be apt to repeat his act.

COÖPERATION NEEDED TO ENFORCE DISCIPLINE

It is my belief that if all mine officials would cooperate in this matter by posting a notice to the effect that, commencing Jan. 1, 1918, all violations of general or special rules will be reported promptly to the district mine inspector, for the purpose of having the guilty party prosecuted and punished, there would be something doing and a change for the better would take place. Not only would less accidents occur in the mine, but there would result a larger output of coal because of the increased safety.

It should be remembered that mine officials are themselves liable to prosecution for not doing their full duty in this regard. I am convinced that a few prosecutions at different places would soon have the effect to arouse careless workers to a sense of their duty to themselves and their fellows in the mine, and good results would follow. R. W. LIGHTBURN,

West Leisenring, Penn. Mine Foreman.

Clearing a Heading of Gas

Letter No. 4—I was much amused by the inquiry of Mine Foreman, which appeared in *Coal Age*, Nov. 10, p. 823. The inquirer states that he attempted to remove a body of gas from the face of an entry by hanging a canvas in the return air-course at a point 90 ft. back from the face. This struck me as a joke, especially as he remarks, "The idea, as far as moving the gas was concerned, seemed good." Although he does not say that the experiment was a success, if the gas was not moved he could hardly say that the idea seemed good to him.

The mine where I am employed as mine foreman is a gaseous mine, but we don't try any experiments such as the one here mentioned. Whenever we find gas or observe our ventilation getting a little weak at the face we proceed to remedy the trouble at once. I don't consider gas anything to experiment with in coal mines. The sooner it is removed, the better. I am willing to leave all experiments of that kind with the Bureau of Mines.

Briefly outlined, our method of removing gas, which has always proved successful, is as follows: All entries are driven 10 ft. wide and the track is laid 3 ft. from one rib and 4 ft. from the other rib, the track gage being 3 ft. This permits a row of posts to be set 1 ft. from the rail on the wide side of the entry, so as to provide a 3-ft. air space behind the brattice.

Like Alfred Engell, *Coal Age*, Dec. 8, p. 990, we nail brattice boards at the top and bottom of the posts for

the support of the canvas. In my opinion, however, the 2-ft. space behind the brattice, as described by Mr. Engell, does not appear to me to be sufficient. I believe such a narrow passage would cramp the volume and reduce the circulation of air in that heading, provided the coal is only 6 ft. thick. Assuming a velocity of 200 ft. per min., the volume of air passing would only be $6 \times 2 \times 200 = 2400$ cu.ft. per min. I am of the opinion that the farther the brattice can be placed from the rib of the entry, the better will be the results obtained. I should be glad to see the question of arranging brattices under these conditions further discussed.

McIntyre, Penn. SAMUEL JONES.

Mass Education Needed

Letter No. 2—What Henry Bock says in his letter on mass education, *Coal Age*, Dec. 8, p. 987, reminds me of an interview with a very prominent mine manager, whose name is familiar in every part of the anthracite coal fields. He said, "Education, conjoined with natural ability, will now and hereafter be the guiding star of mining enterprise."

This saying is very true and, as a proof that technical education is the key that unlocks the mineral treasures of the earth, we have only to notice the skill displayed in the design of machines that reduce manual labor and give better results. The utilization of natural forces in hydraulic mining; the conversion of the power of Niagara into electrical energy and the combination of natural and mechanical forces in the operation of a mine and the preparation of the coal for market, all illustrate the value of technical education coupled with practical experience.

What Technical Education Has Accomplished

It is technical education that has made possible the conservation of many natural resources. Coal screenings that, a few years ago, were dumped on the waste heap as worthless, are now being utilized for the production of power. Outcrop coal that was abandoned as unminable, in the earlier days of mining, is now being recovered, by the use of specially designed equipment. Methods of mining and handling coal have been improved and greatly developed as a result of technical knowledge that gave a greater grasp of the forces of nature with which the miner is always confronted.

While it is true that no amount of scientific or theoretical knowledge will fit a man to take charge of a mine unless he has practical experience to guide him, it is just as true that a practical man's capability is greatly increased by a knowledge of the science and theory of mining. Indeed, the future is likely to develop a still greater need of technical knowledge to insure success. Technical education includes not only a knowledge of natural and mechanical forces, but knowing how to apply them in practice; and this is best learned from the experience of successful men. To rely on one's own aptitude, in this regard, would be to work in a comparatively narrow groove.

The up-to-date mining student is progressive. He studies what other mines are doing and observes their successes and failures. The reading and study of descriptions of mining methods and equipment is all right in its way; but much that is written is too general, and success in practice depends on the manner in which the small details are worked out, in the adoption of new methods and equipment.

At the mine where I am employed, the company changed foremen two years ago. The new man was broadminded and possessed a valuable experience that he had gained in many years of practice. During that time he had visited a large number of collieries to observe their methods and study their equipment. He was a reader of first-class technical literature, and this, together with his keen discernment, has enabled him in two short years to increase the production of the mine 25 per cent., while the cost of its operation has been reduced in about the same proportion. When asked how he did it, his reply was, "By taking advantage of every economical device and method I have seen, and by improving on some of them."

Visiting Other Mines to Observe Methods

An occasional visit to neighboring districts will seldom fail to bring results to the man who is broadminded enough to recognize that he has much to learn from the experience of others. One of the largest mining companies in the anthracite field has found that the policy of sending an intelligent official on a two weeks' tour of inspection of other operations has proved of great value. This has been shown by the many economical devices and methods employed by that company. Many of these are improvements on similar devices in use at other mines.

Some time ago, the same company sent its superintendent to look at a system of haulage in use at a mine 100 miles away. After a close inspection of the system, the superintendent returned and reported that the only thing about the equipment that he would care to adopt was the detaching hook, which was of special design and just what was needed to increase the efficiency of their own system, which he thought was, in other respects, superior to the one he had visited.

It is freely admitted that the time and money spent in making this visit was repaid to his company many times over, in a few months. This simple incident illustrates how any intelligent mine official, by going on an occasional tour of inspection, will gain much information that will prove a real benefit.

The same truth applies to young men who are studying mining while getting their practical experience working in the mine. Aside from the material advantages derived from technical study is the fact that it trains the intellect and develops a taste for some special branch that may later prove a source of absorbing interest and pleasure. FRED B. HICKS.

Kingston, Penn.

Relative Size of Intake and Return Airways

Letter No. 1—I cannot agree with the answer given to an examination question that appeared in *Coal Age*, Dec. 15, p. 1033. The question reads as follows: "Which, if either, should be the larger, the main intake or the return airway? Explain why."

The answer states that "under the conditions common to coal mining, the return airway of a mine should have a larger sectional area than the intake airway,"

and gives as the reason the increased temperature of the return air current, and the increased volume of that current, due to the presence of mine gases.

I claim that the haulage road should be the larger airway, regardless of whether it is the intake or the return airway of the mine. My reason is that every car or trip of cars offers a certain amount of resistance to the air current passing on the haulage road. When the haulage is performed on the intake airway, it seems to me that the resistance offered by the cars passing in and out of the mine will overbalance the effect of the increased volume of the return current because of its higher temperature and the gases generated in the mine.

I would be glad to see this question discussed by the readers of *Coal Age*, hoping that more light may be thrown on the matter. The question is to what extent does the movement of the cars obstruct the circulation of the air on the haulage road, and how does this resistance to the flow of the air compare with the increased resistance due to an increased velocity of the return air current, as suggested in the answer given to this question, on page 1033.

Windber, Penn. F. E. SCHROYER.

Shotfiring in Mines

Letter No. 4—Referring to the letter of Gaston Libiez, *Coal Age*, Dec. 15, p. 1030, I will acknowledge that, in the rather distant past, I shared his view in regard to the explosibility of the gases produced by the combustion of powder in blasting coal. We all realize that it is convenient to go with the crowd or, in other words, to accept too freely the general belief and statements of textbooks, without making a personal investigation and examining critically the proofs offered in support of the theory advanced.

In regard to the question in hand, certain observed facts led me to doubt the correctness of the belief that the mixture of gases produced by the explosion of black powder, and commonly known as "powder smoke," constitutes a highly dangerous element in starting an explosion in a mine. Doubt being once aroused, my further investigation of the matter developed sufficient proof to convince me that the mixture of gases liberated by the explosion of black powder, as stated in my previous letter, "is incapable of promoting or maintaining an explosion." To this statement Mr. Libiez takes exception, but to my mind it is true.

EXPERIENCE IN COAL MINES IN IOWA

When the miners in Iowa fired their own shots, at the end of each shift, and the ignition of the powder was accomplished by the use of squibs, it was necessary to fire the shots in consecutive order. Ordinarily two or more shots were prepared in each working place and all shots following the first had to be fired in the presence of a hot, dense cloud of powder smoke produced by the preceding shot or shots.

This method of firing shots extended through a period of many years, and thousands of practical tests were thus furnished daily, clearly disproving the claim that the gaseous mixture produced by the explosion of powder materially assists in starting a mine explosion if such mixture is exposed to the flame of subsequent shots. The results of these tests not only proved this claim to be without merit, but showed the fallacy of the belief that greater safety is assured by firing shots in the presence of pure air.

It may occasion some surprise, but the statement is true that when making these tests several explosions occurred when two or more shots were fired consecutively in well-ventilated places that were clear of powder smoke, while no explosions resulted from the firing of a second, third or fourth shot, in places having little or no circulation and where the hot gases of the first shot or shots filled the place.

RESULTS OF A LARGE NUMBER OF TESTS IN MINES

The results of the tests led me to make the statement, in my previous letter, announcing my belief that the presence of dense clouds of powder smoke "will have a decided quenching effect on the flame of an explosion that is already under way."

The circumstance mentioned by Mr. Libiez, and well known to all coal miners, regarding the inflammable nature of the gases confined behind a "standing shot," no doubt is largely responsible for the existing belief in the explosibility of the mixture of gases produced in blasting. While I have lighted the gas under such circumstances a number of times, only feeble flashes were produced, which did no harm.

In order to show that the conclusions drawn from such an occurrence are unjustified, allow me to suggest that the gases confined behind a standing shot are necessarily quite different from the mixture of gases thrown into the air when a shot is fired. Besides the fact that the crevice produced in the rupture of the coal is filled with fine coal dust, it is possible that the flash observed when a lamp is introduced in the crevice is due to a small percentage of marsh gas present to a limited extent in most coals.

WHAT CHIEFLY CAUSES THE FLASH BEHIND A SHOT

That is only a suggestion, because it is my belief that the flash is chiefly due to the volatile matter distilled from the fine coal dust first mentioned. This belief is supported by the fact that there can generally be found small particles of coal in a more or less coked condition, at the bottom of the crack, after flashing the gas confined in the crevice.

Moreover, the narrow space behind a standing shot, being filled with hot gases, acts as a chimney and the fresh air entering at the bottom may form an explosive mixture in this confined space, notwithstanding the weakening effect of the powder smoke that is present. Also, the fact that the flash is generally feeble indicates that the presence of the powder smoke has a weakening effect on the explosion, which would otherwise manifest greater violence.

My belief, therefore, is that while the mixture of gases produced in blasting in a close place is undoubtedly injurious to health and may even prove dangerous to life, it exerts an extinctive effect on the flame of the explosion, owing to the lack of available oxygen. This, in short, is the basis of my belief that a reduced circulation of air in the workings of a mine, at the time of firing, lessens the liability of an explosion taking place.

JOHN VERNER,
Chariton, Iowa. Former Mine Inspector.

INQUIRIES OF GENERAL INTEREST

Estimation of Depreciation on Stripping Equipment

Referring to the letter of H. B. Miller, *Coal Age*, Nov. 24, p. 902, describing the method of recovering outcrop coal by stripping, I am much interested in learning how he estimates the depreciation in the value of the stripping equipment.

It seems to me that the custom of most companies, when putting in a stripping plant, such as that described by Mr. Miller, would be to figure the entire cost of the plant against a single job, or at least to charge 50 per cent. of the cost of the equipment to the work in hand. This, of course, would depend, to a certain extent, on the size of the undertaking and cost of the equipment required for its completion.

Mr. Miller has allowed $24 a day for depreciation. Taking his estimate of 1400 tons of coal handled per day, the time required to remove 567,216 tons, in this case, would be a little over 400 days, which would make the total depreciation of equipment charged in this case $400 \times 24 =$ say $10,000.

This appears to be a small amount to charge for depreciation in such a plant, which Mr. Miller estimates as having a value of $150,000, including track material of all kinds.

Taking the depreciation as 50 per cent. of the total value of the plant, or $75,000, according to the custom just mentioned, would make the depreciation, in this case, $75,000 \div 400 =$ $187.50 a day, instead of the $24 a day estimated by Mr. Miller. I would much appreciate learning his method of estimating the depreciation in value on this equipment. B. H. STOCKETT.

Shenandoah, Penn.

The inquiry of this correspondent was submitted to Mr. Miller, whose reply follows:

In estimating the depreciation in the value of an installation, it is my custom to base the estimate on the supposed life of the equipment. In the present instance, I believe that, under favorable conditions and with proper care and upkeep these large-type shovels, worked single-shift, would be good for 20 years of service. I have included the cost for repairs and upkeep in the original estimate, taking this at $18 per day. The depreciation of $24 per day, given in my estimate, was arrived at about as follows:

Taking the working days in a year as approximately 313, would give for the total number of days estimated in the life of the machine, $20 \times 313 = 6260$ days. Then, assuming the total cost of the equipment is $150,000, the rate of depreciation would be $150,000 \div 6260 =$ say $24 per day. Estimating this equipment as handling 1400 tons per day would make the depreciation $2400 \div 1400 =$ 1.7c. per ton.

Before undertaking the installation of a stripping plant for a small acreage, it is my custom to ascertain if there is other territory to which the equipment can be moved on completing the work in hand. Finding such adjacent territory, I would charge the cost of moving the equipment against the second tract, which would give the first acreage the full benefit of depreciation charges.

Assuming that the acreage, however, was sufficiently large to keep the equipment busy during its entire life, say 20 years, single-shift, or 10 years, double-shift, I would then figure the entire cost of the plant against the one job. Again, if the work would only last 5 years, by double shift, I would estimate the depreciation as 50 per cent. of the value of the equipment, allowing the remaining 50 per cent., to be charged to the next job, with the additional cost of moving the plant. Some contractors figure on a depreciation, per annum, of 10 per cent. of the total cost of the plant, working single-shift. H. B. MILLER,

Pittsburgh, Penn. Mining Engineer.

[The above reply answers fully the method used by Mr. Miller in estimating the depreciation in value of equipment, which appears to be equitable.—Editor.]

Shotfiring in British Columbia

While the discussion of shotfiring is absorbing so much attention on the part of the readers of *Coal Age*, because of the importance of the work in respect to the safety of life and property, allow me to ask what regulations govern the firing of shots in the Province of British Columbia. I have been informed that the Coal Mines Regulation Act is very explicit in reference to the handling and use of explosives underground and that, as a result of the strict enforcement of the rules and regulations, accidents in blasting are not frequent. I would like to ask if shotfirers are employed and how the shots are fired. SHOTFIRER.

Delagua, Colo.

It is true the General Rules of the Mines Regulation Act, under which the coal mines of British Columbia are operated, are very explicit in regard to the use of explosives underground and the firing of shots.

All shots are fired by certified shotlighters. In non-gaseous mines where open lights are used shots may be fired by fuse. The miner can take the powder and fuse into the mine, but the detonators must be carried into the mine by the shotlighters by whom they are issued to the miners at the face when and as required.

In gaseous mines where safety lamps are used all shots must be fired by electric battery. In that case the miner is permitted to take with him into the mine both the electric detonators and the powder; but the shotlighter is the only person who is permitted to carry the battery. The shotlighter on entering a place examines a shothole, and if satisfied that it is safe he oversees the charging of the hole. After firing the shot, he must return and examine the place before permitting the miner or miners to return to the working face.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—At $50 a ton what would be the cost of the iron required to lay a track ½ mile in length, using 16-lb. iron for that purpose?

Ans.—The length of rail required for a single track, in this case, is $2 \times 2640 \div 3 = 1760$ yd. Using iron weighing 16 lb. per yd., the total weight required would be $1760 \times 16 \div 2000 = 14.08$ tons. The total cost for iron is, therefore, $14.08 \times 50 = \$704$.

Ques.—What quantity of water will be contained in a sump 100 ft. in length, 7 ft. 6 in. in width and 5 ft. 3 in. in depth?

Ans.—The cubic contents of this sump is $100 \times 7.5 \times 5.25 = 3937.5$ cu.ft. Since 1 gal contains 231 cu.in., the capacity of this sump is $3937.5 \times 1728 \div 231 = 29{,}454$ gallons.

Ques.—Water accumulates at the rate of 200 gal. per min., at the foot of a shaft 600 ft. deep. Power for pumping is available during 8 hours each day. What is the horsepower of the pump that will be required to handle the water in this shaft?

Ans.—Since water flows into the shaft at the rate of 200 gal. per min., the quantity of water that would accumulate in 24 hours is $200 \times 60 \times 24 = 288{,}000$ gal. A pump that will handle this water in 8 hours must have a capacity of $288{,}000 \div (8 \times 60) = 600$ gal. per min. Using a standpipe of sufficient diameter to reduce the velocity of the flow of water in the pipe to such an extent as to practically eliminate the friction head, say a pipe 8 in. in diameter, the horsepower required to operate the pump is then calculated from the formula

$$H = 0.00034\ Gh$$
$$= 0.00034 \times 600 \times 600 = 122.4, \text{ say } 125\ hp.$$

Using a 6-in. standpipe, however, will cause a friction head

$$h_f = \frac{G^2 h}{800 d^5} = \frac{600^2 \times 600}{800 \times 6^5} = 34\ ft.$$

This friction head must be added to the gravity head, making the actual head, against which the pump then operates, 634 ft. The required horsepower, in that case, will be

$$H = 0.00034 \times 600 \times 634 = 129.3 \text{ say } 130\ hp.$$

Ques.—What would be the difference in the reading of the barometer between the surface and the bottom of a shaft 1000 ft. deep?

Ans.—The reply to this question will depend on the elevation of the place above sea level, if an exact answer is desired. At sea level, under normal atmospheric conditions, one inch of mercury column corresponds to an air column of about 925 ft. in height; while, at an elevation of 2000 ft. above sea level, it is equivalent to 996 ft. Again, in order that the barometric readings shall correctly represent the depth of the shaft, both readings must be taken under the same ventilating pressure, whether the fan is blowing or exhausting. For example, it would not be right to compare a free-air reading on the surface with a reading taken at the bottom of a fan shaft, either a downcast or an upcast shaft.

Assuming the top of the shaft is at sea level, the exact difference of barometric reading between the surface and the bottom of a shaft 1000 ft. deep, for normal conditions as taken from tables is 1.097 in.

It is customary, however, to estimate on each 90 ft. of depth, near sea level, as corresponding to 0.1 in. of mercury, which would make the difference of reading, in this case, $0.1\ (1000 \div 90) = 1.1+$ in.

Ques.—What volume of dry air is required to completely explode 350 cu.ft. of marsh gas?

Ans.—For the complete combustion of one volume of methane or marsh gas (CH_4), there is required two volumes of oxygen, as expressed by the equation

$$CH_4 + 2O_2 = CO_2 + 2H_2O$$

In this equation, the numeral preceding the molecule indicates the volume of the gas concerned, and since oxygen forms 20.9 per cent. of pure air, by volume, there is required $2 \div 0.209 = 9.57$ vol. of air to burn one volume of methane.

Ques.—There are 20,000 cu.ft. of air per minute passing along an airway having a rubbing surface of 35,000 sq.ft. and a sectional area of 35 sq.ft. What is the water gage?

Ans.—The water gage, in this case, is found thus:

$$w.g. = \frac{ksQ^2}{5.2a^3} = \frac{0.00000002 \times 35{,}000 \times 20{,}000^2}{5.2 \times 35^3} = 1.25\ in.$$

Ques.—In an airway 72 sq.ft. in sectional area, the velocity of the air is 550 ft. per min.; what will be the velocity of this current where the area is reduced to 60 sq.ft.?

Ans.—For the same quantity of air in circulation, the velocity of the current varies inversely as the sectional area of the airway. In other words, the velocity ratio is equal to the inverse area ratio. Hence, calling the required velocity, for an area of 60 sq.ft., x, we have

$$\frac{x}{550} = \frac{72}{60} = \frac{6}{5}$$

$$x = \frac{6 \times 550}{5} = 660\ ft.\ per\ min.$$

Ques.—What measures would you take to secure the best possible results from a fan, the capacity of which is limited and the demands upon which are close to its capacity?

Ans.—Since the fan is being operated, at present, approaching its full capacity, the circulation in the mine can only be increased by cleaning up all air-courses, enlarging breakthroughs, shortening the course of the air wherever this is practicable, and removing every obstruction to the flow of the air current. Wherever practicable, the air current should be divided into one or more separate splits, which will enable a larger volume of air to circulate under the same power.

COAL AND COKE NEWS

For the Busy Reader

Further authority has been conferred upon James J. Storrow, the fuel administrator for New England. He may now divert coal as he sees fit so as to meet any exigencies that the situation may present.

* * *

To coöperate with the Fuel Administration in securing an equitable division of coal, the National Retail Merchants Association has opened an office in Washington. Samuel B. Crowell will be in charge of the Washington office.

* * *

A story comes from Newark, N. J., to the effect that a retail jeweler took a job as a coal-wagon driver. He started out with two tons of coal, which he dumped in his own cellar and then resigned, saying the work was too hard.

* * *

An announcement made by the New York, New Haven & Hartford Railroad Co. states that during the 11 months ended Nov. 30, the road moved 390,505 more tons of coal over its lines than in the same period of 1916. Of this increase, the larger part was anthracite coal.

* * *

Two pounds of seasoned wood have a fuel value equal to one pound of coal, according to experts of the Government forest service. While different kinds of wood have different fuel values, the foresters say that in general the greater the dry weight of a nonresinous wood the more heat it will give out when burned.

* * *

That the Fuel Administration adopted a happy thought in its "tag-your-shovel day" is evidenced by the cordial manner in which the school authorities throughout the country are coöperating. The day set aside for this purpose is Jan. 30. The tagging of the shovel of the governor, the mayors and other officials is a distinction to be awarded those who have earned it by having tagged the largest number of shovels.

* * *

Had the coal production been continued at the rate to which it had been pushed by the Peabody committee, it would have been sufficient to supply not only the entire coal requirements of this country, but in addition would have been sufficient to create a large surplus to relieve the coal shortage of the allied nations. The foregoing is the salient feature in the report on the work of the Committee on Coal Production sent to Congress by the director of the Council of National Defense.

* * *

In the hope of removing the uncertainty as to possible action with regard to coke prices, Dr. Garfield last week made a formal announcement to the effect that there would be no general revision of coke prices during 1918. All contracts and sales of coke dating from Sept. 24 must conform to the Government schedule. Dr. Garfield pointed out that this is not to be interpreted to mean that small outlying operations, where costs are abnormally high, may not be granted exceptions which will permit of the profitable continuance of such production.

* * *

In producing the largest amount of coal and coke in the history of West Virginia—80,547,370 gross tons—394 persons were killed and 993 injured among 88,665 persons engaged in the industry, according to the mining statistics for the fiscal year ending June 30, 1917. These figures exceed those of 1916 by 935,072 gross tons; coke was produced to the extent of 2,533,314 net tons, an increase of 575,682 tons over 1916. The gross tonnage of coke the latter year was 1,957,632 and in 1911, 2,694,047. The value of the coke and coal is established at nearly $183,000,000 and more than $96,000,000 respectively.

* * *

Less coal was carried by the Norfolk & Western Ry. during the month of November last, than during any month since April, 1915, with the exception of February, this year. During the thirty days of the month, 2,434,238 tons of the bituminous product were shipped over this system, as compared with 2,690,016 during the preceding month, and 2,790,178 during November, 1916. Shipments from fields directly along the Norfolk & Western system during November, last, also showed a decrease when compared with the 2,369,026 tons hauled in October, this year, and the 2,271,535 tons carried during the corresponding month of 1916. The total from these fields during the first eleven months of 1917 is 24,800,552, and for the same period of 1916, 25,738,190.

HARRISBURG, PENN.

Presiding officers of the two branches of the Legislature have completed appointment of members of the commissions to study health insurance and to codify the insurance laws. The Health Insurance Commission will meet in Philadelphia, at the call of the chairman.

Senators Beidleman, Dauphin; Weaver, Westmoreland, and Sones, Lycoming; and Representatives Flynn, Elk; Ramsey, Delaware, and Stearn, Philadelphia, were named on the health insurance commission on which Governor Brambaugh named William Flynn, Pittsburgh; William Draper Lewis, Philadelphia, and Dr. J. B. McAllister, Harrisburg.

The inability of coal companies to unload coal cars at Tidewater points due to the low temperature, has caused the sidetracking of thousands of cars of coal in various railroad yards and a tremendous scarcity of cars in the coal regions. The lack of barges to transport the coal to New York and other points has also figured in causing the car shortage. Many of the mine workers contend that the tracks in the various yards of the railroads have been filled for some time by loaded cars waiting to be moved to destination.

The scarcity of the small cars in the mines has also handicapped the miners greatly in increasing the production of coal in some sections. The area of most mines has more than tripled during the last four years but miners say that the supply of mine cars has not increased. The distance a car of coal has to travel from the miner to the surface has greatly increased in many mines, and miners report that cars are so scarce that at various times they are not able to work for at least an hour or two while waiting for another car after one has left them for the surface.

In the bituminous region many of the mine owners continue to blame the railroads for failure to furnish cars and in some of these cases claims have been made that when coal has been shipped it has been held up.

Operators in the Pittsburgh district, for the most part, have completed their November cost sheets and find that production is much more expensive than it has been any month yet under Government fixed prices for coal. Many of the operators assert that if any advance is not granted them soon they will be compelled to shut down their mines. Car shortage is given as the reason for higher cost of production. The operators say their overhead charges are the same if they operate their mines full or in part. The car shortage situation in the district, however, has improved greatly in the last week of the month.

Elimination of cross-hauling is expected to simplify the transferring of coal freight on the railroads. Coal from West Virginia mines will not be taken to Philadelphia, while coal mined in the bituminous section of the state will be shipped south. Every operator will be ordered to ship his product to the nearest market. This will be done through priority orders.

The charges made by Frank C. Reese, a former member of the Legislature from Pottsville, that anthracite operators are inflating their profits by shipping coal to the public containing as much as 20 to 40 per cent. of slate and bone will be investigated by the fuel administrator.

A call for a more universal use of wood for fuel, as advocated by the Federal Fuel Administration, was made the subject of a statement of Mr. Potter on Dec. 31.

Through a slashing of its passenger service, by order of the Government as a war measure, the Philadelphia & Reading Ry., on Jan. 1, will virtually cease as a passenger-carrying road, and will be used until the end of the war as one of the principal freight carriers of the East.

In the vast scheme designed by the newly created Federal War Board at Washington, the Reading, in the broad sense of the war, will lose its identity and will be merged into the great system of railroads under strict Government operation.

The decision to convert the Reading came with unexpected suddenness even to its officials. One official expressed himself, as saying, "the very heart of things was ripped out bodily." Large schemes are in prospect, among them the using of the Reading line from Harrisburg to New York as a short cut to relieve the congestion on the main line of the Pennsylvania. It is understood that much of the freight from the West going over the Pennsylvania will be switched off at Harrisburg to the Reading lines, where it will be carried into New York by way of the Reading, Allentown and thence over the Jersey Central or the Lehigh Valley.

The most important use to which it is expected the Reading will be utilized will come in handling a major part of the coal business. The Reading is the largest anthracite-carrying road in the country. Its 1100 miles of track reach practically the richest coal beds in the state. Strategically situated, it can shoot its product into any center. It has a direct line to Philadelphia; it can reach Chicago and the West by its connections with the New York Central; New York over both the Lehigh Valley and New Jersey Central, which it controls. It can ship to New England or to the South with almost equal ease, either by rail or water.

The first real evidence of Federal control of railroads came on Dec. 31, when the Delaware, Lackawanna & Western R.R. hauled over its line 200 trains of empty Erie coal cars from Bergen Junction to No. 6 Junction, just outside of Scranton, and there turned the cars over to the Erie to be loaded at the mines of the Erie company.

PENNSYLVANIA

Anthracite

McAdoo—It is reported here that the Lehigh Valley Coal Co., which a score of years ago operated the York Farm colliery, in the western part of Schuylkill County, abandoning it because of excessive water and gas, purposes shortly to start removing the culm banks, which, it is estimated, are worth a half million dollars. Repeated efforts have been made by private interests to get possession of these banks, which contain valuable sizes. The Lehigh Valley Coal Co. has but one other interest in the lower anthracite field and that is at Blackwood, several miles further west. This is a profitable operation, which ships annually between 300,000 and 400,000 tons.

Minersville—The Heilner culm bank is to be utilized by the Philadelphia & Reading Coal and Iron Co., which has already installed a steam shovel for the purpose of removing the deposits, which contain much valuable coal of steam sizes, from the Wolf Creek branch to the Schuylkill Haven and Pine Knot breakers, for preparation for market. Valuable banks directly in the town of Minersville near the high school building are also to be removed.

Reading—Reading coal dealers have been given a jolt by local Fuel Administrator Acker, who ruled that persons buying coal and having it hauled away in their own wagons or at their own expense must get a 60c. instead of 25c. discount per ton. The dealers said it cost them $1.50 to deliver a ton of coal, but allowed only 25c. to persons who brought their own vehicles. The allowance of 60c., though better than 25c. a ton, means nothing to the average

consumer. He could not begin to get a man to haul his coal for $1 a ton, vehicles for hire being scarce.

Georgetown—A big drive on the mine workers started on Dec. 26, and will continue for some time, during the payday period. The unions are enthusiastically back of the Red Cross, and have offered to help the movement, and are making an effort to have every union member join the Red Cross. The Lehigh & Wilkes-Barre Coal Co. has requested a thousand more buttons to use along with the 5000 it has already taken.

Shamokin—The fire at the Susquehanna Collieries Co.'s Scott mine, believed to have been extinguished Christmas morning, broke out afresh early on Dec. 27 and is raging fiercely in a solid pillar of coal. An entire section of the mine will be sealed off to smother the flames. The fire is 1800 ft. below the surface, in No. 4 vein, a gaseous portion of the mine. It is the belief of the officials that the fire ate its way through a small leader beyond the range of the heavy streams of water. There, fanned by the air currents, a serious fire developed, necessitating a change of fire-fighting tactics. Once the fire district has been sealed, the company will place the men thus idle in other portions of the mine, in order to keep up the colliery production.

Lansford—The men employed by the Lehigh Coal and Navigation Co. throughout the Panther Creek Valley to work in the mines and collieries, at monthly salaries, received increases of 25 per cent. when the miners received an increase of 35c. a ton for coal mined. The Susquehanna Collieries Co. on Christmas Day presented its office employees and engineers with checks ranging from $10 to $200.

Wilkes-Barre—A washhouse in the yard of the South Wilkes-Barre No. 5 colliery was slightly damaged by fire on Dec. 27. A call was sent in for the city fire department to protect the large breaker, but the fire was put out by the miners before going inside the mines.

Mount Carmel—Through the scarcity of male labor at the mines of the Susquehanna Collieries Co., Mrs. Cora Van Gasken becomes the first weighmistress in the anthracite region. Mrs. Van Gasken has been placed in charge of weighing coal at the Cameron colliery. At the same time the company announced the appointment of seven other women and girls in clerical positions.

Edwardsville—The Kingston Coal Co. on Christmas Day presented scores of children and widows of miners who had been killed in the mines of the company with cash donations, sweaters, reefers, gloves and other articles of clothing.

Bituminous

Holidaysburg—James Hutton, Sr., a Philadelphia banker, on Dec. 26 purchased the Homestead mine in Clearfield County. Its output of coal will be solely used to keep the big dye plans in Philadelphia going. Other Philadelphia manufacturers, impelled by the coal shortage, are negotiating the purchase of coal mines in the Allegheny Mountains.

Philipsburg—While the miners' union of Beccaria was meeting on Dec. 24, an attempt was made to blow up the building in which the miners were assembled. The explosion, which did much damage to property in that vicinity, must have been premature. A number of miners found a 12-ft. fuse sputtering its way toward several sticks of dynamite.

Heshbon—The first shipments of coal from the new Stanley mines of the Stanley Smokeless Coal Co., at Dias, were made the past week. It is located on the Cambria & Cresson branch of the Pennsylvania R.R. and shipments can be made via P. R.R. and B. R. & P. John Madill, formerly with the Savan Colliery Co., is general superintendent of the new company. A store building and 25 miners' houses have been built.

Connellsville—The Clark Coal Co. has purchased and taken over all the holdings of the Smithfield Coal and Coke Co., at Outcrop. The deal includes about 100 acres of coking coal, 34 coke ovens and the entire mining plant. E. C. Higbee is president of the new company.

Indiana—Vernon F. Taylor, of this city, has sold two of his new operations. The Caldwell Smokeless Coal Co. mine and the Black Lick Coal and Coke Co. mines located on the Black Lick branch of the Pennsylvania R.R. have been sold to Campbell, Peacock & Kinzer, of Philadelphia. The new owners will enlarge the plants and greatly increase the tonnage of both mines. The consideration was not made public.

Plumville—It has just been made public that the Consolidated Coal and Coke Co. has purchased 31 tracts of coal land in South Mahoning and Washington townships, Indiana County, containing about 5000 acres of coal. The company has also purchased several houses in Plumville and the surface of the A. H. Miller heirs' farm, where it will erect a modern mining town. Work has been started on the construction of a siding connecting with the Buffalo & Susquehanna R.R. The considerations were not made public. Wallace B. Chapman, of Indiana, Penn., is local attorney for the new company.

WEST VIRGINIA

Teter—The electrical plant of the Pleasant Valley Coal Mining Co. is practically completed. It is expected that the plant will soon be in operation.

Downs—Some fine miners' houses are being erected by the Bertha Coal Co. at its plant near Downs, Marion County. About 75 houses are nearing completion. A total of 225 houses are to be erected.

OHIO

Lectonia—A mysterious fire at the Delemore mine is being investigated by Federal agents, it is reported, on the theory that the fire was caused by alien enemies. The blaze destroyed the power house at the mine and crippled the operation to such an extent that it was necessary to close down for the time, thus eliminating 250 tons daily production. The fire was similar in its starting place and effect to several other blazes which have destroyed coal-mining equipment and machinery, forcing shutdowns, and Federal authorities are becoming aroused. Operators are now being urged to throw armed guards around their properties.

Parlett—The Wayne Coal Co. held a Christmas tree celebration and entertainment for its employees and their families Saturday evening. H. D. Patterson, general superintendent of the company, delivered an address, thanking the men for their coöperative service. A band from Cadiz, Ohio, and a quartet from Pittsburgh furnished music. Every one of the 600 guests received a gift at the close of the celebration.

INDIANA

Brazil—The new mine of the American Coal Co., of this city, which is being sunk south of Bicknell, will be the largest in the state and will have no boiler house. The machinery will be operated by electricity supplied from a power station at Edwardsport. The mine will have a normal daily capacity of 5000 tons, as compared with 3000 tons a day, the normal capacity of the present American Coal Co. mine No. 1, southwest of Bicknell.

ILLINOIS

Carlinville—Construction work at the proposed site of the two new coal mines of the Standard Oil Co., six miles northeast of Carlinville, is progressing favorably in spite of the cold weatner. A gang of Italian workmen are engaged in laying and surfacing tracks from the Chicago & Northwestern R.R. to the yard tracks of the proposed mines. Houses are to be built to quarter the laborers during the period of construction. A boarding house and commissary will be installed as soon as the houses are finished.

Cuba—The work of opening the coal mine on the Lacky and Vliet farm is progressing nicely. William Gagg is superintending the work. A large amount of coal has been located in the vicinity of the mine.

Christopher—A commission has been appointed to investigate the recent explosions that have occurred lately in the coal mines of southern Illinois. The personnel of the commission is as follows: Coal Operators—Rice Miller, of Hillsboro; James Forester, of DuQuoin, and Archibald McLaren, of Marion. Miners—Ben Firth, of Gillespie; T. J. Reynolds, of Collinsville, and Thomas Clayton, of Benton. Department of Mines and Minerals—Frank Rosbottom, of Benton; Joseph Thompson, of Murphysboro, and T. Bannister, of Herrin.

Zeigler—The Zeigler mine, in which an explosion occurred three weeks ago, killing 17 miners, has been sealed since the explosion and, according to Evan John, director of mines and mining, cannot be reopened for about two weeks. Seven hundred men are out of work. It is expected that the Christopher mine, in which there was an explosion more recently, will be ready for reopening in a few days.

Staunton—The Consolidated Coal Co., threatened with water shortage by the exhaustion of its reservoir supply, is sinking wells in the hope of obtaining a sufficient supply, and is also preparing to pipe water from Cahokia Creek.

Edwardsville—Drills have been placed in operation on the farm of Rudolph Frickenstein, east of here, in a large development enterprise financed by a syndicate. Six borings have been made, but the results will not be divulged until the data have been laid before the syndicate members for final action. The tract on which options have been taken contains about 12,000 acres.

Granite City—Steps are being taken to organize a coöperative society and open a store here. Duncan McDonald, secretary of the Central States Coöperative Society, is advising with local union leaders.

Foreign News

Brantford, Ont.—A municipal coal-distributing office was opened on Dec. 24 under control of an Advisory Committee, on which the coal dealers are represented. All consumers must obtain orders from the municipal office on a dealer and none are served who have more than a week's supply on hand. Orders are only issued for one ton to one-quarter-ton lots. Purchasers are permitted to name their dealer and if he has none on hand the order is placed with the nearest point of distribution.

Toronto, Can.—The Canadian Board of Railway Commissioners at Ottawa has given a decision authorizing a general increase in freight and passenger rates. The reason assigned is the higher cost of coal labor and materials. Passenger rates are increased 15 per cent. with the exception of British Columbia, and freight rates approximately 10 per cent. in the West and 15 per cent. in the East, subject to certain specific limitations. On coal a flat increase of 15c. per ton is allowed, it being considered that this will bear less hardly on the consumer than a percentage increase. In the Western hearings held by the Commission the evidence was to the effect that a flat increase was preferable to the percentage asked by the railways. The date on which the increased rates will come into effect is not specified, as the railways will have to file new tariffs based on the judgment which must receive approval. This may require some weeks.

Berne, Switzerland—In anticipation of having to struggle along with 200,000 tons of coal less a month, the Swiss Government has cut to the bone the railroad traffic, raised rates and made it so difficult and so expensive to travel that only necessity is apt to induce a Swiss to move from one part of his tiny country to another. This step is due to the fact that Germany's initial delivery for September, under the new economic agreement, has fallen many thousands of tons short of the promised minimum of 200,000. The Swiss government also has issued drastic regulations concerning heating. The sale of certain types of electric stoves was forbidden, while electricians were forbidden to install new switches and lines such as would be necessary for utilizing stoves. Hotels and mansions may heat only one-quarter of their rooms and must close their cafes and restaurants at 11 instead of 1 o'clock. The hours of opening stores are reduced.

Personals

H. K. Stauffer, who has been associated with B. Nicoll & Co., 149 Broadway, New York City, as special agent, in charge of the concern's Johnstown office, has been appointed manager of the Pittsburgh office.

F. E. Bedale, Mount Pleasant, Penn., has been named inspector of bituminous coal mines for the compensation insurance authorities at Johnstown. Mr. Bedale succeeds Malcolm MacDougall. Headquarters will be at Harrisburg.

Charles Hall, secretary of the Indiana Coal Bureau, with offices at Terre Haute, Ind., has resigned his position, effective Feb. 15. He has been chosen head of the Bledsoe Coal Co., of Terre Haute. His successor has not yet been selected.

A. S. McQueen, of B. Nicoll & Co., 149 Broadway, New York City, has resigned his position with that firm to take up business on his own account. He will be associated with W. W. Keefer, First National Bank Building, Pittsburgh, Pennsylvania.

W. S. Blythe, of Homer City, Penn., superintendent of the Tide Coal Mining Co., has been promoted to general superintendent of the mines of the Tide Coal Mining Co. and the Coal Run Mining Co. mines. Mr. Blythe will have his headquarters at Indiana, Pennsylvania.

George S. Cokley, superintendent of Cummings shaft, of the Jefferson and Clearfield Coal and Iron Co., has been made superintendent of the mines of the Tide Coal Mining Co., at Homer City, Penn. Cummings shaft has been placed under the supervision of W. M. Downer, superintendent of the Ernest mines of the Jefferson and Clearfield Company.

Joseph Cochrane, formerly superintendent of the Burrell mine, at Firestone, Colo., has accepted a like position at Klondyke mine, of Pike View, Colo. Mr. Cochrane is a mining engineer of considerable experience. He had charge of the Puritan mine during the sinking and equipping, and was then transferred to the Monarch No. 2 mine, owned by the same company, the National Fuel Co. At the examination held in Denver last July for mine inspector, Mr. Cochrane was second highest in percentage.

Obituary

Paul B. Cosgrove, partner in the firm of Cosgrove & Co., one of the best-known coal-operating organizations in the country, died Dec. 21, in Johnson City, Ill. Mr. Cosgrove, though only 28 years of age, held an enviable place in the coal world. He is survived by his mother, a sister and three brothers.

James A. Phillips, of Cleveland, Ohio, who was recognized as a man of honor and integrity among the coal dealers of Ohio, passed away on Wednesday, Dec. 26. Mr. Phillips was at one time manager of the Windsor Coal Co. and the Steiner Coal Co., and for the past three years had been with the Lake City Coal Co. His death is keenly felt by his friends and business associates.

John Thomas Morgan, president of the East Pratt Coal Co., of Birmingham, Ala., died at his residence in that city on Dec. 25, after a brief illness. Mr. Morgan had been in the Birmingham district for the past 40 years, most of which time he was engaged in the development of coal-mining interests, and owned valuable coal lands in Bibb County in addition to properties of the East Pratt Coal Co., in Jefferson County, on which is located the Clift mine.

Lafayette Lentz, aged 89, a prominent resident of Mauch Chunk, Carbon County, Penn., and well known throughout the anthracite coal region, died on Dec. 29 of general debility. He was born in Northampton County, but spent nearly all his life in the Panther Creek Valley. Mr. Lentz had a wide reputation as a coal operator and railroad builder, doing most of the work in driving tunnels for the Lehigh Valley R.R. and successfully completing contracts for several other large railroads. In 1868 he became extensively interested in coal-mining operations and was active in the firm of Lentz, Bowman & Co., Lentz, Lilly & Co. and also the firm of L. A. Riley & Co., operating mines at Park Place.

New Patents

Briqueting Machine. T. Gilmore, Jr., assignor to General Briqueting Co., New York, 1,247,667. Nov. 27, 1917. Filed Feb. 6, 1917. Serial No. 146,873.

Fuel Saver and Smoke Consumer. L. D. West, Denver, Colo., 1,247,761. Nov. 27, 1917. Filed Nov. 15, 1916. Serial No. 131,416.

Dump Car. W. L. Burner and J. D. Benow, assignors to Kilbourne & Jacobs Manufacturing Co., Columbus, Ohio, 1,247,412. Nov. 27, 1917. Filed Jan. 8, 1917. Serial No. 141,252.

Furnace Construction. C. A. Hammel, Los Angeles, Calif., 1,248,321. Nov. 27, 1917. Filed Oct. 9, 1916. Serial No. 124,635.

Mechanical Stoker. G. O. J. Kleven, Salt Lake City, Utah, 1,247,969. Nov. 27, 1917. Filed Nov. 15, 1916. Serial No. 131,575.

Ventilated Interlocking Clinker Bar for Furnaces. O. C. Woolson, New York, N. Y., 1,248,048. Nov. 27, 1917. Filed Aug. 10, 1916. Serial No. 114,117.

Automatic Stopping and Releasing Device for Mine Cars. G. M. Johnson, McDonald, Penn., 1,249,106. Dec. 4, 1917. Filed July 6, 1917. Serial No. 178,998.

Coal-Delivering Apparatus. G. W. Freeland, assignor to Williams, White & Co., a corporation of Illinois, 1,248,473. Dec. 4, 1917. Filed Oct. 10, 1914. Serial No. 866,008.

Publications Received

Cost Accounting for Oil Producers. By Clarence G. Smith. Department of the Interior, Bureau of Mines. Bulletin 158, Petroleum Technology 43. Unillustrated, 117 pp., 6 x 9¼ in.

Blast-Furnace Breakouts, Explosions and Slips, and Methods of Prevention. By F. H. Willcox. Department of the Interior, Bureau of Mines. Bulletin 130. Illustrated, 267 pp., 5⅞ x 9¼ in.

New Tertiary Mollusca Occurring in New Zealand. Accompanied by a few notes on necessary changes in nomenclature. Part I. By Henry Suter. New Zealand Department of Mines, New Zealand Geological Survey. Palaeontological Bulletin No. 5. Illustrated, 93 pp. of text and 13 plates, 8½ x 11 in.

Industry, Society and the Human Element. A Few True Detective Stories That Are Interesting and Instructive. Sherman Detective Agency, Inc. Illustrated, 80 pp., 6¼ x 9¾ in.

This eighty-page book explains the successful methods which Mr. Sherman employs in eliminating discord and promoting harmony between employer and employee. It contains many features valuable to executives at this time and will be sent to executives who request it on their corporation's letterhead. The main offices of the "Sherman Service" are at 20 Broad St., New York City; 208 So. LaSalle St., Chicago, Ill.; 10 State St., Boston, and 42 Church St., New Haven, Conn.

Industrial News

Harrisburg, Ill.—The Saline Gas Coal Co. has been incorporated with a capital stock of $150,000. The incorporators are John H. Crawford, Homer Collier and J. M. Hunsaker.

New York, N. Y.—At a meeting of the board of directors of the Worthington Pump and Machinery Corporation, 115 Broadway, New York, C. P. Coleman was elected as the company's president.

Lincoln, Ill.—The Logan County Fuel Committee has allowed an increase of 30c. a ton for coal at the mines of the county, for local use, making the price $2.95 instead of $2.65. The delivery charge is 60c. a ton.

Columbus, Ohio—The Olmstead Coal and Mining Co. has been incorporated with a capital of $125,000 to mine and sell coal. The incorporators are R. E. Westfall, E. K. Merwine, N. K. Bales, A. G. Price and James Judge.

Gowan, Okla.—The No. 2 Coal Co. has been organized with a capital stock of $10,000, for the purpose of developing some coal-land leases in this section. The incorporators are W. K. Hudson, W. H. Watson and J. G. Anderson, all of Gowan.

Niantic, Ill.—The Carbon Coal Co. has applied for incorporation papers in Illinois. The capital will be $100,000. David W. Beggs, Jessie M. Corzine, Frank D. Shields, Daniel Macknet, Chester W. Russell and Benjamin W. Waggoner are interested.

Columbus, Ohio—Ohio operators are now working on the priority order of Ohio Fuel Administrator Johnson, which compels operators to load for public utilities, state and county institutions and domestic users until a two weeks' supply has been obtained.

Flemington, W. Va.—The Aster Coal Co. has been incorporated with a capital stock of $50,000 to operate mines in Taylor County. The incorporators are D. J. Carter, Harry W. Sheets, C. E. Cocke, B. B. Jarvis and G. D. Derltuc, all of Clarksburg, West Virginia.

Grafton, W. Va.—The Liberty Mining Co. has been incorporated with a capital stock of $20,000 to operate mines at Powell, Marion County. The incorporators are Edmund L. Sawyer, David L. Ross, John J. Henchner, Hugh Warner and Jed W. Robinson, all of Grafton.

Columbus, Ohio—The Ohio Public Utilities Commission has issued orders for railroads to supply wagon mines with open-top equipment. Previously orders were issued to supply only box cars to wagon operations. There are approximately 700 wagon mines in Ohio.

Athens, Ill.—The Athens Coal Mining Co. has been incorporated under Illinois law to mine and sell coal, lease, purchase and deal in coal lands and coal rights and to transact a general mining business. Joseph Hann, S. H. Cummings and Thomas W. Kenyon are the directors.

War, W. Va.—The Underwood Pocahontas Coal Co. has been incorporated with a capital stock of $100,000 to operate mines in McDowell County by H. M. Burke, F. W. Truscott, of War; C. H. Truscott, of Cleveland; George Morrow, of Charleston, and J. E. Jones, of Switchback, West Virginia.

Bokoshe, Okla.—The Gunther Coal Co. has been organized and its charter has been filed in the office of the Secretary of State at Oklahoma City. The company is capitalized at $100,000 and the incorporators are: A. P. Gunther, of Kansas City; E. R. Jones and L. W. Randolph, of Muskogee.

St. Louis, Mo.—State Fuel Administrator Crossley has issued orders that coal cars reaching St. Louis in the morning must be unloaded the same day and the railroads must haul the empties away that night. Coal dealers are asked to report failure of the railroads to promptly remove the empties.

Hillsboro, Ill.—The coal properties of the Chicago & Eastern Illinois Railroad Co. were sold under foreclosure recently in favor of the Central Trust Co., of New York. The holdings consisted of two mines at Witt, Ill., and was bid in by the trustees for the bondholders, for debt, interest and costs.

Springfield, Ill.—The Sangamon County Fuel Committee has fixed $3.75 as the maximum price to be charged consumers, made up as follows: Price at mouth of mine, $2.65; allowance to operator for delivery at wagon chute, 30c.; delivery to consumer, 80c. The price has been approved by State Fuel Administrator Williams.

Pemberton, W. Va.—The Beard Smokeless Coal Co. has been incorporated with a capital stock of $100,000 to operate mines in Shady Springs district, Raleigh County. The incorporators are Prince E. Lilly, John R. Hornbrook, of Lillybrook, W. Va.; C. E. Lilly, of Fioco, W. Va.; Frank Beard and Estel Bryant, of Pemberton.

Charleston, W. Va.—A corporate charter was issued by the Secretary of State to the Cabin Creek Block Coal Co., of Ronda, W. Va., to operate mines in Kanawha County; capital stock, $100,000; incorporators George W. McClintic, W. G. Mathews, B. Stanley Gill, J. R. Hayes and B. D. Truslow, all residents of Charleston.

Coulterville, Ill.—The McKinley Coal and Mining Co. will install a million-dollar plant in this vicinity, where it has 1666 acres of land. The company has two veins of coal, running 6 ft. deep. The mine will be on the Illinois Southern R.R. and will be two miles from the Illinois Central. From 3000 to 4000 tons a day will be mined.

Lima, Ohio—Because of a shortage of coal, the entire City of Lima has been in darkness for a week. The electric-light plant was compelled to shut down, and as a result all street lights and lights in 2000 homes were turned off. There was considerable suffering from lack of coal reported in certain sections of the city.

Norton, Va.—The MacClanahan Coal and Coke Co. has been incorporated with a capital stock of $30,000 to operate mines in Wise County, Virginia. The incorporators are William MacClanahan, of Tralee, W. Va.; K. S. MacClanahan, of Amigo, W. Va.; F. S. Kits, of Beckley, W. Va.; Eli Noneff and W. S. Thompson, of Mullens, West Virginia.

Clayton, Mo.—St. Louis County coal dealers are getting just about half the cars of coal that are shipped to them. Since Dec. 1, according to Samuel Hodgdon, chairman of the County Fuel Committee, the dealers have received 63 cars, and 64 cars are in transit. He says that a car loaded at Herrin, Ill., for the Clayon Supply Co. has been on the tracks there 21 days.

Buffalo, N. Y.—In connection with the taking over of the Niagara Falls water-power plants, it is stated that the Government has asked the Buffalo General Electric Co. to build on the Niagara River below this city a 50,000-hp. steam plant in addition to the one which it already has there. All will be used to generate electricity for operating street railways and electric-light plants.

Pana, Ill.—State Fuel Administrator Williams and County Fuel Administrator Hoover have been investigating alleged excessive charges by the three Pana coal-mining companies. Testimony has been taken under oath and comparison is to be made with rates charged elsewhere. It is alleged that

the companies have been charging more than companies at Staunton, Gillespie and Springfield.

Fairmont, W. Va.—Coal men of Fairmont and vicinity gathered at the Fairmont Hotel, Jan. 2, when a club was organized similar to those existing at other coal centers. It is to include coal men from every mine in Marion County and nearby points, who will dine together once a week with a view of exchanging ideas. A. Brooks Fleming, Jr., of the Consolidated Coal Co., was active in the formation of the club.

Reading, Penn.—Ernest J. Poole, general superintendent of the Carpenter Steel Co., has sent to every one of his 2200 employees who in any way handles fuel a letter asking him to aid in a program of coal saving. The company is working night and day. It must have 5000 tons of coal a month, and in the face of a serious shortage every fireman, heater or other man who uses a coal shovel is asked to use the utmost care.

Columbus, Ohio—Mayor Karb, of Columbus, has vetoed the ordinance providing for the establishment of a municipal coal yard, The ordinance was fathered by Councilman Zimpfer, a Socialist member. It provided for the location of the yard on a site between the Hocking Valley and Toledo & Ohio Central tracks. In his veto Mayor Karb said that he believed the Columbus pool will be sufficient to take care of Columbus.

Wheeling, W. Va.—The Liberty Transit Co., organized recently to operate boats and barges on the Ohio River, has completed its organization by the election of J. C. McKinley, president; Charles M. Ketchum, secretary, and Robert Hazlett, treasurer. A long list of directors has been selected. It is planned to operate boats for the transportation of coal and other badly needed commodities. Operations will be started in the early spring.

Benton, Ill.—The Murphysboro & Southern Illinois Railway Co. has made application to the Illinois Public Utilities Commission for permission to issue $63,000 capital stock and $250,000 in bonds to meet the cost of extending the line from Carbondale to Carterville, connecting with the Coal Belt line, or to extend the line on to Herrin through the rich coal fields of Williamson County. The road is now in operation between Murphysboro and Carbondale.

Cincinnati, Ohio—The final decree of the United States District Court in the case of the Ottto Marmet Coal and Mining Co. against Dredgeboat Northern No. 2, with the other parties involved, has been handed down, confirming the report of the special master appointed, and finding that the Marmet company sustained damages of $2775.93, while the dredging company sustained damages of $1663, to be paid by the Marmet company. Costs are divided.

Alton, Ill.—The Alton Fuel Committee has announced that in determining the prices which retail dealers will be allowed to charge for coal the following allowances will prevail: For wastage and stealage, 16c. per ton; for delivery, 75c. per ton; for overhead, 50c. per ton; for net profit, 25c. per ton. As it costs $3.34 a ton for coal on track at Alton, this means a retail price of $5 a ton. An extra cent or two per bushel will be allowed on sales in smaller quantities.

Columbus, Ohio—The Stalter & Essex Co., of Columbus, has filed charges against the Kanawah & Michigan R.R., alleging that during the month of December only 73 cars were supplied to the mines of the company, which have a capacity of 100 tons daily. It is claimed that other mines on the road have the same percentage of cars and discrimination is not charged. It is charged, however, that the road discriminates against Ohio mines in favor of West Virginia operations.

Morea Colliery, Penn.—The Dodson interests have combined their bituminous, anthracite and real estate purchasing departments under one management. These are now located in the company's new office building at 26 South New St., Bethlehem, Penn. P. J. Malloy will remain purchasing agent, and J. B. Connell, previously general superintendent of Morea and Beaver Brook collieries, is now general purchasing agent and manager, with offices at Bethlehem.

Cincinnati, Ohio—Several local coal companies, including the Reliance Coal Co., as well as several large industrial consumers, have complained of the action of Wiley B. Bryan, of Louisville, Kentucky fuel commissioner, in confiscating in Kentucky coal consigned to them, charging that this action has resulted in suffering in Cincinnati. The matter will be caried direct to the Federal Fuel Administration in order to prevent further diversions of Kentucky coal en route to Cincinnati.

St. Louis, Mo.—St. Louis coal operators have donated 26 cars of coal to be distributed to the city's poor. The donations were obtained by a committee of the St. Louis Coal Club, of which John Henderson, of the West Virginia Coal Co., was chairman, and reported to E. J. Wallace, secretary of the club. The value is between $3000 and $3500 at the mine, freight $780 and delivery $520. Jobbers are to absorb the freight charge and dealers will make the deliveries free on the orders of the charity organizations.

Columbus, Ohio—The Columbus Coal Shippers' Terminal Pool Association, of which B. F. Nigh is manager, was launched Jan. 1. Blanks had been sent to all shippers to the pool and offices were opened in the Brunson Building. C. W. Pinney, an expert railroad man, was selected as chief assistant to the director. Charles Moriarity, the director of all the pools in the Middle West, is expected to arrive in Columbus soon. Classifications of all coal to be handled by the pool has been made and all details of accounting have been arranged.

Troy, N. Y.—A vein of soft coal was struck at the Watervliet arsenal on Dec. 27 by workmen who were making an excavation for a new shrinkage pit. The find was made at a depth of 125 ft. and is regarded as genuine bituminous coal, responding to the usual tests. The deposit is located so far down as to preclude what was found being coal from the gun foundries scattered about the reservation at some previous time. The find is looked upon as of the highest importance because the scarcity of soft coal has been felt with particular severity in this locality.

Salt Lake City, Utah—The State Fuel Administration announces the opening soon of three new Utah mines: The Weber, near Coalville; the Wattis, in Carbon County, and the Peerless, of the Standard group, also in Carbon County. In addition, coal deposit owners at Fillmore and Cedar City are urging railroad connections. The Weber is owned chiefly by Clarence and Ernest Bamberger, of Salt Lake City, and is well equipped with modern machinery. The Wattis, financed by Wattis & Wattis, of Ogden, is expected to ship a dozen cars daily after Jan. 1.

Carbondale, Penn.—The Delaware & Hudson Coal Co., in an effort to assist in relieving the coal shortage, has adopted a plan which provides for the taking of all outside workmen from collieries between Plymouth and Carbondale and putting them at work loading cars for shipment. This plan will be followed out Saturday afternoons and every Sunday and whenever the collieries are not working. It is estimated that at present the company has about 200,000 tons of coal in its storage plant which it is impossible to move to market on account of the lack of labor and cars.

Princeton, W. Va.—E. B. Farley, of Spanishburg, and Mayor Davis Thorn, of Princeton, filed suits recently against a group of coal companies for $10,000 damages each, alleged by reason of dumping of cinders into Bluestone River to be washed onto the plaintiffs' farms. A number of settlements between coal companies and Bluestone land owners in the past few years have been made on the same grounds, it is said. The defendants to these two suits are the Crystal Coal Co., American Coal Co., Louisville Coal Co., Ennis Coal Co. and the Turkey Gap Coal Co.

St. Louis, Mo.—Edward A. Fresen, fuel administrator of Madison County, Illinois, has put a stop to mine owners in his territory organizing real or make-believe retail concerns for marketing their output. He found operators in Edwardsville selling coal at $3.75 a ton. They explained that they had organized retail companies which had contracted for their entire output. He gave them until the following morning to dissolve their retail companies, with the alternative of having a Federal agent take charge of the mines. By the next morning the retail companies had been dissolved and the mines were selling at the legal price.

Jefferson City, Mo.—In order to prevent confiscation by railroads of coal shipments destined to points in Missouri and Kansas, an agreement has been reached between the fuel administrators of the two states, representatives of the railroads and officials of the Southwestern Coal Operators' Association that such shipments shall be labeled "Emergency." Stickers bearing the words "Emergency Shipment" are to be attached to the waybills and the cars. It has also been decided to forward to Robert S. Lovett, director of priority transportation, a joint protest against the requisitioning of equipment from Western lines for the Atlantic seaboard.

Evansville, Ind.—Articles of incorporation for the so-called municipal coal mine of Benjamin Bosse, mayor, were filed in the county recorders' office here recently. At the same time Mayor Bosse incorporated another mine at Buckskin, Gibson County, which he will operate as a private venture in partnership with Walter Korff. The "municipal mine" will be operated by the Bosse Coal Co., the incorporators being Mayor Bosse, Walter Korff, manager, and John R. Brill, city attorney, as attorney. The capital stock of the company is placed at $100,000. The mine is being opened near Chandler, in Warrick County, a few miles east of here.

Cincinnati, Ohio—Heavy ice in the Ohio River, which has formed gorges at several points, is not only barring further river traffic for the time being but is threatening seriously the coal supply of various river coal companies, stored in barges along the Ohio. No sudden break in the gorges, similar to that of some days ago, has yet occurred, but if a thaw should happen in a few days some similar difficulties will be encountered. On the other hand, companies receiving their coal by river have little coal left on hand, on account of the interruption to river shipments for some days past. The ice is very deep and runs from above Cincinnati to Madison.

Columbus, Ohio—On recommendation of George C. Holt, referee, judgments in the amounts of $2,757,465 and $86,576 against the Hocking Valley Railroad Co. were filed in New York in favor of Daniel E. Pomeroy, Walter Buckner, Lewis L. Clark and Stacy G. Richmond. It was alleged that the railroad company had guaranteed payment of 3500 bonds for $1000 each issued by the Kanawha & Hocking Coal and Coke Co. in order to facilitate the sale of the bonds. About two-thirds of the bonds passed into possession of the plaintiffs, who sued upon the railroad company's guarantee when the coal and coke company failed to meet its mortgage obligations.

Greensburg, Penn.—An agreement for the consolidation of the Westmoreland Coal Co., the Penn Gas Coal Co. and the Manor Gas Coal Co., dated Dec. 4, has been filed in the recorder of deeds' office here. The directorate of the three companies is identical. The main offices of the companies are in Philadelphia, while the mines are located in Westmoreland County. The name of the merged company will be the Westmoreland Coal Co. and its officers and directors will be: President, S. Pemberton Hutchinson; vice president, George McCall; secretary, Howard R. Yearsley; treasurer, Herman Roll, all of Philadelphia. The company has been recapitalized at $10,000,000.

Cincinnati, Ohio—Col. Lansing H. Beach, of the United States Corps of Engineers, in charge of river improvement on the Ohio, has asked the aid of the Chamber of Commerce in a plan for compiling statistics showing the probable amount of freight which is available for river shipment, in order to encourage the formation of companies to operate boat lines on the Ohio. The Government, through the engineers and local commercial bodies, intends to coöperate with shippers by using every effort to secure for them facilities for moving freight by river, in view of the heavy congestion of traffic on the railroads. The Chamber of Commerce, through its traffic bureau, is responding by making a thorough canvass of Cincinnati business men, and a large mass of data on the subject will be collected.

Dallas, Tex.—Coal operators of Oklahoma and members of the Choctaw and Chickasaw Indian tribes are much elated over the passage by the National House of Representatives of the bill by Representative Carter, of Oklahoma, providing for the sale of the mineral lands in Oklahoma owned by these two tribes. Coal operators believe the sale of these lands, amounting to more than 400,000 acres of coal lands located in the vicinity of McAlester and several thousand acres of asphalt deposits near Ardmore, will greatly stimulate the coal-mining industry in Oklahoma. Approximately 100,000 acres of the coal lands are now under lease, but the remaining 300,000 acres are undeveloped. An appraisement made some years ago placed a value of $12,000,000 on the coal available on this land. Under the terms of the bill, the Secretary of the Interior is authorized to formulate rules and regulations for the sale. The appraisement is to be completed six months after the appointment of appraisers. The lands are to be advertised and sold at public auction 90 days after the report of the appraisers has been submitted. At the expiration of the first year, the remaining unsold land and any forfeited land is to be again offered for sale to the highest bidder. An appropriation of $50,000 is made to cover cost of appraisement and sale of the lands.

MARKET DEPARTMENT

GENERAL REVIEW

Excessive cold causes sharp increase in domestic demand. Industrial conditions in New England becoming critical. Government takes steps to relieve local domestic shortage.

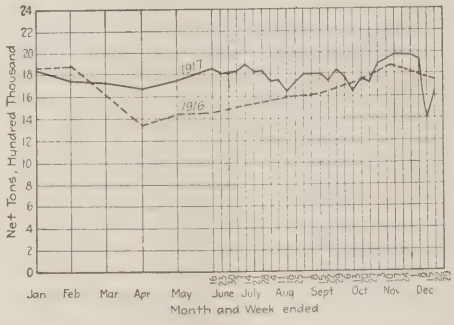
Anthracite—The production of anthracite was naturally slightly curtailed last week on account of the holidays. This curtailment, however, was not as great as is often the case, since many of the miners observed only Christmas Day and did not take the three days to two weeks' lay-off which they frequently do at this season of the year. The intense cold which descended upon the eastern portion of the United States with temperatures in many instances well below the zero mark, and exceptional for this territory, coupled with a decided shortage of fuel throughout the East generally, caused considerable suffering in many localities. So far as is known, little advantage was taken of the stringent conditions by small retailers to boost the price to exorbitant levels. One or two instances of this kind have, however, come to light, and the offenders were promptly arrested. The larger towns and cities, while suffering to a considerable degree, were probably not in as bad condition as some of the country districts. Centers of dense population, such as New York and Philadelphia, may be relieved of coal scarcity much more easily than where the population is scattered. The orders of Secretary McAdoo throwing open to coal traffic the passenger tunnels of the Pennsylvania R.R. under the Hudson River will doubtless do much to relieve fuel scarcity in some of the boroughs of New York City.

Bituminous—The demand for bituminous coal shows no signs of lessening or abating. The steam demand, which has for months been insistent, is now quite as much so as ever. Many industrial plants, some of them engaged in war munition work, have been compelled to shut down for more or less extended periods, while many others are operating on a day-to-day supply. As has been the case heretofore, much of this stringency could be relieved if transportation facilities were available. There is little question but that New England, which ordinarily gets a large portion of its soft coal by water will this year be compelled to ship it in all-rail from the mines of Pennsylvania and West Virginia. There is not, and of necessity will not be, much choice exercised as to the grade or quality of coal to be secured. What is needed is something that will burn and make steam. It makes little difference whether this is slack, run-of-mine or lump. The price is, and has been for some time, an entirely secondary consideration. Transportation facilities have also been considerably affected by the cold weather throughout the Middle West. In this region many mines are working two or three days per week, where the operators and miners would gladly work them six or possibly even seven days per week if cars for loading could be secured. It is yet too early to say what government control of the common carriers will do to relieve the situation, but it is strongly hoped that a gradual improvement will take place. Many schemes have been brought forward, tending toward the conservation of fuel. Among the most prominent means is that of lightless nights. In many cities one or two such nights are observed each week, while it is strongly urged that at least six be observed in the future. Lightless nights at present means the abolition of glaring electric signs and similar electrical displays. In many instances the abolition of street lighting, either wholly or in part might well be followed. It would appear that at least when the moon is full, or nearly so, and the ground is covered with snow, there is little real need for street lighting except at dangerous street crossings and similar localities. Throughout the entire country there is a decided and insistent demand for both domestic and industrial fuel.

A Year Ago — Anthracite stocks at a minimum and the situation is threatening. Negotiations on new bituminous contracts at $3 and better. Railroads confiscating coal and placing more rigid embargoes. A shortage of famine proportions threatened in the Middle West.

COAL PRODUCTION

The depression in the bituminous industry caused by prolonged cold weather continued during the week of Dec. 22. The total production of soft coal (including coal made into coke) is estimated as 9,917,145 net tons. This, although a substantial recovery when compared with the preceding week, was still 10.8 per cent. below the output during the week of Dec. 8. The average production per working day was 1,652,858 tons, as compared with 1,638,513 tons



during mid-August, at the time of the coal strikes in Illinois and the southern Appalachians. Beehive coke reflected the recovery in the entire bituminous industry. The total production during the week is estimated as 545,433 net tons, an average per working day of 90,906 tons. This was still 10.4 per cent. below the production during the week of Dec. 8. Shipments reported by the nine anthracite carriers amounted to 36,060 cars, an increase of 4382 cars over the preceding week. The production of anthracite, however, was still 11.3 per cent. below the mark set during the week of Dec. 8.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

District	Dec. 1	Dec. 8	Dec. 15	Dec. 22
Bituminous : shipments, 114 roads.	182,275	198,161	149,122*	176,695†
Anthracite : shipments, 9 roads...	37,533	40,566	31,672*	36,060†
Beehive coke shipments, 4 roads...	13,055	12,509	10,335*	11,197†

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

The Iron Age—The expected announcement by the President that iron and steel prices would remain in effect for three months longer was made on Dec. 28. With it came the proviso, agreed to at a meeting of steel manufacturers and the War Industries Board held the same day, that on contracts made in the next three months prices would be revised on deliveries after Apr. 1 to conform to any changes that might become effective on that date.

Bradstreets—The big feature of the week is provided by the Government assuming control of the railways, while temporary dullness in trade is the distinguishing characteristic of the post-holiday period. Inventorying is the rule and salesmen are off the road. Christmas buying in the final days of the season was markedly rushed at some markets, but fell behind at others. But underneath all is the fact that the outlook for 1918 is deemed encouraging, though not by any means ultraoptimistic, there being enough uncertainty ahead as regards world politics, not to mention high prices, to dictate caution.

The American Wool and Cotton Reporter—Quiet has prevailed in the wool market for the week under review, owing to the recent Government regulation, the holiday season and inventory taking.

The Dry Goods Economist—Coal shortage still hampers production of war munitions and of merchandise, and while some scattered improvement is noted, the general fuel situation is far from satisfactory.

Marshall Field & Co.—The current wholesale distribution of dry goods for the week shows a marked increase over the shipments for the same period in 1916. The total volume of road sales for both immediate and future deliveries has been in excess of the volume for the corresponding week a year ago. Merchants have been in the market in fewer numbers. Collections continue very good. The market on domestic cotton remains firm.

Atlantic Seaboard

BOSTON

Situation most acute. More serious than public realizes. Said to be only four days' supply in Boston. Many plants inland have shut down and bitter cold causes untold distress in cities. Fuel Administration begins to be definite about relief measures, but many difficulties in the way. Railroads themselves on narrow margins of supply. Frozen coal and ice at loading piers still further impedes shipments. Doctor Garfield's order not unexpected.

Bituminous—The coldest day on record, Dec. 30, and the worst fuel shortage known, suggest in a word the coal situation in New England. Boston retailers are driven to distraction, and on Dec. 31 had in several instances closed their doors to protect their property from angry householders. One small wharf handled 700 people during the day, giving each not over 100 lb. of pea to relieve distress overnight. Police protection is now the regular order at all the wharves where there is any coal. Bituminous is being distributed to consumers who require fuel for heaters, what anthracite is to be had being saved mostly for those who require it for small stove use. The schools have been ordered closed for three days longer. Apartment houses are hard hit by the shortage, as few have bins that are adequate.

Boston is down to 4 days' supply of all kinds, according to reliable information. A great difficulty lies in the unevenness of the supply on the different wharves. A number of dealers are entirely out, while others who have small tonnages are reserving them for their regular trade. These dealers, therefore, do not consider themselves under obligation to distribute to the customers of other dealers, and all-told it is a most acute and anxious situation.

At wholesale, conditions are only better because steam-users have a better understanding of the state the country is in and for them shutting down their plants is their only alternative. In spite of all efforts to accumulate stocks during the spring and summer the railroads themselves are down to narrower margins of supply than the public is aware. Nevertheless the roads are taking a broad-minded attitude and when cargoes are en route to relieve mills and utility plants that have either shut down or are about to, they have been given real assistance. Just recently one of the railroads gave a large paper mill permission to send a crew of men to a storage pile near Boston, 150 miles from the mill, to shovel coal aboard cars, no local labor being available.

Long delays in movement are still characteristic. A barge loaded in New York, Nov. 28, arrived in Providence on Dec. 29 and was then unable to reach the railroad discharging piers because of ice. Coal at Baltimore and all the other loading ports is frozen so hard that freeing cars is accomplished only with the greatest difficulty. Modern handling seems unable to cope with such conditions; the coal literally has to be mined out of the cars.

More than 100 bottoms are reputed to be waiting at Hampton Roads, some of them since early December. Upon cargoes for these boats a large number of plants inland are depending for supply, and conditions are decidedly serious. If there ever was a time when Government efficiency could make a showing, it is now. Officials have complained that they were lacking authority to take necessary steps, and have passed the responsibility from one to another. Now that there is unified control of railroads they are under an agency of the Government and there is opportunity to act.

It is gratifying that state fuel administrators begin to be concrete. The report comes that 500 cars at a congested switch-

ing point on the Western Maryland have been diverted from original consignments and have been ordered to Baltimore via the B. & O. for Curtis Bay piers for loading into bottoms for New England, the coal to be handled by the New England Fuel Administrator and distributed by him on arrival. A further consignment of 1000 cars, assembled from a number of operations from different roads, is reported to be promised for loading at Philadelphia or Baltimore, as may seem advisable. This coal is from West Virginia output, and is understood to come forward on the Government price, although it must be replaced to the original consignees from whom it was diverted to relieve congestion.

However, the New England Fuel Administration will have to find boats and the task will not be easy. The Shipping Board is rumored to have given one steamer at Baltimore for one trip, but coal men are not yet advised about any other boats to load what must approximate 75,000 tons. In effect, the whole arrangement means distribution by the Fuel Administration rather than through the usual channels.

Re-handling plants at Providence and Portland are being strongly advised by local fuel committees to keep such stocks of bituminous as they have for local distribution in place of anthracite, where absolutely necessary. With large plants inland, to which the rehandlers are committed by contract, on the point of shutting down, it is certainly an awkward position to be in. Emergency calls from plants other than those having contracts have had to be turned down, for dispatch at Hampton Roads is not improving. Notwithstanding this, steam users inland from Portland, for instance, are being advised not to seek all-rail shipments but to look to Portland for current supply.

This week, if there are receipts of either anthracite or bituminous by water, there are likely to be cases of seizure under the Lever Act. Single carloads in terminal yards here were seized last week, and distribution made through local dealers.

No quotations are heard in any direction. No one has coal for sale, and the outlook is pretty black. About the only ray of comfort now is the promise of milder weather, with snow!

Doctor Garfield's order of Dec. 24 in connection with the railroad proclamation of Dec. 26, was not unexpected. On every hand in the coal trade there is a disposition to coöperate to the fullest extent. A more complicated situation cannot be imagined.

Anthracite—The Providence, R. I., fuel committee granted an advance of 75c., making the present retail price $10.50 per ton of 2000 lb., sidewalk delivery. This is the largest advance yet reported, and is in recognition of extra costs.

Receipts from Philadelphia are light Tows are much hampered by severe weather while ice and slow dumping interfere seriously with shipments. In New York ports anthracite company barges are lying idle and have been for weeks while the effort was made to meet the exacting demands in New York City.

NEW YORK

New York faces a coal famine. Intense cold wave causes much suffering, but hope is seen in increased receipts and further economies in consumption. Steam coals fail in quantity and office occupants suffer. Bituminous demand increases because of hard-coal shortage. Shipping fails to improve but coal is promised. Drivers threaten to tie up deliveries.

This city has been brought face to face with the most serious coal shortage in its history and what has been feared for some time has become a reality. With the mercury down to 13 deg. below zero, which was 7 deg. lower than any previous mark in the records of the Weather Bureau, the city suffered greatly from the lack of fuel. Efforts were made by everyone in authority to relieve the situation, and although appeals were being constantly made to the Fuel Administrators, nothing could be accomplished. In the meantime the public was in need of coal.

Every effort is being made to conserve fuel and a committee representing the heat, light and power companies, consisting of Louis P. Gawtry, of the Consolidated Gas Co., F. W. Smith, of the United General Electric Co., and C. A. Gillham, of the New York Steam Co., submitted a report to State Fuel Administrator Wiggins recommending six lightless nights a week, Saturday being the only exception, for every city and hamlet in the state. This report, which was made an order, became effective on Wednesday night of this week, and shuts down all advertising signs and will reduce the number of street lights, wherever possible.

The Conservation Committee of the Fuel Administration, headed by Harry T. Peters, of Williams & Peters, is using every effort to ease conditions and have adopted the card system for the purchase of coal. John Whiteley, of Whitney & Kemmerer, a member of the committee, made a tour of the coal docks in the harbor and reported there were sufficient stocks of coal to meet actual requirements but steam facilities were not sufficient to keep the coal moving, while in the city there is not sufficient storage room to safeguard the city beyond a few days at a time. James A. Hill, of the Knickerbocker Fuel Co., No. 1 Broadway, recently added to this committee, will shortly make a report covering the bituminous trade in the city.

Arthur F. Rice, Commissioner of the Coal Merchants' Association, who will have charge of the card distribution in Manhattan and the Bronx, has promised the hearty coöperation of the dealers in the efforts to conserve fuel, and has also written the dealers setting forth the efforts being made to prevent over-purchases of coal and telling them of the coal-card system to be used.

The lack of coal was felt more in the poorer sections of the city, where a tour of the coal cellars showed that more than 50 per cent. of the peddlers were without supplies. Conditions fully as serious prevailed in other sections and dealers instead of delivering coal, disposed of their supplies in small quantities. Sunday was no exception and many of the yards were open, policemen keeping the customers in line to prevent a scramble for coal.

Failure to get coal has driven occupants of flat houses into the police courts for aid, and complaints of over-charging on the part of cellar dealers has caused the Federal District Attorney to order an investigation.

On top of the present conditions the drivers and auto operators have made demands upon the retail dealers which will aggregate increases in wages of about $5 per week. They also want inserted in the agreement a provision whereby they will receive a bonus or present of $5 at Christmas. The matter was referred to the County Fuel Administrator and will probably be adjusted without a strike.

The gas companies benefited by the stringency of the coal situation during the cold wave, demands upon them being increased by 50 per cent.

While it is believed a few days of mild weather will result in New York getting sufficient coal for its immediate needs, there are some who think the situation can best be relieved by a pooling of coal at the various docks.

Production has not been up to expectations. In addition to taking Christmas Day off, employees at some of the mines remained away for the next day. This week there was another holiday and this means a further reduction in production. The output was also reduced during the cold weather of the past week, but all companies made efforts to work steadily.

Secretary McAdoo's orders opening the Pennsylvania's passenger tunnels to coal traffic appears a wise edict. Coal entering Manhattan by this route will not be unloaded within the borough, but will pass under the city to various Long Island points. At Long Island City it may be unloaded and brought back to New York by motor truck over one or more of the East River bridges.

Buyers are ready to purchase anything that looks like coal, not even considering the size.

The scarcity of the steam coals continues and the large consumers are fearful of the outlook. During the cold weather of this week many of the big office buildings were almost without heat and some of the tenants installed oil heaters, while others, on Monday, locked their doors and went home for the day.

Instead of the high quotations for steam sizes, given a couple of weeks ago, most of the prices now asked for individual coals are close to circular. However, there is no coal to be had.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports, are as follows.

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buck	4.30@5.00	5.05@5.75
Rice	3.75@3.95	4.50@4.75
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—These are critical times for the bituminous trade. The situation has grown more serious because of the record-breaking cold wave which settled over this section of the country for four days. There was not a pound of coal available for the spot buyer, and many large consumers with contracts were on the verge of closing down their plants. Some plants did suspend operations.

The contract-making period is drawing close and while no one appears ready to make predictions it is apparent that few operators intend to tie up any large part of their output at the present prices, unless it be with a large consumer whose business they desire to retain. However, the Fuel Administration authorities will supervise all contracts and see that none is made for more than one year.

The shipping situation has not improved, although it was stated in newspaper dispatches that there would be 500 cars available early this week for bunkering at one of the lower ports. Vessels leaving here are from 3 to 5 days late, because of the lack of supplies.

One method of solving the present difficulty in transporting coal from the docks is suggested by labor leaders, who advocate Government control of all tugs, etc., in this harbor.

A freer movement of coal is predicted by many since the Government has control of the railroads. One operator with two mines, one located on the Pennsylvania and the other on the New York Central Lines, received 23 cars out of 138 required during November and December at the mine on the Pennsylvania Lines, and 22 out of 46 required at the other mine on the New York Central for the same two months. The same operator shipped coal about the middle of December, which had not reached its destination on the last day of the year.

The demand for bituminous has been increased by the shortage of anthracite, many users of the latter being anxious now to obtain a supply of bituminous to mix with anthracite culm. Factories working on war contracts have limited supplies. Large consumers of anthracite, city departments among them, have made inquiries regarding bituminous coal, only to be told that the conditions were as bad as in the hard-coal market. Few of the big institutions, including hospitals, have more than a few days' supplies ahead.

Deliveries have been impeded greatly by the heavy ice in the rivers and Bay.

Some shippers contend that the purchaser of the cheaper grades has a better chance of getting his coal than the buyer of the better grades for the reason that if the Government needs coal it will confiscate the better coals first.

PHILADELPHIA

Anthracite trade expects relief through Governmental control of railroads. New retail gross margin causes protest. Individual shippers get top prices now. Intense cold interferes with shipments. New contract forms prepared. Bituminous supply below demand. Car supply unimproved. Some plants closed. Advance in prices still looked for.

Anthracite—The announcement of the Government control of the railroads was received with satisfaction by the anthracite trade. Particularly was this so when it was stated early in the week that the entire Philadelphia & Reading system was to be devoted solely to the carrying of freight, with the elimination of all passenger service, except to a few non-competitive points. This decision was made on account of the Reading being the most important of the anthracite carriers. It is believed that the new plan will remedy the car shortage and that there will be no recurrence of the near-famine which beset the city recently. It will now be possible to send the empties where they are most needed, regardless of the road to whom they belong.

The announcement by Chairman Lewis of the city fuel committee and approved by State Administrator Potter, that effective Jan. 1 the retailers were permitted to increase their gross margin of profit to $2.50 per ton has caused a storm of protest from press and public. After weeks of investigation the authorities decided the dealers were not receiving a fair return on their investments and authorized the advance without giving the press a detailed report of the facts on which their findings were based. They simply stated that the increased expenses of these abnormal times warranted the increase and refused to be drawn into any controversy over it.

It is not believed that the National Administration will interfere with the action of the state and city bodies. In addition to the complaint of the consumers much confusion was caused by the fact that there is not a flat retail price all around. This was thought to be one of the objects of the new ruling, and while that may have been the intention, the fact that the wholesale prices still vary has caused at least

20 different sets of retail prices to be in effect at the same time. This is brought about by there being separate prices for white ash, red ash and Lykens Valley coal as shipped by the companies, with the individuals allowed 75c. above company prices, and then all of these prices further affected to the extent of 20c. a ton on all coal sold on commission, with a still further variation on account of freight rates. In fact the individual shippers who are combatting Chairman Lewis' plan to do away with their 75c. differential, advance this as a reason that even with its elimination the retail prices will be far from uniform. However, under the $2.50 gross margin plan the dealers will now be enabled to go right up to Apr. 1 without changing their prices instead of a change every two weeks as under the former system.

Dealers who may be inclined to charge rates in excess of those fixed by the City Fuel Committee now realize that the committee is in earnest. This week a local retailer was arrested for selling coal at an exorbitant price and brought before the United States Commissioner, who held him in $1000 bail for trial.

There continues to be considerable uneasiness among the independents as to the agitation among the dealers, seconded by the Chairman of the City Fuel Committee, against the differential of 75c. allowed the smaller operators. There are some who express the belief that an adjustment is bound to come, but they hope the present rates will not be disturbed before spring, when an entirely new schedule is expected, especially since the President in his latest statement intimated that he would order a reduction on Apr. 1.

All the anthracite companies are preparing new contract forms in compliance with the recent ruling of Dr. Garfield that such contracts must contain a clause that the contract shall be subject to immediate cancellation at the request of the Fuel Administrator and the coal subject to requisition by the Government. It seems that each move of the Washington authorities brings the matter of Governmental control of the mines more imminent, and the direct intimation this week to this effect by the National Administrator is causing quite an undercurrent of interest throughout the trade.

There is no abatement in the demand for any of the sizes and egg, which in normal times was never much in demand, is now as acceptable as pea, for which the demand is all out of proportion to the other sizes. The steam coals are also particularly active, although operators refrain from charging extreme prices which they no doubt could obtain. Buckwheat, on which size all the companies are far oversold and for which they have ceased taking new business, is being held at $4.15 by the individuals, although some of it is allowed to go through brokers for an additional 20c. The same can be said of rice based on a $3.35 price. Barley is now strong at $2.35, while culm at $1.50 has gained strength. The feature of this latter material is that so anxious are consumers for fuel that trial orders of single car lots are growing frequent, although repeat orders do not average high. Nevertheless there is a growing number of plants which are steadily using it, especially where the equipment is suitable and the element of objection on the part of firemen can be overcome. It is also reported that one of the railroads has designed a type of fire-box on its locomotives whereby a 35 per cent. fuel saving is effected by mixing two parts of crushed bituminous with one of anthracite silt.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for Tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buck	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—Coal is still extremely short. All consumers frantically urge for greatly increased shipments, yet little improvement is noticeable. Recently the weather has been such as to facilitate rail movement, but such a condition cannot be relied upon at this time of year. However, the car supply at the mines does not improve, and the operation that receives as much as a 40 per cent. allotment is indeed fortunate, as most of them report from 10 to 25 per cent.

Many manufacturing plants continue to run on short supply, with shutdowns quite numerous. Among these is the large oil-cloth plant of which State Fuel Administrator Potter is president, which has been closed for an entire week on account of lack of fuel. Up to this time the fuel administration has given little attention to the bituminous situation, the entire time being taken up in placing the anthracite domestic trade on a stable basis. This having been about accomplished its energies will now be turned toward helping the bituminous situation.

About the only activity in the way of spot business continues to be in coal sold for blacksmithing purposes. There is a fair volume of this business being placed and many coals not heretofore regarded as particularly adapted for this purpose are finding their way into this trade. Prices range from $4.50 to $5.75 per net ton, with all orders taken subject to delay.

Some interest was created by the announcement of the National Fuel Administrator that he would supervise all new contracts for the coming year to the extent that he would insist on a clause being written into each one providing for the diversion of coal in transit if so deemed necessary by the fuel authorities. Most shippers are of the opinion that this ruling differs in effect little from the practice of ordering priority shipments; at least it will have the same result. There is little likelihood of any considerable contract business being closed for the new year unless some concession in the way of higher prices is allowed. Rumors of new prices continue to be rampant and there are those who are willing to profess a belief that the new price will be forthcoming any day now. The consensus of opinion as to the increase seems to be that the advance will be from 80 to 90c. per net ton.

BALTIMORE

Baltimore closed the old year and started the new with famine-like conditions for both hard and soft coal. Big industries work part time.

Bituminous—Priority movement having failed largely and been wiped out by Federal order, the consumers of soft coal here faced almost famine-like conditions for the close of the old year and the start of the new. Many of the large corporations, including the street railways and lighting companies, shipbuilding and general war-product works, had from 24- to 48-hour supplies of coal at times. Service was curtailed in numerous cases, and the Bethlehem Steel Co. had to shut down a part of its big plant and shipyard.

Other big shipyards were hurt by failure to get coal or coke, the latter having disappeared from the market, even when given priority shipment rights by the Government. Small consumers were being cared for after a fashion by the contract receipts, or by appeals through the fuel administrator here and his submission of cases to a jobbers' committee. By apportioning these urgent calls the jobbers managed to keep the smaller industries all working, but it was a narrow squeeze at times.

Anthracite—The receipts of hard coal here are still averaging about 20 to 25 cars, against a normal daily need in winter of about 60 cars. The need is really greater because of the shortage heretofore existing. Many homes are heated solely by gas and oil heaters. The poor have been cared for in many cases by bushel sales of soft coal by the city at cost. Numerous institutions and churches are without coal, and there have been consolidations of work in some cases to get fuel results. Throughout the city there were often lines of people at coal yards to get fuel, while some yards were forced to close because they had no more coal to sell. The zero weather over several days caused much suffering, and the death list from pneumonia mounted alarmingly.

Lake Markets

PITTSBURGH

Pittsburgh domestic supply improved. Steel industry still suffers. Improvement from Government railroad control expected to be gradual. No holiday Jan. 1.

The municipal government of Pittsburgh announces that it intends to enforce rigidly the decree for lightless nights, Sundays and Thursdays, all unnecessary illumination to be eliminated. There was a considerable number of offenders last Sunday night and they are to be dealt with as strenuously as possible. The local fuel administration reports a great improvement as to supplies for domestic use, conditions being now almost normal. Relief was afforded chiefly through the receipt of coal by river.

There is a little improvement as to supplies of coal in this general district for plants making munitions, and little production is now being lost on this account. At the steel mills, however, there is scarcely any improvement and at some important works operations are far below normal. The worst case is that of the Republic Iron and Steel Co., the Bessemer department at its Youngstown works having been down for three weeks, there being insufficient coal to operate the finishing departments. This reduces the company's finished steel output by one-half.

Car supplies at mines have been slightly better thus far this week. The holiday, Tuesday, was not observed, either in placing cars or in loading coal, and if the better conditions continue through the week this will be the best week in four for coal shipments.

The view of the coal trade as to Government control of the railroads is that there will probably be a great improvement in coal movement eventually, but that the improvement will be very gradual, for the reason that the railroads must await the formal removal of the legal barriers against pooling. The General Operating Committee was unable to accomplish nearly as much as was expected, because it could not reroute much freight and could not place locomotives on the divisions that needed additional motive power.

Talk of coal shortage has reached such a point that it has gotten on the nerves of the majority of coal operators, who are taking pains now to tell everybody that there is no shortage of coal as coal; it is a shortage of motive power, whereby the coal is at mine instead of where it is wanted. This statement is said to represent precisely the verdict of the meeting of the national association of coal producers held in Pittsburgh last week.

There is scarcely any free coal in the market, but keen buyers are able to pick up odd lots now and then. The market remains quotable as follows: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. additional permitted to be charged when sales are made by brokers.

BUFFALO

Anthracite scarcer. Distribution better. No danger of a famine here this winter. Bituminous threatens to give out. Many plants with small supply. A survey may be ordered.

Bituminous—Every week, indeed every day, the report is that the supply of coal runs shorter. But for the fact that this has been the case for several months one would think there was no coal of account in the country. The fact is that the demand is far more than it ever was before and the amount of all sorts of manufactured goods being produced is immense. A rail trip in any direction will show this to be true. Coal is moving, but not as fast as certain other freight seems to be.

A survey of the bituminous supply of this district will have to be made at once or there may be general disaster from want of fuel. So many people use coal and light carelessly that they become fairly unaware of it and it will take some sort of jolt to stop the practice. An effort is to be made also to obtain Government permission to pay wagon or "country-bank" mines more than 75 cents a ton extra, as it is held that they cannot operate on that differential without a loss.

Most bituminous shippers adhere to Government prices, though it is claimed that all do not. The prices are as follows, per net ton, f.o.b. Buffalo:

	Slack	Lump
Pittsburgh	$3.75	$4.25
Bessemer	3.70	4.20
Allegheny Valley	3.60	4.10

Anthracite—The shippers are not sending much coal this way just now and the severe weather is keeping up the demand. Natural gas runs low and many coal furnaces are not doing much better. December alone has given us as much winter as is sometimes experienced during the whole season and there is time for two or three months more of the same conditions. Anthracite users are becoming alarmed. Canadian retailers throng the Buffalo shipping offices, some coming with the announcement that they intend to stay till they get a supply.

At the same time the shippers feel that they have covered the western anthracite-consuming field pretty well and have no fear of a famine, even if the winter goes on as it has begun. If there is no coal in retailers' yards it is because it has been taken by consumers. The fuel administrator has taken care of all complaints, which do not now come in in as great numbers as they do through the poor office in ordinary winters. Work is so plenty that no one need be idle.

TORONTO

Anthracite in active demand. Coal coming forward freely, but deliveries retarded by labor shortage. Prospective increase in prices.

Cold weather has increased the demand for anthracite for domestic purposes, and dealers are kept busy, deliveries being generally restricted to lots sufficient only for immediate needs. Coal is now coming forward more freely from the mines and transportation conditions are now regarded as fairly satisfactory. The principal difficulty in filling orders is caused by labor shortage, which is still acutely felt in all lines of industry. Prices are firm and for the present unchanged, though an advance of 15 per cent. per ton is anticipated shortly in view of the increase in freight rates.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove, nut and grate, $9.85; pea, $8.85; bituminous steam, $9; slack, $8 to $8.50; domestic lump, $10; cannel, $11; wholesale f.o.b. cars at destination, three-quarter lump, $7 to $7.50; slack, $6.85 to $7.

DETROIT

Steam coal situation is reported temporarily relieved. Domestic supply is short. More than 2600 homes on police list.

Bituminous — Some improvement is reported in volume of incoming shipments of steam coal. Action by President Wilson in placing operation of the railroads under Government control is counted on to remove congestion existing on lines of coal carriers in Ohio and increase the supply of fuel for Detroit. Temporary provision has been made for requirements of the Detroit City Gas Co. and the Detroit Edison Co., both of which were getting low. Henry Ford & Son, tractor manufacturers in Dearborn, a suburb of Detroit, have called on the fuel administration for aid, the company having turned over its fuel supply for relief of some 200 families in the village, who were without coal.

Demand for steam coal continues pressing. One large industrial plant engaged in manufacture of munitions of war was closed a week, because coal was not to be had. Numerous other factories are working on day-to-day supply with the possibility of being obliged to close, ever before them.

Another period of extremely cold weather, with near zero temperature, is causing suffering in homes unsupplied with coal and an increasing consumption of fuel in others.

Anthracite—After more than a week's delay, the work of unloading the cargo of 9000 tons of anthracite from the Lake steamer "B. F. Berry" has been begun by a syndicate of coal men, who with the approval of the state coal administration, have purchased the cargo. The work proceeds slowly and the coal apparently is not reducing the number of orders received by the police department, which, on Dec. 29, exceeded 2600. A small amount of anthracite is coming to Detroit by rail. Efforts of citizens to obtain coal are disappointingly unsuccessful in most cases. Many of the dealers decline to supply those who are not regular customers. This works a severe hardship on numerous families that have come to Detroit during the year.

COLUMBUS

Another cold spell has once more tightened the coal trade in central Ohio. Demand from domestic users is as strong as ever. Fuel committee says the situation is well in hand.

With another cold spell covering Ohio, with temperatures hovering around the zero mark, the coal situation again becomes strenuous. Domestic users are clamoring for supplies and dealers are hard put to it to get supplies and make deliveries. Steam users are also short of fuel and the same is true of all public utilities and institutions. It is believed that the situation in the Buckeye State is as bad if not worse than during the blizzard of several weeks ago. Steps are being taken by the Ohio Fuel Administration through the county committees to relieve the situation.

Under the direction of the Fuel Administration dealers are restricting deliveries to two tons at the most. Because of a shortage of wagons and trucks, many of the purchasers are hauling their own supply of fuel. Consumers are not insisting on any special variety of coal, but are content with any kind or grade. Among apartment houses and office buildings the supply for current use apepars to be adequate. Retail prices are maintained at the levels fixed by the county committee. Retail stocks are not large, but arrivals of cargoes are reported from day to day. The situation outside of Columbus and more especially in the Miami Valley is much worse than in Columbus.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2 70	$3 05	$2 70
Mine run	2 45	2 70	2 45
Screenings	2 20	2 45	2 20

CINCINNATI

Severe weather again prevails, accentuating continued scarcity of coal, due to traffic conditions. The situation is serious.

Another period of severe weather, beginning on Friday, with more snow, has again emphasized the fact that the coal situation is far from settled, and that, on the contrary, the limited production due to the inability of the railroads to furnish cars and move them when loaded has resulted in a severe shortage of fuel of all sorts.

Domestic consumers, who are receiving first attention on account of the suffering that results from a lack of coal for heating, are getting small quantities from dealers, but there is literally not enough coal to go around, even when it is doled out in half-ton lots, as is being done. Many industrial concerns, public utilities, electric railroads, etc., are also facing the necessity of shutting down, and some have already closed on account of a lack of fuel necessary to keep going.

Cincinnati street-car service was interrupted, although only for brief periods, on several occasions recently, on this account, and, since the temporary supply of coal furnished from cars on tracks consigned to Lake ports, released through the cancellation of the so-called priority order, has been exhausted and no similar supply is now available, the present cold weather bids fair to cause more suffering than that which occurred just before Christmas. The situation is calling for anxious thought on the part of the trade, as well as of local and Federal authorities, as no means of relief for the near future is in sight.

LOUISVILLE

Kentucky coal trade receives hopefully news that Government will direct railroads. Priority regulations control industrial coal with little left for non-preferred industries.

The Kentucky coal trade received the news that the United States Government was to take over the railroads hopefully. Things have been so bad where car supply and embargoes have been concerned that the coal operators feel that any change would be an improvement. More cold weather has exhausted practically all of the retail stocks, while the cold has seen another failure of the natural gas supply in Louisville and central Kentucky towns.

Most retailers are a full week behind on deliveries. Inquiries of operators and coal selling organizations made by industrial consumers are numerous. In spite of the fact that there has been a fair supply of cars during the week a large proportion of the operators are not quoting on such inquiries. There is much criticism over the manner of application of the priority rules. One result is to concentrate shipments on one point, with the result that coal is accumulated there in larger quantities than are required and that there is further traffic-delaying congestion.

BIRMINGHAM

Short production last week seriously affects coal supply. Another cold spell causes retail yards to be besieged by householders. Most yards without stocks and but little coal in transit. Steam users clamoring for shipments more vigorously than ever.

Mine workers failed to respond to the earnest requests from the fuel administration and from mine owners to work steadily through the holidays and the production for the past week fell off from 33⅓ to 50 per cent. as a result. This loss in tonnage was seriously felt at this time when coal is badly needed, and distributors were besieged with personal appeals, telegrams and letters urging the shipment of both steam and domestic coal.

Local sales agents and brokers received wires from the fuel administrators of several states asking that coal be shipped to certain points in their jurisdiction and priority orders were also received from the national officials. Many of these requests could not be complied with, as explained by coal men, for the simple reason that they had no coal to meet such demands. Appeals came from many industrial plants, both through personal calls and by wire, stating that they were working on government contracts and were facing loss of time unless relief could be furnished in the shape of more fuel.

Another cold spell the last of the week sent the thermometer down to about 8 deg. above zero and resulted in the cleaning up of what little coal was in local yards. Movement of coal from the mines is slow and cars sometimes stay in local railroad terminals for three and four days before delivery is made to consignees. State fuel administrator S. P. Kennedy has brought to the attention of the national fuel administrator the seriousness of the domestic situation and asked for authority to direct shipments to local yards and other points in the state where the supply is practically exhausted and dealers are unable to secure any coal to supply the suffering public.

Coal operators have worked out a plan for the distribution of coal from each field, which will be submitted to the national administrator and urged for adoption. Briefly, the new method of handling the coal supply calls for the appointment of a distribution committee in each field, which will handle the coal mined in that section. Each coal-producing section will have a member of its distribution committee resident in Washington who will receive from the national fuel director priority orders for coal to be shipped from his respective section and he in turn will forward such orders to his home committee for placing at such mines as can care for the business without interference with the movement of coal being supplied to industrial plants, public utilities and other interests essential to the public and national welfare.

It is claimed that this mode of procedure will secure an equitable and wise distribution of coal, and at the same time avoid the confusion which is now being caused by conflicting priority orders being received from national and state administrators, some of which are cancelled and superseded by from two to three orders before the coal can be billed out to the original consignees.

Coke

CONNELLSVILLE

Car supplies improving slightly. Much blast furnace idleness. Poor quality of coke and explanation thereof. Contracts expiring and coming into force.

Car supplies Monday and Tuesday of this week were 50 per cent. and 30 per cent. respectively, with hopes that the week as a whole will make a better showing than any of the preceding three. Receipts of coke at blast furnaces have perhaps improved a trifle but there is no general improvement distinctly observable, and the best estimate that can be secured is that merchant blast furnace operations average 80 per cent. of capacity while the steel works blast furnaces are averaging 70 to 75 per cent. Close estimates, however, are extremely difficult.

There has been much complaint by blast furnaces of poor coke, consumption per ton of pig iron being claimed to run up as high as 2900 lb., when the standard for the ores customarily used is about 2200 lb. when making basic iron and 2400 lb. when making foundry. If this condition is common it would explain why the reported operation of blast furnaces is lower than would be indicated by the reported shipments of coke, particularly as banking consumes coke without producing iron.

As to poor coke, the operators lay the blame on the railroads, observing that the roads allot cars in proportion to the number of ovens operating. If an operator blows out ovens when he receives less than his requirement in cars, his requirement is thereby cut down, so that the turn-about operations would eventually result in no cars being furnished and no ovens being operated. The recourse is to keep ovens in blast and hold the charge, the quality of which is reduced after 72 hours.

A number of furnace coke contracts expired Dec. 31, these being chiefly agreements that were made for 1917 or contracts that were made first for the half year and then extended for the balance of the year. On the other hand many of the contracts made just before the set price was announced Sept. 24 were only for the period, a year or a half year, beginning Jan. 1. Both operators and furnacemen have been secretive in the past few months as to contracts entered into, but the best opinion obtainable in the trade is that the volume of contract business expiring Dec. 31 is a trifle greater than the volume of contract business coming into operation Jan. 1. As long as production is restricted, however, there is no prospect of much coke becoming available in the spot market. The market remains quotable at $6 for furnace, $7 for 72-hr. selected foundry and $7.30 for crushed, over 1-in., per ton at ovens.

Buffalo—The situation is unchanged, all coke consumers managing to get a supply out of their contracts. As it is supposed not to be possible to renew these contracts the prospect is of at least some of them being out of such coke at the beginning of the year, though most such contracts go on to April. So far as reported no coke has been sold here at the Government prices of $7 for foundry and $6 for furnace at the ovens, yet the complaint of shortage is not heard as is the case with anthracite and bituminous coal.

Middle Western

GENERAL REVIEW

Cold weather continues throughout the Mid-West. Available supply of coal inadequate to meet demands.

During the past week the production of coal has been decreased almost 50% on account of the holiday vacation of the miners and an insufficient car supply, coupled with the cold weather, that has prevailed throughout the Mid-West section. The low temperature that has prevailed almost the entire month of December, has retarded the movement of coal after it was loaded. It has thus increased the demands made on the dealers who in turn naturally look to the operators and jobbers for assistance in tracing and getting to destination delayed shipments. The shortage of hard coal is still noticeable in all sections of the country and in order to relieve this situation it has been necessary for the soft coal producers to make this shortage good. This has been almost an impossibility considering the limited car supply.

The operators everywhere are doubling their efforts to increase production, and hope that shortly they will be able to realize some beneficial results from their energies. According to the statement of Missouri operators the production in that state has been increased, and there is at this time an ample supply on hand at most dealers' yards to care for the immediate needs of their trade. Work in Indiana it is claimed has been fairly good during the past several days, since the Christmas holiday allowed the railroad companies to accumulate sufficient empty coal car equipment to tide the mines over for the remainder of the week. The action of the Government in procuring additional motive power from Western roads, and putting it at work in Indiana has had the effect of increasing the efficiency of some of the coal-carrying roads. At Bicknell the American Mining Co. is constructing one of the largest mines in the state. The new mine it is claimed, will be able to produce 5000 tons daily, and is electrically equipped. The power will be supplied by the Indiana Service Co., from Edwardsport, where a water power station has been built, which furnishes light and power for a wide area in that section of the state.

The situation in Illinois is, what might be considered serious. Railroads are badly crippled, and in need of both cars and motive power. To add to this difficulty, the coal miners have not reported for work during the past week with any regularity, in a manner ignoring the request of the Fuel Administrator that they continue at work throughout the holiday season. In some localities the miners responded nobly but in the majority of cases they did not and as a consequence the production even where cars were to be had slumped badly.

Retailers and steam plants have for months been on hand-to-mouth rations, and it is not necessary to call attention to the results noticeable by one familiar with conditions.

CHICAGO

Situation grows more serious. Many plants fear they will be compelled to shut down. Dealers' yards almost bare.

During the past week there has been no change of any consequence in the Chicago market, because of the little coal available and the congested, and near-paralized condition of the railroads.

In only a few instances has any Eastern coal arrived in this market with the exception of hard coal in limited quantity. This makes this market dependent on Illinois and Indiana and coal from these states has reached destination badly delayed. Every precautionary method possible is being applied to insure the coal reaching here, so that all distressing needs may be promptly and properly looked after. The Fuel Administrator for Illinois, together with his staff of assistants, has been working actively and harmoneously with both dealers and operators, in an attempt to make the half supply go around, with the hope that a better supply will be obtainable in the near future, and conditions thus relieved.

Plans are being perfected for the holding of a large and important meeting of the retail coal men in Chicago on Tuesday and Wednesday, Jan. 8 and 9, under the auspices of the National Retail Coal Merchants Association. Invitations have been sent out to a large number of dealers, and the hope is expressed that the attendance will be large and that dealers from all states in the union will be in attendance. Plans will be discussed for equitably distributing coal, also the best means of aiding the Government in handling this necessary commodity.

Placards announcing that the temperature in buildings should not be permitted to rise above 70 deg., were distributed in Chicago recently by representatives of the Building Managers Association. This is intended as a coal-saving measure, and applies to residences, apartments, office buildings and all hotels. The announcement is signed by John E. Williams and Raymond E. Durham of the fuel administration.

Quotations in the Chicago market are as below, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Washed egg	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	.....	.....	.....	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Hocking	West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Government administrator repudiates his latest anthracite schedule and puts dealers in an unpleasant condition. Conflict of authority in coal administration.

It is evident that a cog slipped recently in the Federal fuel administration machinery, and as a result Milwaukee dealers are busy these days in endeavoring to square matters with their customers by marking down their bills. The last report from this market chronicled an advance of 25c. per ton on all grades of anthracite coal, the same being of effect on Dec. 1. After selling for about ten days under the new order, an edict was received which restored the old schedule and directed dealers to rebate the difference to all purchasers.

This is a comparatively easy matter as far as books are concerned, but to make a refund to cash customers will take a great deal of time and labor, which in these busy days is not relished. The readjustment also involves accounts between wholesalers and retailers. The schedule as corrected is as follows: Nut, $9.45; stove, $9.35; egg, $9.10; buckwheat, $7.55.

A conflict of authority between coal administrators is threatening Wisconsin's coal supply. W. E. Overman, of Minneapolis, was recently appointed fuel administrator for Wisconsin, Minnesota and the Dakotas, and one of his first acts was to order anthracite coal shipped from Wisconsin to the other states named, notwithstanding the objections of W. N. Fitzgerald, the fuel administrator for Wisconsin. The latter appealed to Gov. E. L. Philipp, who at once wired a vigorous protest to Fuel Administrator Garfield, at Washington. Governor Philipp has requested Mr. Garfield to rescind Mr. Overman's orders and allow the present Wisconsin fuel administrator to decide how much coal can be spared. The outcome of the controversy is of great moment to coal consumers.

ST. LOUIS

Situation growing critical. No equipment and transportation facilities extremely bad. Mines working one or two days a week, no storage coal ahead, and everything on a day-to-day basis. No Eastern coals.

Seasonable weather with a temperature around the zero mark and the railroads almost out of commission is bringing St. Louis face to face with an actual coal famine. For the past week the railroads have failed signally, not only in the handling of loads but empties as well, and many mines have been idle for three days at a time on account of no equipment.

The coal trade rejoices at the fact that the Government has taken over the railroads. The only solution of the coal problem in the Middle West is in the betterment of transportation. With the railroads properly controlled and conducted, there would be no coal shortage in this region such as exists today.

It may be that there would have been an unusual demand, but it is a certainty that at least 20 per cent. more coal would be on the market if the roads were under a management that got good efficiency out of the equipment.

It is sincerely hoped that the new order of things that went into effect at noon on Dec. 28 will mean a change for the better. Conditions could scarcely be worse than they are now.

The steam plants in and around the city have not over 24 hours' coal supply ahead, and are depending upon the daily supplies brought in.

There is no coal ahead in the retail yards and they are depending upon arrivals from day to day. The consumer is practically on a hand-to-mouth basis, getting coal in small quantities, taking anything he can get. The city is conducting its municipal coal yards in the congested sections and selling coal for 16c. a bushel. This has helped out the poorer sections wonderfully and if it is continued throughout the winter will eliminate a great deal of suffering.

Cars are unloaded promptly by all consignees in the city, although help is scarce.

In the Carterville field there has been an unusual supply of cars, but for railroad coal principally. Very little coal going out of this field for commercial business, there is an actual shortage of equipment for such consumption. Movement is extremely slow, and the tonnage is not what it should be on account of many minor causes.

In the Standard district the railroads continue to get the greater portion of the coal. The service here has been unusually bad.

The prevailing market is as follows, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. sergs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson and Franklin County rate is 87½c.; other fields, 72½c.

KANSAS CITY

Slight improvement in general conditions throughout the Southwest and it is believed that this improvement will continue and grow more pronounced.

Conditions in the Southwest, which have been acute for several weeks, improved slightly the last few days of December, even though the weather became colder. The lightless nights which saved 150 tons of coal per week in Kansas City brought partial relief in the power and light situation. Dealers, who have been taking care of retail business in the tenement districts in good shape recently, were beset by the "basket and sack" brigade at holiday time in numbers never before equalled. But, although the small order trade has been brisk at each cold spell of weather, there does not seem to be the scarcity of money that has attended other severe winters. No real suffering has been reported in the city. Coöperation of coal dealers is credited with the splendid handling of the retail situation here.

COAL AGE

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The Breakdown of the Railroads

By Josiah Keely

General Manager, Cabin Creek Consolidated Coal Co., Kayford, W. Va.

A large part of the press and the public continue their attacks on the coal industry, maintaining that the present shortage is due as much to inefficient operation of the mines as to the lack of transportation facilities. Many railroad officials have encouraged this belief. Mr. Keely's article here published is a plain and irrefutable statement of facts. What has been true in West Virginia is but a duplicate of conditions that have existed in most of the other important coal regions. Perhaps the railroads did the very best they could; however, too much censure has been directed where at least a little credit is due.—Editor.

ANYONE familiar with mine-haulage problems, can, by applying this knowledge, understand fairly well the difficulties of the railroads up to Nov. 1. In underground haulage, it is important to keep the proper balance in mine-car equipment, gathering locomotives or mules, and distance of partings from the faces. This is worked out by counting the number of cars, deciding on the size of the trip for the haulage locomotives, and making due allowance for cars in transit, cars in the working places, and cars switched out for repairs, or filled with material and slate for unloading. If you have just the right number of mine cars, the making of an additional parting may disarrange the whole scheme and hinder the haulage all over the mine. But new motor extensions are always necessary, so equipment is added from time to time to take care of an increased number of partings.

You have two mines with the same number of men and the same number of cars, but if one has a greater number of partings than the other, the larger tonnage is apt to come from the mine of the fewer gathering points.

If the main partings are pushed up too near the faces, the mules or gathering motors are waiting on the haulage locomotives, or, if the partings are allowed to remain behind, while the faces advance over a thousand feet, the mules are overworked and the haulage motor wastes time waiting at the parting on the gathering of coal from the faces. If car equipment is not increased to take care of the new partings the size of the trip is cut down, and locomotives are wearing their tires off rushing around with small trips, or else men are waiting on cars.

The balance is changing all the time, the size of the trip often depends on the number of loaders on a parting, or it may occur that the machine men need cars faster than pick men. It is the resourcefulness of the mine foreman that is called upon to meet these varying situations, but it is up to the superintendent or the manager to meet the call for equipment.

Let Us Apply These Principles

in a general way to railroading. Every time a siding is put in for a new mine, it is analogous to putting an extra parting inside a mine, a new distribution of railroad cars is necessary, and, as there has always been a car shortage when coal business has been brisk, every other mine operating along the same line contributes from its own car supply toward making up the allotment for the new mine.

One has only to look over the new mines of the past year to see that hundreds of these new railroad sidings have been put in with very little new railroad equipment in the way of rolling stock to take care of them. So, although the total tonnage hauled has not been far behind previous years, it has been gathered from more mines at the requirement of more tonnage miles, and all mines have had poorer service.

This cutting down of the working days and the lowering of earnings of the miners gave plausibility to their claims of inadequate wages; while engines were running from mine to mine with small trains of cars and making overtime, forming a basis for the demands of railroad employees.

A very good illustration of the railroad situation attracted attention over a year ago when Cabin Creek, Paint Creek and Coal River in West Virginia, were wiped out by a cloudburst, immediately losing a combined tonnage of a quarter of a million per month. The railroad lost hardly a ton of its two million per month, which simply meant that it had supplied the available cars to other mines which had not been receiving an adequate supply.

Yet we are told that the railroads "organized" immediately after the war declaration to take care of the increased tonnage demands. Here is the way one railroad "organized." In January of 1917, they were supplying the mines with about ten allotments per month and taking on newly developed mines every day. That is, from railroad reports, they were giving the mines about a ten-days' run per month. They cut the allotment all around twenty per cent. and, with the reduced allotment,

THE BREAKDOWN OF THE RAILROADS—*Continued*

were able to show more working days. Still they were giving the mines but half time, and, to increase their showing in this respect, they made another cut in allotment, so that in October, the fifteen allotments furnished gave exactly the same number of railroad cars as was given in January, but a showing of fifteen days run instead of ten. It is true that some of the mines were allotted so low that an operation listed as a 250-ton mine was frequently able to load 350 tons, but "organization" showed that the railroads were increasing month by month in ability to supply the mines.

In the Meantime

with the Spring of 1917, wages began to advance around the mines, and although the Railroad Brotherhoods "got theirs," the railroad section men, responsible for keeping up the track sections, were not advanced in proportion. In fact, the wage of the section-hands was left at about half the minimum wage of the miner, which resulted in a wholesale desertion of these men to the ranks of the miners, making the mines more able to load coal, while the railroad tracks were allowed to get in such bad shape that frequently mines were held up by wrecks and slides, to say nothing of sidings being so poorly kept up that derailments at the mines were of daily occurrence.

Stretches of track five or six miles in length had scarcely a splice bar with its full quota of bolts, and there were so many rotten ties that "spread track" furnished its quota of derailments. So thorough was the disorganization that not infrequently an excessive number of empty cars were placed at one mine while a shortage existed at another right in sight of it. Train loads of empties were reported on the way and miners were ordered to work only to find that cars would not arrive till noon. Material necessary for operating mines was allowed to stand around, or go astray. The month's feed for mules at one group of twenty mines was twenty days moving thirty miles, while feed was being hauled ten miles in wagons to keep the mines going.

But in spite of the general disorganization and the camouflaging of allotments, the mines did manage to keep going until Nov. 1. Then something began to happen, and by the middle of the month it had happened. The advance in miners' wages had gone into effect, the increase in the price of coal was allowed, and all operations stopped. At first there was suspicion and distrust. It was approaching the time for the Christmas pay to be earned. Rumors were out that the operators were stalling on account of the wage increase. Knots of idle miners could be seen everywhere discussing the sudden stoppage and searching for a satisfying explanation.

About December 1

the train crews began talking, telling the miners that there would be "nothing doing" before the first of the year. Telephones got busy and operators were assured that there was only a temporary "congestion" and that the train crews would be reprimanded for exciting the miners. Nevertheless, miners left in crowds seeking other employment. The Virginian Power Plant, furnishing power to scores of mines, had trouble getting water supply and was shut down two days. The fact was duly discussed by the newspapers, and much solicitude was shown that the mines should be shut down on this account. Apparently the press had not noticed that the mines had been shut down for a week for lack of cars, and the railroad apparently did not know that there was no power, for they suddenly found that they could supply some cars on these days, an ability which they had failed to exhibit before or since. Anyway, the remarkable thing is that no one except the operators seemed to feel that anything exceptional was wrong with the railroads.

Following two weeks of almost absolute idleness at the mines, the monotony was relieved by the receipt of appeals from the Fuel Administrator and the Governor of West Virginia for miners to show their patriotism by working through the holidays. Still only a few articles appeared in the press to show that the general public was aware of the situation. A very moderate letter of Mr. Wheelwright of the Consolidation Coal Co. came out showing quite plainly what was wrong at the mines when no cars were available, and there were rumors of pooling, and the appointments of State Fuel Administrators, but still, aside from some criticism of priority orders, nothing adequate was offered for the sudden stoppage of business.

And So the Old Year Goes Out and the New Comes In

with the sudden loss in December of a million tons of coal. The prediction of a few freight crews came to pass almost to a letter, yet the head officials and the general public apparently do not know what was the trouble.

Appeals were made to all miners to work through the holidays, and now that the holidays are over to save their money! Is it possible that coal operators have been so discredited that their complaints cease to be taken seriously? It also appears that the press and the public are going the even tenor of their ways, continuing to murmur the oft repeated formulas, "Keep Working," "Keep Saving," "Your Country Needs Coal," while the railroads are completely broken down and thousands of miners, having lost their Christmas pay, are still hanging on at the mines hoping to get a chance to load coal.

Can It Be Possible

that it is necessary to so discredit the miner in order that the railroads may not lose the confidence of the public? Head lines would not be too late even yet, but a month of blame has already been borne unjustly by operators and miners. There has never been any serious doubt on the part of those who know, that the coal mines of the country could put out all the coal needed if given a fair chance.

IDEAS AND SUGGESTIONS

Precautions To Be Observed in Coal Mines During Cold Weather

BY FREDERICK B. HICKS
Kingston, Penn.

It is the duty of every official inside or outside the mine to call special attention to the precautions necessary at this season of the year to safeguard mine property against fire and to see that all fire-fighting apparatus is protected against freezing and breakage. The damage caused by frost sometimes affects the entire fire protection system sufficiently to prevent its efficient use.

All hydrants and valves should be examined carefully every three hours by the chief of the mine's fire department, and they should receive this attention both day and night. The valves and hydrants should be oiled with a heavy mineral oil which will not corrode the brass. All hydrants on standpipes and all Y or branch hydrants should be opened after the pipes are emptied, to let out any entrapped water which may have leaked past the valves when the pipes were full, care being taken that the drip valves of the post hydrants are in good condition.

Rotary pumps should also be oiled, and if they are exposed to freezing weather should be reversed to empty them of water. Pipes exposed to the frost should be emptied too, care being taken that the water is let out from above the check valves. Those who are placed in charge of such apparatus should know when the gate and drip valves are in good order.

ADVICE ON CARE OF AUTOMATIC SPRINKLERS

Drip valves should be marked by an arrow showing how they should be turned to open. Hydrant houses should be arrayed for winter service, and lanterns and other appliances should be put into condition and kept hanging convenient for immediate use. If necessary, changes should be made to the doors of the hydrant houses, so that they cannot readily be obstructed by ice.

Automatic sprinklers that cannot be kept warm should have their petcocks opened after the main valve is closed, and the water slowly drawn off at the drip pipe, in order that the sprinklers should not be rendered liable to leakage by a sudden change of atmospheric pressure. This may happen if the water is drawn off rapidly. When it is found necessary to close any sprinkler valve, every member of the colliery fire department should be informed of the fact and also that the valves must be again opened in order to operate the sprinkler in time of fire.

Especial care should be bestowed upon the valves of an automatic sprinkler system. Frequently these valves are shut when they should be open. Valves which are to be kept open should be secured in such position by a leather strap (not a chain) passed around the pipe and one of the spokes of the handwheel of the valve, the ends of the strap being held together by rivets or a padlock. This strap should be sufficiently loose to enable the handwheel to be moved half a turn, in order that the valve may be turned fully open at any time. The valves should be kept a quarter to a half turn from being full, so as to render inspection possible without removing the strap.

On new sprinkler installations it is recommended that all valves be provided with an indicator showing whether they are open or shut. This is important. It is only a matter of chance that the numerous instances of close sprinkler valves have been revealed by the company fire inspectors and not by fires.

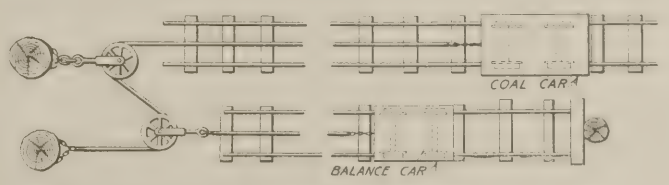
Thousands of dollars' worth of buildings and equipment could have been saved annually in the mines of this country if the practice set out in the foregoing paragraphs had been adopted as part of the plant routine.

Counterbalanced Room Haulage That Saves Considerable Man-Power

BY J. M. RODDY
Springfield, Illinois

A reference is made in a recent issue of *Coal Age* to the effect that miners in the anthracite region use light, bottomless boxes into which they shovel coal, permitting these boxes when full to slide down the room on sheet iron. When empty, the boxes are pulled back to the face of the chamber for reloading. It seems to me that this method entails the loss of considerable man-power that should be saved if possible.

I have had no experience in the anthracite region, but show in the accompanying sketch a system that I think would be favorable under the conditions there encountered and one that should give good results. Two cars are employed, one for a counterbalance, while the other is a coal car. The coal car should be constructed so as to discharge its contents to a waiting mine car when the lower end of the room is reached. The counterbalance will pull the empty coal car up the incline again, and so on continuously.



THIS HAULAGE SCHEME CONSERVES MAN-POWER

This system could be operated successfully on a slope of 1 to 4 or 4½. The rails should be laid on the coal-car line the full length of the room and the ties or sprag track sunk well, so as to keep it in place. The travel of the counterbalance need be only one-half or one-quarter that of the coal car, as shown in the sketch. The traveling speed of the coal car will of course be two or four times that of the counterbalance.

An Up-to-Date Coal-Mine Power Plant

By DEVER C. ASHMEAD
Tarrytown, N. Y.

SYNOPSIS—*A new central power plant just put into operation, taking the place of three old plants. Description of building and machinery, with details of construction and some kinks used. A simple, but good dam and reservoir insures an adequate water-supply. An unusual outside arrangement for a transformer station at one of the substations. Some interesting figures on power production.*

AT CLYMER, Indiana County, Pennsylvania, the Clearfield Bituminous Coal Corporation has recently completed and put into operation a modern power plant. The erection of this plant was started Apr. 1, 1916, and the installation was completed in October, 1917, since which time it has been furnishing power to the company's mines.

When projected the plant was designed to furnish power only to the Barr and Sample Run slope mines in the Clymer region and to the concern's West Branch mine in the Barnesboro region. However, the plant not only did away with the individual power plants installed at the three operations just mentioned, but in addition furnishes power to the Pennsylvania Public Service Corporation. The coal company is now making arrangements to connect its Clymer plant with its Rossiter plant, which is 18 miles away. At present the Clymer plant has a capacity of 2000 kw., but complete arrangements have been made for doubling the present capacity by the addition of a 2000-kw. turbo-generator and a sufficient amount of boiler-horsepower, together with the necessary auxiliary machinery.

In sinking the concrete foundations for the power house, which is a substantial yellow brick structure 121 ft. 6 in. long by 86 ft. wide and 38 ft. 8 in. high, and very attractive in design (see Fig. 1), it was found necessary in some instances to carry the excavations down as much as 23 ft. in order to obtain a solid footing.

The coal seam dips from the rear of the boiler house toward the front at about a pitch of 6 per cent. At the middle of the boiler house the basement floor came on the blossom of the coal. As this did not give sufficient bearing, it was found necessary to use an inverted arch constructed of reinforced concrete to give the necessary support. The reinforcing used was thoroughly cleaned old discarded strap rail $\frac{1}{2}$ x 2 inches. In the spring of 1918 the company intends to lay out the grounds surrounding the boiler plant as a park, such as it has at the Rossiter power house.

The interior of the building is painted white. The floors are of reinforced concrete. The sash is of steel with wire-glass lights. In Fig. 1 it will be noticed that the main approach is not finished, but it is the intention to build a simple and attractive approach in the spring.

The stairways are of steel and concrete, and are of an interesting and unusual construction, as is shown in Fig. 2. The two stringers are made of 10-in. 20-lb. channel-bar sections. A piece of angle bar 9 x $1\frac{3}{4}$ x $1\frac{3}{4}$ x $\frac{3}{16}$ in. is bolted to the flat side of the channel-bar and the angle turned up for the treads to rest on. The treads are made of two pieces of angle bar of the same cross-section and of sufficient length to reach both stringers. These angles are bolted with one side down on the crosspiece and the other side forming the face of the tread or the back of the tread as the case may be. Between these angle bars a piece of steel lath is fitted and concrete is poured in on top, filling the space between the angle bars and making the top of the tread concrete. This affords an absolutely fireproof stairway, there being nothing but steel and concrete used in

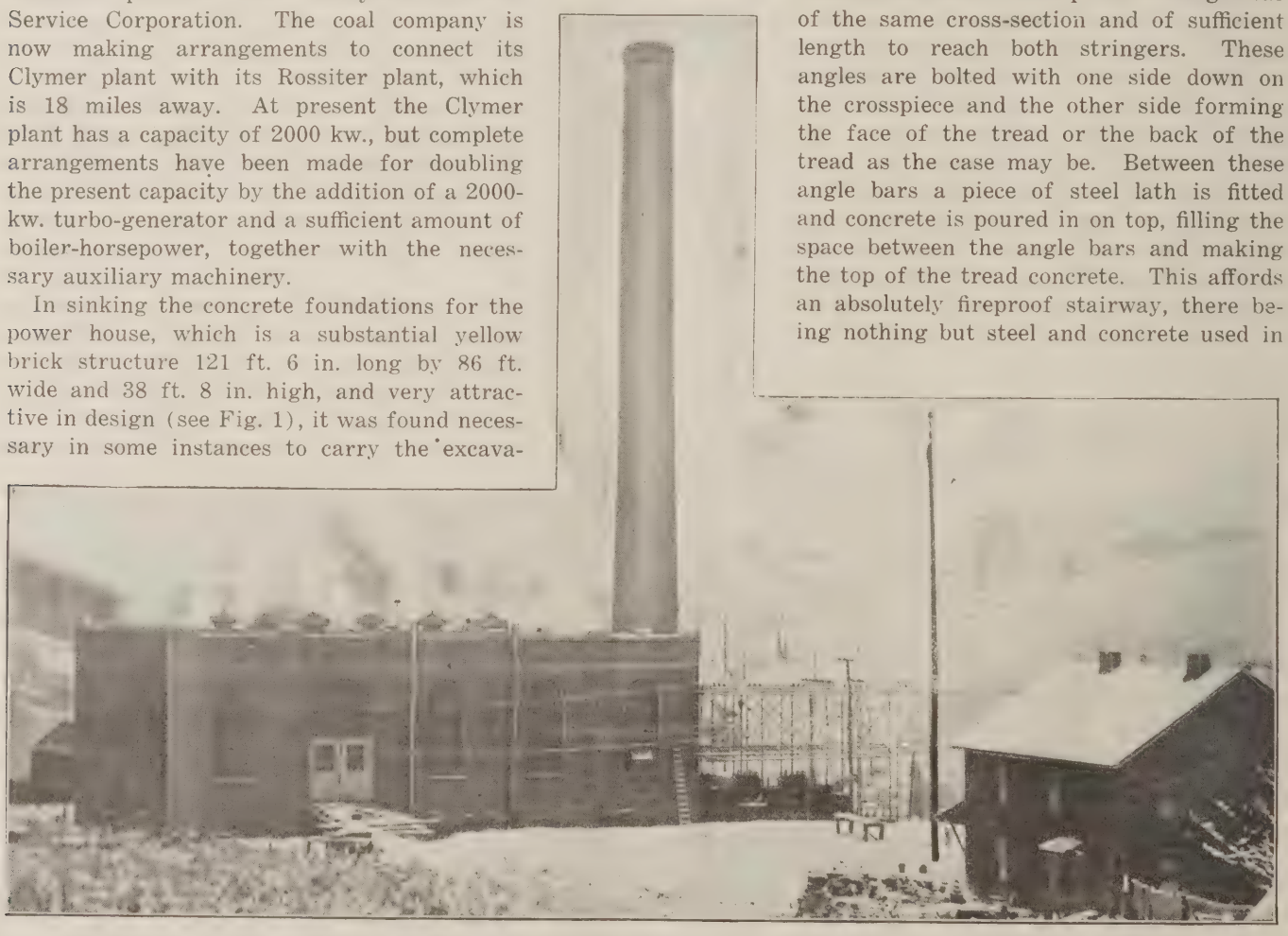


FIG. 1. VIEW OF CLYMER POWER PLANT, SHOWING OUTSIDE TRANSFORMER STATION

its construction. The roof trusses are of steel, and the roof itself is covered with Johns-Manville five-ply asphalt-and-asbestos roofing.

The boiler room of the Clymer power house has every modern convenience for the economical production of power. It is 86 ft. long by 78 ft. wide and contains

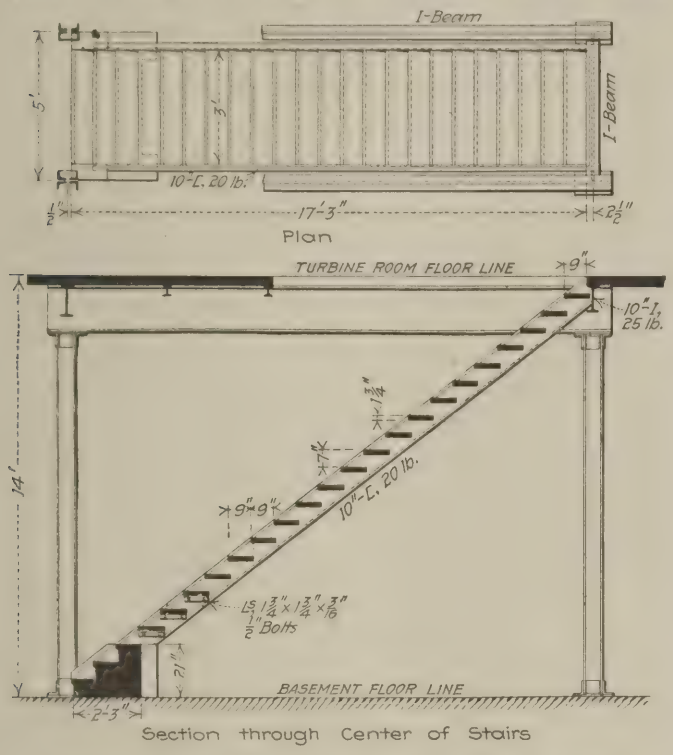


FIG. 2. STEEL STAIRS USED IN POWER HOUSE

four boilers, coal bunkers, feed-water heaters and room for four additional boilers. The draft apparatus, feed-water pumps and coal crushers have been installed in the basement, where provision has also been made for the handling of ashes.

Let us follow the coal from the time it comes into the power house until it leaves in the form of ash, and then follow the water until it is converted to steam. The mine car loaded with mine-run coal, is brought by an electric locomotive directly from the mines to a coal hopper, and the car is dumped over a Phillips crossover dump. The empty car then runs by gravity back to the empty track.

Details of the Coal-Handling Machinery

The coal in the hopper is then picked up by the apron feeder, Fig. 6, and carried 18 ft. to the two-roll crusher. From this crusher it is taken in the bucket elevator, which is 58 ft. long, to the top of the boiler house, and distributed by means of the scraper conveyor to the coal bunkers. As the bucket elevator takes the coal to a point halfway between the two coal bunkers, the scraper conveyor is made reversible so that it can supply both bunkers. The scraper conveyor is 56 ft. long.

The apron conveyor and the crusher are operated by a 15-hp. motor, the bucket elevator by a 7½-hp. motor and the scraper conveyor by a 5-hp. motor. Friction clutches are arranged on all three conveyors and the crusher, so that when it is necessary for men to work around the machinery they can shut down the operation of any piece, which cannot be started from the main floor unless the clutch is in, thereby protecting the workman. Ordinarily the operation of the conveyors is controlled by switches on the main floor of the boiler room, the switches starting or stopping the motors. Part of this coal-handling machinery is shown in Fig. 6.

The coal bunkers themselves are of considerable interest. They are made of steel, to the inside of which have been welded wire nails. To these nails steel lath has been attached, and then cement applied by means of a cement gun, until a thickness of 1½ in. was obtained. This makes a solid concrete lining for the bunkers. The outside of the bunkers is shown in Fig. 3. All the coal-handling apparatus was furnished by the Link-Belt Company.

By means of chutes the coal is delivered from the bunkers to Jones underfeed stokers (Fig. 4) which feed the coal to four 500-hp. Keeler water-tube boilers operated at 175-lb. pressure. With this type of stoker, it is necessary to take the ashes out of what is ordinarily the coal door. The ashes are raked out onto the main floor of the boiler room and dropped through an ash opening into steel cars in the ash pit. These cars are run to the outside and dumped. A double track has been provided, one for the present boiler equipment and one for the future installation.

Mechanical Draft Apparatus Is Used

The draft for the present set of boilers is supplied by a 150-ft. brick chimney 8 ft. 6 in. in diameter. A second chimney will be built as soon as the second battery of boilers is installed. The draft supplied by the chimney is augmented by a Jones mechanical draft apparatus.

The arrangement of the blower fan for this mechanical draft is rather interesting. Two vertical self-oiling



FIG. 3. COAL BUNKER; 75-TON CAPACITY

engines built by the Troy Engine Works have been provided for driving the fan, one engine at each end of the mainshaft. The arrangement is such that in the event of engine trouble the fan can be uncoupled from the engine driving it by unscrewing four nuts on a flange coupling and removing the bolts, shifting the fan ½ in. and coupling to the engine at the other end of the fanshaft. The whole change can be made in five minutes.

The feed water is supplied from a reservoir (to be described in Part II of this article) to two 1000-hp. Cochrane open feed-water heaters. From here it goes to a hotwell tank which contains a sufficient supply to run the boilers for 15 min. in case of an accident to the water line or the supply. This would give ample time to shut down the plant and draw the fires. An automatic valve

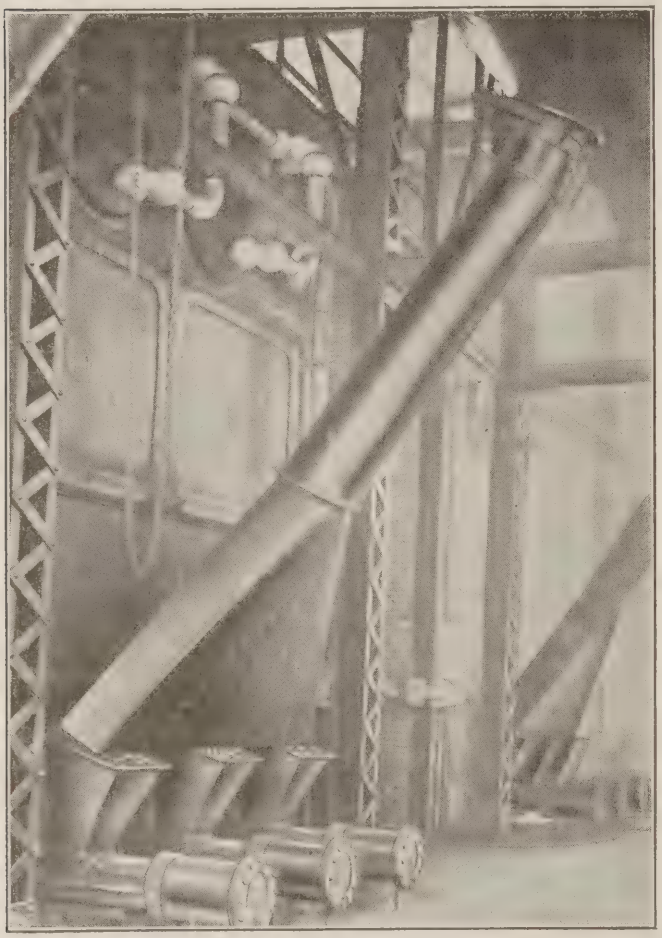


FIG. 4. JONES UNDERFEED STOKERS

is provided in the hotwell tank to keep it filled to the proper level.

From this hotwell tank the feed water is supplied to the boilers by two Alberger 3-in., three-stage, type S turbine-driven centrifugal pumps, which operate noncondensing. The operation of these pumps is regulated by a Foster feed-water regulator, which is so arranged that in case the fireman should neglect to give the pumps the proper attention, such as cutting off the feed water to the boilers and not stopping the pumps, the regulator will automatically shut down the pumps by closing a valve in the steam line, which is operated by the pressure of the water. This prevents damage to the pumps from too high a pressure.

The blower machinery, the feed-water pumps and the crushing machinery are located in the basement of the boiler house. The company is now building light concrete partitions to separate the crusher machinery and its attendant dust from the pumps and mechanical draft systems. At present the blower fan is sucking up the coal dust and blowing it to the boilers, but some of it leaks into the boiler room and some gets into the blower machinery and the pumps, causing unnecessary wear.

The system of piping is extremely interesting. The main steam headers, Fig. 6, are arranged in a ring. The five valves are placed so that in case of an accident to any part of the leader line that particular section can be cut out. As soon as the new battery of boilers is installed there will be a second connecting ring, further extending the plan of being able to cut out any part of the header system without shutting down.

Each boiler has two valves on its individual header, as shown in the figure, so that in case men are working on the inside of the boiler they will have a double protection against carelessness. The piping is extra heavy and flanged Vanstone joints are used.

The turbine room, which is 86 ft. long by 43 ft. 6 in. wide, contains two type ATB, 1000-kw. (125-kv.-a.), 80-power-factor, 3600-r.p.m., 2300-volt, 60-cycle, three-phase General Electric turbo-alternators with separate excitation and arranged to operate condensing. The turbo-generators, exciters and switchboard are installed on the main floor, the condensers, circulating and dry vacuum pumps being on the basement floor. A plan and cross-section of the turbine room is shown in Fig. 6, which is a diagrammatic view of the entire plant.

Excitation is had from a General Electric motor-driven exciter set consisting of one DLC-6-35-kw. 1200-r.p.m., 125-volt, compound-wound exciter direct connected to one 1-6-50-hp. 1200-r.p.m., 220-volt, 60-cycle, three-phase form K motor. This exciter is further augmented with one General Electric type CC-2-35-kw. 3600-r.p.m., 125-volt, direct-connected, turbine-driven exciter of the noncondensing type.

The General Electric type H-60-20-kv.-a., 2200/220-volt, 60-cycle, single-phase, oil-cooled transformers are used to step down the generated voltage for use with

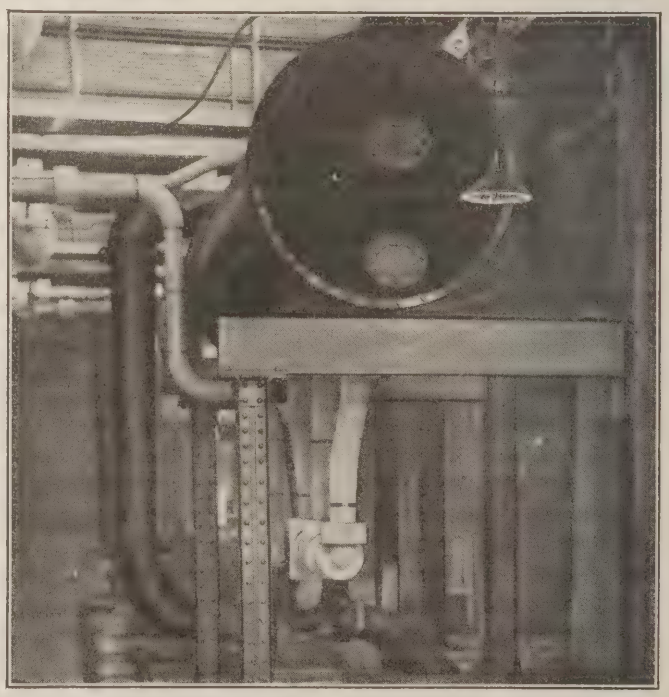


FIG. 5. SHOWING THE CONDENSER EQUIPMENT

the motor-driven exciter set and the motors used to drive the coal-handling apparatus.

The switchboard is constructed of a natural black slate and consists of one two-circuit exciter panel, one transformer and Tirrill regulator panel, two alternating-

current generator panels, two blank panels for future generators, one total load panel, three step-up transformer panels, and two blank panels for future feeder lines. Fig. 8 shows the interior of the generator room with the switchboard in the background. The switchboard is so arranged that all the oil switches are mounted on a pipe framework 6 ft. back of the panels and connected to switch handles by means of levers and bell cranks. A 15-ton Morris Brothers double-beam hand-operated traveling crane, with a chain hoist, has been installed in the turbine room.

One particularly interesting feature is the unusual arrangement of the air ducts for carrying cold air to the generators for their cooling. Fig. 7 shows the details of these air ducts. At the Rossiter power plant of this company a great deal of trouble was had with the generators due to the formation of ice on the outside by the condensation of the moisture in the air of the room, the generator being made too cool by the ice-cold air from out-of-doors, causing the condensed moisture to freeze. In other words, the generator acted as a suction fan and sucked in more air than it could heat.

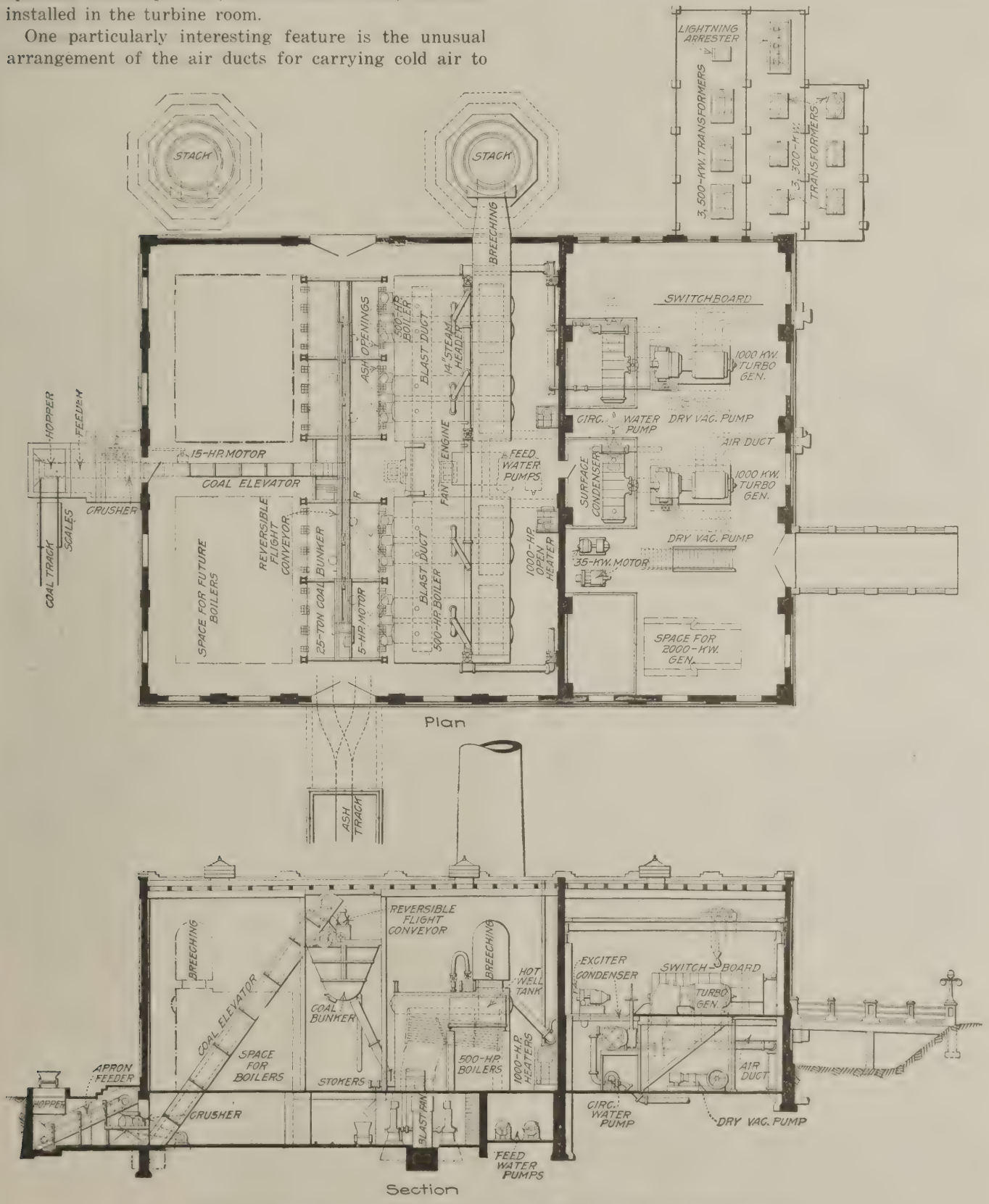


FIG. 6. PLAN AND CROSS-SECTION OF THE CLYMER POWER PLANT

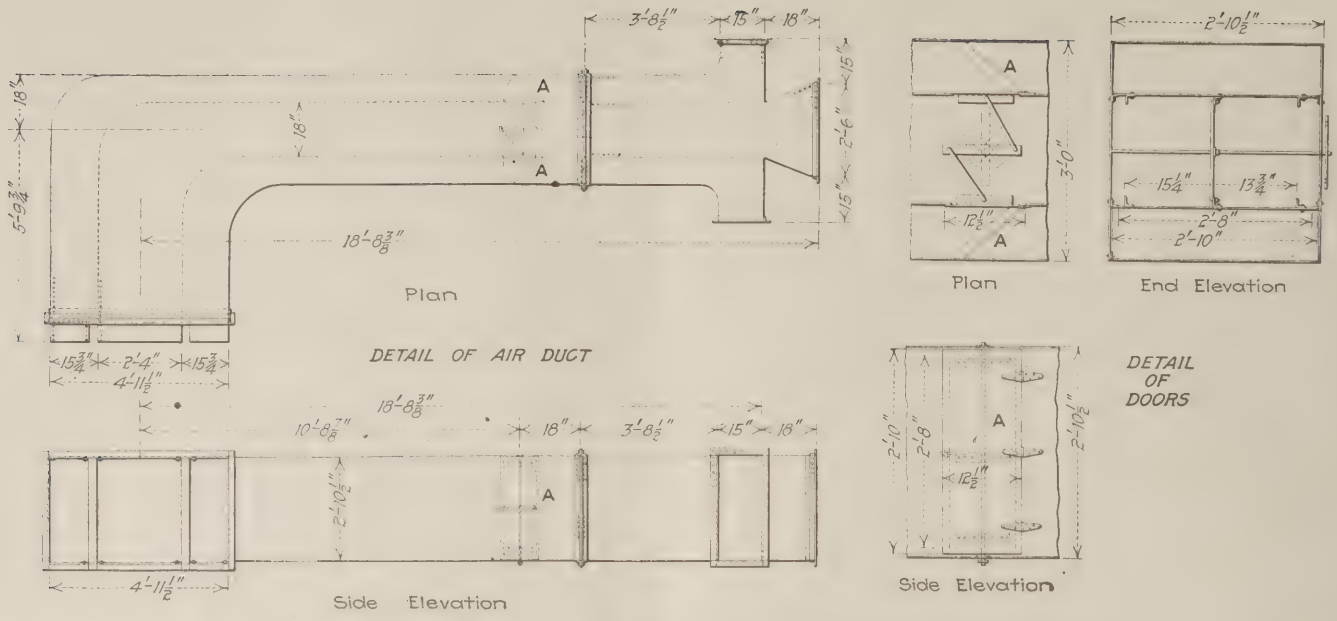


FIG. 7. DETAILS OF AIR DUCTS THAT COOL THE GENERATORS

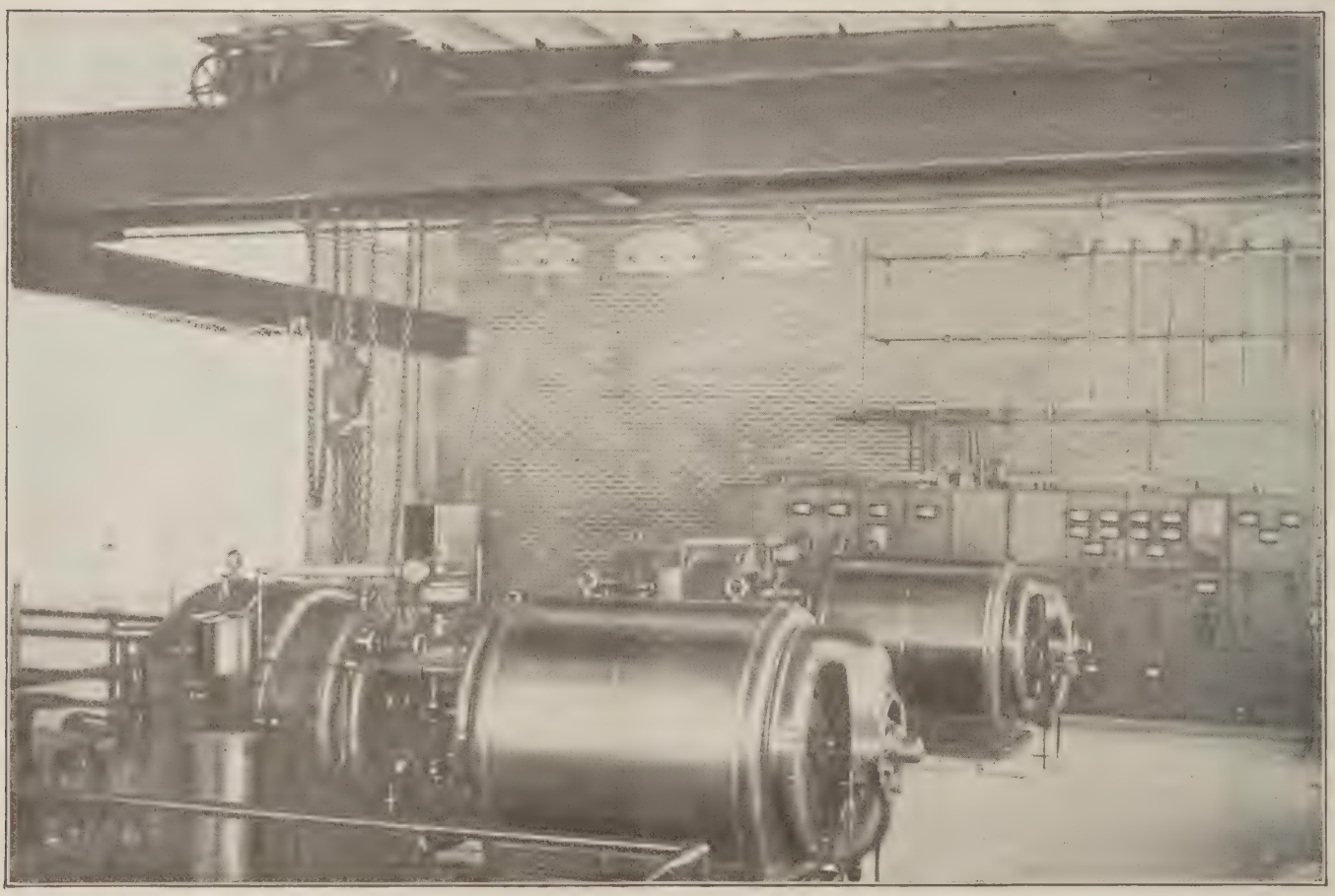


FIG. 8. PART OF GENERATOR ROOM, SHOWING GENERATORS AND SWITCHBOARD

In order to do away with this trouble, the door *A* was placed in each side of the intake air duct, as shown in Fig. 7. These doors are so arranged that the amount of air passing to the generator can be regulated by opening or closing them, thus maintaining an even temperature.

The condensing equipment consists of two Alberger "Spiro-Flo" surface condensers together with two 10-in. two-impeller turbo volute pumps direct connected to and driven by Alberger-Curtis noncondensing steam turbines with two 2-in. Alberger standard volute condensate pumps mounted on the end of the pumpshafts. There are also two 8x16 12-in. Alberger horizontal dry vacuum pumps. A vacuum of 27½ to 28 in. is obtained with these pumps. (See Fig. 5 for illustration of the condensers and the two-impeller turbo volute pumps and turbine, and also the volute condensate pumps.)

[The next installment of this article will describe the dam and reservoir of the Clymer plant.—Editor.]

(*To be concluded*)

Efficiency Engineering for Coal Mines*

By C. H. ELSOM
Charleston, West Virginia

SYNOPSIS — *The art of coal mining today involves several specialties. Only by employing specialists who are capable of securing the best results in their various lines will the overall efficiency of the entire mine be made a maximum. One of the most important specialties involved is here discussed.*

NO PROGRESSIVE man or organization of men is bound by past performances. Opinions must of necessity change with conditions, and old methods must be revised if advancement is to be attained. Progress and stagnation are of opposite polarities: antiquated methods must give way to new.

An astronomer fixes his telescope on a distant star, and as his observations progress the angle of the telescope must be constantly shifted, not because of any motion of the star, but because the earth moves. In like manner thinking men, men who do things, are quick to realize the changes going on about them. They know that precedents are precarious and that new ideas are essential to success.

Naturally this change is being reflected in the coal-mining industry, and higher efficiencies, both with respect to labor and equipment, as well as better ways of accomplishing the same results, are occupying no little thought and attention on the part of the coal operator.

Is Efficiency Engineering for Coal Mines Justified?

In arriving at a decision as to whether efficiency engineering for coal mines is justified, we must determine whether by means of it there results an actual saving in dollars and cents. The best definition ever given for an engineer is "one who can do for one dollar what any fool could do for two," and it is doubtful if there is any field of endeavor involving an equal amount of capital and doing the same volume of business as the coal industry where so many two-dollar men have been employed. It has been correctly stated that the average operator has a good working knowledge of civil and mining engineering, yet when he opens a new mine a mining engineer is the first man he employs. He admits that he knows little or nothing about electrical engineering, yet he will intrust this work to an untrained electrician and rely on incompetent or biased advice. For this reason, this paper is devoted chiefly to the discussion of the efficiencies that can be brought about by the electrical engineer.

The coal industry has developed rapidly, and many can no doubt recall the time when the only equipment needed to start a mine was a mine car, a mule, a pick and a shovel. This equipment was crude, and it was found necessary to electrify the mine in an effort to increase tonnage. Thus each operation soon had its individual power plant, with direct-current equipment. The next step was the isolated alternating-current plant, and then the central station with its high-tension distributing lines and the substations located so as to supply power near the point where it was to be used. The advantages of this arrangement were an unlimited source of power, improved voltage, continuity of service and a shifting of responsibility to the shoulders of others specially trained for this work.

On the other hand, it soon became apparent that it made a radical difference in the power bills whether a motor-generator set or a rotary converter was used as converting apparatus, whether the fans and pumps continued to be driven by direct-current motors or put on alternating-current service, whether the hoist motor was put on direct current or alternating current. In short, it was found that a whole new situation presented itself for solution, and the man who thought quickly and correctly, as well as acted promptly, was the one to effect the greater saving. There are many yet, however, who do not realize the importance of adopting new methods, and of getting out of the rut.

Costly Errors Are Frequent

To cite a familiar example, the confusion of ideas with reference to *power* and *voltage* is such that errors are frequent and cases are known where a second generator was installed when it was desired to improve the voltage at the end of a long transmission line. Had this additional expenditure been put into a substation at the end of a transmission line, the object in view would have been achieved. I know of a substation containing two large motor generators located at the drift mouth of a big mine. The present workings are two miles from the substation, and in the center of the workings the voltage is so low that the coal cutting and all mining operations are carried on with extreme difficulty; furthermore, 45 per cent. of the power purchased is lost in conversion and transmission. Simply relocating one of these motor generator sets so as to have one at each end of the haulage system would result in an improvement in voltage, an increased production and a decrease in maintenance and power bills, due to lessened losses and improved voltage. This change would cost several thousand dollars, but the saving effected thereby would be such as to equal the expense in a year and a half.

In the installation of trolley, feeders and bonding the most expensive method is to allow these same incorrect ideas to influence the plan of procedure. Other instances of inefficiencies may be cited, such as one mine where a short grade caused heavy peaks on the power house. A few hundred dollars would have eliminated this trouble by cutting down the grade, but the cause of trouble in the power house was attributed to lack of power, and something over four thousand dollars was spent in additional equipment, which further resulted in much greater operating expenses. Other somewhat similar cases of inefficiencies are numerous. Poorly designed power houses and substations, the wrong solution of converting apparatus, fans, tipple motors, locomotives, etc., are too numerous to mention.

*Paper read before the West Virginia Coal Mining Institute.

Similarly, the mining engineer and the practical coal-mining man has his special field to cover, in which efficiency engineering is equally as important. In other words, the efficiency engineer takes advantage of *all* facts that will accomplish more with less money, as opposed to notions or ideas of untrained men which please the originator of these ideas but cause a loss in the revenue.

Time does not permit a detailed discussion of the various phases that an efficiency engineer has to consider in relation to mining installations, but a few practical illustrations are given to show the need of more thought and attention to the power end, the heart or prime mover of the whole system.

A few years ago a power plant was installed in Virginia to furnish power to coal mines and to eliminate the isolated power plants. This company at first met with strong opposition, but a few companies thought the idea a good one, and the results obtained by them started the operators thinking along the line of central-station power and its advantages and disadvantages. Today there are in the coal fields of this section seven large central stations, and another company recently organized, thus giving practically all coal companies the opportunity of purchasing power.

If such enormous expenditures of money have been made in these utilities, and if so many operators have encouraged them, why are there any private plants in existence? If they are a good thing for so many coal companies, why would not purchased power be advantageous to your mine? Why are you uncertain relative to this question? The reason, in my mind, is very apparent. There is still a wide difference of opinion relative to the advisability of purchased power, not so much from the advantages of its flexibility, ease of control, etc., but from the cost of operation.

Some Points on Purchased Power

Relative to the cost of purchased power, why do some of your neighbors tell you it is cheaper than your own plant, and others that central-station power is higher? There is a logical reason for this discrepancy of opinion; in fact, undoubtedly both of your neighbors are correct for their particular plants.

The question of purchased power, and why both of these opinions are correct, was discussed fully in an article in the July 1, 1916, issue of *Coal Age*, by H. P. Musser and F. B. Lamb. It was there plainly shown that it is just as absurd to make a decision relative to the advisability of purchased power from comparison with the results obtained from any other company as it is to assume you need a 15-hp. fan motor to ventilate your mine merely because there are a large number of fan motors of this size used.

In other words, each and every case has to be analyzed separately; the kilowatt-hours you now use and those you would use with purchased power, as well as the demand charge, should all be carefully considered. It might be added here that many companies have made the mistake of assuming that the kilowatt-hours now used will be the same as will be used with purchased power. Actual cases have been known where this consumption was less and other cases where it was 100 per cent. higher. Future conditions and additional load should also be carefully considered.

Now, central-station power is comparatively a new thing for coal mines. Determination of rates and proper composition of contracts, to be fair to each party, has become a specialized branch of the electrical profession as applied to coal-mining work. You have probably read over some power contracts carefully, and when you had finished wondered what it was all about.

I have known of many instances where contracts were signed without an analysis of conditions or due consideration given to the contract proper. Is it surprising, then, that some are dissatisfied? There are many companies that should buy power, and there are others who will still make the mistake of not putting in their own plant.

Another Reason for Difference in Opinion

It may be added that another cause of the difference of opinion relative to the cost of purchased power is the widely different rate (both secondary and primary) of the various power companies. The total bills are rather hard to compare, due to different methods used by power companies of basing the demand charges, while the secondary rates can readily be compared. Curves have been compiled showing the comparison of rates of various power companies, the comparison of primary charge being based on the average results obtained from actual tests.

Points taken at different parts of this curve show the following percentages based on four power companies which have practically the same rate:

SECONDARY CHARGE

	Per Cent.	Per Cent.	Per Cent.	Per Cent.
At 10,000 kw.-hr.	112	101	98	95
At 40,000 kw.-hr.	100	96	68	73
At 500,000 kw.-hr.	128	111	64	81

TOTAL BILLS

	Per Cent.	Per Cent.	Per Cent.	Per Cent.
At 10,000 kw.-hr.	112	101	98	95
At 40,000 kw.-hr.	100	96	85	84
At 500,000 kw.-hr.	131	111	102	108

It will be noted that the secondary rate and total bills for small consumptions are fairly uniform. However, there is a wide difference at the consumption of power, which would probably strike the average operation.

If the foregoing, including the rate just mentioned, are self-evident facts relative to this important question to the coal operator, he should not spend thousands of dollars and bind his company in a long-term contract without giving the matter careful consideration.

The marked economies that can, under proper conditions, be obtained with purchased power have been a strong factor in demanding the attention of the operators to efficiency engineering. The selection of the electrical equipment for a new mine is of high importance, and there are many points to consider. The size of the lease, quality and thickness of coal and the output desired are, of course, the important factors in the determination of the amount and size of equipment necessary.

If the development will be distributed over a large area, or if the drift mouth is a considerable distance from the natural location of a power house, the source of direct-current supply must be brought closer to the working places. This can be done by locating a motor-generator or rotary near the drift mouth or inside the mine and converting to direct current from alternating current, which is generated by the coal company's own plant or else purchased from a central station.

Too much emphasis cannot be laid upon the importance of selecting either a generator or converting apparatus of the proper size, speed, etc., to take care of the power requirements of the mine. It is almost as poor engineering to select equipment too large as too small, and the fact that voltage and power are so often confused has led many companies to install apparatus entirely too big for their requirements. A machine too large is an expensive luxury, as the load factor and efficiency are low. Cases are known where a large machine was bought second-hand because it was cheap. In the end it was very expensive, as the additional cost for a machine of the proper size was soon lost in the increased monthly expense of operating the inefficient unit.

Mine loads come at irregular peaks or swings, these peaks extending in most cases over a short period of time. The generator or converting apparatus must, of course, have capacity enough to handle these peaks. To meet these requirements the manufacturers have designed generators and converting apparatus capable of handling large overloads for short intervals.

Average Load Factor Decided From Many Tests

From exhaustive tests on various coal mines in West Virginia and Kentucky, the average load factor was found to be between 25 and 30 per cent. Nine plants of 150-kw. capacity each were tested, which plants showed the following average data:

$$\frac{Horsepower\ installed}{Horsepower\ connected} = 1.72$$

$$\frac{Horsepower\ installed}{Horsepower\ peak} = 2.82$$

Thirteen plants of 200-kw. capacity each showed the following average results:

$$\frac{Horsepower\ installed}{Horsepower\ connected} = 1.60$$

$$\frac{Horsepower\ installed}{Horsepower\ peak} = 3.97$$

The kilowatt-hours per ton of coal mined is naturally variable for different mines, due to the difference in mining conditions, variations in the hardness of coal, length of grades, ventilating, pumping, etc.

Assume a high average of 4.5 kw.-hr. per ton of coal mined, a monthly output of 10,000 tons and a consumption of 45,000 kw.-hr. per month. With a 27.5 per cent. load factor this means a 5-min. peak of 212 kw. A 150-kw. generator or converting equipment, with a 25 per cent. overload for two hours and a momentary overload of 100 per cent. would be amply large to handle all ordinary cases as cited above. In designing the building to house this machine, provision should be made for the ready addition of a second or third unit, should future developments warrant such an increase.

It is evident from this data that it is the heavy peaks or swings that must be prepared for, and right here is where the combination of alternating and direct current in and around the mine often makes the economical and efficient use of power possible; through driving with alternating current such apparatus as would inherently cause high peaks, on the converting apparatus. In connection with a power contract, however, signed on the connected-load method the above procedure may or may not be advisable, due to the increase of primary charge.

I have in mind one coal company that has two 150-kw. motor-generator sets installed. The hoist and all tipple motors are operated on direct current and the kilowatt demand, as shown by a curve-drawing meter, is 210. The all-month efficiency of the motor-generator sets varies from 45 to 55 per cent. This would indicate that the sets are not carrying continuously anything like their rated capacity, but the two must be maintained simply to take care of the peak loads. By a rearrangement of apparatus one set could be dispensed with and the all-month efficiency of the other set increased approximately 20 per cent. Now, assuming that this company requires 33,000 kw.-hr. a month on the direct-current side to run the mine, that that power costs one cent per kw.-hr., a 20 per cent. increase in efficiency means a saving of $160 per month or $1920 a year. Capitalized at 6 per cent. this means interest on an investment of $32,000. This is an extreme, but not an exaggerated case.

There are many differences of opinion with reference to the relative merits of rotary converters and motor-generator sets, and in every case a decision should be based on the conditions affecting operation. Briefly, a rotary converter is a much more efficient machine and in general will stand greater overloads without serious commutation troubles. On the other hand, if there is a poor regulation in the alternating-current voltage supply, the rotary voltage is influenced more than that of the motor-generator set. To raise or lower the direct-current voltage, or to compound it quickly, the motor-generator set has the advantage. If it is desired to use the set for the power factor corrections, the synchronous motor has its advantage. Thus when the duty and conditions to be met are known, the choice is a matter of selecting that apparatus which will give the most satisfactory and economical results.

How To Select the Motor

In selecting motors for hoists, tipples, fans, etc., it is essential that both the starting and running conditions be known; and in the case of a hoist, the cycle of operation is often essential. If an induction motor has a high starting-torque duty and low running-torque duty, it is expensive to put in a squirrel-cage motor of a large enough size to start the load. To do this means poor power factor, lessened efficiency and as a consequence loss of power. In such a case a wound-rotor induction motor should be selected.

In many mines pumping is an important item, requiring large power consumption. Where alternating-current central-station power is available, the problem should be investigated to determine if a saving can be effected by doing the pumping with alternating-current motors. I know of one case where the cost of power was reduced 30 per cent. by putting alternating current motors on the pumps.

The question of the best method of bonding can never be settled once and for all. New methods are being tried, and the present high price of copper makes attractive the elimination of copper bonds by the electric welding of the fishplates to the rails. In fact there are many companies that could have their track welded from the salvage value of the copper scrap secured from their present return, and in so doing would eliminate future bonding maintenance charges.

In the installation of feeder circuits for mining machines, fans, trolley, etc., it is a common error to keep

each circuit separate and independent of the others, and no advantage is taken of the diversity factor of the minimum load and the maximum return from the investment in copper is not utilized.

The question of feeding the gatherer and hauler of mine cars with hay or "canned juice" is one that is demanding the attention of the wideawake operator. He knows from experience all about the "hay burner," but when it comes to feeding an inanimate object with an in isible substance, he has stepped out of his realm; and many operators again find themselves in a different phase of the electrical field.

The limits of this article do not permit a discussion of the many considerations calling for investigation relative to the storage-battery locomotive. Suffice it to say, however, that although this type of equipment is comparatively new, the field of development is unlimited. At the present time, however, caution and exact analysis of conditions are advisable. Wherever possible the cycle of operation of the locomotive should be known, methods of charging should be carefully considered, and it should be borne in mind that where power is purchased one method of charging may cost 100 per cent. more than another.

The successful single-phase alternating-current locomotive for coal mines, with its elimination of substations and converting apparatus, or to go even further the wireless transmission of energy, the possibilities of a gigantic central station located in the coal fields to transmit power to Chicago, instead of shipping coal there, are not altogether idle dreams, and the conclusions one is forced to draw are that coal operators cannot afford to ignore the trend of the times.

Coal-mining electrical engineering is a highly specialized subject in which the engineer should know mining conditions, the problems of the operators, and should give the subject undivided attention. Further, he should not connect himself to any other pursuit that will not enable him to always give unprejudiced and unbiased opinions. In other words, his recommendations should be based in full sympathy with his client's conditions, financially and otherwise. That the operators are realizing the great advantage of employing engineers regularly is conclusively proved by the large number who, in the last year or two, have retained the services of engineers to act in a consulting capacity and to make regular inspections and reports on their mines.

Five Features in Mine Workings

It is of interest to notice on the accompanying map the following five features, which are of importance in the working of a mine:

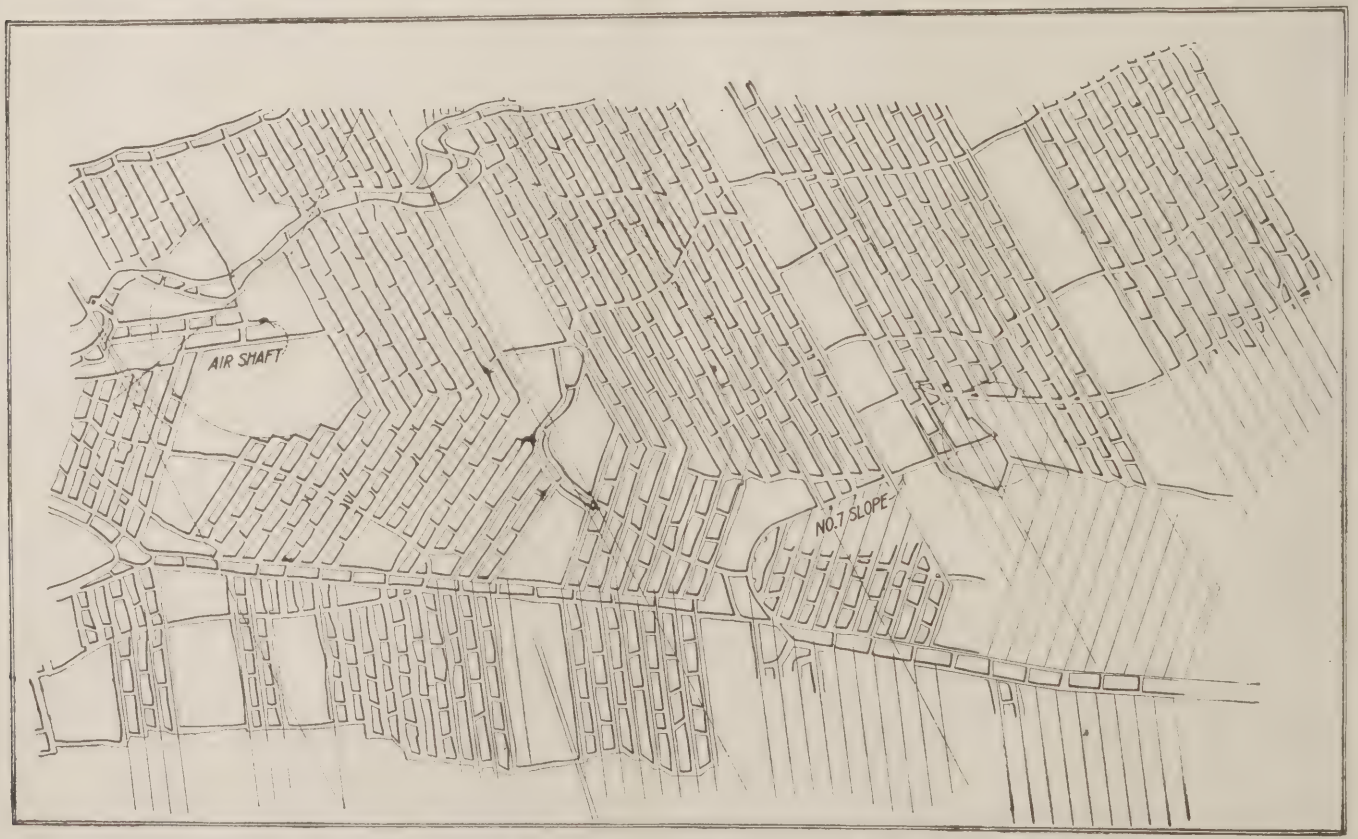
1. The large shaft pillars that are used to protect the shaft from any movement of the rock.

2. The large pillars that are left about every 11 rooms. These pillars are 150 ft. thick and prevent any squeeze that comes on the mine from spreading beyond the pillars.

3. The future direction of every room is planned, and the rooms are driven according to these plans.

4. The regularity in the size of the pillars left between rooms. There is no "hogging," as is seen in so many mines. The idea is not to get some cheap coal now, but to get all the coal.

5. This map shows very prominently the contours of the coal and also the top of the anticline. The contours are shown by the turns of the headings, which are driven almost level. The anticline is shown by the way the rooms head into one another.



ILLUSTRATING FIVE FEATURES THAT ARE OF IMPORTANCE IN THE WORKING OF A MINE

Block Signal System for Coal Mines

By FRANK HUSKINSON
Leadville, Colorado

SYNOPSIS—*Most block signal systems at present in use are manually operated. These are successful as long as the motorman does not forget to throw the switch. An automatic signal system such as here described, which does not depend on manual operation, has many advantages.*

ONE of the most important applications of electricity in coal mining is the signaling system. Of these a number of different types are in use today. The advantages and disadvantages of the different types have been matters of discussion among mine superintendents and electricians for some time. Almost all block signal systems in use today are operated by the motorman or switchman throwing in or out an electric switch that controls a set of electric lights at the various stations. Almost all block signal systems are reliable as long as the motormen attend to the proper throwing of the switches.

A reliable, safe, self-regulating and self-resetting automatic block signal system has long been one of the needs of all coal mines that employ electric locomotives for haulage. Below I give a description and details of a safe system, which is the only one of its kind that I know of. This is an automatic block signal system that has proved absolutely reliable, and in which the only requirements are that the trolley wheel be on the wire and the current turned on to insure operation.

In Fig. 1 is shown a complete connection diagram of the two block stations. As many signal lights and signs as are needed may be connected from the line marked "Power Line" and the return or ground. These signal lights and signs are generally located at convenient places in the mine. The blocks themselves are usually placed at some point out of the way of all meddlers and persons that have no business with them.

Outside Station May Be Placed in Electric Shop

The electric shop is the most convenient place in which to locate the outside station, while a good, safe place can easily be made for the station inside the mine. The details of the arrangement that is used on the trolley lines for the operation of the blocks is shown in Fig. 2. It consists of a hardwood strip about 4 ft. long fitted with two pieces of angle iron, so arranged that as the trolley wheel comes in contact with the angle piece it will make a connection between the trolley wire and the angle iron as long as the trolley wheel is passing along the section. This allows the trolley-line current to flow through any lines that may be connected to the angle-iron piece as long as the wheel is passing over it.

In Fig. 3 is shown a detail of the solenoids and levers that operate the arms *Z*, Fig. 1. The solenoids are wound to suit the voltage and other conditions. However, there must be enough turns of wire on the solenoids to make them strong magnets, so as to produce a quick action on the plunger, which in turn operates the levers that move the arms. The capscrew is for adjusting the air space between the plunger and the magnet.

Fig. 4 is a detail of the lever, showing the catch arrangement on the end. In Fig. 5 is shown a detail of the relays, the windings on which, as will be noticed in Fig. 1, are in series with a lamp. This lamp is a 32 cp., 120-watt carbon globe. Of course, the size of the lamp or the number of lamps that are used in series with the relays will determine the size and amount of wire that will be required to make the relays strong enough to hold the lever marked *B*, in Fig. 5. The relays should have enough wire and be so arranged as to insure quick action on the lever *B*.

In Fig. 6 is shown a detail of the contact segments. The dimensions, etc., given in the diagram can be varied to suit the requirements of the rest of the block signal. Fig. 7 shows a detail of the arms *Z*, in Fig. 1. These arms are hardwood strips of suitable size with the four contacts arranged as shown at *A*, Fig. 7.

Working Parts of the Block Signal System

Fig. 8 shows the star wheel. This wheel is adjusted and fastened to the arm *Z* and can be made out of fiber or iron and the dimensions made to correspond with the rest of the block signal. In Fig. 9 is shown a detail or a signal box. As many of these boxes or lights as are wanted can be wired off the line marked "Power Line" in Fig. 1, and the return.

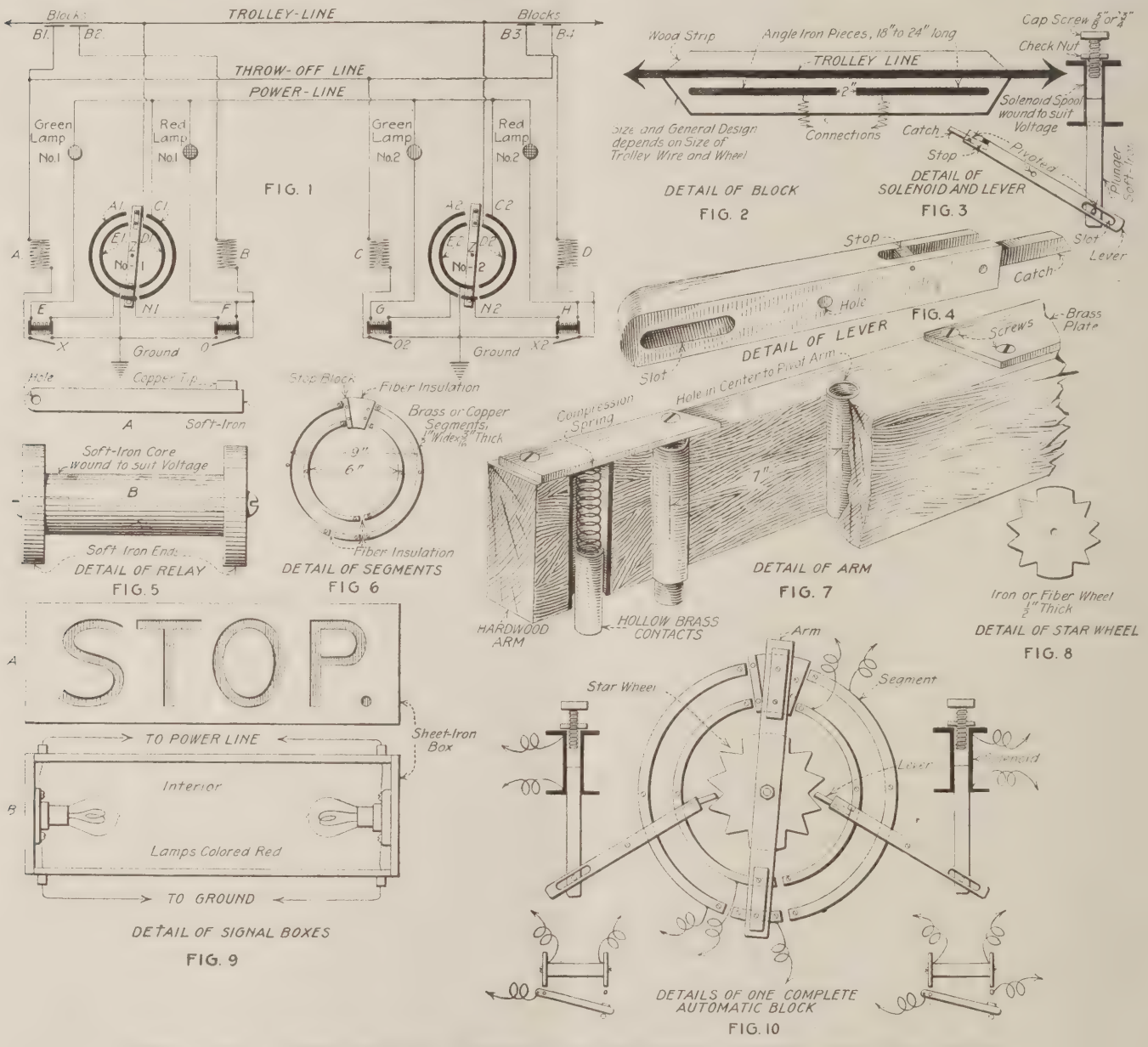
Fig. 10 shows in detail a complete automatic block assembled. The arm is shown in the neutral position. A careful study of Fig. 10 will give a clear idea of the working parts of this block signal, while a careful study of the diagram, Fig. 1, and the detailed description here given will convey a good idea of the operation of this automatic block signal system.

The operation of this automatic block signal system is as follows: The arms *Z*, both being in the neutral position and the locomotive going into the mine, the trolley wheel closes the circuit for an instant at *B*1, allowing the trolley line current to flow to the solenoid *A* and thence to the contact *X* on the relay *E*. But the circuit is open here, so that there is no operation of the signal when the circuit is closed on *B*1. The trolley wheel now passes from *B*1 to *B*2.

As soon as the wheel closes the circuit at *B*2, the current travels to the solenoid *B*, then to the relay *F*, then to the contact *N*1, through the arm *Z* on No. 1, to the contact *E*1, and to the ground. This completes the circuit, causing the lever on the relay *F* to rise and close the circuit at *O*. This allows the solenoid *B* to receive the trolley line current passing direct through its windings to ground. Thus the solenoid *B* operates the levers that move the arm *Z*. This causes the arm *Z* to open the circuit on contacts *N*1 and *E*1, and close the contacts *A*1 and *E*1 simultaneously. It also closes contacts *C*1 and *D*1 together. This causes

the trolley line current to flow from the contact *D*1 to the contact *C*1 through the arm *Z* on No. 1, thence to the power line, to the green lamp No. 1, to the relay *E*, to the contact *A*1, to the contact *E*1, and thence to the ground, causing the green lamp No. 1 to light up and the relay *E* to close the lever at *X*, thereby connecting one side of the solenoid *A* to the ground. The same current also traverses the power line to the red lamp No. 2, to the relay *H*, to the contact *N*2, through the arm *Z* on No. 2, to the ground, causing the red lamp No. 2 to light up and the relay *H* to close the lever at *X*2, thereby connecting one side of solenoid *D* to the ground. Any lamps and signal boxes that are connected to the power line and the ground will thus light up and stay lit until the block is again moved. This is the operation of the signals as the locomotive goes in.

causes the solenoid *D* to operate the arm *Z* on No. 2 This opens the circuit between the contacts *N*2 and *E*2, and allows the relay *H* to open the circuit at *X*2. The red lamp No. 2 goes out, but a fraction of a second afterward the circuit is closed between the contacts *C*2 and *D*2 by the arm *Z* on No. 2. This allows the trolley-line current to flow from the contact *D*2 to *C*2, thence to the power line, to the green lamp No. 2, to the relay *G*, to the contact *A*2, to the contact *E*2, and thence to the ground, causing the green lamp No. 2 to light up and the relay *G* to close the circuit at *O*2 thereby



FIGS. 1 TO 10. DETAILS OF AN AUTOMATIC BLOCK SIGNAL SYSTEM FOR COAL MINES

When the locomotive comes to the inside block the operation is as follows: The trolley wheel closes the circuit between the trolley line and *B*3. This allows the current to travel to the solenoid *D*, to the relay *H*, to the contact *X*2, and thence to the ground. This connecting one side of the solenoid *C* to the ground. This makes no difference at block No. 1, as the current in the power line is the same. But just an instant after the trolley wheel closes the circuit at *B*3, it breaks this circuit and closes the circuit at *B*4. This allows the current to flow to the solenoid *C*, to the relay *G*, to the contact *O*2, and thence to the ground, causing the solenoid *C* to operate, which puts the arm *Z* back on the neutral position at No. 2. This opens the circuit between the contacts *C*2 and *D*2, also between the contacts *N*2 and *E*2. The green lamp No. 2 goes

out, and at the same instant the current flows along the throw-off line to the solenoid *A*, to the relay *E*, to the contact *X*, and to the ground, causing the solenoid *A* to operate. This puts the arm *Z* on No. 1 back to the neutral position, opening the circuit between the contacts *C*1 and *D*1. It also opens the circuit between the contacts *A*1 and *E*1, and closes the circuit between the contacts *E*1 and *N*1. The blocks are now both back on the neutral position the same as before the locomotive started in.

The operation of the blocks with the locomotive going out will be as follows: The trolley wheel closes the circuit between the trolley line and *B*4, allowing the trolley-line current to travel to the solenoid *C* and to the relay *C*. The circuit is open at this point. Simultaneously the current travels the throw-off line to the solenoid *A* and to the relay *E*. The circuit is open at this point, so that on *B*4 there is no operation of the blocks, the same as on *B*1 coming in there was no operation. An instant later the trolley wheel leaves *B*4 and connects *B*3 with the trolley line. This allows the current to travel to the solenoid *D*, to the relay *H*, to *N*2, to *E*2, and thence to the ground. This causes the solenoid *D* to operate the arm *Z* on No. 2, thereby opening the circuit between *E*2 and *N*2 and closing the circuit between *C*2 and *D*2. This also closes the circuit between *A*2 and *E*2, allowing the current to travel from *D*2 to *C*2, then to the power line, to the green lamp No. 2, to the relay *G*, to the contact *A*2, to *E*2, and thence to the ground. This causes the green lamp No. 2 to light up. The relay *G* closes the circuit at the contact *O*2, thereby connecting one side of the solenoid *C* to the ground. At the same instant the current traverses the power line to the red lamp No. 1, to the relay *F*, to contact *N*1, to *E*1, and thence to the ground, causing the red lamp No. 1 to light up and the relay *F* to close the circuit at the contact *O*, thereby connecting one side of the solenoid *B* to the ground.

Further Operating Details of System

When the locomotive comes out the trolley wheel closes the circuit at *B*2, so that the current flows to the solenoid *B*, to the relay *F*, to the contact *O* and to the ground. This causes the solenoid *B* to operate the arm *Z* on No. 1. This opens the circuit between the contacts *N*1 and *E*1; the red lamp No. 1 goes out and the circuit is closed between *C*1 and *D*1. It is also closed between *A*1 and *E*1. This allows the current to flow from *D*1 to *C*1, to the green lamp No. 1, to the relay *E*, to the contact *A*1, to the contact *E*1, and thence to the ground. This causes the green lamp No. 1 to light up.

The relay *E* also closes the circuit at *X*, thereby connecting one side of *A* to the ground. No change takes place on No. 2, as the current in the power line is unchanged. An instant after the circuit is made between the trolley line and *B*2, the trolley wheel leaves *B*2 and closes the circuit between the trolley line and *B*1. This allows the current to flow to the solenoid *A*, to the relay *E*, and to the ground, causing the solenoid *A* to operate the arm *Z* on No. 1, bringing it back to the neutral position. This opens the circuit between *C*1 and *D*1, and also between *A*1 and *E*1, and closes the circuit between *E*1 and *N*1. At the same instant the current travels to the throw-off line, to the solenoid *C*, to the relay *G*, to the contact *O*2, and to the ground, causing the solenoid *C* to operate the arm *Z* on No. 2, throwing it back to the neutral position. This opens the circuit between *C*2 and *D*2 and also between *A*2 and *E*2. It closes the circuit between *E*2 and *N*2. This brings the blocks both back to the neutral position and ready to repeat the same action over again.

Minecdotes

The Air Car

In former years pranks were perpetrated frequently upon the new recruit who was being initiated into the odds and ends incident to mine work. Sometimes the greenhorn proved himself master of the situation. I remember one case in particular, several years ago, where this proved to be the case. A new driver, on his second or third day in the mine, came to the sidetrack one afternoon empty handed, with the announcement that he couldn't get any coal that trip, the men on the heading and air-course having gone home on account of smoke. Now, the driver boss, though he was quite a hustler, was also a bully, and when he thought he knew his man he would ridicule, terrify and abuse him unmercifully. In those days drivers were plentiful and jobs were not.

"You homesick-looking jay. You red-brush farmer. You simple rube. What did you mean by letting those men go home? I've a good mind to send you home, too. Why didn't you get the air car for them?"

"The—air—car?" stammered the culprit.

"Yes—the air car! Don't you know what an air car is?"

The new driver confessed that there were a lot of things he didn't know anything about—one of them being an air car.

"Well, if you are going to drive here, you want to wake up and get wise. Now, you burn her to the outside and get the air car. Bring it in on the motor trip. Don't you ever let anybody go home again for the want of air."

The man ran all the way to the outside and, of course, received the "horse laugh" when his errand became known. When he got back to the sidetrack his humiliation was further witnessed. He, too, might have enjoyed the joke had he not been so conscious of the driver boss' far-stretched sense of humor in "rubbing it in"; but his silence was ominous, and the driver boss began to feel uneasy.

On the outside that evening the recruit was waiting for the driver boss. He said simply: "I want you to show me what an air car is."

"Why, you simple fool," the driver boss said with a weak show of his former bravado, "don't you know that there ain't no such thing as an air car?"

The driver threw off his coat. "Pardner, I may be foolish on this air-car business, but I'm going to find out if I'm the only fool here."

They didn't fight, because the driver boss, after sizing his man up, acknowledged that for once, he, himself, was a fool, too.

Repairing Locomotives Underground

At one of the large mines of the Northwestern Mining and Exchange Co., in Clearfield County, Pennsylvania, is a rather interesting underground motor room in which all repairs are made to the haulage locomotives. The small gathering locomotives are sent to the surface to undergo repair work; but the large ones, which cannot be run onto the cage and hoisted to the surface, are repaired in the mine when that is possible.

The motor room is about 15 to 16 ft. wide. The walls are of brick and the roof of steel I-beams. A



AN UNDERGROUND MOTOR ROOM

track runs through the room at one side, as is shown in the accompanying illustration. A large pit permits the mechanics to work under a locomotive. At the left of the room can be seen the work bench, which is equipped with all the various vises and tools needed for repair work. The crane in the foreground can handle a weight of 15 tons. It is operated by hand and can travel the full length of the room. Electric lights furnish sufficient illumination for the machinist and his helper.

Use of Hot Liquid Pitch in the Making of Briquettes

A plant for making briquettes with the aid of hot liquid pitch which is to be delivered by rail direct from the tar works is being erected at the Hohenzollern Colliery, near Beuthen, in Upper Silesia. The novelty consists in the use of liquid pitch transported in special tank wagons by railway. This was first tried in August, 1914, in the Essen district, when ordinary boiler tanks of 15 tons capacity were used. The tanks had only three miles to travel by road, but with charging and discharging the operations took seven hours; yet there was a saving in material and cost.

The State Railway line is to be utilized for the plant now being completed in Silesia. The process adopted is the Fohr-Kleinschmidt, which, worked on the old plan, was a little more economical than other processes, but promises a considerably increased economy when starting with liquid pitch on the new plan. It might be thought that liquid pitch and powdered or disintegrated coal might be run directly together in briquetting, but such attempts only yield a lumpy product devoid of strength.

By the Fohr-Kleinschmidt process the cold pitch as supplied, without fine disintegration, is heated first to 100 deg. C., the thick fluid being then transferred to a melting drum kept at a temperature of 130 to 170 deg., from which the thin liquid flows into a receptacle to be further heated and sprayed by means of steam or compressed air. The sprayed particles congeal in a mixing drum while still floating in the air; in this condition the pitch, forming a sooty dust, meets the finely disintegrated coal and is mixed with it in slowly revolving drums, fitted with stirring and lifting devices, being pressed into briquettes at temperatures ranging from 50 to 80 deg. C.

The Engelsburg Colliery of the Verein fur Bergbau and Stahlindustrie at Bochum has eight presses at work, yielding some 600 or 700 tons of briquettes daily. The pitch consumption has been reduced 1 per cent. by the adoption of the Fohr-Kleinschmidt process, and the hot pitch is to make a further reduction in cost possible. There will be less waste, no need for disintegrating and remelting the pitch, and several operations will be much simplified; the disintegration affected the eyes of the men in charge, and this will now be eliminated. The emptying of the tanks by compressed air takes 15 min. The pitch to be used in the new plant in Silesia is distilled at a temperature of 250 deg. C.

Hungarian Editor Opens Co-operative Mine in West Virginia

About two months ago Martin Himler, the editor of the Hungarian miners' journal, *Magyar Bányaslap*, organized a company on a coöperative basis. About 85 per cent. of the stockholders are Hungarian miners, belonging to every district where men of that nationality are now working.

Mr. Himler intends that this camp shall be a model operation and he hopes to make a careful study of the reasons that cause the Hungarian miners to wander round from mine to mine. When the experiments are ended he expects to be able to make practical suggestions to other operators who are employing Hungarian labor as to the manner in which Hungarians may be made more steady.

Half the earnings will be distributed to the stockholders in the form of dividends and the other half among the miners in proportion to their earnings. The mine is located at Ajax, W. Va., 18 miles east of Williamson.

PICKING TABLES on which coal is cleaned should have a travel of not over 50 ft. per minute and should be of sufficient width so that the coal will spread out thin enough that lumps of coal will not be covered by others.

Engineer Regiment for France

There is now being recruited at Camp Meade, Md., a special engineer regiment for quarry work in France. This organization is known as the 28th Engineers, National Army, and its purpose is to operate the existing quarries and to open and operate such new quarries as may be needed in France to supply the crushed stone for the building of the highway systems, for railroad ballast, for concrete, and such uses.

Already two complete companies of 250 men have been recruited and equipped for service abroad. On the roster are the names of expert quarrymen, rock and churn-drill runners, blasters and powdermen, crushermen, stationary steam engineers, locomotive engineers, steam shovel men and cranemen, clamshell bucket men, blacksmiths, machinists, electricians, compressor men, trackmen, cooks, master mechanics, quarry superintendents, foremen, and railroad brakemen and switchmen from every state in the Union.

Each company will have a complete quarry equipment of steam shovels, standard gage engines and dump-cars, well drills, tripod drills, hammer drills, jaw and gyratory crushers, screens, belt conveyors, etc., necessary to produce a minimum output of 1000 tons of crushed rock per day. This equipment has already been ordered and has been shipped to the point of embarkation.

All men who volunteer for this service will be enlisted as privates, but those who show themselves qualified will be raised to the grade of noncommissioned officers. Any specially qualified man who is beyond the present draft age may enlist by showing proper qualifications and passing the requisite physical examination.

The officers of this regiment are all professional engineers who have done quarry and heavy rockwork in all parts of the United States and are graduates of the officers' training camps.

The 28th Engineers offers an exceptional opportunity for the quarrymen of this country to show their skill and courage, as the success of the American Army operation in France is dependent upon the roads and railroads, which in turn are largely dependent upon the supply of crushed stone.

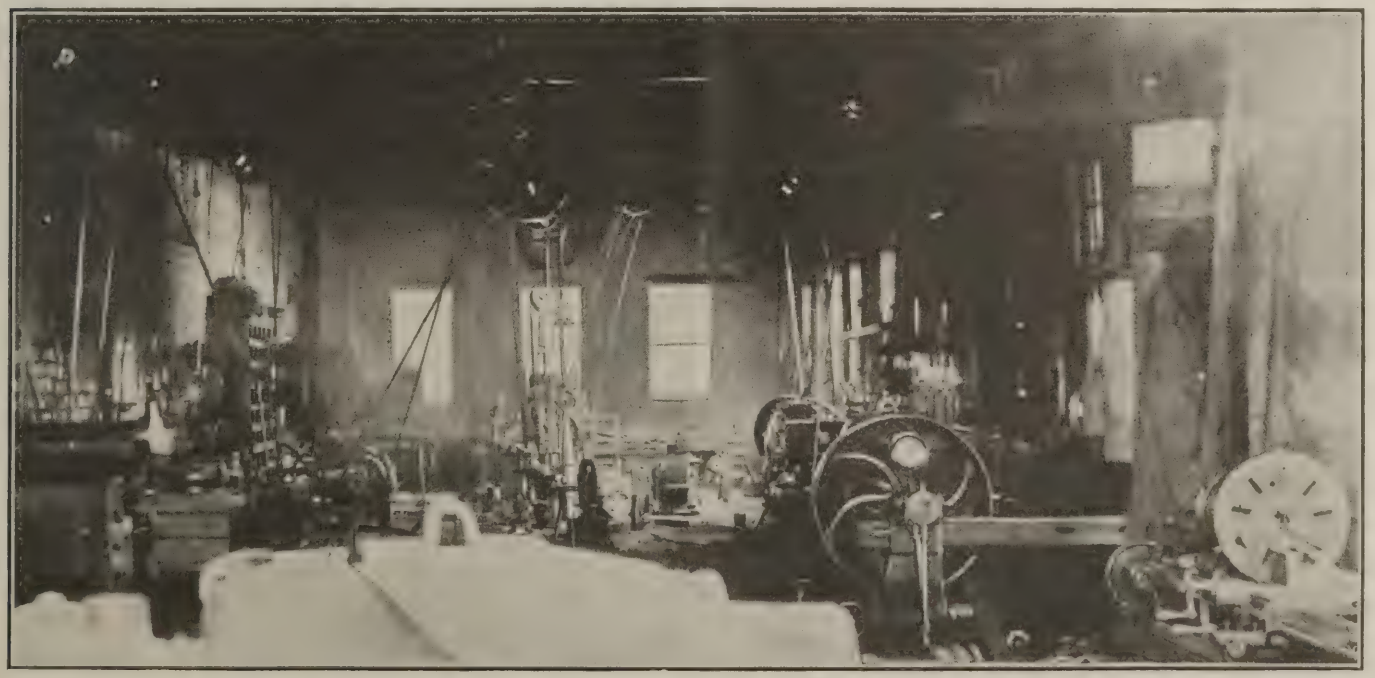
Any inquiries regarding service in this regiment will be answered on writing to the Commanding Officer, 28th Engineers, N. A., Camp Meade, Maryland.

Foundry and Machine Shop at a Central Pennsylvania Coal Mine

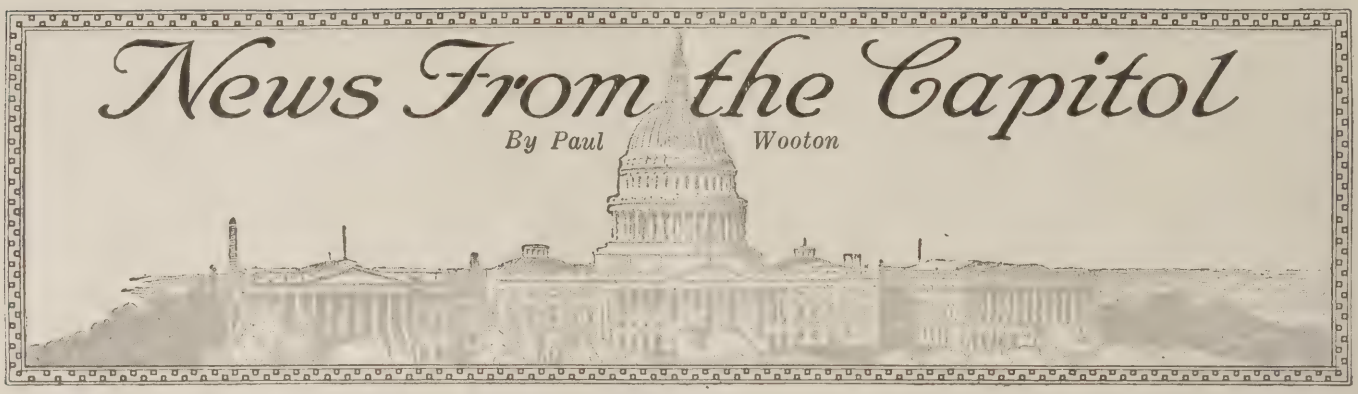
At one of the mines owned by a large coal operator in central Pennsylvania there is installed a large machine shop and, what is an unusual feature around a mine, a foundry. The machine shop is well equipped, containing the following machinery: A thread-cutting machine; a radial post drill; a pipe machine; a portable hand-power crane; one lathe 18 in. by 9 ft.; one 24-in. planer; an hydraulic press; one lathe, 34-in. swing, 18 ft. long; a test gage for steam; two small lathes; a blacksmith forge; a centering machine; a power emery wheel, and a power hacksaw. All of these tools are driven by belt drive from a mainshaft which extends down the center of the shop. The power is furnished by a simple 10 x 18-in. slide-valve engine. Fourteen men are employed. (View of shop is given below.)

Immediately adjacent to the machine shop is a small motor repair shop in which the gathering motors are taken care of. On the opposite side of the machine shop the blacksmith shop is located.

The foundry is a short distance away from the machine shop, and is equipped with a 6-ton cupola furnace. All the iron castings used at this and two other mines owned by the same company are made here, as are also most of the brass castings. The largest casting ever turned out by the foundry weighed 1600 lb. At present the iron is handled from the cupola to the molds by hand ladles, but the company intends to install a small hand-power traveling crane in the near future. Three men are employed in the foundry—a founder and two apprentices.



INTERIOR VIEW OF WELL-EQUIPPED MACHINE SHOP AT A CENTRAL PENNSYLVANIA COLLIERY



[Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Metropolitan Bank Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 703, Metropolitan Bank Building, Washington, D. C., while at the capital.—Editor.]

Lovett Attributes Rail Congestion to "Tag System" of Army and Navy

In a statement issued by Judge Robert S. Lovett, Director of priority, on Jan. 5, the "tag system" of Army and Navy officials was blamed for much of the freight congestion. The public, he said, had been misinformed by statements that priority orders, issued by him and since suspended by Director General McAdoo, had caused the railroad tie-up. Judge Lovett's order is as follows:

It is being reiterated before committees and in various reports, and repeated from day to day in newspapers, that the present congestion in railroad transportation is due in large measure to numerous and unwise "priority orders," and it is well known and is generally published that I am in charge of priorities. The obvious inference, therefore, is that such ill-advised priority orders were issued by me. Nothing could be further from the truth.

No one knows better than I have known all along that reckless and indiscriminate issue of priority orders would add enormously to the transportation difficulties, and that the greatest caution should be observed in issuing such orders. The result is that since my appointment by the President, in August last, I have issued but five orders awarding priority in transportation, to wit: Order No. 1, issued Aug. 20, directing the movement of coal to the Northwestern States via the Lakes; Order No. 2, issued Oct. 27, restricting the use of open-top cars; Order No. 3, issued Nov. 2, giving preference to certain coal shipments from Utah and Wyoming mines; Order No. 4, issued Nov. 29, according priority in the shipment of certain cattle foodstuffs to the drought-stricken sections of Texas and New Mexico; and Order No. 5, issued Dec. 7, according priority to perishable freight, foodstuffs and certain military supplies, and to coal, coke and certain war materials.

No railroad man or other person with knowledge of the facts has claimed or will claim that any of these orders has caused congestion or seriously hampered transportation.

The fact is that the so-called priority orders, which are more or less responsible for traffic congestion and of which complaint is made, are the result of an arrangement made by the railroads themselves and the supply departments of the Army, Navy and Shipping Board, with which I had nothing whatever to do. That arrangement was embodied in Bulletin No. 22, issued by the so-called "Railroad War Board" in July last, and is commonly referred to as the "tag" system. It prescribed a form of placard or tag which when tacked on a car entitled that car without further orders or instructions to preferred movement to destination. Large quantities of these placards were printed and distributed throughout the United States in the hands of quartermasters, agents, contractors and others getting material for the Government, and naturally one was tacked to every shipment made, whether urgent or not.

Consequently, everything bought was rushed to destination, with the inevitable result that terminals were crowded with materials before they were needed or could be unloaded. No complaint of this system was made or reported to me until late in November, and priority Order No. 5, issued by me Dec. 7, made provision for restricting and regulating the evil.

However indifferent one may be personally to misrepresentation, yet, where the performance of public duty is involved, the facts as they are ought to be stated. Of course, I know the misrepresentation was not intentional, and the unusual circumstances were such as to make it almost unavoidable.

Weekly Production Statistics

Bituminous coal production during 1917 was 544,142,000 tons, according to an estimate made by C. E. Lesher, the geologist of the United States Geological Survey, who is in charge of coal statistics. This is an increase of 8.3 per cent. over the 1916 production. December production did much to pull down the year's total. During the closing month of the year, the production was 42,050,000 tons. This is the poorest monthly showing since April.

Despite the extreme cold which prevailed over much of the coal-producing area, a good showing was made in the five working days of Christmas week, when the mines of the country produced 8,964,000 tons. Coke production during the same week was 538,276 tons. There was a decided decrease in the number of cars of anthracite coal forwarded. During the week ended Dec. 29 anthracite shipments were 29,228 cars.

Commenting on his figures, showing the limiting factors in coal production for the week ended Dec. 22, Mr. Lesher says:

Reports from almost every district indicate some improvement over the extraordinary depression of the week of Dec. 15. For the country as a whole losses due to all causes amounted to 31.9 per cent. of the full-time capacity, as compared with 42.3 per cent. during the preceding week. Improvement was reported in car supply, losses due to that factor declining from 30.8 to 24.8 per cent. Losses attributed to labor shortage and to mine disability returned to normal.

Recovery was most rapid in Illinois, Indiana and Ohio. In the last-mentioned state losses attributed to car shortage fell from 57.1 to 38.8 per cent. of full-time output. Western

Pennsylvania and the Irwin gas field also reported decided improvement in central Pennsylvania, however, conditions underwent little change. The Junior Philippi, Winding Gulf and Fairmont regions of West Virginia, and the Southern Appalachian district, reported increased losses due to car shortage. From the remaining districts of West Virginia and Kentucky a slight improvement was reported.

The production of Alabama was adversely affected by strikes and labor shortage; losses due to these causes amounted to 9.1 per cent.

The Southwestern region—Missouri, Kansas, Oklahoma, Arkansas—and the Rocky Mountain fields—Montana, Wyoming, Colorado and New Mexico—also reported substantial recovery from the depression of the week before.

Director of Railroads McAdoo Working on Coal Transportation Problem

Among the many pressing problems which confronted Director General of Railroads McAdoo last week, none took precedence over the transportation of coal. Dr. H. A. Garfield, the fuel administrator, conferred frequently with Mr. McAdoo. In fact, he seemed to be the one man who could see Mr. McAdoo whenever he wished. Mr. McAdoo's office was besieged throughout the week by prominent men representing powerful interests, but most of them were disappointed at not being able to secure personal interviews with him.

A schedule for distributing coal is being worked out. Every effort is being made to prevent cross-hauling. Distribution points are being selected from which the state administrators may order it into consumption.

All Priority Orders with Respect to Transportation Suspended

The following statement was issued by Doctor Garfield to clear up what apparently is a very general misunderstanding with regard to priority orders:

"By direction of Director General McAdoo, all priority orders heretofore issued with respect to transportation have been suspended and no further priorities may be claimed thereunder. Future orders for priorities will be issued in emergencies under Mr. McAdoo's direction as occasion may require."

National Coal Association Blames Railroads for Coal Shortage

All blame for the coal situation is laid at the door of the railroads by the National Coal Association. In a formal announcement the National Association says in part:

"There need not have been a fuel famine in 1917; there need not have been even a coal shortage. That there was a fuel famine, with its attendant suffering, was due solely to inadequate transportation facilities.

"So far as car supply in its effect on operations of mines is concerned, the mine operators feel encouraged by the centralized control of the railroads under Mr. McAdoo. They feel satisfied that sufficient cars will then be supplied to keep the mines running regularly somewhere near capacity. If this is done the producers can keep their men, because the wages now paid are the highest in the history of the industry, and compare favorably with those paid in other lines of industry."

FUEL ADMINISTRATOR GARFIELD has refused to issue priority orders to assure New York City 1500 cars of coal a day. The city's situation is serious.

In Lighter Vein

Some Qualifications!

The recent naming of county fuel administrators in the several counties of the state has been the subject of considerable comment. The Republicans, of course, did not expect many of them to be chosen from the G. O. P. and they got their expectations fulfilled. They did expect, however, that the men appointed would have more or less knowledge of the fuel business. In that, they claim, they have been disappointed in many instances.

They are telling a little story to illustrate the situation.

In a certain county where a fuel administrator was to be named there is an old man whose frank, blunt, good-natured manner is much on the style of Irvin Cobb's "Judge Priest," with whom most readers of current magazine stories are familiar.

Into this old gentleman's office one day came a young man for a confidential chat.

"Uncle John," he began, "I've just been offered the position of fuel administrator for this county by J. Walter Barnes, state administrator, and I want to get your advice about accepting it."

"Accept it, young man, by all means accept it," he said brusquely, "never turn down anything that's handed to you. Do you know anything about the fuel business?"

The young man admitted that he did not.

"Did you ever teach school?" the old man then asked.

"Yes, taught school for two years, some time back."

"Well, then, you are just the man for the place. If you don't know anything about the fuel business and have taught school you will make an ideal fuel administrator!"—*Charleston Mail.*

This Is the Life!

Following are some statistics taken from a coal operator's diary during 1916:

Threatened to be sued	300 times
Have been sued	0 times
Been asked about car supply	300,000 times
Told about car supply	23 times
Did not know about car supply	200,000 times
Lied about car supply	99,977 times
Shipped coal on contract	148,410 tons
Shipped coal on spot orders	15,240 tons
Loss on contract coal	$48,410.23
Profit on spot coal	50,460.48
Net profit	$2,050.25
Contributions to Y. M. C. A., Y. W. C. A., Belgian Relief Fund, Belgian Tobacco Fund, Boy Scouts, Tuberculosis Sanitarium, Church Building Fund (3 times), Destitute Widows (20 times), Destitute Orphans (1 time) and Salvation Army	$424.10
Living expenses for year	1,602.92
Total	$2,027.02
Balance cash on hand	23.23

THE LABOR SITUATION

General Labor Review

Everybody is working as hard as the railroads will let them, and some are working nine hours a day. The mine workers are showing themselves as willing to override contracts in the interest of production as the operators were in the interest of harmony. In the face of the enemy neither unions nor operators know any law but that of patriotism.

The mine workers expect to discuss the nine-hour day at the biennial convention to be held at Indianapolis. It is going to be a warm discussion doubtless, because it is a matter which everyone will see from a different viewpoint; for every man's judgment will be based on local conditions, and these vary markedly from place to place.

Why the Anthracite Miner Counts Twice

It is of importance that the anthracite miners produce a big tonnage, because the anthracite region is a small field far nearer than any other to a certain large population. If that population is not satisfactorily served by the anthracite mines, it must be more generously served than is necessary by the bituminous mines; and as these are more remote, such service will be obtained only with much waste of transportation. Moreover, the capacity for the production of anthracite is quite inadequate and hard coal cannot be satisfactorily replaced by bituminous coal. For this reason, it is necessary to do all possible to promote the production of anthracite.

Those who are so located that they can provide coal with minimum transportation should be asked to work more steadily and more hours than others. The bituminous mine workers for their part should fill the cars they receive as soon as they receive them. They should not shut down in the evening till all the cars supplied are duly loaded. If they have any objection to make, it should be made to the railroad authorities, who should cut down allotments when men have to work overtime to fill cars which other men in the same district could fill without working overtime.

Some Car Allotments Should Be Made Larger

But for the most part there is no hope in the bituminous region that the allotment will exceed what the operating forces can load. On most railroads the allotment will be such that a full day will be far less than eight hours. It is likely that the Government will regulate matters so that those men will be enabled to work the longer hours who mine coking coal and such coal as is transportable to market with minimum effort.

It is probable also that the railroads will be so regulated that miners will be enabled to work at least seven hours whenever the mines run. It is a mistake to put the allotment so low that while the mines run every day they will run each day far below capacity. It is too much to ask men to travel a long distance, put on their dirty clothes and get all begrimed for a few hours' work. A few less working days would be better. The men would have a chance to make use of the time thus afforded them.

Talk Much About Duties, Little About Rights

But it will take some time for things to adjust themselves. Till that time occurs everyone will have to have patience and talk much about their duties and little about their rights. Let every man be severe in his judgment of himself and sparing in his condemnation of the railroads and the Fuel Administration. Everything cannot be done at once; not everything done will be right, certainly not at first. We all have to learn, not least of all the fuel administrators who know little about either coal or transportation and find themselves tackling problems which would baffle even experts. These men have been chosen for their disinterestedness and not for their knowledge of the conditions to be met. If care is taken to keep them informed of the situation, they will probably solve matters in the end with as fair a degree of efficiency as we have a right to expect.

The New Year brought more recognition of the rights of the salaried men which have been so long neglected. Foremen and other monthly men employed by the G. B. Markle Coal Co., whose salaries were not subject to the contracts made by the mine workers, received bonuses ranging from $15 to $100 for the efforts they had made to increase the production.

Reading Strives Mightily To Get Tonnage

The Philadelphia & Reading Coal and Iron Co. showed its determination to make monetary sacrifices to obtain coal when on Dec. 28 its big Bear Run breaker was rendered temporarily idle by the breakage of some of the machinery. The company ordered the 900 men to remain on the job under pay till the repairs were made. As a result 600 tons of coal were run through the breaker after it was repaired.

A few anthracite mines in the Southern field worked on New Year's Day. The Philadelphia & Reading Coal and Iron Co. had six collieries, out of 40, working. Around Hazleton and Wilkes-Barre attempts were made to run, but without success. The weather was so cold that the mine workers' enthusiasm was somewhat dampened. Had the day been pleasanter the sacrifice of New Year's could have been made with less difficulty.

Does Advance Apply to Differential Also?

In West Virginia the Preston County Coal Operators' Association and the miners of that district have failed to come to an agreement. They are still in controversy as to whether the 15 per cent. advance on yardage and deadwork, provided in the last wage increase, applies to the differential existing between the prices paid for mining wide and narrow work. Not being able to agree they have, by mutual consent, referred the controversy to Dr. Harry A. Garfield, the Federal Fuel Administrator, for arbitration, his decision to be final and binding and retroactive to Nov. 1.

Much tonnage was lost during the holidays by the failure of the Illinois miners to keep their promise to work every day except Christmas and New Year's. In the Central Illinois field, around Springfield, the output on the day after Christmas and the day after New Year's was 30,000 tons less than the daily average. At many mines in this district and in the southern Illinois fields not more than one-third of the men reported on those days for work, and it was two or three days after each holiday before the men were at work in full force.

Miners Make Merry Too Long in Illinois

For the greater part of the year the average daily production in Central Illinois has been 60,000 tons or 1200 carloads. On Dec. 26 the production was only 710 cars and on Jan. 2 it was about the same. The district in which this tonnage reduction occurred extends from Lincoln to Centralia and from Pana to Carlinville. The announcement of the figures comes from the Central Illinois Coal Bureau, which receives reports on one-fourth of the output of the state. There was a similar loss of production in the other districts.

The official report of the recent United Mine Workers' election shows that all the state officials were reëlected. For president, Frank Farrington defeated Frank Hefferly, of Collinsville, by a vote of 28,438 to 24,254. For secretary-treasurer, Walter Nesbit, of Belleville, defeated Edward A. Wieck by 31,365 to 13,991. For vice president Harry Fishwick defeated Dave Stuart by 24,836 to 23,100.

Miner's Best Home Is His Own

The committee appointed by ex-President John P. White, of the United Mine Workers of America, under authority of a resolution adopted by the last international convention to investigate the advisability of establishing a home for superannuated miners and the cost of maintaing it, will report adversely on the project. The committee's report will recommend a pension scheme instead, because under that system the fear of pauperism will be removed.

The committee's opposition to the establishment of a home is based on the grounds that the men of advanced years should be enabled to obtain relief without leaving their families and being separated from their loved ones to become the wards of an institution.

The report will recommend a per capita tax of 25c. a month, to be levied on the 400,000 members of the United Mine Workers during the next five years, and further, the payment after 1923 of a monthly pension of $20 to all miners more than 65 years of age. Miners under 65 years of age who are incapacitated by accident, and have no means of support, will receive a like amount. Under the committee's plan no miner will be eligible until he has been continuously a member of the organization for 10 years and has paid the pension tax for five years.

The committee is composed of William Mitchell, of Iowa; Evan Evans, of Illinois, and John Hutchinson, of Indiana. The investigation of the committee was far-reaching. Visits were made to the Typographical Union's Home at Colorado Springs; Printing Pressmen and Assistants' Home at Rogersville, Tenn., and several homes maintained by fraternal societies and also the homes provided by the Government for old soldiers.

Should Wait for Delayed Cars

Waiting for cars which may not come for hours or may not come at all is trying to the best of men. But today it is a patriotic duty. The soldier has to wait days, even months, for a foe who doesn't come and attack as expected. The miner might well consent to wait a little while for cars which the Government has promised to deliver but cannot get to the mine on schedule time. He *might* wait and before long he *will* wait. Eventually he will be made to realize that it is his duty.

Just now at some mines in Illinois he is unwilling to wait, even though his agreement, made before the war, required him to stay at the mine an hour at starting time if cars were not on hand. The operators at some mines say that men go home if the cars are only a few minutes late. As a result the cars lie idle on the switches until the next day, and a day's output is lost.

Louis Senior, owner of the Branch mine, near Belleville, has filed a complaint with the Belleville District Fuel Commission, comprised of Adolph Knobeloch, Victor Gans and E. A. Daley, declaring that four times within the past six weeks the men employed at his mine have refused to go to work because no cars were on the siding at 7:30 a.m. He declares that the men have signed an agreement specifying that, even though no cars are at hand, they will start working at 7:30 a.m. and continue at work until 8:30 a.m.

He asserts that the men have broken this agreement, even when cars were in sight, and in other cases when the cars were being pushed into the siding. The capacity of the mine is 600 tons a day, and that tonnage is lost every time the mine is laid idle. The commission will ask the Government to define its powers to deal with the case. Other operators say they are having the same experience and the aggregate tonnage lost is large.

Will Work Only Under Flag

Some of the mines in Crawford County, Kansas, are manned by Austrians and others by Italians. The companies have found it desirable to group them by nationalities, as their racial antipathies make frequent troubles. The other day 500 Austrians threw down their tools, and the operating company naturally assumed that the men did it to hamper the United States in the successful conduct of the war.

Fred Robertson, a fuel administrator, was called in to get the men back to work. On securing an interpreter he soon found out the cause of the trouble. Over the mines in which the Italians worked an American flag had been erected, and the distinction had made the Austrians jealous. They wouldn't work without flags on the tipples over which their coal was dumped. A rush order was sent for flags, and at last accounts the flags were flying and the Austrians were trying to put out more coal than the Italians.

To Knit Up Pacific Industry

The delegations to the Indianapolis convention from Washington, Montana and Wyoming propose to seek at that meeting permission to form a tristate organization in order that working agreements between mine workers and operators in those three Northwestern States would run for the same period and have similar provisions. The Monarch mine in the Cle Elum field in District No. 10 has made an agreement with its men covering both the hours of labor and the day and contract rates.

The Pacific Coast Coal Co. and District No. 10 have made an agreement for the men engaged in the briquetting plant of the company at Renton, King County, near Seattle. The agreement provides for an eight-hour day and for a wage increase running from 40c. to $1.27 per day. The press operator, the blacksmith and the machinist will receive $5; the feed operator, $4.50; the press-floor operator, the powdered coal operator, the kettleman, the briquet loader, the box-car loader and the coal unloader, $4.25; the dryer operator's helper, $4, and the laborers, $3.75.

Labor Aids the Red Cross

When it comes to helping a cause in which they believe, no one will "shell out" more readily than the mine worker. The Red Cross workers at Pottsville erected their booths at the collieries and approached the miners when they received their semimonthly pay. As a result 5500 of the coal diggers joined the Red Cross.

But, after all, the palm goes to an Illinois mine. For there is still patriotism of the Abraham Lincoln type in Illinois despite all the true stories of alienism we have to record. The members of local union No. 1055, at Cambria, Williamson County, Illinois, agreed to accept the offer of the Carterville & Big Muddy Coal Co. and to work on New Year's Day, donating their services to the Red Cross. The company agreed to turn over to that organization every cent received for the coal, and the Clear-Clinch Co., which jobbed the coal, promised to give its commissions to the same excellent object.

And for the money thus earned every man, woman and child in Cambria was to receive a membership in the Red Cross. The town was to be made a 100-per-cent. Red Cross town. Whatever remained after the membership was filled was to go to the Williamson County Chapter of the Red Cross, for use in purchasing goods for surgical dressings.

Of Course, There is a Strike

Scanning the whole horizon of the United States coal-mining activities, of course, a strike can always be found. The day before New Year's the men of the Superior Coal Co., a small concern in troublous Michigan, went on strike to compel the company to restore Charles Tonnacliffe, a fireman, to the corporation's working force. John Crutchfield, of Saginaw, the president of the Michigan mine workers, supports Tonnacliffe's claim to work. According to J. E. Evans, the general manager, the mine workers quite generally do not, and have petitioned Crutchfield to allow them to continue work without Tonnacliffe. They are said even to threaten to leave the union if the president of the organization proves obdurate in his support of Tonnacliffe. Work resumed Jan. 4 pending adjustment of difficulties. Michigan miners have a paramount obligation to work steadily. By working they reduce the need for transportation immensely. Though the mines are small, strategically they are of great importance.

EDITORIALS

What "Sufficient Interest" Really Means

THE Annual Report of the Federal Trade Commission tries to clear that board of the crime of having, in the report of June 20, correctly outlined the facts about the anthracite situation. The Federal Trade Commission stands convicted of having told the truth, the whole truth and nothing but the truth. No gainsaying now can turn that truth into a falsehood.

"Whatever measure of success," said the report of June 20, "has marked the efforts of the commission with regard to anthracite coal has been largely because the car supply has been adequate by reason of the close corporate relation between rail transportation and anthracite production. Quite the contrary condition exists with relation to bituminous and rail transportation"—apparently meaning transportation of bituminous coal by rail—"and with relation to water transportation as to both kinds of coal."

Of course, the commission received a call for its unfortunate frankness. Men have been returned to Congress for no less a service than denying this self-evident fact. So in the annual report of the commission, an attempt is made to explain away the first statement, this extraordinary language being used in that ill-adjudged endeavor:

"This statement of the commission seems to have been open to a construction that a close relation between coal-mining companies and transportation agencies is desirable. On the contrary, the commission was seeking simply to show that, if *sufficient interest* is present, transportation facilities in existence can be made adequately to care for stimulated production. The speedy movement of coal by interested transportation companies was pointed out to emphasize by contrast the misuse of rolling stock by other transportation companies.

"The evils of a community of interest between coal-producing and coal-transporting companies are fully recognized by the commission. Directly as to anthracite, this is shown by the abnormal freight rates which have been secured by interested transportation companies for the movement of such coal. Instead of being in the public interest, this community of corporate interest, therefore, makes for unduly high prices of coal to the public and has in it the making of further monopoly."

We have italicized "sufficient interest" because it is the gist of the sentence. What is "sufficient interest" but sufficient profit. There was profit in using coal cars for coal, therefore they were used for that purpose in the anthracite region. The commission lauds sufficient interest at the opening of its statement and laments it at its close.

However, it is a fact that the fullness of car supply in the anthracite region is not due solely to the monopolization of coal cars in coal-transport service. It is a fact that the number of cars in the anthracite region is equal to the needs of the busiest season. That has never been true of the bituminous region. The railroads hauling anthracite have had "sufficient interest"—that is, sufficient profit—not only to keep cars in coal service but to buy and maintain them in condition for that purpose.

They have also had a more even demand for transportation throughout the year. This has made it reasonable to buy cars to supply the peak load with satisfaction. No one can afford to buy equipment to supply a peak load of short duration or uncertain occurrence. It has been by the control that the commission deplores, or pretends to deplore, that the distribution of demand for coal has been secured. The Federal Trade Commission will do well to put the facts before the public without fear of consequences and without sign of hedging.

Given the prospect of profit, men will invest in coal cars. Given the prospect of greater profit in coal transport than in other transport, men will transport coal and let other merchandise rest. Few invest willingly in unprofitable enterprises, the commissioners themselves not excluded. Few do what pays them less when they can do something that will pay them more.

That is just why men have been leaving the mines for the munition factories. The latter paid more for their labor and so commanded their services. It doesn't do to work at an unprofitable trade, because as a rule the rate of pay is a rough measure of the desire of the public for a certain type of service.

There is a class of demagogues who condemn men for seeking a profit, and say no man should be actuated by such mean motives. Suppose some people do operate at a loss, willingly or by compulsion, the same demagogues declare that a large profit is being made, for surely, they add, no one will work at a loss. They convict themselves. They say that everyone ought to do what they also say there is no one who will do. They preach civic virtue and deny that the possession of civic virtue is attainable. Why take so contradictory a course?

"The Very Bulwark of Coal Mining"

SPEAKING at a dinner of the American Institute of Mining Engineers, New York Section, a metal-mining engineer and manager, Arthur Thacher, said: "I can look back on 40 years of mining experience during which I have seen wages of American miners rise from 65c. a day for 12 hours' work to $4 and $6 a day; yet our cost per ton is less now than when we paid 65c. The increased use of machinery does not account for the whole increase in efficiency, because the same kind of shoveling and pickwork is still employed. We are working more intelligently; our men are not complaining of extra work, for the performance of it is made easier by the intelligence used in its performance."

That is an interesting statement, and it is true. Compare it with coal mining, which has faced continuously

increasing costs per ton because of increasing prices of piecework. When the European war commenced the charges for haulage, ventilation, drainage, hoisting, dumping and railroad-car loading in most cases had gone down rather than up. In 1914 most of these operations involved manifold more units of duty than they did years ago, and wages also had risen, but as we were working with intelligence and were doing the work on a day-wage basis, we were meeting, and in some cases, more than meeting, these larger burdens by our greater efficiency.

Nor were the men working any harder than before. In many instances they were hardly working at all. The motorman rarely left his seat. The coupler almost never pushed a car. The dumper merely pulled a lever. The trimmer handled a car dropper instead of barring the railroad cars. The pumper watched a pump; he did not as in years past work the crooked handle of a pitcher pump. Nor was ventilation secured by a hand fan or a furnace, which latter needed the constant attention of the stoker and was good for only a small section of a mine or for a restricted coal working.

And so the daymen worked less and did more, but the piecework price mounted even higher and higher. Some one attacking the proposal to replace piecework by day-work at the mines said in connection with some remarks at the recent meeting of the Coal Mining Institute of America that piecework was "the very bulwark of coal mining," and when he said that he spoke well. It is the bulwark, the trenchwork of coal mining, the defense of the weak and the craven in the industry.

But some day we hope to go "over the top." We are going to cease digging deeper and deeper and are going forward in coal mining. We are going to shelter ourselves no longer behind bulwarks. We propose to establish a new industry, but that will not be done as long as we retain the piecework system.

When the profit of progress goes to the progressive then will progressing be possible. As it is now, what little progress we have in actual mining profits only the man on whom it is thrust; and why thrust progress and profit on anyone who will not even *help* to pay for it?

True, if we put our mines on a piecework basis throughout, replacing what day rates we have by tonnage rates, we might, and probably would, save a large amount of money *at first*. We would speed up our workers, but there is a limit to that speeding. There is a point beyond which the workman, however much speeded, encouraged, dogged or threatened, cannot go. That goal once reached there is no future progress possible. The utmost is then attained; but, given new machinery and new methods, marvelous progress can be made. If, however, the man who works on the piecework basis is to get all the advantages of those helps, methods and machinery, who is going to bestir himself to supply them? Who will stay up nights to imagine and develop them? Who will put money into the coal business to secure them? Who, to make a more correct statement, will deliberately throw money away to have the workman profit by them?

It will be said that a new development will justify a new piecework scale. Those who have tried to get such new scales will please bear witness to their troubles. It is an almost hopeless task to secure such a revised contract. The scales as written do not provide for any revision of rates when conditions are revised.

And besides, the change is not always revolutionary and the need for a new scale is not clearly indicated. But where it is quite revolutionary it may be at first an advance of doubtful merit, as is usual in all progress. Would some one make a scale for flying per mile when the Wrights were first trying out their airplanes at Kitty Hawk? And if a scale had been made, what a damper would have been set on the progress of aviation, provided there was a union capable of preventing that scale from being lowered and strong enough even to raise it biennially, annually and, on occasion, seasonally also!

Paying the Price

AS a nation we have dallied carelessly with the "good roads movement." Now we are paying the price. It is proposed to send trains of loaded army motor trucks, under their own power, from Detroit to the seaboard. The first fleet was eight days in reaching Pittsburgh. Less than one-half this time would have been consumed if there had been even a fairly good road to travel.

Much freight could now be diverted from the railroads to the highways if good ones existed, but our extreme need finds us with only one-tenth of our 2,500,000 miles of public roads available for heavy motor-truck traffic.

The American people will have learned by the time the war is over that there are national prophets in this land whose advice is deadly. Such are those who told us that should war come, the American people would rise overnight, and in their might would smother all enemies. We have been rising since last May and haven't got up on our feet yet. Let us not forget the price we are paying for our credulity.

Danger and Discipline

THE fact that the fatality rate of the coal mines has outstripped the tonnage rate in the past year is a matter for careful thought on the part of both operator and mine worker. There is little question but what greater discipline would result in reducing that fatality rate. The soldiers from Australia, we are told, did not at first take kindly to discipline. They opposed the strictness and precision of militarism till they found that it was badly needed in the presence of danger.

Mines are, in a modified way, like battlefields. They are places of real or potential danger, and discipline is necessary. Where there are unions, there is no reason why it should not be union discipline. In some mines the pit committee strictly prevents crowding around the cage and pushing around the man trip, and other breaches of the mine law. It is proud to act as an instrument of beneficence.

But whatever the condition of the mine—unionized or ununionized—there must be discipline for safety. Discipline after all is coöperation as opposed to self-interest.

The discipline of the mine is different from the discipline of the battlefield as mines are different from battlefields. But discipline there must always be. Let us make up our minds to that before the danger overtakes us.

LEGAL DEPARTMENT

RISK OF FALLING ROOF NOT ASSUMED—A miner directed by his foreman to load out slate that had fallen from a mine roof was entitled to rely upon the foreman's assurance to him that the roof was then safe, without testing it for himself. (Kentucky Court of Appeals, Spencer vs. Consolidation Coal Co., 197 Southwestern Reporter, 1069.)

CONTRIBUTORY NEGLIGENCE OF MINER—There can be no recovery for accidental killing of a miner by fall of coal above a point where he was cutting a groove along the side of an entry preparatory to the installation of a telephone wire, on it appearing that he was warned against a loose condition of the overhead coal, and knew that he should not undertake to cut a groove there before removal of the overhanging coal, which required the assistance of several men. (United States Circuit Court of Appeals, Fourth Circuit; Dodd vs. Pocahontas Consolidated Collieries Co., 244 Federal Reporter, 151.)

RISK OF FALLING SLATE ASSUMED—A coal operator is not liable for injury sustained by a miner through falling slate, on a theory of the company's negligent failure to provide him with a reasonably safe working place, where it was part of his duties to take down slate for his own protection after firing shots loosening it. Nor is the employer to be held liable for such accident on a theory of bad ventilation of the mine preventing the injured man from making a proper inspection of the roof to determine the necessity for removing the slate, where the miner returned to his working place after firing shots without waiting for the foreman to close a trapdoor, which the miner knew would cause the accumulated smoke to disappear. (Kentucky Court of Appeals, Gregg vs. Stonega Coke and Coal Co., 198 Southwestern Reporter, 5.)

NON-ENGLISH SPEAKING EMPLOYEES—Within the rule of law that an employer is liable for injury to one employee caused by negligence of another, when the latter had previously shown himself to be so incompetent as to show that the employer was negligent in retaining him, an employee is not to be deemed to be incompetent merely because he is not familiar with the English language. So where a particular accident resulting in injury to one employee is found to have been caused by some negligent act of another not directly dependent upon the inability of the latter to understand English, as where machinery is started while another employee is known to be in a perilous position, the employer is not liable, in the absence of proof that the negligent worker's incompetence was previously known. (New York Court of Appeals' Barber vs. Smeallie, 117 Northeastern Reporter, 611.)

INSPECTION OF GASEOUS MINES—A statute in force in Utah reads: "In all mines known to generate explosive gases, the mine foreman, or firebosses, shall make a careful examination every morning of all working places and travelingways, and all other places which might endanger the safety of the workmen, within three hours prior to the time at which the workmen shall enter the mine. Such examination shall be made with the safety lamp." In affirming judgment against a coal operator, on the theory of a violation, of the provisions of this law it is held that if any explosive gases are found in a mine the statutory inspection must be made, although experts might regard the quantity as not being dangerous. "The language of the statute is positive and direct. . . . 'In all mines known to generate explosive gases' the examination and inspection directed by the statute must be made. A moment's reflection will make clear that the statute was intended to and does apply to all mines where explosive gases are known to exist, regardless of the quantity thereof. The Legislature thus withdrew the question respecting the quantity of gases, or whether the quantity was safe or otherwise, from the judgment of all classes, whether experts or non-experts, and imposed the duty of examination and inspection in all mines where explosive gases in any quantity are known to exist. . . . The Legislature has thus adopted the safe course." (Utah Supreme Court, Eleganti vs. Standard Coal Co., 168 Pacific Reporter, 266.)

SUIT FOR EMPLOYEE'S DEATH—"FELLOW SERVANTS" IN MINING—Where a miner was fatally injured in an accident for which the employing mining company was liable, leaving no widow or children, his mother was entitled to sue the company for damages on the father refusing to do so as administrator, although the right to sue was primarily in him. Decedent, who was injured while engaged in operating a cut of loaded cars on an incline through negligence of another employee operating a separate cut of cars, was not a "fellow servant" of the latter, within the rule of law that an employer is not liable for injury to one employee through unanticipatable negligence of a fellow servant of the injured man. Neither of the employees in this case, while operating a separate cut of cars, was in any way associated with the other, or in a position to see or to know what the other was doing, or how he was performing his duty. (Kentucky Court of Appeals, Harris vs. Rex Coal Co., 197 Southwestern Reporter, 1075).

ASPECTS OF MINING LEASES—A coal-mining lease contained the provision: "If at any time during the existence of this lease the lessee, his assigns, or successors, shall cease for the period of three months to operate the mines in the manner usual and herein contemplated, then such failure shall, *ipso facto*, work a forfeiture of this lease, and thereupon all improvements placed upon said property shall become the property of the lessor, *unless the delay is unavoidable and caused by circumstances beyond the control of the lessee.*" In a suit to forfeit the lease, it is held that a strike of the lessee's employees and a slight landslide upon the rails of the lessee's railroad, which was removed within a few days, did not excuse failure to operate. And the fact that the lessor gave notice that it would demand a forfeiture if the contract should not be fulfilled on the part of the lessee did not give the lessee any added period during which nonperformance would not work a forfeiture. One operating a mine under contract with a lessee thereof is not a necessary party to a suit by the lessor to forfeit the lease. (Virginia Supreme Court of Appeals, Matoaka Coal Corporation vs. Clinch Valley Mining Corporation, 93 Southeastern Reporter, 799.)

ADOPTING WORKMEN'S COMPENSATION IN IOWA—Under the specific provisions of the Iowa Workmen's Compensation Act, when an employer elects to reject the provisions of the law, or when he elects to adopt them after giving notice of such rejection, the election does not become binding upon his employees until and unless notice is not only filed with the state industrial commissioner, but is also posted conspicuously at the place where the employment is carried on. Hence, where a coal-mining company filed notice with the commissioner and posted it at its mine, showing that the provisions of the act were rejected, and, on determining to rescind this action, notice was filed with the commissioner, but was not posted at the mine, there was no sufficient election to come under the law, and an injured man was at liberty to bring an ordinary suit at law for damages. His right in this respect is not affected by the facts that the notice rejecting the act was torn down at the mine, and that there was general understanding among the employees that the company had accepted the statute, nor by the fact that the injured man could not talk or read English. (Iowa Supreme Court, Paucher vs. Enterprise Coal Mining Co., 1035.)

MINERS! Kiddies like yours are waiting in long lines for hours in hope of getting your coal. Some of them don't get any but go home to a cold stove.



Loading the coal into sacks in the yard

Taking the coal home on a wagon



DO ALL YOU CAN to help them get it. "Inasmuch as ye have done unto one of the least of these, my brethren, ye have done it unto Me."

Discussion by Readers

Women in Industry

Letter No. 2—I did not see the article referred to by C. McManiman, in his letter discussing the employment of women to fill the places of men who have answered the draft call. In his letter, which appears in *Coal Age*, Dec. 22, p. 1067, Mr. McManiman appears to object to women being employed as slate pickers, loaders, locomotive runners, etc., but thinks they could fill the positions of checkweighers, warehouse keepers and distributors of explosives.

In my opinion present conditions do not demand the employment of women in or about the mines. They are doing excellent work for the Red Cross, the Y. M. C. A. and as members of the War Council. In a few instances, women appear to excel the men in the work they have undertaken to help win the war.

The positions relating to coal mining that women might fill would, I believe, have to be confined merely to clerical work. The actual performance of the duties involved in the positions just mentioned, however, require considerably more than clerical ability. The weighing of coal, for example, at the majority of mines, requires much executive and physical ability.

A warehouse keeper should not only be a conservative person but possessed of a wide mechanical knowledge of the requirements of the entire plant. In regard to a distributor of explosives, I would not think of placing a woman in that position, which requires not only strength to handle the work, but experience along particular lines with which women are not commonly familiar.

A Look Into the Future

While conditions at present do not appear to require that women engage in mining work, it must be acknowledged that such a possibility exists in respect to the future. Before that is done, however, the men remaining at home must be willing to make whatever sacrifices are required, such as temporarily closing nonessential industries, and devoting their energies to the mining of coal and other work on which the success of the war depends.

Suggestions have appeared, from time to time, in regard to what industries are unessential and could be dispensed with, for a time, without loss to the community. I will not attempt to enumerate them. I believe, however, that when the emergency arises, the country will be equal to the tasks before it. The work already done shows a high degree of efficiency in many respects.

Speaking of the need of workers to supply the places of men called to the front, let me suggest that there are a large number of boys under the age of 16. These boys are more fitted than women for all classes of mine work. In fact, it has not been so long since they were permitted to work in and about the mines. At present, the new Federal child-labor law makes it unconstitutional for boys under the age of 16 to be employed in any industry, the product of which is shipped into another state.

Although I worked in the mines when I was 12 years old, I realize that the law to which I have referred was enacted for the protection of the boys and the proper development of the human race. It was a good law and greatly needed. In the present crisis, however, it will not be strange if conditions soon require that this law be set aside, since boys of that age can better be spared than women, and their employment in these positions will not be so detrimental to the human race.

It is my belief and conviction that none of our good laws, designed for the betterment of the people in times of peace, will be allowed to overshadow the patriotic necessity that arises in time of war. When the time comes and the need is present, I believe that the President will permit no red tape to interfere with the immediate adoption of what is required to accomplish the end for which we are all striving. It is hardly necessary to remember, here, that the laws of most coal-producing states forbid the employment of women in the mines.

W. H. Noone.

Thomas, W. Va.

Miners and the War

Letter No. 5—I was greatly interested in reading the letters regarding miners not being as anxious to do their utmost to produce, at this time, the largest possible quantity of coal, which has been urged as a great factor in winning the war.

I must admit that miners, as a class, do not care to be driven like mules, or to be whipped into line any more than workers in other industries. As a class, miners are stubborn but, on the whole, I do not know that this feature of their make-up is any more prominent than the same trait in coal operators. It is this characteristic obstinacy that has frequently widened the gap between employer and employed, in all industries.

Organization of Miners and Its Effect

It must be admitted that the lack of coöperation often manifest between miners and the operators who employ them has led the former to organize for their own protection. If greater efficiency is to be realized in the mining of coal, and the operation of mines, it is clear that both parties must work in harmony. An instance occurred a few mornings ago that illustrates the importance of this fact.

At a certain mine, it happened that morning that the miners' train, which daily carries them to their work, was three minutes behind the appointed time. Taking advantage of this slight delay, the miners, with little thought of coöperation and working in harmony with their employer, refused to go to work and the mine was forced to stand idle that day.

The remark is often made that miners have employed such assertive tactics ever since they were organized. But, while this may be true it is certain that remarks of that kind will not tend to bring the miners and operators together. What is needed is less wilfulness and more kindliness for each other, expressed both in words and acts.

There is ample opportunity and every inducement, at present, for miners to produce the greatest possible output of coal and to work every day that the mine is running. Instead of this, however, we often find the miner indifferent to the present rigid demand for coal. He is prone to regulate his workdays in accordance with his own individual needs, rather than from any feeling of patriotism.

Miners and the Penalty Clause

The average miner regards the "penalty clause," for example, as an attempt to drive him to work. Anyone who has this idea or assumes such an attitude, in the present war crisis, could not have read the excellent Foreword, entitled "Is This My Boy?" which appeared in *Coal Age*, Nov. 24, or thought very much in that direction. As a miner, I am frank to say that I favor the penalty clause, as long as it is used against the right party and in a way that no innocent person will suffer. It is true that at present miners should earn good wages, owing to the increased price of mining. At the same time, there are other conditions that affect the earnings of the miner. Speaking for myself, I feel safe in saying that I never had a less Christmas pay, in the last eight years, than that which I received in my envelope on the 24th of last month.

One has not far to look for the reason for this shortage. It was not my own fault, neither did I find that I had not been credited with every ounce of coal mined. Yet, my pay fell below a 50 per cent. rating. Looking for the cause, I found that I had been obliged to lose three and one-half days, owing to my coal not being cut. Three more days were lost when the mine was not working, probably because there were no flats.

Taking these things into account, I feel that the lack of tonnage in coal production, so generally ascribed to the failure of miners to work regularly in their places, cannot be placed to their charge. This shortage of output should not occur, under present conditions when the country is needing more coal than ever before.

In closing, I want to recommend that less be said about the inefficiency of miners, and a more earnest effort be made to place the blame where it rightly belongs. Let the railroads and the mine managements each assume their share of the blame. When the real source of the trouble is found and understood, there will be more hope of overcoming the difficulty and producing all the coal that the country requires.

W. H. Luxton,
Linton, Ind. Miner.

Shotfiring re Explosion

Letter No. 1—In connection with the claim of John Verner, former state mine inspector in Iowa, that a mine atmosphere laden with powder smoke contains so much carbon dioxide that it is "incapable of promoting or maintaining an explosion" and "will have a decided quenching effect on the flame of an explosion that is already under way," *Coal Age*, Nov. 3, p. 774, kindly allow me to cite an instance bearing on this point.

It became my duty, a short time since (Dec. 10, 1917) to enter a mine at the head of a rescue party, for the purpose of rescuing, if possible, two unfortunate shotlighters who had been caught in an explosion of powder smoke intensified and propagated by dust.

Our party arrived on the scene and entered the mine three hours after the explosion had occurred. Attempts at rescue had been made previous to our reaching the place, but these had proved unsuccessful, owing to the men being quickly overcome by the afterdamp, which the force of the explosion had driven back into the old workings on the right of the main entries. The first rescue party had entered the mine equipped only with their carbide lamps. They had not proceeded a great distance before feeling the effects of the afterdamp and were obliged to return to fresh air. We found them so overcome by the gas as to be unfit for further service.

The explosion had put the fan out of commission and the only means of ventilation remaining was a low stack at the mouth of the return airway. Here a fire was started and maintained, by burning old oil barrels and other wood. Having no helmets or breathing apparatus of any kind and desiring to avoid the experience of the rescuers who had preceded us, we decided to use the Wolf safety lamp, which would enable us to detect either an explosive mixture or blackdamp.

Rescue Work and Conditions Following the Explosion

Thus equipped, we entered the mine and were able to do reasonably quick work, in repairing brattices and hanging curtains at the mouths of those places from which afterdamp was coming. In this manner we proceeded a distance of about 1000 ft. on the main heading and 400 ft. farther on a crossheading turned to the left. At this point, we suddenly came upon the two dead bodies of the shotlighters where it was least expected to find them.

The bodies of the two men showed a few slight bruises, but were practically unburned excepting for a slight singeing of the hair. This work had now consumed 4½ hours, and a few of our party felt a slight sickness but nothing serious. Our good fortune, in this respect, was due to using every precaution.

We adopted the plan of keeping one man from 20 to 40 ft. in advance of the party. The man carried two lamps, one of which he placed on the floor of the entry, and the other he used for testing the condition of the air at the roof. If the bottom lamp burned dimly, we waited for it to brighten or go out.

We hesitated to check our advance sufficiently to seal off the openings on the left entirely, for which there was an insufficient supply of both lumber and canvas. At times, the lamp carried in advance of the party would go out within 15 ft. of them, and it was necessary to replace it with another safety lamp and wait for the air to clear before going farther. In this way, we proceeded from one crosscut to another, until we finally reached the place where the bodies were found.

It was not my fortune to make one of the party who inspected the mine later with a view to determine the cause of the explosion. There was, however, plenty of evidence, which we observed on every hand and which

showed that there had been an effort on the part of the shotlighters to make too high speed in firing the shots. The men worked together, lighting the holes successively, in the same or adjoining places, as rapidly as possible.

My observation has convinced me that the primary cause of this explosion was due to the quick firing of blasts, in places filled with the powder smoke produced by previous shots. Like Gaston Libiez, who writes on this subject, in *Coal Age*, Dec. 15, p. 1030, I am surprised that Mr. Verner should claim that an atmosphere composed of hot air and gases that are largely inflammable will not assist in promoting and maintaining an explosion in a mine.

I hope this matter will be thoroughly discussed in order that we may arrive at a correct understanding, as the long experience of Mr. Verner is worthy of careful consideration.

GAS INSPECTOR.

Worley, Ky.

Illinois and Missouri Coal Fields

Letter No. 1—While I can claim no first-hand knowledge of the Arkansas coal field, yet the inclusion of this field with the Missouri and Iowa fields, as appears in the article of Charles Keyes, *Coal Age*, Nov. 24, p. 886, there seems no reason to doubt. However, I would take vigorous exception to the statement that the western interior province and the eastern interior province were originally one stratigraphic province.

That the Missouri basin was entirely separate from the Illinois basin prior to the deposition of strata to within 25 ft. below No. 2 coal of the Illinois section, there is definite reason for doubting. But, above that level, within the Illinois basin, about 1000 ft. of strata were later deposited, which were entirely separated from and have no connection with the Missouri basin.

LIMITATION OF A POSSIBLE CONNECTING LINK

The possible connection of the Illinois and Missouri basins through southern Calhoun County, Illinois, applies only to strata included in the section extending from about 25 or 30 ft. above No. 2 coal to the same distance below that seam, especially in the occurrence of the clays at the Cheltenham fireclay horizon at Golden Eagle and in the Cheltenham district of St. Louis. The continuity of the Illinois No. 2 coal in Missouri and its identification with one of the Missouri coals, certainly, has not been definitely established, although there seems to be some evidence that the Bevier coal of Missouri is correlated with the Murphysboro or No. 2 coal of Illinois.

The similarity between the Illinois and Missouri sections, and the possibility of the continuity of the measures in these two basins, however, ceases probably a short distance above No. 2 coal and, certainly, before No. 6 coal is reached. The latter seam known as No. 6 coal outcrops in Illinois through eastern Jersey, Greene and Scott Counties, about 30 miles from the Missouri field. There is no evidence to show that it ever continued across the gap, and there is no coal, in the Missouri section that will permit a definite comparison.

The Illinois coal measures, lying above No. 6 or the Herrin coal, lie within the outcrop of this coal around the basin, which makes the possibility of their original connection with strata in the Missouri basin still more remote. There is positively no route by which the shales and limestones of the Missouri section can be traced into Illinois.

In the attempt to correlate the Missouri section with the Illinois section on the basis of lithologic sequence, a most unusual section was given by Mr. Keyes, on page 887 of his article, as representing the Illinois succession of rocks. The following are the sections given:

	Missouri		Illinois	
Missourian Series	Atchison shales	500	Shales	235
	Forbes limestone	30	Effingham limestones	8
	Platte shales	200	Shales	200
	Plattsmouth limestone	50	Martinville limestones	25
	Lawrence shales	300	Shales	100
	Stanton limestones	20	Livingston limestones	20
	Parkville shales	100	Shales	75
	Iola limestones	30	Absent	...
	Thayer shales	100	Shales	75
	Bethany limestones	50	Shoal limestones	7
Des Moines Series	Marais des C. shales	300	Shales	35
	Henrietta limestones	100	Mazon limestones	100
	Cherokee shales	250	Shales	200
Arkansan Series	Absent		Absent	

Kindly allow me to submit the following section, based upon stratigraphic studies of the State Geological Survey, which is more nearly representative of the conditions in Illinois:

McLeansboro	? Shales	100-150
	? Limestone (Effingham?)	8
	? Shales and sandstones	200?
	New Haven limestone	25
	Shales and sandstones	100–150
	Shoal Creek limestone	7
	Shale and some coal	100
	Carlinville limestone	7
	Shale, some limestone, and coal	200–300
	Limestone caprock No. 6 coal	6
Carbondale	Shales with No. 6 coal at top and No. 2 coal at base	300
Pottsville	Shales and sandstones	1,000

The Pottsville in the above section is represented, in Missouri, by strata lying rather below the middle of the Cherokee shales. The Carbondale formation is represented, in Missouri, by strata beginning about the middle of the Cherokee shales (at the horizon of the Bevier coal) and extending about to the top of the Des Moines series. The McLeansboro formation begins at about the same horizon as the Missourian series. Between the Missourian series and the Des Moines series, in Missouri, and the McLeansboro and Carbondale formations, in Illinois, there was probably, locally at least, a period of erosion followed by conspicuous sandstone deposition.

It seems to me that there is no special significance in the possible similarity in sequence, between the McLeansboro formation of Illinois and the Missourian series of Missouri, without paleontologic evidence to substantiate the correlations. At present, there are no data available that will justify the definite correlation of any horizon in the McLeansboro with any stratum or formation in the Missourian series.

GILBERT H. CADY,

Urbana, Ill. Illinois State Geological Survey.

The Zone Postal Law

Kindly permit me to refer to the appeal made in the advertisement of the American Authors' League of America, Inc., which appeared on the second page of the advertising columns of *Coal Age*, Dec. 29, and presented some strong arguments in favor of the repeal of the Postal-Zone Enactment, recently passed by Congress, to take effect July 1, 1918.

Owing to its bearing on circulation, there may be some hesitancy in permitting the discussion of this ques-

tion in the columns open to readers, were it not for the fact that the subject is one of even more vital interest to subscribers than to the publishers themselves. The former must eventually bear the burden of the increased expense created by this law.

As stated in the advertisement to which I have referred, this increase of expense will range from 50 to 900 per cent., according to the distance of the subscriber from the office of publication. For that reason, allow me to suggest that this injudicious legislation should have all the publicity possible.

In their hour of greatest need, the American people cannot afford to grope in the dark nor to Rip-Van-Winkleize themselves in an intellectual slumber, in respect to anything that menaces the free and unrestricted distribution of ideas throughout the length and breadth of the land.

Patriotic Mission of the Country's Press

One point that seems to me has not been thoroughly emphasized in the Authors' League advertisement is the patriotic service that is being rendered by the country's periodicals. Surely, we cannot undervalue their mission. It is the press more than any other instrument that is responsible for the patriotic harmony of our people throughout the length and breadth of the land.

The daily, weekly and monthly publications that are now distributed broadcast from sea to sea serve to vitalize and unify public opinion. Only by this means can that gospel of justice and truth, which is provoking in Prussianism a growing passion of hatred for us and our principles, be disseminated and this country and the world made to realize that the Emperor of Germany is fighting a world democracy that threatens his own autocratic rule.

In view of these facts, let Congress reflect and ask itself what per cent. of the American people who are now reading the best of these periodicals will be able to continue their subscriptions, after the excess carrier charges prescribed by the Zone-Postal Amendment have gone into effect. Then, what will be the result of this limitation in the dissemination of patriotic literature throughout the country, on the average citizen's patriotic ardor.

Effect of Obstructing the Avenues of News

It goes without saying that the first effect will be to create a widespread feeling that the law is unjust—Prussianizing the press which has been and is the great highway for the dissemination of the principles of democracy.

Scorning to pay this tax draft, which the advertisement of the Authors' League rightly styles "a tax on ideas," through the Postoffice Department that was never designed for any other purpose than to serve the people, the effect will be a waning interest in the loyal support of all measures that should, instead, be kept at white heat until victory is ours.

Finally, the injustice of this act is most apparent from the discrimination it makes between dwellers within the zone of publication and those further removed who must pay the excess demanded, simply because their occupation does not permit them to dwell in closer proximity to the great centers of thought. How many coal-mining officials and miners, let me ask, would be able to pursue their occupation in the Flatiron Building, in New York City? Is it justice to demand that, because of their more distant location, American citizens are subject to a tax on ideas that should be free as the expression of thought?

As stated previously, we must court no chance that portends calamity. Hence, as one of the great army of subscribers, I join in the appeal of publishers, whose interests are even less at stake than our own, to ask for the repeal of this law in the interest of patriotism and justice to all people. I heartily indorse the suggestion of writing our several congressmen soliciting their cooperation in securing the repeal of an unwise law that should never have been enacted. W. H. Noone.

Thomas, W. Va.

Test of a Man's Capability

Letter No. 4—I was greatly interested in the way John Rose, former district mine inspector in Tennessee, replied to a previous letter by "Mule Driver," *Coal Age*, Nov. 17, p. 860. I presume that both are good men, even though one of them appears to be a mule driver.

However, should these two men go to the stockyards, for the purpose of selecting mules for use in a mine, Mr. Mule Driver would probably show his superiority to our friend the inspector, by selecting mules having long ears and other characteristics that adapt them to mine work.

Capability Determined by a Man's Training

The driver's experience has taught him that the tips of the long ears of a mule, brushing the roof and timbers in a mine, will cause the animal to "duck," as the boys say, and avoid many a hard knock that the short-eared fellow will get, until he has learned the road.

Now, this is no reflection on the capability of the inspector, whose strong points lie in another line, as foreign to the mule driver as his knowledge of the mule is to the inspector. A man's capability must be examined in the line of his training. It goes without saying that a man that has worked his way up from the rank and file to hold a technical position in any industry has accomplished that end by study and observation, through years of toil that have made his experience valuable.

If I am not mistaken, my friend, Mr. Rose, belongs to a class that has arisen from coupling cars, at the age of 10 or 12 years, to the position of mine foreman at 40 and mine inspector a few years later. As Mr. Rose has pointed out in his letter, the capability of a man is not to be determined by the fact that he holds a certificate of competency to act as mine foreman, or because he can pick out a mule driver among the men who come to him for work.

Selection of Men For Particular Duties

The selection of men for the duties that they are competent to perform is most successfully performed, in my opinion, by submitting to them a previously arranged set of questions, for which a blank form may be prepared. The experienced foreman or superintendent can then decide, from an examination of the answers given by the man to these questions, what duties he is capable of performing.

As mine foreman, I have hired mule drivers with big feet, and I may not be credited with telling the truth when I say that they could run, yes, and stop a trip and save a mule, as they were by long training fully acquainted with that trick.

Among those who apply for work in mines are a style of "hangers on." Certainly, their Piccadilly collars and tan shoes do not recommend them for the work underground, but there is something besides that stamps them as being of a different kind from the man who plainly appears to have inherited capability from a child. In hiring men, the foreman must have such as insight into a man's nature that will reveal his true character.

Let me say, here, that a man's knowledge of mining is determined by his practical experience and greatly broadened by his habit of reading mining books and papers. It is my belief that a man who has never read much on mining or studied its principles is not equipped for a position of responsibilty underground—he is not the man for the job.

From an experience of 45 years in coal mines, I must admit that I knew little about capability, until ideas and methods were unfolded to me through the reading of *Mines and Minerals*, *The Colliery Guardian*, and last and towering above them all, *Coal Age*. My advice to men who desire to be capable, in the true sense of the word, is to read and study while they work.

R. W. LIGHTBURN,
West Leisenring, Penn. Mine Foreman.

Blacklisting To Prevent Accident

Letter No. 5—Referring to the claim of James T. Reynolds, *Coal Age*, Dec. 15, p. 1028, that "the most effectual means to obtain the desired safety in mines is the blacklisting of unsafe miners, through the hearty coöperation of all coal operators," allow me to ask, How do we discover an unsafe miner?

Most mining men will admit that, in the majority of cases, the unsafe miner is only discovered after he has been injured or killed as a result of his own ignorance, carelessness or reckless disregard of danger.

It is the duty of every fireboss and safety inspector to make safe miners. This is often slow work and can only be accomplished by making daily visits to each working place and patiently instructing each workman in regard to what is necessary to make his place safe, and telling him how he can mine his coal with the least danger to himself and others.

Should the fireboss discover danger in a place when making his morning rounds, whether this is due to the presence of gas or the lack of sufficient timbers to support the roof, he must block all entrances to the place with a suitable danger sign, report the danger in his book and notify the foreman, telling him what is needed to make the place safe. If the miner is permitted to do the work required to make his place safe, the fireboss or the safety inspector should oversee the job and not leave the place until he is satisfied that it is safe for work.

In my experience as safety inspector I have found many stubborn cases that require the exercise of tact and good judgment. If a place where a miner is at work needs more timber, I stop the man from working until it is timbered to my satisfaction. I do not allow any cars loaded until the needed timbers are in place. This generally has a good effect, as no miner likes to lose his turn, and he is more careful to keep his place in good order when he knows that the inspector is liable to appear any hour of the day.

When told to set timber a miner will often reply by saying that he will set the needed props as soon as he has finished loading the car he has on hand. Right then is the time for the inspector to act, and I say: "John, I am interested in your safety and welfare. Step over here where it is safe and, as I have time, I will stand the post for you." It is seldom that I have had to do the work, however, as the man naturally resents the idea that he is lazy and proceeds at once to set the timber. Neither is he likely to let the same thing occur again.

Appreciate the Efforts of Your Men

There are a lot of tricks in handling men, and I have found that to show appreciation of a miner's efforts to make his place safe is a big incentive to him to continue so doing. He is glad to know that I recognize that he understands how to protect himself. Where no consideration is given to the daily inspection of every working place in a mine, the men become careless and indifferent to danger.

In mines where the accident rate is on the increase it can generally be concluded that the work of inspection is on the decline. There are, of course, instances where men are killed by the fall of a rock that has been left without sufficient support, by the extraction of the coal after the inspector made his visit.

Now, from this review of the carelessness and neglect of miners to obey instructions and their disregard of danger, it is my belief that there are better methods of preventing accidents from these causes than that of "blacklisting." Coal operators should employ a sufficient number of firebosses and safety inspectors to discover where danger exists in time to avoid the results.

Backbone Needed in Dealing with Offenders

Further, mine officials should have backbone enough to report men who are stubborn and who disobey instructions or violate the mining law, and turn them over to the mine inspector of the district. I find, however, that this is seldom necessary where a man uses tact and common sense in dealing with the men in his charge. In any case I would not go so far as to use the blacklist, which may do an innocent man great injury.

Lack of discipline on the part of mine officials is responsible for much carelessness on the part of miners. In closing, let me urge every safety inspector to do his best to teach the men in his charge the best methods of protecting themselves and making the mines safe for work. After the manner of Admiral Nelson, at the battle of Trafalgar, who is reported to have said to his men, immediately before the battle, "England, today, expects every man to do his duty," let us strive to impress our men with the same spirit of loyalty to duty. By this means, we may hopefully expect to reduce the accident rate in mines.

ROBERT A. MARSHALL,
Farr, Colo. Safety Inspector.

INQUIRIES OF GENERAL INTEREST

Status of the Coal Jobber

Since the issuance of the Government's ruling regulating the selling price of coal and the jobber's commission, that class of dealers has been practically put out of business. The reason for this is found in the fact that coal operators are unwilling to sell their output to the jobber at a less price than that fixed by the Government. The consumer is not able to buy coal as cheaply as the larger dealer, who formerly was able to supply the general trade from his yards, which he kept stocked to meet the demands of his customers.

Under the authority granted by the Government, the Fuel Administration has fixed the price at which coal can be sold in each district, in conformity with the conditions existing relative to the mining and shipping of the product. At the same time, the jobber was allowed to make a profit of 15c. per ton on all coal sold by him. The difficulty arises, however, from the failure of the administrator to specify how this commission was to be paid.

Since the rulings were made, most of the coal operators have established their own sales agency and claim the right to absorb the jobber's commission. Since the arrangement went into effect, jobbers everywhere are receiving requests from their former customers who have always looked to them for their supply of fuel. They explain that they have found it impossible to buy enough coal to keep their power plants in continuous operation. In many cases these large consumers would be willing to pay the jobber's commission of 15c. per ton allowed by the Government, if they could be assured of a regular supply of coal.

Whenever these manufacturers and retail dealers have taken the matter up with the Fuel Administration, at Washington, they have received a reply telling them to refer their wants to the dealers who have supplied them regularly in the past. The outlook in this direction, however, is hopeless unless the jobber can secure his coal from the operators at the Government price less their own commission.

It will readily be seen that this is a situation that should be adjusted by the Fuel Administrator, in such a manner that the channels of trade shall be undisturbed and large dealers and manufacturers be able to obtain their supplies in the quantities required and as needed. The question arises: Has the coal operator the legal right to establish a sales agency and absorb the business of the jobber when he is unable to supply the local demands in cities and towns distant from the mines?

A way out of the difficulty has been suggested that, if legal, would permit the jobber to still continue in his business of supplying coal in large quantities to the manufacturers and dealers in his locality. The suggestion is that the jobber act as purchasing agent for his former customers and others who would get their supply of fuel from him. While many of these manufacturers and small dealers could not afford to hire a regular purchasing agent, they could pay a small commission for his services on a tonnage basis.

If this scheme is within the requirements of the law, a purchasing agent would take no part in the transaction further than to forward the order for coal to the operator and collect his own small commission from the consumer. The operator would ship and bill the coal direct to the consignee, who would pay him for the same at the fixed Government price. In addition, the consumer would pay the purchasing agent, for his services, a small percentage based on the tonnage received. What we desire to know, in this connection, is whether such a proceeding would be legal and within the law.

Grand Rapids, Mich. JOBBER.

The question asked by this correspondent was submitted by *Coal Age* to the United States Fuel Administration, at Washington, D. C., and brought the following response from H. D. Nims, who is connected with the Administration. In answer to the question asked, Mr. Nims writes as follows:

> It would be a violation of the spirit of the President's price-fixing orders to say that consumers could employ agents to purchase coal for them at the Government price. In effect, this would be allowing coal to get to the consumer at a price higher than that fixed by the Government. Our rulings, however, do not expressly prevent one from hiring such an agent on a salary basis, for the purpose of purchasing coal at the Government price; but, certainly, in no way should the operator or jobber who sells the coal receive a part of the agent's salary and thus secure for his coal more than that authorized.

Coal Age has interpreted the meaning of this response to be that there is nothing in the Government ruling to prevent a person acting as purchasing agent for one or more parties who are in the market for coal, provided (and this is important) that no part of the salary or commission paid to the agent for his services shall find its way into the pocket of the coal operator, who would thus be able to secure more for his coal than the price authorized by the Government.

In the authorization by the Government that enables the Fuel Administration to fix a price for the sale of coal there has been no intention to disturb the usual channels of trade, or to detract unnecessarily from any legitimate business. Doctor Garfield, as Fuel Administrator, has proceeded with great caution, and the prices fixed by his board have been made to conform to local conditions as closely as a thorough investigation of those conditions would permit. Clearly, the purpose of fixing the selling price of coal at the mines and elsewhere was for the protection of consumers, and to prevent the charging of extortionate prices by coal operators, owing to the extraordinary demand for this product. Some time will doubtless be required for the new conditions relating to the sale of coal to adjust themselves with equity and fairness to all.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—What form of airway will give the most air with the same power, and why?

Ans.—A circular airway will give a larger quantity of air with the same power than either a square or rectangular airway of the same length. The reason is that the perimeter of a circle is less than that of a square or rectangle having the same area as the circle. The circular airway, therefore, presents a less rubbing surface, for the same length, than either a square or rectangular airway of equal sectional area.

Ques.—Which do you consider should be the larger, the upcast or the downcast, and why?

Ans.—The upcast shaft of a mine should always have a larger sectional area than the downcast shaft, for the reason that the return air current passing up the upcast has a generally larger volume than the intake current entering the mine by the downcast shaft. The larger volume of the upcast current is due to its higher temperature and the presence of gases generated in the mine workings.

Ques.—If you had charge of a mine, and the fan engine suddenly broke down, what would you expect to be the condition of the ventilation, and how would you continue to run the mine the rest of the day?

Ans.—If there is no duplicate engine for operating the fan, the men should be withdrawn from the mine at once, and no attempt should be made to continue to run the mine, until the engine can be repaired and the fan again put in operation. Even then, the mine must be examined by the firebosses and pronounced safe before the men are permitted to enter for work.

Ques.—Which is the more reliable, mechanical or natural ventilation, and why?

Ans.—Mechanical ventilation is always more reliable than natural ventilation, because the latter is subject to atmospheric changes that may completely destroy the ventilation in the mine. For example, natural ventilation depending on the higher temperature of the mine air may be rendered useless when the outside tempera ture approaches closely to that of the mine. Again, natural ventilation depending on the force of surface winds may be rendered useless, or the circulation in the mine changed, by a change in the direction of the wind, or by the dying out of the wind completely.

Ques.—What principles are involved in the construction of a safety lamp that would render one lamp more sensitive, in the detection of gas, than another?

Ans.—The sensitiveness of a safety lamp, in the detection of gas, as far as its construction is concerned, depends on the free entry of the air into the combustion chamber, at a point on a level with or below the lamp flame, so as to avoid conflicting ascending and descending currents within the lamp chimney, which would not only cause the lamp to smoke, but would mix the burnt gases that fill the upper portion of the chimney, with the air entering the combustion chamber and invalidate the test.

Also, if the entry of the air into the combustion chamber of a lamp is restricted the gaseous condition of the air surrounding the flame will be considerably changed and the test will not represent truly the air surrounding the lamp. The unbonneted Davy lamp affords the free access of the outside air to the lamp flame, to a greater extent than is true of any other type of lamp, which makes the Davy lamp more sensitive to gas than any lamp in use.

Ques.—A pair of headings, with the usual crosscuts and rising 1 in 4, is standing full of firedamp. The ventilating pressure is low. Give the various methods which may be used to restore the ventilation.

Ans.—Since these headings are driven to the rise, the gas will have a tendency to work toward the face of both headings, which makes its removal more difficult. The work must be begun by erecting a brattice in the mouth of the intake heading. Starting from the rib opposite the mouth of this heading, the brattice must be extended slowly into the heading, setting one post at a time and giving ample time for the air current passing around the end of the brattice to carry off the gas. All work must be performed on the intake side of the brattice, using safety lamps only and making careful tests to ascertain the progress of the work. In this manner, the brattice must be extended up the intake heading, as far as the last open crosscut.

At this juncture, ample time must be given and every possible means adopted to force the current against the air and gas in the other heading. To accomplish this, it will be necessary to increase the circulation as much as possible and to partially close the end of the brattice by drawing it over to the rib at the outby corner of the crosscut, so as to urge the air into the crosscut, instead of permitting it to return behind the brattice. When the crosscut is found to be taking the air, the brattice can be removed from the intake side and a canvas hung on the main entry so as to deflect the air and cause it to ventilate the two headings. This will give more freedom to the passage of air up the intake heading and force it through the crosscut driving the gas from the return heading.

After clearing the gas from the two headings below the open crosscut, the work of removing the gas accumulated above this crosscut should be commenced by extending a brattice from the outby corner of the last breakthrough, on the intake side. This brattice must be extended slowly toward the face, by setting a single post at a time, in the same manner as before, until all the gas has been removed from the face of the intake heading, after which the same method must be pursued in removing the gas from the face of the return heading. This is the only practicable and safe method of removing the gas filling a pair of rise headings.

COAL AND COKE NEWS

For the Busy Reader

A price of $2.25 has been fixed by the Fuel Administration for run-of-mine lignite at North Dakota mines.

* * *

To insure a steady flow of coal to New England by rail, the Fuel Administration has issued orders to 102 mines to furnish a certain number of cars per day. A total of 500 cars per day is to be forwarded to New England.

* * *

Shortage of coal was given by the Board of Health of Philadelphia as one of the reasons for 73 deaths in that city of pneumonia within a 24-hour period, the highest record of deaths from this disease in one day in the last five years.

* * *

The cold wave brought with it such pressing demands for fuel that an unusually large number of diversions of shipments became necessary to relieve the need for domestic fuel over most of the Middle West, as well as some of the Eastern States.

* * *

Eleven ships, aggregating 65,000 tons, have been turned over to the Fuel Administration by the Shipping Board to be used in transporting coal to New England. These vessels will continue in this service until a reserve sufficient to guarantee an adequate supply for the winter will have been assured to that section of the country.

* * *

A second producing district has been established by the Fuel Administration. The district consists of Boone, Clay, Logan, Mingo, Canawaha, Putnam and Nicholas Counties, of West Virginia, and those parts of the two adjoining counties in Kentucky, which are served by the Norfolk & Western R.R. A. H. Land, of Huntington, W. Va., has been named deputy distributor in charge of the new district.

* * *

By ordering all operators in the Pocahontas fields to give preference to tidewater shipments, the Fuel Administration has made it impossible to ship smokeless coal to Chicago and other Middle Western points. Substitution of coal from near-by fields is being undertaken by the Fuel Administration. Raymond Durham, the fuel administrator for Cook County, Illinois, is in Washington assisting in this substitution.

* * *

Approximately 250,000 tons of anthracite coal consigned to New York City were delayed at New Jersey terminals last week owing to ice in the Hudson and East Rivers, the Fuel Administration announced Jan. 3. In the same announcement, it was stated that no great amount of relief could be furnished through the Pennsylvania tubes and that no material improvement in the rate of delivery of coal is expected until the weather moderates.

* * *

Figures compiled from the returns to the Provost Marshal General show that 225,109 coal miners registered in accordance with the selective service law. The total number called from this industry was 74,109. The total number accepted, however, was 18,710 out of the 600,148 engaged in coal mining. Among the coal miners called 2601 asked to be exempted for industrial reasons. Of these claims 851, or 32.7 per cent., were granted.

* * *

Some idea of the seriousness of the existing coal shortage can be gained from the statement that "one hundred steamships, aggregating more than 1,000,000 tons gross, are being held in New York harbor through lack of coal, and the number is increasing daily." Some of these vessels have been waiting for coal for over a month. When it is remembered that these boats are principally engaged in carrying food supplies and munitions of war to our Allies in Europe the gravity of the situation can be better appreciated.

HARRISBURG, PENN.

The five men entombed by the cave-in at the Marcy Vein of the Barnum Colliery of the Pennsylvania Coal Co., at Pittston, Luzerne County, have been rescued virtually uninjured. Late last Saturday night a squad of rescuers, working through an emergency opening connected with No. 10 shaft, succeeded in learning that the imprisoned men were alive. The force was quickly increased in this particular section, and after several hours' work cleaning away the fallen rock the men were able to crawl out. At the time of the cave the men were able to escape to an old chamber, saving themselves from being crushed to death. One man employed in this section of the mine is still missing, but there is no colliery record that he was at work on the day of the cave-in, although he is absent from his boarding house, the proprietor of which is unable to say whether or not he went to work Saturday morning.

The cave was caused by pillar robbing. The Barnum colliery has been in operation for about 40 years, and all the mining being done in this vein is second mining. About 28 men were engaged in removing pillars, and without much warning the roof began to creep, and an acre or more of the chambers came down completely. Miners in the chambers nearest the roadway had bolted to the main gangway at the first signs of the creep. The air was squeezed from the chambers with such terrific force that the men were picked up like chips and hurled to the ground or against the ribs with terrific force.

The property damage is the most extensive ever suffered by this company which has a dozen big collieries in this section. Ten electric motors are buried by the fall and many of their operators had narrow escapes.

State Mine Inspector Robert Johnson and General Manager J. P. Jennings headed the rescue work. They found their progress shut off by the cave a few hundred feet from the main shaft and from No. 10 shaft, the second entrance to the vein. The ill-fated Twin mine, which contains the bodies of 58 men buried by a similar cave in 1896, is only a short distance away.

* * *

Immediate action by Congress to prohibit the sale of liquor within a five-mile zone from any coal mine or coke plant in the country will be asked as the result of a special conference of coke operators in the Connellsville district on Jan. 3. About 200 operators of the coke industry were present and listened to the address of Warren G. Blauvelt, coke advisor to Fuel Administrator Garfield. It developed that the 40,000 men employed in the coal mines and coke plants of the Connellsville region are working but half time and spending their checks in drinking bouts when they should be at work.

The car shortage and congestion of railroads was also freely discussed, and when Advisor Blauvelt stated that Director General McAdoo had given assurance of a car supply by Apr. 1 sufficient to move continuously the maximum daily output of every plant in the coke region, the consensus of opinion indicated a demand for prohibitory legislation affecting the immediate vicinites of these plants. In order to get a maximum output the operators stated that they must be freed from the endless difficulty with labor, and asked for legislation to remove the drinking factor from the problem. A nominating committee, composed of W. H. Klingerman, operating head of the H. C. Frick Coke Co.; J. M. Jamison and J. H. Hileman, Jr., of Pittsburgh; Charles E. Lenhart, L. L. Willard, William A. Stone and R. M. Fry, all prominent coke men of Uniontown, was named to appoint an executive committee of three, who will regulate the future coke output of the Connellsville region for the duration of the war and as long afterward as the Fuel Administration may deem advisable.

* * *

Differences between the Auditor General and the officers of the State Workmen's Compensation Insurance Fund over the Auditor General's desire to audit the fund to ascertain whether it can be made self-sustaining at the present rate of expenditure for administration is attracting considerable attention in the bituminous region, as many of the soft-coal companies carry their compensation insurance with the state fund.

Attorney General Brown has advised the fund officers that the Auditor General has no power to audit the fund. The Auditor General is studying the law relative to his powers and it is believed that under the act of 1810 he can send Miles A. Dawson, an insurance expert, to the office to audit the books.

Auditor General Snyder states that his only purpose in actuating the proposition to ascertain the condition of the fund was to make it a sure protection of the corporations insured and for the people who benefit by the compensation act, and that in order to carry this purpose into effect the department will insist on a reduction in the payroll and other expenditures and a closer inspection of the management.

The Auditor General laid particular stress upon the fact that he regretted the action of the manager of the board in attempting to prevent an inspection of the records, as he feared it might cause an unjustified impression that would have an adverse effect upon the policies issued by the board or the solvency of the fund, which remain unquestioned.

* * *

Every coal miner using explosives will have to obtain a Federal explosives license before he can buy squibs from his town grocer or small merchant, or get his supply through his licensed mine foreman, according to a ruling by the Bureau of Mines received by Clerk of Courts Wagner of Luzerne County on Jan. 3.

This is an important decision, affecting all miners and vendors, and may retard the production of coal unless the coal companies take steps to facilitate the buying of squibs at the mine openings where the powder is sold. It has been the custom of many miners living in the small mining towns throughout the region to purchase their squibs at their grocer's or other small dealers handling mine supplies.

PENNSYLVANIA

Anthracite

Harwood—The large electric plant of the Lehigh Coal and Navigation Co.'s electric plant suffered heavy damage on Jan. 1, when one of the large turbine's engines in some unknown manner caught fire and was completely burned and put out of service. For a time there were fears that the fire might spread to adjoining equipment in the plant, but through hard work on the part of workmen and electricians the blaze was confined to the one engine. The plant furnishes power to a number of coal companies in the Lehigh region.

Shenandoah—While five men were tightening straps on a heavy pressure steam pipe at the McTurk Colliery's inside stable on Jan. 2, it burst, flooding the stable with steam. The men escaped with slight burns, but seven mules were killed and eight others were so severely burned that they are likely to die. The loss is $5000.

Reading—The Reading Coal and Iron Co. shipped but 881 cars on Jan. 4, which is about half the normal output. It is said that the breakers are filled with coal, but that it was simply impossible to handle it, due to the extreme low temperature. Never before has it been necessary to cut down the tonnage of freight and coalings for so long a period. Notwithstanding the modern locomotives that are now employed, there have been instances when they have been frozen up solidly and it was necessary to draw fires.

Wilkes-Barre—The Wilkes-Barre chamber of commerce recently decided to give its support to the movement to utilize waste mine gas for commercial and domestic purposes as a means of saving coal. The question has been before the chamber since the time Governor Brumbaugh called men from various towns and cities to consider the question. The chamber here has decided to do all in its power to find a satisfactory way of using the great amount of waste gas.

Duryea—Fire completely destroyed the William A. Breaker of the Lehigh Valley Coal Co. on Jan. 3, with a loss estimated at about $200,000. The boiler house and all other buildings were saved, largely by the efforts of the fire departments of three towns, which were called in.

General Manager Chase has stated that the 1200 tons a day produced at this colliery would not be interrupted and the 500 men employed would not be thrown out of work. Arrangements have been made to send the coal run through the William A. Breaker to the Stevens, Coxey and Austin breakers. The men who would be thrown out of work by the destruction of the breaker have been given positions at other collieries. The officials of the company say that the fire was of accidental origin.

Jeddo—Plans are being drawn for the erection of a washery at No. 4 colliery of the G. B. Markle Coal Co. The banks of that place will be prepared for market just as soon as the new plant is complete and will add greatly to the tonnage of the company. Operations of this company on the North side have been hampered during the week as a result of the severe weather freezing springs and streams. The water supply has been at a minimum and it is said that unless relief is gained in a very short time the water for the collieries will have to be hauled.

Bituminous

Uniontown—On railroad sidings between Ache Junction and Brownsville, on the Coal Lick Run branch of the Pennsylvania R.R., and between Martin and Brownsville on the same branch, there are 1200 freight cars tied up. Many of the cars are loaded with coal. As a result of the congestion many mines in this region have shut down and coal miners are leaving to seek work in other fields.

The Vesta Coal and Coke Co. has awarded contract for the erection of 45 new dwelling houses, to be constructed at the Vesta No. 6 works, near West Brownsville. The contract price is $130,000. The homes are to be modern in every respect. It is expected to have the houses completed within three months.

Midland—In order to keep its work in continued operation, the Crucible Steel Company, with offices in Pittsburgh and its plant here, obtained 15 cars of coal from the Pittsburgh fuel administrator's office. This consignment has been received in addition to a number of cars of coke.

WEST VIRGINIA

Charleston—The last official act of State Chief of the Department of Mines Earl A. Henry was to revoke the certificates issued by the department to W. M. Printiss, superintendent, and I. M. Pitman, mine foreman, of Yukon Pocahontas Mine No. 1, at Susanna, McDowell County, where an explosion occurred Dec. 15 and resulted in the loss of 18 lives. Chief Henry said that had the mine foreman and superintendent performed their duties, the explosion could have been prevented because the mine was in first-class condition.

Deeds, agreements and other papers in a $385,000 coal land transaction, by which the Black Band Fuel Co. has disposed of its coal, lumber, mining, merchandising, railroad and other interests at Olcott, on Coal River, in the southwestern end of Kanawha County, to John Kresge, of Boston, were placed on record in the Kanawha county clerk's office. Five thousand acres of mineral and timber lands, including mines in operation, stock in the Kanawha Central R.R. and the company stores were involved in the deal.

Morgantown—A deal was recently closed by Blaine St. Clair, of Union District, by which he leases his three veins of coal—the Sewickley, the Redstone and the upper Freeport—to Charles Kuhn and others of Westmoreland County, Pennsylvania. The coal, which underlies a tract of 150 acres overlooking the Monongahela River, will be mined on a royalty basis. Mr. St. Clair is to receive a royalty of 15c. a ton and is guaranteed at least $1500 a year.

ALABAMA

Birmingham—The Gulf States Steel Co. has taken over the properties of the Sayre estate, consisting of 15,000 acres of coal lands, with a good mine under operation, 150 coke ovens in full operation and railroad appurtenances to the mines and ovens. The deal involves a cash outlay of $700,000. The Gulf States Steel Co. will immediately take over the properties and figure on some big developments.

The Birmingham-Trussville Iron Co. is making good progress in the construction of its coal washery and other plant structures at Labuco mines, from which an output of 1000 tons per day is now being obtained. A large number of dwellings are in course of construction for housing employees. The 300 coke ovens of this company at Trussville are now in blast, the coke being disposed of to outside interests pending the placing in blast of its furnaces, which are practically ready for the torch.

ILLINOIS

Pana—The North mine of the Pana Coal Co., which has been idle for almost ten years, will be reopened as soon as repairs and improvements are completed. About 200 men will be employed. This will give Pana four of the largest mines in the state, two operated by the Pana company and one each by the Penwell and Smith-Lohr companies.

Carlinville—Development work has been begun on the Herman Schoper property near here, recently purchased by the Standard Oil Co. It is understood that two shafts will be sunk. Company houses are to be erected for the employees but assurances have been given by C. M. Clark, the Standard Oil official in charge of the development, that all business will be transacted through Carlinville. Merchants have been asked to contribute to a fund of $5000 for building a cinder road to the mines. The field to be developed includes parts of South Otter, Honey Point, Shaw's Point, Nilwood and Carlinville townships. The Standard has also bought the mine of the Carlinville Coal Co. and is preparing to double its output.

Bethalto—The mine of John Kowaljik here will have to close because Kowaljik is an enemy alien and cannot, therefore, obtain a license to buy powder. He applied to the explosives license agent at Edwardsville. It was refused, and his case was reported to the Bureau of Mines at Washington. Kowaljik was born in Germany. He has been in this country since 1913 and took out first papers in 1916.

Lincoln—An attempt is to be made to reopen the Lincoln mine which has been closed several weeks on account of fire. It is believed the flames have been smothered by sealing. The shaft will be opened in a few days and if any fire remains an attempt will be made to extinguish it.

Farmersville—The Elly Coal Co. is preparing to reopen its mine here, which has been closed three years. The débris has been cleared away and the mine will be retimbered. It formerly employed 300 men. B. C. Perry and Mr. Hamilton, of Girard, are interested in the company.

Orient—The mine of the Chicago, Wilmington and Franklin Coal Co. has been idle several days on account of a fire that destroyed the screening plant.

OHIO

Martins Ferry—The Clarkson Coal Co.'s No. 2 mine at Fairpoint has devised a scheme to keep the mine going at top speed regardless of the lack of motive power on the B. & O. division. The loaded cars are being dumped in an open field and already the pile of coal has assumed enormous proportions. Should the present rail congestion be relieved in the near future it will be an easy matter to load the cars from the elevated field position.

A representative of the Consolidated Copper Co., of Canada, has been in Belmont County looking after the purchase of coal lands for his company. He states that coal there costs $11 a ton, his idea being to purchase coal lands and operate the mines, shipping the product direct.

Steubenville—Announcement was made here that the Adena Coal Co., which has been operating in the vicinity of Adena for the past two years, has purchased the Laura O. Hastings farm of 33 acres and a five-acre tract from W. P. Moore, paying $9575 for the land, or $250 an acre, the highest price ever paid for coal property in that section of the county.

WASHINGTON

Wilkeson—All hope of rescuing the six entombed miners who were trapped by a vein of water in the mines of the Wilkeson Coal and Coke Co. has been given up, although 200 men are working on the cave-in.

Foreign News

Tokio, Japan—Discovery of the most extensive deposit of anthracite ever found on the main island of Japan is announced. It extends for more than 18 miles along mountain ranges and, as it is near the naval base at Maizurn and in close proximity to the railway, the discovery is regarded as of great importance.

Quebec, Que.—At the annual meeting of the British Columbia Skeena Coal Co., Dec. 28, it was announced that recent investigations on the 30,000 acres of anthracite coal lands on the Upper Skeena River, northwest of Prince Rupert, had led to the discovery of large deposits resembling in analysis the smokeless coals of Pennsylvania. This is stated to be the only known occurrence of this kind of coal in Canada, and as it is much in demand for naval purposes, the find is regarded as important.

Berlin, Germany—In its issue of Dec. 11, "Vorwaerts" states that the coal business in Berlin is simply chaos, and the resultant misery in the poorer quarters is beyond words. Berlin municipal enterprises are almost in an equally bad position. Berlin gas and electricity works, the city overhead and underground railways, are so scantily furnished with coal that they "live from hand to mouth." The slightest interference with the present slender supplies, "such as any frosty day may bring, must compel a partial, if not total, stoppage." The authorities are said to be letting matters drift.

Personals

Edward Wallace, editor of the "United Mine Workers' Journal," has enlisted in the Canadian Army. Wallace was rejected by the American Army officers, being 50 years of age.

Ralph E. Buckman has resigned his position as superintendent for the Indian Creek Coal and Coke Co., to accept a similar position with the Langeloth Coal Co. at Langeloth, Washington County, Pennsylvania.

Joseph B. Connell, connected with the C. M. Dodson Coal Co., Hazleton, Penn., in the capacity of superintendent of the mines at Beaver Brook, Morea and Locust Mountain, has been appointed general manager for the company, with headquarters in Bethlehem.

Frederick W. Wyant resigned his position in the engineering department of the Vandalia Coal Co. at Linton, Ind., to accept the position of division engineer of the Somerset division of the United Coal Corporation. He entered upon his new duties Dec. 26, with headquarters at Boswell, Somerset County, Pennsylvania.

Frank J. Foley, manager of the mining section of the Industrial department, Westinghouse Electric and Manufacturing Co., has accepted a position as manager of the mining and traction department of the Edison Storage Battery Co., located at Orange, N. J. Mr. Foley, who is a graduate of Pratt Institute, Brooklyn, has been with the Westinghouse company for 12 years, commencing with the service department in New York City and later being transferred to the industrial department at East Pittsburgh.

Obituary

Howell Harris, of Scranton, Penn., one of the best known mining engineers in Pennsylvania, died at his home on Jan. 2 after a long illness. He was 55 years old and was general superintendent of the mining properties operated by the late William Connell.

Industrial News

Norton, Va.—The Norton Coal Co. is having plans prepared for the construction of fifty additional coke ovens, to provide for increased capacity.

Lincoln, Neb.—The Grand River Coal Co. has filed notice of an increase in its capitalization from $25,000 to $175,000 to provide for extensions and improvements.

Jackson, Ky.—The Jackson Block Coal Co. has filed notice of an increase in its capitalization from $12,000 to $30,000 to provide for expansion.

Marion, Ohio—In order to get better cooperation among the retailers, the Marion Retail Coal Dealers' Association has been organized. It is planned to secure a more equitable distribution of the available coal supply.

Philadelphia, Penn.—The Pennsylvania R.R. has placed an embargo on all carload lots of freight, except foodstuffs and coal, coming from other lines to the Pennsylvania. The embargo affects all Pennsylvania R.R. lines east of Pittsburgh.

Cleveland, Ohio—With low gas pressure, zero weather and a shortage of coal, this city is again threatened with darkened streets. One plant of the Otis Steel Co., employing 600 men, recently closed because of fuel shortage, it is said.

Columbus, Ohio—For the first time in history, solid trains of coal were being rushed through the Union passenger station with right of way over all other service. The coal is from Ohio, Kentucky and West Virginia fields and consigned to the East.

Reading, Penn.—E. H. Deysher, John M. Ebersole and Clifford H. Price, Reading, and G. E. Aleman, Shoemakersville, have organized the Anthracite Reclaiming Co., and are planning for the construction of river coal washeries at Arders and Kline's Grove, near Sunbury.

St. Louis, Mo.—Thomas R. Mould, of St. Louis, has filed suit in the Belleville Circuit Court against the Suburban Coal and Mining Co. for $150,000 damages, alleging that the company has undermined property owned by him in St. Clair County and has removed several thousand tons of coal.

Wellston, Ohio—The Model Service Co., of Defiance, has purchased a short branch of the Cincinnati, Hamilton & Dayton running between Wellston and Dean from a junk dealer of Cincinnati. The purchasing company will operate the road in the interests of the coal mines along the line.

Pittsburgh, Penn.—The Verner Coal and Coke Co.'s purchases in Findley township, Allegheny County, have been increased by the company taking title to 72 acres from James Lee Mossey, and 36 acres from David McBride, for which $25,424 was paid, according to deeds recorded.

Wilkes-Barre, Penn.—In conformity with the State law signed by Governor Brumbaugh July 19, 1917, requiring motor-driven ambulances instead of the horse- or mule-driven ambulance, local coal companies during the week received a number of machines designed especially for mine service

Columbus, Ohio—The Ohio Fuel Administration has issued orders denying certain wagon mines in Ohio cars unless they comply with the orders of the Fuel Administration as to price. It is claimed that many of the mines are paying no attention to the price schedule as fixed by the Fuel Administration.

Lexington, Ky.—The State Railroad Commission on Feb. 7 will sit here to hear the complaints of the Lexington and Versailles, Ky., against the Cincinnati, New Orleans & Texas Pacific. This is to the effect that the railroad is discriminating in rates on coal to cities opposite Cincinnati against Lexington and Nicholasville.

Akron, Ohio—The coal pool at Akron, Ohio, was started the first of the year with T. E. Barry, of the Pittsburgh Coal Co., as director. The committee consists of Jay Converse, secretary-treasurer of the Stillwater Coal Co.; John Rawley, of the Akron Coal Co.; Louis Klages, of the Klages Coal and Ice Co., and George Smith, a jobber.

Indianapolis, Ind.—Coal production in Indiana during the month of December will total nearly 2,000,000 tons, more coal than has ever before been taken out of the mines of the state in one month, according to E. I. Lewis, chairman of the public service commission. This figure is based on reports made by railroads and checked by mine operators.

New Albany, Ind.—Options are being taken on coal land in Pike and Warrick Counties, Indiana, as a result of the report that the Baltimore & Ohio R.R. would construct a line through that section. The switch would open up thousands of acres of lands, showing veins 6 and 7 ft. thick. Much of it could be stripped by steam shovels, it is said.

Wilkes-Barre, Penn.—A ruling has been made by the board of appeals for the middle judicial exemption district that miners who are actually engaged in the cutting of coal are to receive deferred classifications and will be enrolled in the second class. The board members believe that such men can be of more service to the country at work in the mines than in the army.

South Charleston, Ohio—In an address at a farmers' meeting here recently Governor Cox of Ohio declared that the 1,000,000-ton excess of coal in the Northwest, "occasioned by the blunder of Fuel Administrator Garfield," is responsible in large measure for lack of fuel in the East and for transports loaded with supplies for troops in foreign countries, reported tied up at ports.

Columbus, Ohio—The Ohio Fuel Administration is making a campaign to increase the efficiency of coal burned in steam plants throughout Ohio. As a result a number of Economy Inspectors have been employed and are going about instructing firemen in the proper use of fuel. At one plant the inspectors secured 50 per cent. better efficiency. The plant formerly used 90 tons daily.

Tyrone, Penn.—The J. C. Stone Co., manufacturers of mining and ventilating machinery, has recently passed its ten-year milestone in business. Started a decade ago, the success of the venture has proved greater than the founders' most sanguine expectations. The company is beginning its second ten years with flattering prospects, and is backed by an organization of expert and efficient men.

Louisville, Ky.—The Jefferson County Fuel Committee has revised the margins allowed to dealers on coal, increasing that on domestic coals and reducing that on industrial coals, and, generally, equalizing the entire list. Margins now in effect between cost to the dealers for the coal and his selling prices are as follows: Domestic sizes, $1.95; industrial coal, $1.50; anthracite, $2.10; coke, $2.50.

Akron, Ohio—About 10 mines of the Buckeye Coal and Railway Co., located in the Hocking Valley, were forced to suspend operations last week because of lack of water for the boilers of the power plant located at Jobs. For some time there had been a shortage of water, and it was hauled from Nelsonville, a distance of six miles. Lack of motive power on the Hocking Valley Ry. has made it necessary to suspend.

Columbus, Ohio—Three mines formerly owned by the Luhrig Coal Co., of Cincinnati, located on the main line of the Baltimore & Ohio west of Athens, will soon be put into operation by New York capitalists, which recently secured possession of the property. The mines have been idle for more than three years. It is expected to work about 400 men when the mines are ready for operation.

Connellsville, Penn.—Negotiations were closed recently by which the Smithfield Coal and Coke Co., plant was consolidated with the Clark Coal Co., which was incorporated some time ago by E. C. Higbee, W. D. McGinnis, Bruce F. Sterling and C. D. Clarke. The combine, which will be known as the Clark Coal Co., will have 80 acres of Connellsville coking coal, 34 ovens and a very complete coking equipment.

Columbus, Ohio—The Columbus Railway, Power and Light Co., which has been hampered because of lack of fuel, has secured a half interest in a coal mine in West Virginia which has a daily capacity of 1500 tons. But soon after securing the interest the greater part of the output was commandeered by the Federal Government. Application has been made for better transportation service to get an adequate coal supply.

Pittsburgh, Penn.—In a drive by the Government on violators of the coal price fixing regulations, Harry Hamilton, president of the Standard Coal Co., was placed under arrest at the Hotel Nixon, Butler. Hamilton is accused of charging consumers in excess of $2.45 a ton for run-of-mine coal, the price fixed by National Fuel Administrator H. A. Garfield. The Government asserts that Hamilton's company charged as much as 80c. a ton more than the fixed price.

New York, N. Y.—Shipment of coal was given preference over passenger traffic in an effort to relieve the coal famine here and in New England. The Pennsylvania R.R. tubes under the Hudson River are now being used for freight as well as passenger traffic to rush coal to Long Island and points served by the New Haven lines. The Baltimore & Ohio R.R. uses the Pennsylvania station in Manhattan for its passenger traffic, the change necessitating a revision of the schedule of both roads.

Philadelphia, Penn.—Government confiscation of Pennsylvania coal brought a protest from State Fuel Administrator Potter in the form of a telegram to Federal Administrator Garfield. The confiscation objected to is that which takes coal from this state for points in the South and Southwest, where there are coal fields adequate to provide for present fuel requirements. Mr. Potter was forced to this step by the increasingly desperate situation in this city, where there are now thousands of homes without coal.

Columbus, Ohio—The Buckeye Coal and Railway Co., of Columbus, will soon equip 20 mines, located in the Nelsonville and Bailey Run districts, with electrical power. In all, 12 mines in the Nelsonville district will be furnished with power from the Ohio Light and Power Co., Newark, Ohio. Eight mines in the Bailey Run district will be supplied with power from the Hocking Power Co. All the mines are practically new operations, and when the electrical equipment is complete the output will be largely increased.

Connellsville, Penn.—By the sale of the 100-acre coal field underlying the Fayette County poor farm on Jan. 5 at $5000 an acre, a new record value in coal was attained. George Whyel, a prominent coal operator of western Pennsylvania, is the purchaser. The last high-water mark sale was made by J. V. Thompson to a Pittsburgh capitalist, who paid $1800 an acre for the Pittsburgh 9-ft. seam in the Klondyke region. Recently H. C. Frick purchased 12,000 acres of the Thompson coal lands in the same vein at $550 an acre.

Pittsburgh, Penn.—A. S. McKone, banker, of Tunnelton, W. Va., purchased 350 acres of coal land, containing the Upper Freeport seam of coal, on the Baltimore & Ohio R.R., at the west end of the Tunnelton, Preston County, W. Va., from the Merchants Coal Corporation, a subsidiary of the United Coal Corporation, together with 150 acres from other parties. A company has been organized and work has been started on the development and construction of a mine, to be turned over, when completed, to the Baltimore & Ohio R.R., for coaling locomotives.

St. Louis, Mo.—Wallace Crossley, Missouri Fuel Administrator, is getting after the operators who double up as jobbers for the sake of the 15c. a ton allowed to jobbers under the Government's price schedule. Quite a number of the operators have been doing this, he says, and if they don't stop it they will be prosecuted. He says that evidence is being gathered against them. The jobber, he declares, is a necessary factor in the coal trade and he intends to protect legitimate jobbers from a continuance of the practice.

Huntingdon, Penn.—While the citizens of Huntingdon and other central Pennsylvania towns are suffering from lack of coal, the sidings of the Huntingdon & Broadtop R.R. here contain over 800 cars loaded with bituminous coal from the South Broadtop region. These loaded cars have been on the sidings here for more than a month, while others are accumulating all along the line. There is no present indication of any outward movement of the loaded cars, and a general explanation is given by company employees that the delay in shipment is due to lack of motive power.

Indianapolis, Ind.—Paul Poynter, who has charge of the wagon mines in the state for the Federal Fuel Administration, announced recently that he had issued an order increasing the prices which wagon mine operators may charge for their product when it is shipped over the railroads. This does not do away with the Government regulation on the price at the mouth of the mine, where the coal is sold for wagon delivery. The mine price of Indiana coal as fixed by the Government is $2.65 per ton of Indiana lump, $2.40 for mine-run and $2.15 for screenings. Mr. Poynter's increases for the wagon mines that have turned to rail delivery are $3.25 for Indiana lump, $3 for mine run and $2.75 for screenings.

Chicago, Ill.—After an existence of nine years as a department of the Chicago Pneumatic Tool Co., the motor truck interests of the company were on Jan. 1 taken over by a new organization known as the Little Giant Truck Company. The motor-truck department of the tool company had grown to such proportions that a separate organization to handle its many interests became necessary. The Little Giant Truck Co. is owned and controlled by the Chicago Pneumatic Tool Co., and the officers are the same—W. O. Duntley, president; W. B. Seelig, secretary; L. Beardsley, treasurer, with T. J. Hudson, sales manager. The headquarters will remain in the Little Giant Building, 1615 Michigan Ave.

St. Louis, Mo.—The Board of Aldermen, by a unanimous vote, has rejected the proposition of a committee of railroad heads, of which W. S. McChesney, president of the Terminal Association, is chairman, to use the municipal free bridge provided they are permitted to continue charging the 20c. a ton arbitrary on coal. The proposition was based on the contention that the Interstate Commerce Commission, sustained by the United States Supreme Court, has held that 20c. is a reasonable charge for the hauling and switching service in transporting coal from East St. Louis to St. Louis. Its rejection is on the ground that neither the commission nor the court has passed upon the question of an arbitrary for the use of the free bridge. Mayor Kiel and city officials have gone to Washington to offer the bridge to Director-General McAdoo for the use of the railroads.

MARKET DEPARTMENT

GENERAL REVIEW

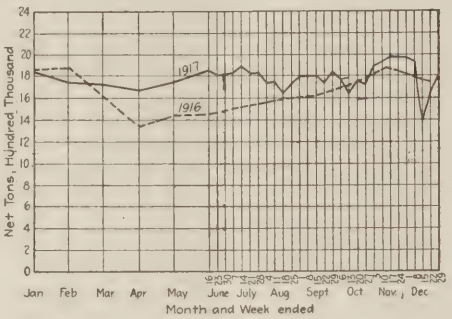
Cold weather causes excessive domestic demand. Car supply holding back distribution. Conditions, especially in the West, slightly better.

The production and distribution of anthracite is proceeding as rapidly as transportation facilities will permit. This is not, however, fast enough to satisfy the demand. The various local fuel administration boards and committees are perfecting their organizations, the efforts to relieve congestion on the railroads are beginning to make themselves felt, there is a slightly better car supply, and it is believed that conditions in general are easier than they have been in the recent past. It can hardly be expected that government regulation of the railroads will work any miracle to coal distribution. It is believed, however, that the beginning of better transportation facilities has been made. From all over the country the demand of industrial consumers, especially for bituminous, are heavy, and it is feared that in many localities, even in spite of such economy measures as lightless nights and the like, many industrial plants will be compelled to suspend operations. Conditions in New England along this line became especially acute, and a priority order was issued for the shipment of 500 cars daily to the New England administrator, to be distributed by him as necessity might dictate. It was feared that this priority order to New England would curtail the supply of fuel to other parts of the country, such as New York City and its vicinity, and a request was immediately dispatched to the National Fuel Administrator, urging that this order be rescinded. This request was denied, and it is feared by many that serious economic results will follow. This will not necessarily be the case, provided increased transportation can be secured. Throughout the West and Middle West the situation has been somewhat relieved. Coal standing on tracks in various railroad yards has been in several instances commandeered by local fuel authorities, with the result that temporary local stringency has been to a greater or less extent relieved. The production prospects are in several instances somewhat better than a week or two weeks ago. In the Pittsburgh district several operators of small mines were arrested for evasion of the government price. The tonnage involved in these evasions was almost insignificant. The conditions in the manufacturing centers of the Middle West such as Detroit, Chicago and St. Louis, have been somewhat relieved during the past week. A freer movement of coal over the railroads has effected this change. The needs of St. Louis are for the time being at least well provided for. Chicago has received heavier shipments, but no stocking could be accomplished. Detroit, also, has received more coal during the past week than the previous one, but this has had little effect upon dealers' yards or the supplies held by them. Many domestic consumers in Detroit have suffered severely during the past month. In the extreme West it is believed that the situation will be somewhat relieved by the substitution of coals mined near at hand in place of the somewhat better fuel brought in by long railroad hauls. The shipment of coal from docks in Milwaukee to the states lying to the northwest has ceased, and it is believed that Wisconsin's supply for the present winter is both ample and secure. There is nowhere manifest a disposition to be critical as to the kind or quality of fuel secured. The principal concern of consumers, both industrial and domestic, is to get coal—something that will burn and generate heat, and the question of whether it is lump, egg or screenings is of entirely secondary importance. While many localities are still on the ragged edge of want, and nowhere does the supply equal the demand, it may be safely said that the situation as a whole is better than it has been in the recent past.

A Year Ago—Retail anthracite trade easier, but the wholesale situation as stiff as ever. Very sharp decline in bituminous quotations. Preliminary discussions on new contracts. Improved car supply and heavy shipments in the Middle West.

COAL PRODUCTION

In the five working days of Christmas week the soft-coal mines are estimated to have produced 8,964,000 net tons, an average per working day of 1,793,000 tons. The recovery from the extraordinary depression of mid-December continues, but the rate of production has not yet attained the mark set in November. The increase was effected in spite of continued adverse weather conditions. A preliminary estimate places the December production at 42,050,000 tons, the lowest recorded since April, 1917. On this basis the entire 1917 production should be approximately 544,142,000 tons, representing an increase over 1916 of 8.3 per cent. The production of beehive coke, following the bituminous industry as a whole, rose from 96,086 net tons, during the preceding week, to 107,655 tons per working day. Anthracite shipments were reported as 29,228 cars.



CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED

District	Dec. 8	Dec. 15	Dec. 22	Dec. 29
Bituminous: shipments, 114 roads.	198,161	149,122	177,599*	158,290†
Anthracite: shipments, 9 roads...	40,566	31,672	36,083	29,228†
Beehive coke shipments, 4 roads...	12,509	10,335	11,835*	11,050†

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

The Iron Age—The first week in the new year has brought blast furnace and steel works' operation to the verge of complete demoralization. Western blizzards have made vastly worse what has been for weeks a serious situation and embargoes on shipments have made conditions at rolling mills almost hopeless. Scores of blast furnaces have been banked in the Pittsburgh, Youngstown, Wheeling, Cleveland and Chicago districts. Steel works in the same territories have been able to operate at but 50 to 75 per cent. of capacity. The East, while spared fresh snow blockades, has had record low temperatures and so little fuel has been delivered to steel plants that working schedules have gone to pieces. Never has the industry been so generally crippled or with so poor a prospect of any early return to normal conditions.

Bradstreets—Post-holiday influences, inventorying, intensely cold weather east and south and heavy snows at the west have made for a quiet week in ordinary distributive trade, and weather plus coal and car shortages have curtailed manufacture and industry.

The Dry Goods Economist — Manufacturers, wholesalers and selling agents in most lines of dry goods have completed their stock-taking and are now in a position to take up the problems of the new year with a full knowledge of the actual results of 1917 business.

The American Wool and Cotton Reporter—More confidence and interest was evident in the wool trade for the week under review. The trade is gradually recovering from the shock of the government regulation announcement. The market is quiet but very strong.

Marshall Field & Co.—Current wholesale shipments of dry goods for the week are well ahead of the corresponding period of last year. Road sales for both immediate and future delivery are about equal to the same week in 1917. The number of customers in the market has been slightly less than in the same week a year ago. The market on domestic cotton continues strong. Collections are good.

Atlantic Seaboard

BOSTON

Situation grows worse rapidly. Emergency supplies cannot begin to cope with demands. First cargoes arrive for Fuel Administration. All-rail deliveries also begin to reach destinations.

Bituminous — The Panama collier "Achilles" was recently diverted for one trip to help out the urgent situation in New England. But 12,400 tons is only a drop in the bucket. The bulk of the cargo went to hospitals and similar institutions that were very near distress for fuel. The New England order issued both by the Federal Fuel Administrator and by the Director-General of Railroads was secured through the efforts of J. J. Storrow, New England fuel administrator, and is intended to virtually give priority to the needs of this territory. Certain mines are designated for a given amount of coal per day, in all aggregating 500 cars from the different roads, all of which is understood to be equipment in addition to the allottment of cars the designated mines would regularly receive, the order being effective Jan. 8.

The railroads are also among the consumers in serious straits for fuel, and part of the 500-car order is to relieve them. A long list of industrial plants engaged in work on war orders is also included and strenuous efforts are being made to meet the most pressing of the demands. The City of Lynn finds its reserve so far depleted that all its industries have agreed to work on half time until an adequate supply can be received. The harbor, as in the case of New Bedford, Fall River, and other ports, is completely frozen over and water movement has been so completely paralyzed that any relief must come by rail from points like Boston where the harbor is navigable.

Meanwhile, various steamers are arriving, and it is hoped that with milder weather the end of the week will see some relief. The famine is widespread, and "acute" is not a sufficiently strong word to describe the situation. A great many plants have been obliged to shut down and there is no knowing what will be the outcome. Should the New England order be revoked, the situation will be hopeless.

NEW YORK

Coal situation easier, but still serious. The authorities assist in relieving the suffering among the poor. Receipts show increase and prospects are brighter. Lack of bituminous delays sailings. Car shortage shows no improvement and miners are restless.

Anthracite—The strenuous efforts made by the local fuel administration, railroad officials and coalmen to relieve the coal situation have been partially successful and there has been a better distribution of fuel during this week. This market has gone through the hardest week in its history. Temperatures each day were either below or near the zero mark. The rivers and New York Bay were filled with heavy ice and in the vicinity of the coal terminals this became so thick that the services of the heaviest tugs in the harbor were necessary to penetrate it and make a channel for the coalboats.

Relieving the situation meant hard work for the state and county fuel administration and for A. H. Smith, president of the New York Central Lines, who is the director-general of the railroads in the East. They were ably assisted by the State Fuel Conservation Committee.

The extreme low temperatures caused much suffering and with the rivers and bay practically one mass of ice the situation became serious. There were large tonnages of coal reported as being at the loading docks but it was impossible to move it. Heavy railroad tugs assisted by U. S. Navy tugs and, in one instance, by one of the big Sound steamers, were em-

ployed in making a passageway for the coal barges and after many hours of hard work were successful in their efforts.

Several of the companies also aided in the work of relief by sending coal in cars direct to their piers along the North River where the coal was loaded into the dealers' wagons. The situation in Brooklyn and other parts of Long Island was helped by the sending of coal trains through the Pennsylvania tunnels to Long Island City, while dealers whose yards are located along the Brooklyn water-front went several days without coal owing to the frozen condition of Newtown Creek and Gowanus Canal.

The low temperatures played havoc with the supplies in the cellar bins and many residents, fearing a coal famine, closed their homes and took residence in apartment hotels for the winter. Churches in many instances closed their main buildings and conducted services in smaller rooms. Many of the city hospitals were within a few hours of being without coal and in some instances similar institutions were without fuel.

The appeals from the poor became so numerous that Mayor Hylan instructed the police to ascertain how much coal is in the bins of the residents of the city and to solicit contributions of coal for division among those who needed it. In this way more than 1000 tons was divided in small lots among the needy. The forces of the various city departments were used in making the deliveries. Mayor Hylan also appointed a committee headed by Harry T. Peters to devise ways and means to conserve the coal supply and also to raise funds for the purchase of coal for the poor. Besides Mr. Peters the committee has among its members M. F. Burns, Thomas Farrell, Rudolph Reimer, T. V. Patterson and J. F. Bermingham, all prominent coalmen.

The failure of a general adherence to the rules of the State Fuel Administrator that all advertising signs and other unnecessary lights be darkened six nights a week, Saturday excepted, resulted in the appointment of a special committee to enforce the rule.

The efforts to relieve the situation during the time the nearby waters were filled with ice, resulted in the loss in four days of 27 barges each containing an average of 500 tons of coal.

While no definite announcement has been received here regarding the pooling of all anthracite shipments at tidewater docks, some dealers look upon this as the only solution of the situation.

With the demand for domestic coals leading, the steam sizes are short and hard to get. Wholesale dealers are unable to find any supplies, all production having apparently been sold at the mines or already on contract.

Continued efforts to secure the fixing of a gross margin for retail dealers in Manhattan and the Bronx has resulted in the county fuel administrator deciding upon the following margins which have been sent to Washington for approval by the Fuel Administration officials. Domestic sizes, $2.50; pea and soft coal, $2.10 and buckwheat, rice and barley, $1.90. These margins will not make any substantial change in the retail prices of coal in the two boroughs.

The threatened tie-up of the drivers and auto-truck operators of the retail dealers has been adjusted by the granting of weekly increases in wages of $3.

Receipts have been so small that most retail dealers have practically discontinued deliveries. Instead they have disposed of their stocks at the yards at 60 cents per cwt., the prices fixed by the Fuel Administration authorities.

One of the most serious situations confronting lower New York was the issuing of an order by the New Jersey fuel authorities preventing the carting of coal from that state across the river to New York. A continuance of this order would have resulted in shutting off the coal supply for all of the big office buildings, but an appeal to Washington soon resulted in its being rescinded.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buck	4.30@5.00	5.50@6.00
Rice	3.75@3.95	4.50@5.00
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—Conditions in the bituminous market continue to be serious with no immediate prospect of betterment. Supplies are not nearly sufficient to meet the demand and the condition of the water surrounding this city has interfered greatly with the transportation problem.

The delay in shipping has become extremely serious. The number of vessels tied up in the harbor because of the lack of fuel has reached 200 notwithstanding the efforts made to secure bunker supplies for them. Among the ships are passenger vessels carrying mails to foreign countries. The piers are also congested with freight destined for other lands.

A Washington dispatch that arguments had been presented to Dr. Garfield for an advance of $1.05 per ton in the mine price of bituminous coal, making the price $3.50 instead of $2.45, found much favor among the dealers here and it was the belief that at least part of the increase would be granted.

Dumping into barges at the docks has become more active but owing to the ice floes delivery at the various yards has been slow. The shortage has seriously impeded various industrial plants and many of them have been forced to suspend operations pending the receipt of fuel.

The Government operation of railroads has, so far, not made any appreciable difference in car supply. Operators report conditions similar to those existing for the past several weeks. Mine workers are restless.

Local dealers believe the local situation is just as serious as the New England situation and that more coal should be sent here. Three barges loaded for Boston and containing about 1200 tons were taken by the local fuel administration authorities on Saturday and devoted to local uses.

The order of Director-General of Railroads McAdoo increasing the demurrage rates, to take effect on Jan. 21 will no doubt have a potent effect upon the car situation and ought to result in an improvement.

No definite announcement has been made regarding the renewal of contracts, but it is expected that except in special instances, few contracts will be made for the coming year.

It was stated early this week that 1,009,000 tons less of bituminous coal has been received in this city since July of 1917 than were received during the corresponding period of the previous year.

Dr. Garfield notified State Fuel Administrator Wiggin on Wednesday that he would not rescind the priority order giving New England 500 cars of bituminous coal per day. The refusal came after appeals for more coal had been made to Dr. Garfield by Mr. Wiggin and Mayor Hylan, the latter asking that 1500 cars of coal be allotted to New York daily and given priority orders on the railroads. Dr. Garfield notified Mayor Hylan that he would not issue priority orders to send coal to New York.

Unless a normal supply of coal is brought to New York quickly it is feared many of the large manufacturing companies will have to shut down. It is also feared that most of the public schools will be closed next week.

PHILADELPHIA

Anthacite trade badly upset by zero weather. Shipments light and much suffering among consumers. National authorities order relief. New retail prices in effect, despite protests. Steam coal in extreme demand. Bituminous held back by abnormal weather. Better car supply promised. No price increase yet. New bunker price effective. No contract activity.

Anthracite—Trade conditions have never been so upset in the city's history. With the thermometer hovering near zero for a week, and from 10 to 20 degrees below throughout the mining region, there have been panicky times to say the least. As the dealers' yards were bare, or nearly so, before the severe weather arrived, the situation soon became desperate. There has been much suffering and in two instances the deaths of infants were ascribed to the lack of heat in the homes. Many manufacturing plants also closed and at the end of the week at least 25 per cent. of the city schools were closed for want of fuel.

Lately the weather moderated to near the freezing point and while this helped conditions, yet there continued to be much suffering and many of the schools were unable to reopen. The various fuel committees admitted that they were at their wits' end. They finally succeeded in convincing Secretary McAdoo of the seriousness of the situation and he, late in the week, ordered an embargo on freight of all kinds with the exception of coal and food-stuffs on all roads from Pottsville to Philadelphia. Even at this it was almost a week before the effect began to make itself manifest.

A canvass of the retail yards disclosed about 75 per cent. of them closed with "no coal" signs displayed. In the southern section of the city and parts of West Philadelphia, conditions were most alarming, because whenever a car of coal arrived there were mild riots. A crowd would gather, climb on the car and help itself. Policemen appeared none too anxious to make arrests, and while they tried to make an example of a few, the prisoners were soon discharged by the magistrates with a reprimand. In one day as many as ten cars of coal were taken on the street in this manner, the loss falling upon the railroad company, as the cars had not as yet been delivered to the dealers' yards. Many other cars had from one to five or more tons removed and in many cases this loss fell on the dealers, as their only remedy would be to refuse the car or ask to have it re-weighed.

Government control of prices has proved a blessing to the consumer. Consumers clamoring for coal offered almost any price, and no one questioned the present rates. It is not believed there is any extortion and the price arrangement of a $2.50 gross margin over actual cost as fixed by the coal committee is being adhered to. Retail prices run about as follows: Egg, $8.80 to $9.20; stove, $9 to $9.70; chestnut, $9.15 to $9.80; pea, $7.55 to $7.90. This range includes the lowest rates as charged by dealers who are handling company coal, and the higher ones as charged by those who are being supplied by the independents. Where a dealer buys from both the large and small operators some effort is being made to average the prices.

This week the Fuel Committee has taken advantage of the power recently granted it to confiscate coal in cases of urgent need. A recent instance is the case of directors of big companies who for years have been in the custom of buying their domestic coal by the carload and having it hauled to their homes by a dealer. This week there were several cars so shipped, but Chairman Lewis immediately notified the dealers to allow consignees but 30 days' supply, and to take the balance into their stock in the regular way.

The City Fuel Committee stated this week that all public buildings, such as hotels and theaters, violating the regulation as to keeping the temperatures of their buildings at 68 deg., would be subject to more drastic rulings in regard to the use of heat, a copy of which supplementary rules has already been published.

The city authorities have now reached a clear understanding with the fuel committee and are thoroughly coöperating with it. Many of the city departments, such as the water works and police stations have been running on small stocks, yet it is not believed they will suffer interruption. Already a number of public spirited business men with heavy reserves of coal have offered their supply of coal to the city in case of need.

This week the local gas company has been running half page notices in the papers asking consumers to conserve the supply and also warning them that the gas may be suddenly shut off and cautioning the people not to allow lights to burn all night, because of the resulting danger should the flow suddenly stop.

The small sizes of coal are in abnormal demand and apparently there is no steam coal for sale. None of the large companies and few of the independents will book any additional business. The prices continue to be held in check and in no way reflect what could be obtained. Buckwheat at $4.15, or $4.35 through brokers, is about the limit, although the demand is enormous. Rice at $3.35 or $3.55 is almost as active. Barley is also strong at $2.35 or $2.55. Culm has lost none of its recent popularity and is selling close to $1.50.

The prices per gross ton f.o.b. cars for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5 90	$6 05	Buck	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous — The situation has grown more serious of late, with the quantity of coal for commercial use far below the demand. Many manufacturing plants are working on short time, while others have been closed down entirely for periods running from two days to two weeks. It was fully believed that with the Government control of the railroads the question of car supply would have been on a fair way to solution by this time, but the zero weather which has prevailed entirely upset the plans in this direction. However, with a fair rise in temperature recently it is now believed that the improvement of rail

conditions will be reflected in an increased car supply.

The various fuel committees have lately devoted considerable attention to the bituminous trade and one of the striking effects of their activities seems to be the gradual elimination of a coal supply to industries engaged in strictly non-essential production. As a consequence a large proportion of coal reaching here is going to plants where it is most badly needed.

Reports from the various districts shipping into this market are that the car supply has recently been only from 10 per cent. to 25 per cent. for commercial coal, although one good-sized operation has not received a single commercial car for loading since Dec. 20.

The mine operators were greatly disappointed at not being granted permission by the Fuel Administration to increase prices on Jan. 1, as had been fully expected by many. Nevertheless, they feel that their claims cannot be much longer denied, and the lowest price they figure on at this time is $3 per net ton. While they believe they should have even more than this in order to allow of a reasonable profit, still they will accept a $3 price as an evidence that the authorities are beginning to appreciate their situation.

The new bunker coal price of $3.80 went into effect on Jan. 1, this being an advance of $1.35 per net ton over the old price of $2.45, as allowed by the Fuel Administration.

While a number of good-sized contracts expired with the close of the old year, it has not increased the amount of coal for sale at the Government price, as any coal released in that manner is being applied mostly on still existing contracts, which even with the additional tonnage are far behind their quotas. So far as can be learned there is no activity in the contract business.

BALTIMORE

Bituminous supply a little easier after one of the worst weeks in history of the trade. Confiscation by fuel administrator relieves anthracite shortage somewhat. New retail prices set.

Bituminous—The first week of the new year proved one of the worst in the history of the coal trade, but the past few days brought a better supply of fuel and emergency needs are being met fairly well. After Chesapeake Bay and its tributaries had become ice-bound to such an extent that even the largest vessels could not be moved, an accumulation of coal became evident at tidewater piers. Some of this was diverted by Washington to New England, and finally another portion was commandeered by the local fuel administrator.

This action came after the local supply had dwindled to such an extent that industries in several cases were forced to part production and after the lighting company's gas supply had run so low that the system failed in many homes. With oil almost an impossibility and with many homes without coal, the failure of gas supply for heating and lighting caused real suffering for about 24 hr., as the trouble came when the thermometer stood close to zero. Conditions in the bay were finally improved by battleships sent from Norfolk to break channels in the ice to the harbor and piers. City departments were so hard hit by lack of fuel that the high pressure fire service was without coal for a brief period. The commandeering of 250 cars of coal on Monday for local distribution, however, broke the worst of the needs.

Anthracite—The hard coal situation also was finally saved by seizure of coal awheel near the city, destined elsewhere but held up by rail congestion. Previous to the seizure many homes were without coal, schools and other public buildings were closed for lack of heat, and there was much inconvenience and suffering. Reports came of children and others dying from cold and exposure. Coal dealers were at their wits' end, with long lines of would-be purchasers and little or no coal to distribute. Vast damage was done by bursting water pipes in unheated buildings.

Prices have not been the main consideration, and an advance of 25 cents a ton on prepared sizes, as authorized by the fuel administrator, passed practically unnoticed by the public. The advance was to take the place of one made each year here to care for added cost of winter hauling, and which did not become effective in October as usual. The new prices, based on the mine costs, plus freight, plus war tax and plus a profit margin of $2 on prepared sizes and $1.75 on pea coal, are as follows:

Hard white ash—Broken, $9.65; egg, $9.35; stove, $9.60; chestnut, $9.75; pea, $8.10, and buckwheat, $7.35; Sunbury—Egg, $9.60; stove, $9.85; chestnut, $10; Lykens Valley—Egg, $10.10; stove, $10.35; chestnut, $10.35.

The prices are based on the long ton, and where there is bagging or carrying the actual extra cost is added, to be not less than 25 cents a ton. Bushel sales shall be at the rate of 50 cents for prepared sizes for 80 lb.; and 40 cents for pea coal. Five cents off is allowed on each bushel where purchasers carry their own coal.

Lake Markets

PITTSBURGH

Production prospects slightly more promising. Local supplies fair. Arrests for violating set prices.

The week opened with car supplies rather poor but on the whole railroad conditions are a trifle more promising. The Greek Christmas, which fell on Monday, cut into labor supplies materially.

Local fuel supplies are practically sufficient, although there are no stocks to speak of. Reports were circulated late last week that many of the office buildings were short of coal and were in danger of being without light and heat this week. A number of coal companies near Pittsburgh accordingly made an offer to supply trucks with coal on Sunday, but there were few applicants and the conclusion reached is that conditions were not nearly as bad as painted.

The amount of coal in transit between mines and steel works has been decreased somewhat, receipts of steam, gas and by-product coal at steel works being somewhat improved. Steel output is still considerably restricted, however, by fuel shortage.

A half dozen or more arrests have been made of coal company officials on the charge of violating the set prices, and the authorities claim to have ample evidence to convict. All the cases thus far involve small producers. According to such information as has leaked out, the means taken to cover violation of the law were crude.

There is practically no free coal in the open market, but it is believed a moderate tonnage is changing hands, sellers picking out consumers to whom they prefer to sell but reporting no coal to offer against general inquiries. The market remains quotable at the set prices, $2.45 for mine-run, $2.20 for slack and $2.70 for screened, per net ton at mine, Pittsburgh district, with 15c. permitted to be charged in addition in case of sales by brokers.

BUFFALO

No improvement in the bituminous situation, but cars show some increase. Prospect of plants closing soon if no relief is afforded. Anthracite moving fairly well. Consumption heavy.

Bituminous—No member of the trade will admit that the situation has improved as yet, though the railroad changes must furnish more ability to move freight in a short time. The removal of passenger trains must produce that effect. The need of this is shown by the report from the Allegheny Valley coal region, which is estimated to have had about one day's supply of cars last week. From all sides come reports of this or that plant just ready to close for want of coal, though none of account have done so in this district yet.

The coal consumers of this city have not yet begun to learn the art of saving coal. Despite the constant fear of running out of fuel the office buildings are burning all day long hundreds of electric lights many of which are not needed. The local fuel administrator has posted notices forbidding such waste, but it does not occur to anyone that he is the one meant.

The Canadian coal-selling licenses come out much cut down, showing that the authorities believe that country to have received more than its share of coal lately.

All these indications go to show that the situation is strained and is likely to remain so to a great extent, no matter what is done. Add to this the fact that the country is trying to do a large amount of extra work and the reason for congestion is fully explained.

The bituminous jobbers seem willing to give up all contracts as soon as they expire, some of them expressing a desire to do so. Then the following Government prices will be general:

	Slack	Lump
Pittsburgh	$3.75	$4.25
Bessemer	3.70	4.20
Allegheny Valley	3.60	4.10

All per net ton, f.o.b. Buffalo.

Anthracite—The local supply has not been up to the consumption during the late cold snap, but the weather is mild again and normal conditions will soon restore something of confidence on the part of consumers. If they would not take more coal than they need the supply would be sufficient. During the late zero weather complaints multiplied, but they will fall off now unless the cold weather returns.

Some of the outlying districts appear to be destitute and there are instances where the town authorities have given permits to cut down the shade trees. It is the general idea that the winter severity cannot last long, as we have already had enough coal weather and snow for more than an ordinary winter.

TORONTO

Coal situation very serious. Shortage due to extreme cold, causing much suffering. Civic relief system inadequate. Fuel controller trying to arrange for supplies.

The coal situation has become very serious. Owing to protracted severe weather the supplies of fuel arriving have been entirely inadequate to meet a greatly increased demand and much suffering and hardship have resulted. This is by no means confined to the poorer classes, as many who have ordered and paid for a supply weeks ahead are unable to obtain it.

To relieve the distress the civic coal depots are delivering quarter and half-ton lots at the rate of $10.50 per ton, but have been overwhelmed with orders which they cannot fill for some time as the supply at their disposal is limited. Reports from other Ontario cities and towns indicate that similar conditions are general.

Fuel controller Magrath, now in Washington, telegraphs that he has received the promise of early shipments to Canada and that these will receive precedence over other traffic on the Canadian railways. Quotations are merely nominal, prices actually paid being variable.

DETROIT

With the railroads reporting a somewhat freer movement of soft coal, the supply appears little improved. Anthracite continues scarce. Domestic consumers suffer hardships.

Bituminous—Despite the fact that reports from railroad traffic departments indicate a considerable improvement in the volume of incoming shipments of bituminous caol, the deficiency in supply continues. Many of the industrial plants including some that are employed in turning out work for the Government are working on a day-to-day supply, which it is feared might be cut off should snowfall or a tightening of railroad congestion curtail the volume of receipts.

Demand continues urgent from steam plants. The fact that no reserve exists on which they may draw, while industrial consumption is quite materially increased in comparison with last winter makes the situation dangerous. Vigorous protest is being prepared for presentation to the Michigan and National fuel administrators, against the shipment to Detroit of Indiana coal instead of the Kentucky or West Virginia product. The objection is made by industrial consumers that the freight rate on the Indiana coal is 7c. a ton higher, while its efficiency in steam production is pronounced far inferior to the coal from the other fields, which heretofore have contributed in greater part to Detroit's supply.

The Detroit board of education has under consideration a plan to close the public schools for a month, extending the school term into the summer. The purpose of the plan is to permit distribution of supplies of coal that have been provided for school needs.

Anthracite—Very little improvement is noticeable in the quantity of anthracite coming to Detroit. The cargoes of hard coal, which the fuel administration confiscated on the steamers "Thomas Barlum" and "Richard J. Reiss" have been unloaded and distributed. The fuel administration has no further supply in sight on which to draw.

COLUMBUS

Continued cold weather is still causing considerable stringency in the coal trade of Ohio. Shortage of domestic stocks reported.

The cold wave which arrived a week ago still continues and as a consequence there is a considerable shortage of domestic and steam fuel stocks. Domestic users are probably in the worst shape as retail supplies are limited. Deliveries under the direction of the county fuel committees are being rushed and up to date only a few isolated cases of great suffering have been reported. On the whole the situation is not as bad as was the case during the first cold snap and the steps that have been taken for relief are proving efficacious.

Retailers are still restricting deliveries to small loads in an effort to make the available supply go around. Retail prices are firm at the levels fixed some time ago. Pocahontas is quite scarce and only a small

portion of the usual tonnage is coming into this market. West Virginia splints are coming in better with improvement in railroad facilities.

The steam business is active. Owing to Federal restrictions certain plants making non-essentials have been deprived of fuel. Supplies have been secured by schools, hospitals and public institutions. Some of the public utilities are short of fuel but few have had to suspend operations. In most instances they have curtailed service. Restrictions as to unnecessary sign and store lighting have relieved matters to a large extent.

Car supply, or in other words, efficiency of motive power on railroads has been better during the week and as a result the output in certain districts has been larger. Even with the intervention of a holiday the production in the Hocking Valley district is estimated at 75 per cent. Jackson and Pomeroy are credited with 65 per cent. and other districts, excepting eastern Ohio, about 50 per cent. In eastern Ohio the car service has been bad and the output is about 35 to 45 per cent. and a large portion of that is railroad fuel.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump, inch and a quarter, three-quarter, nut and egg	$2.70	$3.05	$2.70
Mine run	2.45	2.70	2.45
Nut, pea and slack and coarse slack	2.20	2.45	2.20

CINCINNATI

Continued severe weather and limited receipts of coal have kept the city on the edge of suffering. Careful distribution is meeting the situation.

Continued wintry weather, with low temperatures and snow, has marked the past week, although moderation at the close was noted. The limited receipts of coal necessitated extremely careful handling of the small supplies thus made available, in order to give to those actually in need of it enough fuel to prevent suffering. This was done, it seems, although it was at the expense of some industrial consumers, who were constantly on the verge of a total absence of fuel, and, consequently, of the necessity of shutting down.

There appears to be no permanent relief in sight for some time to come, as the transportation tangle is by no means straightened out, and the amount of coal in the city in the hands of dealers and consumers is greatly below normal, so that it will take some time, with favorable conditions as to transportation, to enable the desired suppleis to be stored. If any less coal were being received it would be impossible to take care of the public; and the situation at points north of Cincinnati is even worse, judging from reports.

LOUISVILLE

Coal business is Government-regulated in almost everything but name and Kentucky trade sees no developments. Hears of Government taking over industry without batting an eye.

One of the features of the week in the Kentucky coal trade has been the widely-discussed report that the Government is shortly to take over entire operation of the coal mines of the country. In view of the fact that the industry is already to most intents and purposes Government-controlled, the leading members of the Kentucky trade express no special interest in the report.

The situation is still a difficult one, although there has been some little improvement in the supply of cars, at least in parts of the Kentucky field and a larger volume of coal has gone out. Priority orders are determining the manner of distribution so that sales organizations are more or less inactive, in spite of a general deluge of inquiries and requests for consideration.

Another week of cold weather, with gas failures all over the central section, has greatly stinulated the domestic demand and increased the requirements of the retail trade. An increase of 15c. a ton has been granted the trade in Louisville on certain domestic grades, while there is still a restriction on quantities allowed and all retailers are behind a week or more on deliveries. Failures of certain grades of coal are common and in many homes and factories fuel other than that for which furnaces were designed is being burned. Lightless days and nights and other fuel-saving devices are being put into effect and generally observed. A promise of milder weather is hailed with joy by the trade.

BIRMINGHAM

Domestic situation remains critical, though relief is afforded in a measure by warmer weather and priority shipments. Steam coal being eagerly sought through the aid of state and national fuel administrators. Output at mines slowly returning to normal after the holidays. Traffic congestion hinders movement greatly.

While the shortage of domestic coal throughout southern territory continues acute, the pressure has been relieved slightly by a few days of relatively warm weather and the diversion of coal to local dealers and to other points in the state where a coal famine existed, by orders of the fuel administrator. Local dealers have received a few cars each during the week, which were quickly unloaded into waiting wagons and trucks. Few yards have any coal on hand at all, the inventory of stocks at the close of the week showing the smallest stock yet reported.

The threatened closing of the city schools for lack of fuel has been temporarily avoided by the coöperation of local producers, who have promised sufficient shipments to tide over the present critical situation. It is probable that the city will close down its lighting plant and secure its current from the local electric company to further conserve its fuel supply. The current used by the Birmingham Railway, Light and Power Co. is generated by water-power on the Coosa River.

Brokers and distributing agencies are being much perplexed by the conflicting priority orders of state and national fuel administrators and are much "in the air" as to how to proceed with coal distribution. The belief is expressed, however, that the Government will soon centralize the distribution in each field in the hands of a local committee, and will designate the essential industries which are to be supplied as near as possible with full fuel requirements. This is thought to be the most important measure of relief which could be adopted, as the continued parcelling out of the limited supply to every class of consumer is hazarding the operation of public utilities and manufacturing plants essential to the national welfare.

Operations at the mines have not assumed normal proportions as yet, though the output was better than a week ago. Several mines operated Sunday and probably produced several thousand tons of coal, mostly for local distribution.

Congested traffic conditions are impeding the movement of coal from the mines, those on the Frisco lines reporting that cars were allowed to stand under load for a week in some instances before being moved to the consignee.

Coke

CONNELLSVILLE

Car supplies improved. Receipts at furnaces somewhat better. Less coke under contract.

Car supplies were poor indeed all last week, but this week opened with an excellent supply placed, this condition combining unfortunately with the fact that Monday was the "Greek Christmas" of the Julian calendar, falling 13 days after the Christmas of the Gregorian calendar, and the supply of labor for loading was rather poor.

There has been a partial cleanup of the large amount of coke in transit, or rather nominally in transit, between the ovens and the blast furnaces, whereby receipts at blast furnaces have increased a trifle while shipments last week were no better than formerly. An occasional banked furnace has been able to resume, but production of pig iron as a whole shows practically no improvement.

There remain few, if any, price adjustment contracts, subject to the spot market, these having practically all expired Dec. 31. On the other hand, a number of new contracts, made before prices were set Sept. 24, have become operative. The general opinion is that there is less coke under contract now than formerly, and supplies offered in the open market should increase if there is anything like full production. At the moment there are practically no offerings. The market remains quotable at $6 for furnace, $7 for 72-hr. selected foundry and $7.30 for crushed, over 1 in. per net ton at ovens.

Upon the request of Warren S. Blauvelt, in charge of coke under the Fuel Administration, a meeting of all the coke operators in the Connellsville region was called for last Thursday, at Uniontown, Mr. Blauvelt meeting about 200 of the operators. He made a strong plea for energetic action to increase the production of coke, while the operators insisted that much better transportation facilities were needed. The following committee was appointed: Charles Lenhart, vice president of the Producers' Coke Co., chairman; Walter S. Klingerman, president of the H. C. Frick Coke Co.; Hart Hillman, of J. H. Hillman & Sons Co.; L. L. Willard, general superintendent of the Rainey interests; John Jamison of Jamison Coal and Coke Co.; W. A. Stone, of W. A. Stone & Co.; R. M. Fry, of the Orient Coke Co. This general committee is to appoint an executive committee of three to operate directly under the Fuel Administration, and the committee is getting its organization in shape this week.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 29 at 251,398 tons, a decrease of 39,976 tons, and shipments at 255,079 tons, a decrease of 33,678 tons.

Buffalo—While it is far from easy to get shipments or in fact to make them, the movement is kept up in some manner. The supply of iron ore is adequate for the present and the demand for pig iron is good. There is some uncertainty as to what can be done when the contracts for coke expire, as the Government will not allow them to be renewed in their present form, but so long as the coke is made the trade will get it in some way. Nominal coke prices are still $7 and $6 at the ovens for foundry and furnace, to which must be added $1.85 freight.

Birmingham—Federal control of the railroads has not thus far afforded much relief in the movement of coke, as equipment is still short, and its restricted use is embarrassing industries securing foundry coke from local producers. Deliveries are slow and insufficient to meet the needs of consumers. Production is closely approximating the output prior to the holidays. Inability to secure even repair material without great delay is causing a large aggregate loss in output. The demand is unusually strong.

Middle Western

GENERAL REVIEW

The coal trade is much concerned over the report that Fuel Administrator Garfield contemplates radical changes in coal distribution.

Operators, jobbers and retail dealers, express much interest in the report from Washington, that radical changes are to be made at an early date by the Federal Fuel Administrator. If current reports be true—and they are not now questioned—the United States Fuel Administration is to be decentralized at an early date. Deputy fuel administrators are to be appointed in each producing district, 15 or 20 in the country, who will have exclusive charge of the allotment of all coal sold and shipped.

The plan, it is understood, contemplates the joining of Illinois and Indiana as a producing territory, and the appointment of a deputy fuel administrator in charge, with headquarters probably in Chicago. His work will be confined to an association of producers and he will have ample authority to dictate the movement of the production for the territory allotted.

Should this plan be put into effect, no doubt there would be immediately installed a zoning system. This will restrirt roal movement to territory lying in the closest proximity of the direct haul to the producing mines, and coal would not be allowed to go beyond the zone boundaries. It is planned to do away entirely with cross country hauls, the hauling of one coal into and through another producing territory to a destination beyond.

Under this plan it will be seen that Illinois and Indiana users will be compelled to rely on a vastly greater supply from their own states, thereby replacing a large volume of eastern coal, that has heretofore been marketed here. It is likely that Illinois coal will supply Iowa and Missouri, and that Indiana production will find placement in its own state and Chicago. Eastern coal will no doubt continue to move into Wisconsin through the Lake gateway. Michigan also will be supplied by Lake boats through the same channels as Wisconsin.

The apparent urgent and immediate need for coal, in this part of the country near the producing centers, fully warrants the belief that early steps will be taken to divert all coal from the Northwest, for a period of 60 days, allowing a heavier movement throughout Illinois and Iowa, where the requests for relief are urgent. Reports reaching us indicate that there is sufficient coal in stock in the Northwestern territory to last for several months, this accumulation is the result of priority shipments made before Lake traffic closed, and will, it is expected, be exhausted before more is allowed to go there.

If the decentralized plan be put into force, it will not be necessary to make appeals for relief to Washington, and much of the formalities can be dispensed with by making direct appeals to the deputy in charge, who will then make allotments.

Much concern is manifest as to who the deputy will be. That the appointee should be a man entirely familiar with coal movement, and trade relationship is unquestionably an important matter to the Mid-western operators. Particularly is this true with the operators of Illinois and Indiana, where extreme care is exercised in the preparation, and vast sums of money have been expended in properly equipping plants in order to size coal to meet the needs of some particular class of trade.

The holiday season with the coal miners seems to be over judging from the manner in which production has been increasing during the past week. Generally speaking, operators are getting maximum tonnage, and have had an ample car supply, with the exception of some few small operations that have but one line of road. It was feared that the heavy snow that fell the first of the week, would have a bad effect on the railroads, but little or no trouble has been noted, particularly on such roads as the Burlington, Illinois Central and Chicago & Eastern Illinois, the heaviest coal carrying roads in the Mid-West section. In some localities, reports are being made of badly delayed shipments, but such reports are in many cases minor incidents, and do not reflect the showing that the railroads are making in handling coal shipments.

It is gratifying to both operator and dealer, as well as good news for the consumers that there is relief in sight, and what a few days ago threatened to be a deplorable condition seems to have been met and overcome. The relief it is understood is but temporary, however, should the present efforts by operators, miners, and railroads indefinitely continue, there will be no further need for alarm as far as Western bituminous coal supply is concerned, provided the Fuel Administrator does not determine other channels of movement for outputs in Illinois and Indiana. Local and state fuel administrators are active in their efforts to give relief where it is needed, and in every case the operators are responding with prompt shipments of a sufficient volume of coal to relieve the situation.

The situation as regards Eastern bituminous and hard coal is, if anything, more serious than at any time for several years. Seldom is there a car of Eastern bituminous reaching the smaller towns in this section, and the hard coal situation is but little better. What anthracite arrives is quickly absorbed in the larger terminal centers.

CHICAGO

The supply of soft coal received during the past week exceeds that of the previous three weeks. Situation greatly relieved.

The latter part of last week, City Fuel Administrator Durham called into conference a number of prominent operators and association secretaries and requested that extra efforts be made during the coming week to get sufficient coal into Chicago to take care of the urgent needs. His request was met by operators from all sections of the state, with the result that a supply of almost 3000 cars were immediately headed for this market. Each operator was allowed to serve his own clientele, and no confusion was noted. Under the threat of having coal confiscated, it was thought to be a better policy to allow the producer to serve his own trade. By this means the confusion that would follow should coal have been taken and placed in yards and plants unaccustomed to its use was avoided.

While there is no substantial stock of coal at any yard or plant, it is believed by those who have followed the matter closely that there is enough coal en route to this market (if a reasonable supply is allowed to continue) to keep all from suffering. Under such conditions as have prevailed for the past several weeks there is an occasional dealer that feels he is neglected. In reality, however, the trouble, when traced back, is found to be not the operator, but a result of failure to accept coal earlier in the season, prior to government control, allowing stocks to become depleted at a season of the year when all coal offered should have been accepted.

Operators and jobbers in this vicinity are considerably exercised over an order coming from Washington in reference to contracts. There is a suggestion that Dr. Garfield intends to abrogate all contracts, and that he will expect that all new contracts will be made by the use of a uniform blank. It is apparent from the reading of the new order that no contract will be allowed to pass that does not bear the official sanction of the fuel administration. It would appear that this should be entirely satisfactory to the trade in general, because the price is fixed by the Government, thereby doing away with the usual yearly practice of expensive negotiations for new contracts. Admittedly the fellow that has been on the level with his connections has nothing to fear, and will be in a position to claim a continuation of favors heretofore enjoyed.

Quotations in the Chicago market are as below, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam and domestic lump, egg, nut, stove, chestnut and pea	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Washed egg, stove and nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	.....	.....	.....	2.15@2.30	2.85@3.00

	Smokeless						
	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West. Va. Splint
Dom. and steam lump, egg and nut	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Fuel Administrator not responsible for an unauthorized advance. Wisconsin's coal supply protected.

The misunderstanding which resulted in an unauthorized raise of 25c. per ton in coal prices on Dec. 1, for which rebating is now in progress, was not due to any act of the fuel administration office, but was brought about on the strength of a report that President Wilson had requested coal operators to raise prices 35c. per ton.

As a result of the protest made by Gov. Philipp to Administrator Garfield, no more coal will be shipped to the Northwest from Lake Michigan docks. Minnesota and the Dakotas must depend upon the stocks at Duluth-Superior for their future supplies of fuel. It is also settled that Administrator Fitzgerald of Milwaukee will continue to direct the distribution of coal in Wisconsin. He has ordered all coal dealers in the state to report the amount of coal they have sold thus far during the present winter, together with an estimate of the amount they will require to supply consumers until spring. Inquiry is also made as to the extent to which coke and wood are being used.

ST. LOUIS

Car shortage somewhat severe. Transportation slow, but enough coal coming in from Standard district to take care of current needs. Fuel administrators have situation well in hand and future looks more optimistic than it has. No Eastern coals, and tonnage of Carterville exceedingly light.

The situation in the St. Louis market at the present time is exceptionally good. As a matter of fact, reports from all over the country show that St. Louis is in better shape for fuel than any other large city. There is some slight congestion in the terminals on the east side and also on one or two of the trunk lines on the west side, but in a general way the situation is extremely good.

Some coal from the Standard field is coming through to destination in St. Louis in three days.

The local demand, while it exceeds the supply, is nevertheless being taken care of in small quantities. The domestic consumer is in good shape and will continue to be unless there should be a prolonged and unusual siege of severe weather and even in that event Fuel Administrator Crossley expects to be able to handle the situation.

The situation throughout the state is far better than was anticipated two or three weeks ago. To those who criticized the measures taken, the results are surprising. Not only in the State of Missouri, but in Iowa, Nebraska, and Kansas there is coal as the result of Administrator Crossley's excellent work at St. Louis and Kansas City and his forbidding the railroads to confiscate coal without first getting permission. His measures have worked wonders in the local fuel situation.

There is no anthracite coming in to speak of and absolutely no smokeless. Arkansas is almost off of the market. The steam coal condition in and around St. Louis is not satisfactory on account of the failure of the users to get coal stored ahead, but there is no actual shortage that is preventing plants from running full time.

The prevailing circular is, per net ton f.o.b. mine:

	Williamson and Franklin Co.	Mt. Olive and Staunton	Standard
Prepared sizes, lump egg, Nos. 1, 2, 3 and 4 nut washed and unwashed	$2.65@2.80	$2.65@2.80	$2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Screenings and No. 5 nut washed and unwashed	2.15@2.30	2.15@2.30	2.15@2.30

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

SEATTLE

Government control of railroads to relieve coal shortage in northwest. May reclassify Washington coals, revise price at mines and declare embargo against Wyoming and Utah coals. Retail prices set in many cities.

Government control of railroads has already had its effect in the Northwest in the saving of fuel through the elimination of heavy passenger equipment from transcontinental lines. Now that the Government is in a position to force dealers to accept coal which will need a minimum of hauling, it is expected that eastern Washington and northern Idaho communities, which have insisted upon being served with Wyoming and Utah coal, will be served with western Washington coal, thereby releasing a number of cars.

Retail prices of coal in various cities of Washington have just been established the most important changes going into effect in Tacoma, where dealers are allowed a margin of $1 a ton over the mine price established for Pierce and King counties, together with freight and tax and delivery charges. Mine prices there are now $3.70 mine run, $4.95 prepared sizes and $3.45 for screenings. Zone delivery charges have been scheduled at from $1 a ton to $2.25, according to the distance of hauling. This would bring the cost of lump coal in Tacoma delivered at the consumer's door from $8.25 to $9.58, a higher price than has prevailed in the city in a number of years. The basis of figuring costs is as follows: Maximum cost, f.o.b. mine, $4.95; brokerage $0.15; freight and tax (from mines nearest to Tacoma freight is 66c. and tax 2c., total, $0.68); dealer's margin, $1, total, $7.28, to which must be added delivery charges of from $1 to $2.25. Retail prices at Everett are as follows: Black Diamond, prepared furnace, $6.95 to $7.45; Carbonado steam, $8.35 to $8.65; Carbonado lump, $9.55 to $10.05; Newcastle lump and nut, $8.30 to $8.80; Issaquah lump and nut, $7.85 to $8.80; Roslyn mine run, $7.45 to $7.95; Renton lump and nut, $7.90 to $8.65, Wellington lump, $9.70 to $10.20.

FOREIGN MARKETS

England

Coal—In the open market the volume of business passing is still negligible. Some improvement is discernible in demand for Admiralty descriptions.

	New Regulation Prices
Best Welsh steam coal	$8.62
Best seconds	8.27
Seconds	8.08
Best dry coal	7.89
Best Monmouthshires	7.89
Seconds	7.65
Best Cardiff smalls	6.19
Cargo smalls	5.47

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—There has been some slight improvement in the tonnage position.

Gibraltar	$24.30	Port Said	48.60
Marseilles	21.79	Las Palmas	20.02
Genoa	24.60	St. Vincent	20.64
Alexandria	42.50	River Plate	29.15
Naples	23.86		

Reported by Hull, Blyth & Co. of London and Cardiff, under date of Dec. 20, 1917.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

CINCINNATI	Jan. 5 1918	One Month Ago	One Year Ago
PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:			
No. 2 Southern foundry....	$35.90	$33.00	$18.90
No. 2 Northern foundry....	35.90	33.00	21.76
NEW YORK			
No. 2X Northern foundry..	34.25	34.25	22.00
No. 2 plain Northern foundry	33.75	33.75	21.00
No. 2 Southern foundry....	37.25	37.25	22.00
BIRMINGHAM			
No. 2 Southern foundry....	33.00	33.00	16.00
CHICAGO			
No. 2 Northern foundry....	33.00	33.00	22.00
No. 2 Southern foundry....	37.00	37.00	....
PITTSBURGH			
Bessemer iron*	37.25	37.25	24.95
Basic iron*	33.95	33.95	20.95

*These prices include the freight charge from the valley to the Pittsburgh district. †Delivered Tidewater, New York.

Note—On Sept. 24 the President approved the new schedule of steel prices, that of pig iron being set at $33.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York, Jan. 5, 1918	New York, 1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.....	$3.00	$4.195	$3.25	$4.27	$4.20
Channels, 3 to 15 in.....	3.00	4.195	3.25	4.27	4.20
Angles, 3 to 6 in., ¼ in. thick	3.00	4.195	3.25	4.27	4.20
Tees, 3 in. and larger.....	3.05	4.245	3.40	4.27	4.25
Plates	3.225	4.45	4.00	4.52	4.45

BAR IRON—Prices in cents per pound at cities named are as follows:

	Pittsburgh	St. Louis	Denver	Birmingham
Dec. 31, 1917.....	3.50	4.45	4.05	4.50

NAILS—Prices per keg from warehouse in cities named:

	Mill, Pittsburgh	St. Louis	Denver	Chicago	San Francisco	Dallas
Wire	$2.70	$4.30	$4.85	$4.25	$4.60	$4.50
Cut	2.70	5.25	....	4.40	6.15	....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh, Jan. 5, 1918	Pittsburgh, One Year Ago	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes, ⅝-in. and larger	$5.00–7.00	$2.65	$5.00	$6.45	$7.25	$8.00	$5.40
Track bolts	7.00–8.00	3.25	6.25	Premium	8.80	6.75	6.15
Standard section angle bars	3.50	2.00	4.50	Premium	4.65	...	5.00

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts held on Apr. 30, 1917:

Cleveland	Chicago	St. Louis	Denver	Birmingham
List	+10%	+10%	+35%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill, Pittsburgh	Chicago	St. Louis	Denver	Birmingham
Straight	$4.75	$6.50	$5.50	$7.50	$6.75
Assorted	4.90	6.50–7.00	5.75	7.75	7.00

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York, Jan. 5, 1918	New York, 1 Month Ago	New York, One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in. $58.35	$59.50	$44.50	$55.15	$57.00	$66.40	$62.00	
6 in. and over 55.35	56.50	41.50	53.15	54.00	63.40	59.00	

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh, Jan. 5, 1918	Pittsburgh, One Year Ago	Chicago, Jan. 5, 1918	Chicago, One Year Ago
Standard bessemer rails.....	....	$38.00	....	$38.00
Standard openhearth rails...	....	40.00	....	40.00
Light rails, 8 to 10 lb.....	....	52.00	....	47.00
Light rails, 12 to 14 lb.....	....	52.00	....	46.00
Light rails, 25 to 45 lb.....	....	50.00	....	44.00

Note—No quotations. Cambria Steel Co. and Carnegie Steel Co. reported to be filled up on rails for a year.

OLD MATERIAL—Prices per net ton in Chicago and St. Louis (including delivery to buyer's works and freight transfer charges):

	Chicago, Jan. 5, 1918	Chicago, One Month Ago	St. Louis, Jan. 5, 1918	St. Louis, One Month Ago
No. 1 railroad wrought...	$29.50	$25.00	$31.00	$30.50
Stove plate	16.00	15.50	16.50	16.50
No. 1 machinery cast.....	20.00	20.50	21.50	19.00
Machine shop turnings...	16.50	16.50	16.75	16.75
Cast borings	16.50	16.50	16.00	16.50
Railroad malleable cast...	26.50	26.00	25.50	25.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Chicago	Birmingham	St. Louis	Denver
$0.12	$0.09	$0.16	$0.15	$0.16

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Chicago
Solid	12c.	14½c.	9c.
Hollow	24c.	23½c.	..

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh: basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel, Inches	Steel, Black	Steel, Galvanized	Iron, Inches	Iron, Black	Iron, Galvanized
⅛, ¼ and ⅜..	44%	17%	¾ to 1½	33%	17%
½	48%	33½%			
¾ to 3.....	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6.....	47%	34½%	2½ to 4.....	28%	15%
			4½ to 6.....	28%	15%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜..	40%	22½%	¾ to 1½	33%	18%
½	45%	36½%			
¾ to 1½.....	49%	36½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4.....	45%	33½%	2¼ to 4.....	29%	17%
4½ to 6.....	44%	22½%	4½ to 6.....	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black, New York	Black, Chicago	Black, St. Louis
¾ to 3 in. butt welded.....	38%	42.8%	40.1%
3½ to 6 in. lap welded.....	18%	38.8%	36.1%

	Galvanized, New York	Galvanized, Chicago	Galvanized, St. Louis
¾ to 3 in. butt welded.....	22%	27.8%	25.1%
3½ to 6 in. butt welded.....	List	24.8%	22.1%

Malleable fittings, Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 15 and 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair-sized orders, the following amount is deducted from list:

	New York, Jan. 5, 1918	New York, One Year Ago	Cleveland, Jan. 5, 1918	Cleveland, One Year Ago	Chicago, Jan. 5, 1918	Chicago, One Year Ago
Hot pressed square...	List	$0.50	$1.40	$2.75	$1.50	$3.00
Hot pressed hexagon..	List	.50	1.20	2.75	.85	3.00
Cold punched square..	List	.50	.75	3.00	1.50	2.50
Cold punched hexagon	List	.50	.75	3.00	1.50	3.00

Semifinished nuts sell at the following discounts from list price:

	Dec. 31, 1917	One Year Ago
New York	40%	50%
Cleveland	60%	50—10%
Chicago	50%	50—10%
St. Louis	50%	.....

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
⅜ by 4 in. and smaller.....	30%	50%	40—10%
Larger and longer up to 1 in. by 30 in.	15%	40%	30—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York ..... $1.00 Cleveland ..... $3.50 Chicago $3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York ..... $5.00 Cleveland ..... $4.50 Chicago $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller.....	30%	30%	40%*
Tinned	30%	30%	40%*

*For less than keg lots the discount is 35%.

Button heads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in., sell as follows per 100 lb.:

New York ..... $7.00 Cleveland ..... $6.15 Chicago $5.50

Coneheads, same sizes:

New York ..... $7.10 Cleveland ..... $6.25 Chicago $5.60

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	Chicago	St. Louis	Birmingham	Denver
Cup	7	5¼	5.6	8½	10
Fiber or sponge.....	8	6	5.9	15	15
Transmission	7	6	5.9	10	15
Axle	4½	4	3.3	3	5
Gear	4½	4½	6	5½	5½
Car journal	23 (gal.)	3½	3.75	5	5

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Jan. 5, 1918	One Year Ago	Jan. 5, 1918	One Year Ago	Jan. 1, 1918	One Year Ago
Best grade	70.00	60.00	93.00	51.25	70.00	50.00
Commercial	40.00	30.00	21.50	18.50	25.00 to 30.00	20.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	65c. per ft.
Common, 2½-in.	40–10%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade... 30% Second grade... 30-5% Third grade... 40-10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	40%
Denver	40%	40%
Birmingham	35%	40%
Chicago	30—10%	40—5%

RAWHIDE LACING—40% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.77
Asbestos for high-pressure steam	1.54
Duck and rubber for piston packing	.88
Flax, regular	.66
Flax, waterproofed	.99
Compressed asbestos sheet	.99
Wire insertion asbestos sheet	1.21
Rubber sheet ¼	.55
Rubber sheet, wire insertion	.88
Rubber sheet, duck insertion	.44
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.10
Asbestos wick, ½- and 1-lb. balls	.65 to .70

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York	St. Louis
Galvanized iron rigging	List + 20%	+20%
Galvanized cast steel rigging	Net List	List
Bright plain rigging	30%	30%
Bright cast steel	17½%	17½%
Bright iron and iron tiller	5%	5%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is the price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.35½	Kansas City	$0.33½
New York	.34	Los Angeles	.33½
Chicago	.32½	Seattle	.33½
Denver	.35½	St. Louis	.33
Birmingham	.36		

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard Thickness Per Lin.Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1 -in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2 -in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05

85% magnesia high pressure ..... 15% off

For low-pressure heating and return lines..... 4-ply.... 58% off; 3-ply.... 60% off; 2-ply.... 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago		
	Jan. 5, 1918	One Year Ago	Jan. 5, 1918	One Year Ago	Jan. 5, 1918	One Year Ago	St. Louis
Raw in barrels	$1.28	$0.96	$1.25	$1.00	$1.26	$1.03	$1.26
5-gal. cans	1.38	1.00	1.40	1.10	1.36	1.13	1.29

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White			
	Jan. 5, 1918		1 Year Ago		Jan. 5, 1918		1 Yr. Ago	
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry	Dry and In Oil	
25- and 50-lb. kegs	11.50	11.00	10.50	11.00	10.50		10.50	
12½-lb. keg	11.75	11.25	10.75	11.25	10.75		10.75	
100-lb. keg	11.25	11.50	11.00	11.50	11.00		11.00	
1- to 5-lb. cans	13.25	13.00	12.50	12.50	13.00		12.50	

CALCIUM CARBIDE—Price f.o.b. cars at warehouse points in Eastern [illegible] per ton for Union miners' lamp carbide, and $97.50 per [illegible] miners' lamp carbide. Union sells in 25-lb. cans for [illegible] per can.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$13.50	Birmingham (clay)	$8.00
St. Louis, salmon	8.00	Birmingham (shale)	9.00
Denver	8.00		

FUEL OIL—Price variable, depending upon stock. New York quotations not available owing to this fact. In Chicago and St. Louis the following prices are quoted:

	Chicago	St. Louis
Domestic light, 22-26 Baumé	5½c.	7½c.
Mexican heavy, 12-14 Baumé	7c.	none

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York and Chicago:

	1-Ply		2-Ply		3-Ply	
	c.l.	c.c.l.	c.l.	l.c.l.	c.l.	l.c.l.
No. 1 grade	$1.15	$1.40	$1.45	$1.60	$1.75	$1.90
No. 2 grade	1.10	1.25	1.25	1.40	1.50	1.65

Asbestos asphalt-saturated felt (14 lb. per square) costs $6.50 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.85 per roll in carload lots and $2.10 for smaller quantities.

Shingles, red and green slate finish, cost $4.75 per square in carloads, $5 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less Than Carload Lots
Tar felt (14 lb. per square of 100 sq.ft.)	$61.00	$62.00
Tar pitch (in 400-lb. bbl.)	15.00	16.50
Asphalt pitch (in barrels)	29.00	30.50
Asphalt felt	60.00	62.00

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Dec. 31, 1917	One Month Ago	One Year Ago
$4.50 to $5.00	$4.50 to $5.00	$2.60 to $2.70

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$79.00	$135.00
Chicago	79.00	137.00
Denver, per ton	110.00	200.00
Kansas City	58.00	112.00
St. Paul	55.00	138.00
Boston	95.00	171.00
Birmingham	56.80	106.50

LUMBER—Price of yellow pine per M in carload lots:

	1-In. Rough, 10 In. x 16 Ft.	2-In. T. and G.	8 x 8 In. x 20 Ft.
St. Louis	$32.00	$29.00	$30.00
Birmingham	29.50	32.50	41.75

Price per M in carload lots:

	1-In. Rough, 10 In. x 16 Ft. and Under			2-In. T. and G. 10 In. x 16 Ft.	
	Y.P.	Fir	Hemlock	Y.P.	Fir
Boston	$45.00	....	....	$50.00	$50.00
Cincinnati	35.00	....	....	37.50	....
Kansas City	43.00	$50.00	$50.00	51.00	55.00
Seattle	....	27.00	27.00	27.00	27.00
New Orleans	36.00	....	....	28.00	....
St. Paul	....	53.00	34.00	61.00	37.50
Denver	....	30.00	30.00	....	32.00

	8 x 8-In. x 20 Ft. and Under				12 x 12-In., 20 Ft. and Under	
	Y.P.	Fir	Hemlock	Spruce	Y.P.	Fir
Boston	$52.50	$52.50	....	$40.00	$60.00	$60.00
Cincinnati	35.00	....	....	....	35.50	....
Kansas City	42.00	34.00	....	....	48.00	35.00
Seattle	27.00	27.00	$27.00	27.00	27.00	27.00
New Orleans	28.00	....	....	....	38.00	....
St. Paul	....	38.00	38.00	38.00	....	51.00
Denver	....	34.00	....	30.00	....	36.00

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$11.40	$14.75	$28.90	$13.50	$16.00	$26.00	$11.50	$17.90	$36.40
10	23.30	26.50	52.55	26.00	29.00	....	30.80	34.30	67.60
8	33.10	36.70	73.20	35.00	40.50	....	42.85	46.85	....
6	....	56.20	....	....	65.35	....	69.60	74.10	....
4	....	80.55	....	....	93.65	....	101.75	106.05	....
2	....	120.30	....	....	140.50	....	156.50	163.00	....
1	....	156.25	....	....	182.50	....	201.00	209.50	....
0	....	187.05	....	....	241.00	....	276.00	285.00	....
00	....	252.65	....	....	294.50	....	317.00	330.00	....
000	....	309.35	....	....	360.50	....	417.00	428.50	....
0000	....	376.75	....	....	439.50	....	508.00	516.00	....

EXPLOSIVES—Price per pound in 200-lb. lots at cities named:

	Low Freezing	Gelatin			Black Powder*
	20%	40%	60%	80%	
New York	....	$0.27½	$0.34½	....	$2.50
Boston	....	....	.36¼	$0.43¾	....
Kansas City	$0.20	.26¼	.33¼	.43¼	....
Los Angeles	.20	.27	.35	....	....
Seattle	.18½	.24¾	.31¾	.41¾	....
Chicago	.19¾	.23¾	.33	.43	2.45
St. Paul	.20	.26¼	.33¼	....	2.55
St. Louis	.20	.26¼	.33¼	.43¼	2.05
Denver	.19	.25¼	.32¼	.42¼	....
Dallas	.25	.29	.39	.49	....

*Keg.

FREIGHT RATES—On finished steel products in the Pittsburgh district, including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates are effective in cents per 100 lb.:

Boston	21.5	Minneapolis	35.5
Buffalo	11.6	New Orleans	30.7
Chicago	21.5	New York	19.5
Cincinnati	18.5	Pacific Coast (all rail)	90.0
Cleveland	13.5	Philadelphia	18.5
Denver	79.0	St. Louis	27.0
Kansas City	47.0	St. Paul	35.5

COAL AGE

Volume 13 NEW YORK, JANUARY 19, 1918 Number 3

Coal Mining Results in 1917 and Present Outlook

The production of coal in 1917 was the greatest in history.

The total output was..... 633,401,789 short tons

An increase of..... 43,303,614 " "
Or 7.3 per cent. over 1916.

ANTHRACITE production was..... 99,604,960 " "
Or 12,026,467 tons more than in 1916.

BITUMINOUS production was.....533,796,829 " "
Or 31,277,147 tons more than in 1916.

COKE output was..... 55,286,403 " "
Beehive coke decreased; byproduct coke increased.

YET THERE IS A SHORTAGE of fuel, particularly in the East. Where has the increased tonnage gone? Why is the situation so critical here in a country that contains only one-seventeenth of the world's population and still produces one-half of the world's fuel?

Of last year's record output only about two per cent. of the total production passed out of the country. We supplied almost nothing to our allies.

Due to increased efficiency in firing and less waste generally, several million tons were saved by domestic consumers. Absolutely no coal has gone into storage. Therefore, the only answer is that industrial activity in America in 1917 was far above normal, due to the demands of the war.

Consumers in the Northwest, or Lake regions, received about 3,000,000 more tons last fall than they did one year ago. The coal supply in the Eastern states has suffered as a consequence.

The railroads of the country took 15,000,000 tons more, the munition plants at least 10,000,000 tons more, and the Government consumed 6,000,000 tons more. The total of these requirements alone accounts for the disappearance of the greater part of the year's increase in output.

THE ANTHRACITE MINES accomplished wonderful results. In the face of a 16 per cent. labor shortage, the production of anthracite increased 12,000,000 short tons, or about 14 per cent. The Pennsylvania bituminous mines produced the same tonnage as in 1916, while West Virginia showed a decrease in output. Illinois recorded the largest production in its history and succeeded in replacing West Virginia as the second largest coal producer. Alabama, Ohio, Indiana, Colorado and most of the Western states showed increases. If the Eastern states could have worked more days, the fuel situation in Pennsylvania, New York and New England would not now be so serious.

All through the year transportation has been the point of attack. During the hottest days of the past summer the cry of the operators was for cars, not miners. There are sufficient mines and plenty of operating equipment, but these things are ineffective if there are no cars into which to load the coal. It is further true that the trouble is not so much car-shortage as it is inefficient car-service.

THIS COUNTRY has learned a lesson. We know now that our rich stores of coal are of no use unless they are in the bins of the consumer. We know that a man in the mines is as essential as a soldier in the trenches. We know now that if our Government were to assume control of all our coal mines, the Federal power over industry would be absolute and laws would be of little avail. We know also that the result of our present unpleasant experiences will be to relieve the nation's industries from a fuel shortage next winter, unless we have bunglers on the job.

The outlook for the year 1918, so far as the mining end is concerned, is extremely favorable. The Government must exempt miners from draft. The Federal railroad director must regulate so as to insure the immediate unloading of all cars. The miners' union must lift all restrictions that limit either hours or tonnage of the individual workman. If these things are done, the output in 1918 will cover all requirements, and the United States with plenty of fuel will bring the world war to a successful conclusion.

Activities in Different Coal-Producing States in 1917

THE following reports, written especially for this annual review number of *Coal Age*, were prepared in practically all cases by the chief coal-mine inspectors of the various states. There are also several supplementary reports which review briefly some of the high spots in the general development work of the industry during the year. The past twelve months has been the most momentous year in the history of coal mining. The unusual conditions were created by the World War into which this nation has been plunged. At the present time it is opportune to call attention to the desirability of having all reports of production expressed in net (short) tons. In some cases returns of output are given in long tons, and in other cases the short ton is used. It is also confusing to have the annual reports end at different periods. In some instances the reports are for the fiscal year ending June 30: other states end their fiscal year in October; while still other states cover the year up to Nov. 30. It would be much more satisfactory to all concerned if each and every report covered the calendar year. We suggest that the inspectors lend their efforts to bringing about such a standardization. One thing that stands out in the majority of the reports is that the tonnage produced over the entire country would have exceeded all expectations had the car supply been equal to the demand.

Alabama

By C. H. Nesbitt
Chief Mine Inspector, Birmingham, Ala.

TAKING into consideration the increase in 1916 over 1915, which amounted to 2,967,794 tons; that 199 mines were being operated in 1916, whereas in 1917 there were working about 297, and a greater number of coke ovens; recalling also the fact that the commercial coal market was inactive during 1916 until the last quarter, while the whole of 1917 showed great activity in all lines, notwithstanding interruptions in the way of a car shortage, and a temporary lull in mid-summer due to labor troubles; I do not think it excessive to approximate the production for 1917 at 21,000,000 tons, as against 18,234,625 in 1916.



C. H. Nesbitt

During 1917, the number of men killed in Alabama was 108; this is 10 less fatalities than in 1916.

Year's Developments in Alabama

By H. S. Geismer
Keiser-Geismer Engineering Co., Birmingham, Ala.

SEVERAL interesting facts stand out in reviewing the coal-mining industry in Alabama for 1917. First, a marked decrease in the tonnage produced by coal mines using convict labor, this being due to the fact that ever since Alabama adopted prohibition there has been a gradual falling off in the number of convictions by the courts. In consequence, many of the jails in Alabama are empty and few new arrivals are noted at the convict camps. This must not be interpreted to mean that prohibition has caused a decrease in the total coal tonnage produced, as quite the opposite is true.

Second, along the fringes of the coal-mining area where the coal seams come to the outcrop a large number of wagon mines have been opened, and the labor for these mines has been furnished to a large extent by the near-by farming communities. Farmers owning teams are contracting for the hauling of the coal, and their sons and laborers have gone to work as miners. Present indications are that this will affect the 1918 crops to a considerable extent in some localities, as the men who have gone to work at the mines are earning more than they can earn on the farms and it is doubtful if they will return to the farms in time to take care of the 1918 crop.

Third, several large stripping operations have been started, and if the present price of coal is maintained through 1918 quite a large tonnage will be produced by them.

Fourth, the Southern Railway Co. has begun development on a large tract of coal land and early in 1918 will be producing coal. This is the first mine in Alabama to be opened by a railroad company.

Strange as it may seem, the Alabama output for the last few months of 1917 has not been much affected by a shortage of labor, by price fixing, or by shortage of railroad cars, and the coal mines have been able to supply at least 95 per cent. of the demands of their regular customers in spite of the extraordinary demands of the railroads and the other customers. Most of the mines in the state are now producing about as large a tonnage as they can handle with the equipment they have. It is almost impossible to buy mining equipment with any definite promise of delivery, and in consequence most of the mining companies have not purchased the equipment necessary to an increased output.

The railroad car supply is said to be better in Alabama than in any coal-producing state of the Union with the possible exception of Virginia. This is due no doubt largely to the fact that the railroads take about one-fourth of the entire output of the state for their own consumption.

The shortage of coal at most of the domestic coal yards in the state has been the cause of much unfavorable comment from the newspapers, chiefly directed against the coal operators. In fact, this phase of the coal situation has practically monopolized the newspaper space set aside for the coal-mining industry.

How Alabama Output Is Divided

This shortage at the coal yards is easily explained, however. The output of coal in Alabama is divided about as follows: One-half the output is used by the coke- and iron-making corporations; one-fourth the output is used by the railroads, and the balance is divided between steam and domestic users. Most of the domestic coal is purchased by the consumers during a few months in the fall, while the production of domestic coal has to be distributed pretty well over the entire year.

In order to meet this condition, the coal yards generally begin to stock up in April and by fall have their yards filled with coal. This stock, with the daily shipments which they receive during the balance of the year, enables them to take care of the trade. This year, because of the high prices and the uncertainty of the market, few of the coal yards contracted for their normal requirements early in the year and, after waiting until the middle of the summer, found that the mines had sold their outputs and there was little coal to be had. The railroads were constantly increasing their coal con-

sumption—in fact most of them doubled their normal requirements—and this demand absorbed a great deal of the free coal that might have been available for the coal yards.

To make matters worse, the prices fixed by the Fuel Administration in the fall made it more profitable for the coal mines which had been producing lump and slack to sell their entire output on a run-of-mine basis, and for that reason even the amount of coal suitable for domestic purposes fell below the outputs of former years. Another factor in the domestic coal situation has been the withdrawal from the market of two steel companies which have found it necessary to use all the coal they could produce for gas-making purposes at their own plants.

Summary of Conditions

Summarizing the conditions for the year, three things may be said to have somewhat affected the possible outputs: First, early in the year there was a car shortage on two of the railroads serving the coal fields; second, about the middle of the summer the United Mine Workers of America attempted to organize all the camps, and for two months there was much unrest among the miners, which resulted in a noticeable reduction in outputs at many of the mines; third, during the last three months of the year some of the less thrifty among the miners and mine workers discovered that it was not necessary to work full time in order to make a living, and as a result many working places were idle two and three days a week. This condition has been found hard to cope with, and upon its successful solution depends in a measure the possibilities of increasing the coal output for 1918 over that of preceding years.

In order to take care of increased demands two of the large iron-making corporations had double-shifted their mines most of the year, and the results have been satisfactory.

Several coal companies which had produced their own electric power in the past contracted with the Alabama Power Co. for power during 1917. As the Alabama Power Co. produces its electricity by water power, this move has increased the available coal supply. Several mining companies which have not used electricity in the past have also contracted for electric power during the year; the number would undoubtedly have been larger if it had been possible to obtain deliveries on electrical equipment. As it is, the Alabama Power Co. has contracted for more power to coal-mining companies during 1917 than in the two previous years.

There has been considerable discussion about the quality of the coal produced, but it is doubtful if anyone has refused a car of coal because of its quality. This must not be taken to mean that such rejection could not have have been justified; on the contrary, rejections might often have been enforced, but poor coal is generally better than no coal.

The coke-producing companies who wash their coal before coking and who are thus able to check qualities have found that they have larger washer losses to contend with, and in a corresponding measure all consumers of coal undoubtedly have suffered from an increase of ash in their fuel; this is a condition that cannot be remedied so long as labor is scarce.

Judging by results in Alabama, it is doubtful if any of the rulings of the Fuel Administration have been of much assistance. Take the case of the wagon mines for example. It has been ruled that they cannot add the price of their hauling to the Government's fixed price unless their coal is delivered direct to a consumer, the idea being no doubt to encourage them to haul this coal to towns and cities and thus relieve the domestic situation. But since railroads are consumers (anxious consumers at that), and furthermore since railroads are generally near to these wagon mines, the railroads have been offered and have accepted practically all the wagon-mine coal.

Alaska

By Sumner S. Smith

Alaska Engineering Commission, Eska, Alaska

A GROWING activity in the Alaska coal fields and an increased production of approximately 500 per cent. over last year's output was witnessed in Alaska during the past year. A number of new operators produced small amounts of coal from ten-acre free-use permits, and many of the former operators greatly increased their outputs. Several leasing units in the Matanuska field have been leased and are now under exploration. In the Bering River field private interests have continued construction of a standard-gage road to their holdings on Canyon Creek and are reported to have the mine opened in such a manner that shipments can be started at an early date. The Matanuska branch of the Government railroad has been completed to Unit 12 on the Chickaloon River, with a spur 2.7 miles up Eska Creek and a preliminary survey on Moose Creek—some five miles to Units 2 and 3. Unit No. 12, in the Matanuska field, was withdrawn last year for the use of the Alaskan Engineering Commission, although work was not commenced at that point till this summer, owing to the difficulties of getting in supplies before the completion of that portion of the railroad. Unit 7 was leased early this spring to the Eska Creek Coal Co., which shipped 7783 tons, one-sixth of which went to the local market and the balance to the Alaskan Engineering Commission. As this corporation was not financially strong it transferred its holdings to the commission, which took over the property to insure a regular supply of fuel.

The largest producers from the ten-acre permits were the Doherty Coal Co., the Cache Creek Dredging Co. and John A. Herbert. The first produced about 19,500 tons, of which 500 was sold to the local trade in Anchorage and the balance to the commission. The second mined about 5000 tons, which was used during the active season on the company's dredge on Cache Creek. The last-named produced 4300 tons at Bluff Point, on Cook Inlet, which was sold to the canneries and towns along the Inlet. These figures are all in long tons. George Wallin, of Candle, mined about 500 tons on his ten-acre lease near that point. The commission produced approximately 18,500 short tons from the Eska Creek mine and 300 short tons from the Chickaloon property, which has been taken out in development work.

The total output from the entire territory probably closely approximates 60,000 tons, as there were some two dozen operators on the free-use ten-acre areas who mined small amounts for their own use.

In the Matanuska field a group of men headed by Henry Baxter, of Anchorage, has commenced development on Units 2 and 3, while another group has started work on Units 10 and 11 under the management of Lars Netland, of San Francisco.

Arkansas

By Robert Boyd, Jr.

State Mine Inspector, Fort Smith, Ark.

PRODUCTION of coal for the State of Arkansas for the year 1917 is about 1,867,802 short tons, of a value of $3,675,950. The number of producing mines in the state is 115, employing 5345 miners in all classes. The estimated value of the powder purchased by the miners in 1917 is $168,132.

Colorado

By A. R. Tibbits

Office of State Inspectors of Mines, Denver, Colo.

IN COMMON with that of the whole country the coal industry of Colorado has been under extraordinarily heavy pressure during the year 1917. With the increasingly insistent demands for enlarged output of the basic industries; with a scarcity of labor incident to war; with serious car shortage interfering with steadinesss of production and with constantly mounting wages and other costs, the situation has at times reached a critical stage in which the industry was saved from disaster only by the intelligent coöperation of operators and workmen.

Coal prices in Colorado were increased during 1917. Some increases were naturally necessary as a result of increasing costs of production. The following figures show the range of wholesale prices for the best grades of domestic coal, both lump and nut, now in effect at the mines in the southern

field, Routt County, and the northern field:

Southern Field

	Per Ton
Lump	$4.45
Nut	3.50

Routt County

	Per Ton
Lump and nut	$4.45
Slack	1.90
Mine-run	3.45

Prices for the best grades of lignite coal sold at the mines:

Northern Field

	Per Ton
Lump	$3.95
Slack	$1.00 and 1.70
Mine-run	2.75 and 2.90

The foregoing prices, effective Nov. 1, were authorized by the Government in consideration of a specified advance in wages, and are the maximum prices for which coal may be sold. However, the great bulk of the coal mined in these three districts is sold as steam coal at very much lower prices, specified by old contracts not expired and which cannot be violated. Some of the operators maintain that this 45c. advance in price was not equal to the increased cost of production.



JAMES DALRYMPLE
State Mine Inspector, Colorado

It has been the policy of the Colorado operators to encourage the storage of those grades of coal which could be kept without loss, thus equalizing the demand throughout the year and keeping the mines in operation. In furtherance of this policy the producers have made unusually low figures to retailers throughout the summer months.

TABLE SHOWING WAGE SCALE IN MINES OF THE NORTHERN FIELD AND ROUTT COUNTY, NOVEMBER, 1917

Northern Field

	Per Ton
Miner (Boulder and Weld Counties)	
Machine	$0.54
Pick	$0.69 to 75
	Per Day
Driver	$4.00
Timberman	4.00
Laborer	3.84

Routt County

	Per Ton
Miner, Pick	$0.75
	Per Day
Miner, Pick	$5.28
Driver	5.28
Timberman	5.28
Laborer	5.28

TABLE SHOWING COMPARATIVE WAGE SCALE IN COAL MINES OF THE SOUTHERN FIELD, JANUARY, 1917, AND NOVEMBER, 1917

	Wage Scale, January, 1917, Per Ton	Wage Scale, November, 1917, Per Ton	Per Cent. Increase Over January, 1917
Miner (Trinidad District)	$0.58	$0.78	$34.49
Miner (Walsen District)	.63	.83	31.75
Miner (Canon District)	$0.73 .78 .83	$0.99 1.04 1.09	$35.62 33.33 31.33
	Per Day	Per Day	
Driver	$3.25	$5.25	61.54
Timberman	3.30	5.30	60.66
Laborer	2.15	4.15	93.02

Wage increases throughout the year amounted in some cases to almost 100 per cent. The accompanying tables show wages paid coal miners and certain classes of day workmen in the three leading coal-mining districts of Colorado. Approximate wage scales are in effect in other parts of the state.

The Colorado Fuel and Iron Co. has had three successive wage advances during the year, which have been negotiated between the company officers and the miners' representatives under the provisions of the Industrial Representation Plan. In other instances the wage scale was amicably negotiated between the representatives of the companies and the United Mine Workers, or the wages were automatically advanced by companies negotiating only individually with their workmen.

November earnings at four of the largest southern Colorado mines showed that at the mines the average pay of all miners who worked full time was $174.33.

Many of the Colorado coal operators state that the increase in cost of production as a result of increasing prices of necessary supplies, many of which have advanced more than 100 per cent. (in some instances several hundred per cent.), has amounted to almost as much as the increase due to the advance of wages.

Numerous local strikes occurred at the coal camps, but none were serious and were speedily adjusted by the Colorado Industrial Commission.

The following table is a brief summary of the year's operations at the mines:

COAL PRODUCTION OF COLORADO BY COUNTIES FOR 1917

Counties	Total Production
Boulder	1,261,621
Delta	103,060
El Paso	366,920
Fremont	866,064
Garfield	108,180
Gunnison	647,070
Huerfano	2,355,751
Jackson	86,699
Jefferson	127,644
La Plata	126,789
Las Animas	4,449,743
Mesa	206,734
Moffat	500
Montezuma	998
Montrose	1,513
Pitkin	21,463
Rio Blanco	4,710
Routt	1,065,007
Weld	622,658
Total	12,433,129

There were many fatal accidents, the Hastings explosion alone cost the industry 121 men. This increase of loss of life may be attributed to several causes. Labor being scarce, the workmen feel their independence and pay little or no heed to the rules adopted at the mines for the protection of life and limb. The mine officials on the other hand, in order to keep up the maximum production, are afraid to enforce these rules by dismissal, knowing that any discharged employee can find immediate reëmployment at the next mine. Another cause that contributed largely to the increased rate of fatalities was prompted by the large earnings of the miners and other underground workers, inducing many men from other callings to enter the mines, and who, having no experience in coal mining, were unable to take care of themselves.

The average number of men employed in and about the mines in 1917 is 13,570, the total number of days worked per mine being 204.5.

The coal production of Colorado in 1917 was the largest ever produced in the state. In 1910 the tonnage reached 12,104,887 tons, which has not been exceeded until 1917. Had it not been for the car shortage and labor scarcity, the production would easily have reached the 13,500,000-ton mark.

Illinois

By Martin Bolt
Assistant Director, Department of Mines and Minerals, Springfield, Ill.

DURING the year 1917 the coal mines of Illinois will produce a larger tonnage than during any preceding year in the history of coal mining in the state. There are several reasons why the production of coal will be much greater, or should be greater, than in any preceding calendar year. The figures given must necessarily be estimated, because of the fact that the report of the Department of Mines and Minerals is for the fiscal year ending June 30, 1917.

There were 324 shipping mines in operation during the last fiscal year. Since the close of the fiscal year a number of mines have been reopened, and the number in operation at present will exceed the figures shown in the annual report for last year. This, together with the fact that the number of mine workers has materially increased during the last year, will surely give to Illinois the largest tonnage in its history.

The coal report for the year ending June 30, 1917, gives as the production for the months of January, February, March, April, May and June 42,550,693 tons. Taking the figures as a basis, and estimating that the number of mines in operation has increased, that the number of mine workers has shown an increase, that special effort has been made on the part of the railroad companies to supply cars in which to haul the coal, we feel reasonably safe in saying that the production of coal in

Illinois for the calendar year ending 1917 will be approximately 85,700,000 tons.

These figures do not indicate what the possibilities of coal production in Illinois are; with adequate car supply, labor supply and the equipment now in operation, it is safe to say that 125 million tons or more can easily be produced.

During a single month a number of years ago the production reached approximately 12,000,000 tons. What we need in Illinois is cars in which to load the coal, and we will do our part in supplying the necessary fuel to meet the demands at present and for the future.

We have the mines; we have the men; give us the cars and we will produce the coal.

Indiana

By Michael Scollard
State Mine Inspector, Indianapolis, Ind.

THE output of coal, and the mining industry in general in the State of Indiana during the fiscal year 1917, was much better than was expected at the beginning of the year. There was some time lost owing to the shortage of railroad cars and local strikes, notwithstanding which the total production from mines employing ten or more persons was 24,013,021 short tons. This is the greatest number of tons ever produced in a single year in this state from mines under the jurisdiction of this department.

The estimated production of stripping plants and of mines employing less than ten persons was 1,000,000 short tons, making a total of 25,013,021 short tons during the year. There are about 250 small mines in operation. The stripping system is used in this state where the overburden can be removed economically by steam shovels or other mechanical means, thus exposing the coal. There are ten of these plants in operation at the close of the fiscal year. From 14 to 40 ft. of overburden is removed from Nos. 3, 4 and 5 bituminous coal, which ranges from 5 to 7 ft. in thickness. The daily capacity of some of these plants is 800 tons; others produce from 2000 to 15,000 tons per month.

Of the coal produced, 23,567,414 tons was bituminous and 445,607 tons was block coal. This exceeds 1916 production by 5,774,430 tons. In the production of the coal there were 183 bituminous mines in operation and 20 block-coal mines, making a total of 203 mines under the jurisdiction of this department. The average number of days the mines were in operation were: Bituminous mines, 223 days; block-coal mines, 226 days. There were 705,306 kegs of black powder and 62,201 lb. of permissible powder used in producing this coal.

Of the bituminous coal produced, 13,140,495 tons was consumed in this state and 10,827,945 tons was shipped out of the state; 23,171 tons of block coal was consumed in the state and 422,446 tons was shipped to other states. The principal markets for Indiana coal are Chicago and Indianapolis. Owing to the great demand for coal, it was impossible to know the exact average selling price before the Government set a price on coal at the mine.

The average number of employees for the year in block-coal mines was 757, while the average numer of employees in bituminous mines was 23,163, which is an increase of 620 over last year. At the close of 1917, in all probability, there were 25,000 men engaged in the production of coal. The total wages reported is $23,567,937.75, making an average earning, per mine employee, of $985.60.

During the fiscal year ending Sept. 30, 1917, there were 27 new mines opened in the state. Fifteen of these were hand, or pick, mines and twelve were machine mines. Three of the pick mines were block-coal mines. These mines were all located in nine different counties.

There were five mines abandoned during the fiscal year, one in each of the following counties: Martin, Owen, Perry, Spencer and Warrick. The abandoned mines were all small producers.

There were 61 fatal accidents to persons employed in the mines and five fatal accidents to persons employed on the surface. The number of tons produced per fatality was 363,834. There was an average of 23,940 persons employed about the mines, which would be 2.75 killed per thousand employed. This fatality is greatly deplored by all parties connected with the mining industry.

Mining is one of the most hazardous employments and it is especially important that miners should know the dangers met with in coal mines. A surprisingly large number of fatal accidents occurs each year at the working faces of the mine, caused by falling slate. Many of these are caused by faults or slips in the roof which are hard to detect, while a large per cent. are caused by the lack of proper examination and timbering of the roof. In my opinion fatalities from this cause will not be greatly reduced until there is a law compelling more frequent examination of working places by the management and making it an offense for a miner not to timber his place properly.

Our present mining laws are inadequate for the mining industry of Indiana at this time. Mechanical processes employed in mining have been introduced more rapidly than the safety and precautionary measures necessary to safeguard the miners from the new and additional dangers to which these new processes expose them. Since the last revision of the law, for instance, electrical power for lighting and mining purposes, electrically driven machinery, etc., have been introduced extensively for mining and hauling purposes, which means more rapid transit of coal cars to shaft bottom. This involves the installation of high-power transmission wires throughout the haulage roads and entry ways, which, in many instances, are not more than 50 in. in height. These wires are not infrequently exposed for want of proper insulation and protection. Larger and wider cars are being used, mines are being sunk deeper, more gas is generated and much gas given off by "cave-ins" in mines. As a result, to the fatalities previously recorded from falling slate, premature blasts and asphyxiation have been added those of electrocution, crushed between sides of pillars and cars, burned by gas and caught by motor trips.

It is therefore hoped that the legislature will place on the statute books some laws that will state specifically the safeguards to be used to protect the workmen from the new and additional dangers.

The General Assembly of 1915 created a commission for the purpose of codifying the present mining laws. This commission also being authorized to recommend in its report such amendments and changes in the law as would, in its opinion, be conducive to the highest interests of safety in the mining industry in all its relations.

The commission was appointed, and consists of two representatives of the operators, two representatives of the miners and a mining engineer. They held several meetings at which they compiled a set of mining laws, which contained many recommendations to the legislature for passage. The report was signed by the entire commission and was referred to the Committee on Mines and Mining in the Senate. At a public hearing on the report, the miners' organization of District No. 11 and the representatives of the miners who were members of the commission

TONS OF COAL PRODUCED AND WAGES PAID TO MINERS IN INDIANA FOR THE YEAR ENDING SEPT. 30, 1917, BY COUNTIES, BLOCK AND BITUMINOUS COAL BEING SHOWN SEPARATELY

Counties	Block	Wages Paid	Bituminous	Wages Paid	Total Production	Total Wages
Vigo	120,718	$220,801.39	6,772,416	$6,630,163.97	6,893,134	$6,850,965.36
Vermillion	....	.....	4,198,028	4,236,261.61	4,198,028	4,236,261.61
Sullivan	.....	.....	3,395,464	3,334,901.17	3,395,464	3,334,901.17
Knox	.....	.....	3,001,024	2,514,267.10	3,001,024	2,514,267.10
Greene	.....	.....	2,892,356	2,663,920.35	2,892,356	2,663,920.35
Pike	.....	.....	916,294	924,576.00	916,294	924,576.00
Warrick	.....	.....	746,026	687,329.45	756,026	687,329.45
Clay	261,490	420,179.79	394,403	416,226.48	655,893	836,406.27
Parke	63,399	97,272.06	310,742	353,686.43	374,141	450,958.49
Vanderburg	.....	.....	390,404	437,574.82	390,404	437,574.82
Gibson	.....	.....	443,190	498,650.65	443,190	498,650.65
Daviess	.....	.....	85,237	106,419.06	85,237	106,419.06
Perry	.....	.....	13,996	14,814.90	13,996	14,818.90
Fountain	.....	.....	7,834	10,892.52	7,834	10,892.52
Total	445,607	$738,253.24	23,567,414	$22,829,684.51	24,013,021	$23,567,937.75

objected to its passage on the ground that many discrepancies had gotten into the report, and the report was indefinitely postponed in committee. As a result, there were no additional mining laws placed on the statute books in 1917.

Very few mining laws have been placed on the statute books within the last few years. As they now stand, they are inadequate for the present system of mining.

During the fiscal year there were 840 regular inspections made by the inspectors of the department, and written reports of the conditions of the mine and the recommendations made were filed with this office.

In addition to the regular inspection work, numerous calls have come to the department regarding dangerous conditions existing in the various mines. Chief among these were complaints regarding scales, ventilation, failure to provide washhouses, complaints regarding the dangerous condition of cages, the system of handling explosives and the like. All these calls were given prompt attention by our inspectors.

Accidents Carefully Investigated

Sixty-six fatal accidents were investigated during the fiscal year. Conditions of that section of the mine and places where accidents occurred were carefully noted, and the evidence taken at such investigations has been filed with this office. Numerous serious and slight accidents have been investigated on the regular inspection tours, and recommendations made with the view of preventing accidents from recurring in the same manner.

Many special inspections were made of mines where gas is likely to accumulate in abandoned workings, caused by squeezes and cave-ins. Mines whose workings are approaching old abandoned mines, which contain large accumulations of gas and water, are given special attention. Escape shafts, ventilation apparatus and the like are all carefully inspected. Large mines where gas and damps are generated are visited more frequently than mines where those dangers do not exist.

Days are spent by mine inspectors in abandoned workings in mines, climbing over falls of roof and over cave-ins, where accessible, for the purpose of ascertaining if gas has accumulated in the cavities above, which would be forced out into the workings by additional caves and be ignited by an open light and cause a disaster. Other hazardous duties of the inspectors are exploring mines after explosions, as members of the rescue parties, examining mine for fire before the ventilation is fully restored after explosions, and assisting in controlling mine fires. These are additional duties to the regular inspection work, which is that of seeing that the mining laws are complied with and the health and safety of the persons employed in the mines assured.

The movement for prevention of accidents and knowing how to protect one's self from the dangers met with in coal mines is finding favor with the miners and operators in this state, and is encouraged by the Industrial Board of Indiana. This was demonstrated at an explosion which occurred at the Oliphant-Johnson mine in Knox County on Dec. 19, 1916, when two persons were killed, 28 were seriously burned and two died in a few days from the effects of their burns. Sixty-five miners, who were working in a section of the mine that was not seriously affected by the explosion, discovered that their escape to the surface was cut off by hot gases and afterdamps. They retreated into a pair of entries, and using what material was at hand they sealed the entries off from the rest of the mine workings, preventing the gases from getting to them, thereby saving their lives. A few hours later they were located by a rescue party and were taken to the surface in safety.

Many first-aid and rescue teams have been organized in the mining districts, many of which have been trained by the Federal Bureau of Mines in the use of oxygen apparatus, which is of great assistance in exploring mines after explosions and in overcoming fires in the mines.

Iowa

By L. E. Stamm
Secretary, Iowa Mine Inspectors,
Des Moines, Iowa

THE year 1917 differs but little from previous years in so far as certain statistics relating to the coal industry of this state are concerned. The number of employees, the number of mines in the state and the tonnage mined varies slightly from year to year, each year usually showing a slight gain over the one preceding.

The greatest demand for the product of the Iowa mines comes during the winter months. In fact, many of the smaller local mines in the state cease to operate about Apr. 1 of each year and then resume operations about Aug. 1. In this way they operate only when there is a demand for their product. The larger mines supplying the railroad trade of the state, as well as selling coal to the commercial trade, continue to operate the entire year through. The work is hardly as steady during the months of May, June and July as in other months, as there is but little demand for commercial coal in these months and the mines hardly put in full time.

These conditions prevailing have resulted in something over 7,000,000 tons of coal being produced in this state from year to year. The number of employees varies but little, usually about 16,000 men being given employment in and around the mines of the state.

Iowa's neighbor state, Illinois, producing almost eight times as much coal, has been looking to the Iowa field to consume a part of her production. The result has been that for a number of years, up to the latter part of 1916, all northern and eastern Iowa has for the most part been supplied with coal from the Illinois field. This has not been favorable to a large production of Iowa coal.

Car Shortage Curtails Supply

During the latter part of 1916 and first part of 1917 a car shortage prevailed and not quite so much foreign coal came into Iowa, and Iowa coal again came into demand in the northern and eastern parts of the state. Following the car shortage of the winter of 1916-17 came a demand for coal at Eastern points caused by war conditions. This caused coal from the Central States to be diverted eastward, and this has been a decided advantage to Iowa coal producers. Conditions, therefore, were fairly good in the mines of Iowa during April, May and June of the year 1917.

This state would no doubt have continued had it not been for the agitation started in regard to the price for Iowa coal, together with articles appearing in the papers stating that the President would set the price for Iowa coal at the mines considerably lower than that which prevailed at the mines in May and June. All this talk of lower prices had a depressing effect on the industry, so much so that many dealers in the state refused to lay in their usual stocks anticipating a much lower price. The result was that many of the larger mines sold practically no coal at all to the commercial trade during the month of July and first part of the month of August, just when conditions of the trade should have been at their best. In the latter part of August the price of Iowa coal at the mines was fixed by the President, and immediately thereafter orders almost swamped the mining companies of the state. Since that time there has been a steady production and demand.

Coal Business Unsettled

However, during the year 1917, the coal business of Iowa has been more or less unsettled. First the miners felt that the agreement entered into in April, 1916, for two years did not cover the increased cost of living which had come about on account of war conditions, and they asked that a supplementary agreement be entered into that would give them a higher wage in the coal production. This was agreed to by the operators of the state, and the raise given the day laborers in the mines approximated 20 per cent., while 10c. per ton was added for the miner. Cost of living still continued to advance, and the miners asked for and were granted another increase following the Washington agreement in October, which added $1.40 per day to the wages of the day laborers in the mines and an additional 10c. per ton to the miner in addition to increased pay for deadwork.

Prices asked for Iowa coal advanced considerably during the year 1917, and a feeling prevailed that the price asked for Iowa coal was too high. Many com-

plaints as to prices of coal came to the Governor of Iowa and to the mayors, especially of the larger cities in the state. The result of this was that the Governor called a hearing on the coal situation and asked for the operators' cost of production, dealers' cost of operation, information as to the daily production of coal and its distribution, and as to the amount of coal on hand in the various cities and towns of the state.

The hearing was adjourned twice and took up three days' time, and developed that there was no substantial shortage of cars to handle the production at the mines. It showed that the mines of the state were operating at their full capacity so far as conditions would permit. It showed that the miners and other laborers at the mines are coöperating in every way to increase the production at the mines. Reports were received at this hearing from 361 municipalities. Only three reported normal conditions as to a supply of fuel; 73 reported conditions as good; 159 reported conditions as bad, and 126 reported conditions as serious. These related to the fuel supplies in each place reporting the amount of coal on hand, the amount ordered and the demand. The places reporting the conditions as serious stated that the city or town reporting had on hand enough coal to last but three or four days with nothing in sight to relieve the situation. Others reported as bad showed enough coal on hand to last from one to two weeks. The hearing was conducted before Governor Harding and three mayors representing the League of Iowa Municipalities. This information will no doubt be of considerable value to the Fuel Administrator of Iowa and will enable him to care better for the fuel situation as existing at the present time.

Iowa is not able at present to produce all the coal consumed within the state. Approximately 7,500,000 tons of coal is produced annually by the mines of the state. Of this amount about 4,000,000 tons or more are used by the railroads operating within the state, and a small part of the production of the mines is shipped to other states. To supply the necessary needs, Government reports state that something over 4,000,000 tons of coal is shipped into Iowa from other coal-producing states, making the annual consumption of coal within this state for railroads, manufacturing industries and domestic use approximately 11,500,000 tons per year. It can thus be seen that if no Iowa coal was taken by the railroads of the state that the Iowa coal mines could supply every other need for coal in Iowa at the present time.

Under a change in the law the Iowa Mine Inspectors' office now gathers statistical information relating to the Iowa coal industry for a calendar year ending Dec. 31. Blanks for reports are sent to all companies on Jan. 1 of each year, and these blanks are usually returned and ready for tabulation about Feb. 1 of each year, so I am therefore not able to give anything but approximate figures on the coal production for the year 1917, and can only make a comparison with the figures as compiled for 1916.

The statistics on file in this office for 1916 show a production of 7,217,969 tons of coal produced for that year. There was a slight falling off in the number of employees, the reports showing but an average of 15,195 employees in and around the mines for that year. Shipping mines operated on an average of 211 days during the year, while local mines operated on an average of but 143 days during the year. Total gross earnings of all employees in and around the mines for 1916 was $10,259,008.95. There were 283,004 kegs of black powder used in the Iowa mines in 1916, and 149,168 pounds of dynamite used in mining coal in that year. Reports show 52 mining machines in use in Iowa in 1916. About the usual number of fatal and nonfatal accidents were reported for the year. No serious labor troubles occurred in the mines during the year, and none so far in the year 1917.

The production, employees, etc., for the year 1917 can only be forecast from reports of 1916 and from conditions existing at the mines during the year, but my best judgment would be that the final figures when received from the mines will show a decided increase in both the tonnage for the year and in the number of persons employed in the industry. I believe the production for 1917 will total better than 7,500,000 for the year and the employees this year should exceed 17,000. Work at the mines is exceptionally good for the time of year; in fact, the fall and winter months of 1917 have been better than for many years. I understand there are no large stocks of coal on hand at any place in the state, and it looks now as if the mines would have a steady production for some time to come. I also look for a good year in coal production in 1918.

Kansas

By Fred Green
State Mine Inspector, Pittsburg, Kan.

KANSAS, like all other states of the Union, has made an unprecedented record, in the coal-mining industry of the state. Even before entering into the war against Germany the demand for fuel was so great that every resource of the state's mining wealth was brought into action. Our production possibilities are about 12,000,000 tons of coal per annum, at the present time, but owing to the lack of transportation facilities, including engine equipment and coal cars, our production from the mines in 1917 has been only about 7,500,000 tons, this being an increase over the year 1916, however, of three quarters of a million tons.

The steam-shovel system of mining has become an important factor in the mining industry of this state, and about one-fourth of the coal production is obtained from that source. Three of the largest steam shovels in the world are used in the coal fields of southeastern Kansas, extracting the coal from its deposit where the overburden is not sufficient to permit of deep mines working successfully.

Cherokee County, the southern county of the Kansas coal field, has been working continually for 40 years in a sort of haphazard way, and the consequence is that a very large part of the coal has been left in the ground in the form of pillars. Numberless mines were worked out, leaving these large pillars of coal, as the profit to be obtained was not sufficient when the mines were being operated to take extraordinary risk this line of work requires. However, there have developed during the year more than 100 small shafts, sunk almost exclusively on pillars that were left behind when the coal industry was not so profitable as it is at this time.

Proper Timbering Means Safety

One might look with awe on these little box-like tipples, wondering where the miner would find a way of escape if the main shaft should give way or cave in, but upon investigation the Mine Inspection Department of the State of Kansas finds these little places to be interlocked with each other, and that one "hole," or shaft, becomes an escape shaft for the other. On the whole, with proper timbering, the condition is about as safe as in the developing mines in the northern part of the field.

In the Crawford County district the depth to the coal seam runs from 100 to 250 ft. The undeveloped part of the field seems to be deeper. After reaching a depth of 100 ft., we find marsh gas generating from the coal seams in more or less quantities, and, until this winter, many shotfirers have lost their lives by explosions caused from accumulation of gas through insufficient ventilation, dusty roads, carelessly stored away powder and badly prepared shots. The officers of the Mine Inspection Department have been spending their energies to remedy these conditions, together with requiring the management of these "gassy" mines to heat and humidify the air current by exhaust steam pipes, sprinkling the gob walls and salting during the cold season. As a result not a shotfirer has lost his life this winter from that cause.

A great future is in store for the coal industry of this state, and if Uncle Sam succeeds in keeping empty cars at the mines I predict that next year will be far the greatest year in the production of coal that southwestern Kansas has ever known.

Rescue and first-aid work in this state are assuming larger proportions than ever before, and at the last session of the legislature of this state it was made possible to obtain adequate equipment for three rescue stations in the main coal fields of the state, in southeastern Kansas; and the state mine inspec-

tor of the State of Kansas was appointed ex-officio superintendent in charge of all the rescue stations. The law provided for a central station at Pittsburg, Kan.; a substation at Arma, Kan., and a substation at Scammon, Kan. Joseph F. Davies, formerly in charge of Government Rescue Car No. 4, stationed at Pittsburg, is superintendent in charge of the central rescue station, and William H. Jones and Robert Laws are in charge of the Arma and Scammon stations, respectively. All these men have established a good record for themselves in this field in rescue and first-aid work. While all the rescue stations are not fully equipped at this time, the State of Kansas is making rapid strides toward safety, first-aid and rescue work for the benefit of her thousands of coal miners.

Certification of Mine Officials

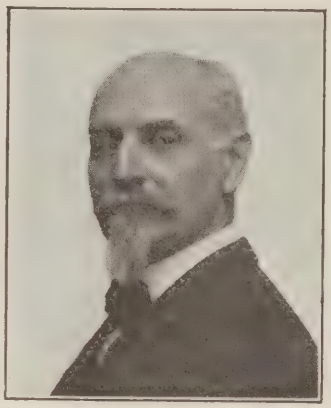
A law was also passed at the last legislature providing for the certification of shotfirers, hoisting engineers, gasmen and firebosses, assistant mine foremen and mine foremen, and providing a board, known as the "Mining Examining Board," for the examination of persons employed in such vocations. The law provides for the revocation of a certificate for intoxication, mental disability, neglect of duty or other sufficient cause when the case is properly proved before the examining board. It is thought that this will bring about a higher standard of efficiency among the miners and cause them to use a greater amount of care in the performance of their respective duties, and thus make for the safety of the men who work in the mines.

Kentucky

By C. J. Norwood
Chief of Department of Mines, Lexington, Ky.

CONDITIONS involved in Federal control of coal production have caused some confusion as to making monthly reports to the State Department of Mines, therefore it has been more than usually difficult to make a satisfactory estimate of the yearly output so soon after the close of the year. The figures for output actually reported up to December, together with estimates for December and for such preceding months for which certain operators are still delinquent, indicate an output of slightly more than 26,000,000 tons. The tonnage actually reported for the eleven months' period is nearly 23,000,000 tons. The indicated production was as follows: By western district, 9,458,302 tons, of which 995,360 tons is estimated; southeastern district, 5,804,023 tons, of which 723,224 tons is estimated; by northeastern district, 10,862,685 tons, of which 1,574,276 tons is estimated, making a total of 26,125,010 tons. Had the car supply been adequate, the output would readily have exceeded 30,000,000 tons.

The production of the western field was affected by car shortage, but not so much as that of the eastern. In the northeastern district of the eastern field the car shortage held production about 25 per cent. below what it would have been in this district. Two companies alone report a loss of more than 1,500,000 tons due to car shortage. This field also had to contend with a labor shortage amounting to about 25 per cent. in localities, but this was due rather to the continued car shortage than to inability to procure men. If steady work could be maintained the production of the southeastern district of the same field was apparently more than a million tons less than for the



C. J. Norwood

preceding year. This was due in part to a shutdown caused by a strike of two months' duration in the early fall, which was chiefly to enforce recognition of the union, but partly for the eight-hour day and further wage increases, and in considerable part due to the excessive car shortage.

A large increase in the number of new developments in the eastern field affected the average labor supply through a process of division, even though the number of miners and laborers in this field exceeded that of past years. The general opinion is that sufficient labor for each operation could have been procured had the car supply been sufficient.

Fixed Prices Retard Production

The scale of prices as at first fixed by the Federal Fuel Administrator also somewhat retarded production in parts of the eastern field for a while because of confusion in classification of coal, and questions as to its application throughout the field have generally been adjusted. Use of local names instead of thickness and physical conditions for coals is still producing some confusion.

In consequence of 62 deaths in one explosion in Webster County, the mine-fatality record far exceeds any of the past; the State Department of Mines is badly handicapped through lack of sufficient number of inspectors and accidents are increasing. Not less than three more inspectors and better salaries to hold competent men are greatly needed.

Maryland

By John L. Casey
Mine Inspector for Allegany and Garrett Counties, Maryland

THE following table gives a concise summary of the mine-accident record at the different mines in Maryland during the year 1917:

Number of men underground	4,700
Number of men on surface	900
Foreman and clerical force	300
Total	5,900

The number of men killed during 1917 and the causes for the accidents are as follows:

Fall of roof coal	2
Fall of rashings	2
Fall of roof rock	4
Fall of middle rock	2
Fall of draw rock	1
Fall of bone coal	1
Caught while tunneling	1
Caught between cage and timber	1
Caught between motor and roof	1
Run over by loaded car	2
Jumped from runaway trip	1
Caught with rock shot	1
Electricity	1
Total	20

The following tabulation shows the companies at whose mines fatal accidents occurred during the year and the number:

Barton Mining Co	1
Blaine Mining Co	1
Piedmont & Georges Creek Co	2
McNitt Big Vein Co	1
New York Mining Co	1
Davis Coal and Coke Co	2
Hamill Coal and Coke Co	1
Maryland & Georges Creek Co	1
Consolidation Coal Co	3
Frostburg Big Vein Co	1
Georges Creek Co	1
Mt. Savage & Georges Creek Co	1
Garrett County Mining Co	1
Ajax & Hocking Co	1
Standard Coal Co	1
Fitzpatrick Coal Co	1
Total	20

This makes a total of 13 accidents for Allegany County and 7 for Garret. In Allegany County are 39 companies operating 130 coal mines, while 18 companies in Garrett County operate 40 coal mines. During the year 18 new companies were organized and commenced shipping coal. The estimated tonnage for 1917 is 4,000,000 tons.

Michigan

By Duncan A. Read
State Mine Inspector, Lansing, Mich.

FOR the fiscal year ending Nov. 30, 1917, the number of tons of coal mined in the State of Michigan was 1,308,947. The average number of men employed each month was 2128.

Missouri

By J. Goldman
Secretary Bureau of Mines and Mine Inspector, Jefferson, Mo.

MISSOURI broke the records in 1917 in coal production. The demand for fuel has been greater than ever before in the history of the state. Notwithstanding the great demand there has been little shortage for the general consumers and

practically none for the manufacturing concerns.

There were no strikes in this state, and the miners were constantly employed during the year at wages both satisfactory to them and to the employers. G. W. Hill, chief mine inspector, was highly commended by the Governor for the efficient manner in which inspections were made. Mr. Hill was reappointed by the Governor in May and immediately surrounded himself with intelligent and practical miners. With this splendid force the miners were safeguarded in their work and at all times were well pleased with their surroundings.

In view of the fact that over 5,000,000 tons of coal was mined in 1917, there were only 13 fatal accidents, about one accident to every 400,000 tons of coal mined. This is a splendid record, and, of course, is due to the excellent condition in which the mines were kept under the supervision of Mr. Hill and his corps of efficient assistants.

Montana

By John Sanderson
State Mine Inspector, Helena, Mont.

THE end of the fiscal year in the coal department has been changed from Oct. 31 to June 30. Under these circumstances I can only assume an approximate output for the state beginning with July 1, 1917, there being no figures available since that date.

The coal production for this state for the eight months beginning Nov. 1, 1916, and ending June 30, 1917, was 2,903,926 tons, therefore basing the output for the year on these figures, it is safe to assume that the total production will be about 4,400,000 tons. The production of coal for Montana will exceed by several thousand tons the output of 1916, which was the banner year in this state in point of production. There has been a marked increase in the demand for coal over former years, and although there have been a few complaints of a scarcity in some places, on investigation it has been found that these conditions have been local, and the situation has been relieved at once. The increased demand for coal, along with the price as fixed by the United States Fuel Administrator, has been a factor in causing very many new mines to be opened up in the state, in some cases located from 5 to 30 miles away from a railroad.



John Sanderson

While the production from these mines is not noticed along the line of the railroad, still they are the means of keeping the residents in their respective districts supplied with coal, where otherwise they would be compelled to get their fuel supply from dealers in towns on the railroad. Most of these mines are opening up in the eastern part of the state, in lignite coal, which lies near the surface, and the cost of opening up is not high. These mines generally employ from two up to as high as ten miners.

There has been some shortage of cars in the several coal fields of the state, but, taken altogether, the supply has been fair. The labor situation among the coal miners of the state during the year has been fair, there having been little labor trouble, and that of a local nature. The worst of the labor troubles took place at the mine of the Republic Coal Co., located at Klein, Musselshell County, where the miners were on strike for about seven weeks, which curtailed the output to the extent of about 100,000 tons. Several new mines have been put into operation during the year, some of which, when producing to their full capacity, will add quite an increase to the present output of the state.

The railroad mines—namely, the North Western Improvement Co., located at Red Lodge, the Republic Coal Co., located at Klein, and the Cottonwood Coal Co., located at Stockett and Lehigh—do not enter the commercial market whatever, their entire output being consumed by the various railroads.

New Mexico

By W. W. Risdon
State Mine Inspector, Albuquerque, N. M.

THE fiscal year in New Mexico is from Nov. 1 to Oct. 31 of the succeeding year. Hence this report covers the period from Nov. 1, 1916, to Oct. 31, 1917. The total tonnage for the fiscal year amounted to 4,113,544 tons: Anthracite, 46,613 tons; bituminous, 3,375,098 tons; semi-bituminous, 691,833 tons. Approximate value, $8,227,988. About 46,899 tons was used in operating the mines; 1,049,102 tons was used in making coke; 3,917,543 tons was sold in the markets of Kansas, Oklahoma, Texas, New Mexico, Arizona, California and Mexico.

Number of men employed at the mines were: Miners, 3163; daymen in the mines, 1244; boys in the mines, 67; daymen on top, 983; boys on top, 48. Total number of men and boys employed at the mines, 5505. Number of men employed in making coke, 397. Number of coke ovens, 1157. Tons of coke manufactured, 561,112. Approximate value of coke made, $2,525,000.

There were twelve fatal accidents in the mines during the fiscal year. This is charging the industry with one man found dead in the mine—who in all probability died of heart failure—and two men who died in the hospital some 30 hours after being injured in the mine by a fall of top coal.



W. W. Risdon

While the year 1917 shows an increase of 220,359 tons of coal over the year 1916, the production for 1917 was curtailed by strikes and shortage of miners. A strike at the mines of the Gallup-American Coal Co. caused a loss in the production from the Gallup district of at least 100,000 tons of coal. The strike was called on the first day of July. The demand was for recognition of the union. While the strike was called only against the mines operated by the Gallup-American Coal Co., the other mines in the district were affected by the disturbance of working conditions at their mines.

From records kept at the mines of the large companies of the men at work each day, the miners employed in the mines in this state are working a little over half time. In making this statement I am figuring full time as being 8 hours at the working face six days per week. From the best information I am able to get, 25 to 33 per cent. of the miners are off every day in the year, and in no case do they work 8 hours at the face. The daily average falls below 6 hours at the working face. The net result is about 56 per cent. efficiency for the coal miner in New Mexico.

Colfax County is the principal producer of the state. Two companies—the St. Louis, Rocky Mountain & Pacific Co. and the Phelps-Ddoge Corporation—produced 3,203,181 tons of coal and made 561,112 tons of coke. Each of these companies is opening new mines which are expected to be big producers. Over $250,000 have been spent by these companies this year for improvements and additions to equipment.

During the year the Diamond Coal Co. opened a new mine in McKinley County. This company has spent over $250,000 in building a power plant, new

buildings and the electrification of the old mine. The Gallup-American is figuring on extensive developments during the coming year and in all probability McKinley County can be counted on for a big increase in production.

New Mexico has a large area of workable coal seams, and if the demand for coal continues to be as great as it was for the year 1917 there can be no doubt that some large producing mines will be opened.

North Dakota

By J. W. Bliss
State Engineer, Bismarck, N. D.

FOR the year just closed, the production of lignite coal in North Dakota was about 20 per cent. greater than for the previous year. Transportation difficulties, as well as increased demands for anthracite and bituminous coals, have produced a serious shortage; and in many localities in the state where these coals were formerly sold they cannot be secured at the present time, or if available at all, they can be had only in such small amounts that, with the irregular supply, the average citizen does not feel secure. As a result, in thousands of homes in the state lignite is being used for the first time, and with a degree of success which indicates that even after normal conditions are restored a tremendously increased demand for the native coal will exist. Practically all the power plants in the state are now using lignite, finding it economical to do so.

About 689,000 tons of lignite was produced during the year, valued at $2 a ton at the mine. An average of 1115 men was employed during the winter months, of whom 757 are classified as miners and 358 were employed in other capacities. An average of 632 men was employed during the summer months,



J. W. Bliss

of whom 388 are classified as miners and 244 were employed in other capacities.

There have been but three fatalities, an average of 0.45 per hundred thousand tons of production, or 0.35 per cent. of the average number of men employed. The few fatalities and accidents are due to the fact that the lignite mines of this state produce no explosive gases, and with the exception of a few localities the roof materials are substantial.

Labor has been scarce, and there have been two small strikes; but these being of short duration, they had no appreciable effect on the production.

The State School of Mines, which has been experimenting for a number of years with the problems of briquetting lignite, has been making very satisfactory progress. These experiments indicate that commercial briquetting, under circumstances permitting of the utilization of all the byproducts, will result in a rapid development of the immense beds of lignite which underlie the western half of the state.

South Dakota

By O. E. Ellerman
State Mine Inspector, Lead, S. D.

THE coal-mining industry of South Dakota remains inactive, and as a coal producer the state has gained but little prominence. The total output for the year 1917 was 10,848 tons, and this seems to be an approximate annual average for the past number of years. Nearly the entire production is used as a local fuel by the farmers and ranchmen.

The lignite field comprises areas in Harding, Perkins, Dewey and Meade Counties, with negligible quantities in the adjacent territory. The districts mentioned lie north and east of the Black Hills, the metal mining section of the state, where the mines and quarries produce annually mineral weath valued at $8,000,000. The product from the coal mines for the past year had a value, at the mine, of $25,268. The industry gave employment to 110 men for an average of 150 days.

The mining industry in the Black Hills region gives employment to upward of 3000 persons for over 300 days in each year, and South Dakota ranks fifth among the states of the Union in the production of gold. In addition to this, gradual increases are made annually in producing tungsten, lead, silver, mica, tin, copper, gypsum and numerous other minerals of less value. The production of coal remains the same with no new developments or advancement in output. There are, however, reasons why a state that has deposits estimated at over a billion tons of minable coal cannot show a larger annual tonnage.

The backwardness in making use of local fuel is due directly to the following: First, the distance from railroad and lack of transportation facilities. Second, the grade of the coal, which readily disintegrates upon exposure to the air and for that reason cannot be transported any great distance This no doubt has a tendency to retard exploitation.

To commercialize this natural resource it will be necessary to have near railroad connections and to install plants for the briquetting of the lignite. A plant at the Scranton mine, just over the border in North Dakota, was placed in commission this past year and has proved that the coal can be briquetted without a binder. It is a success, and the entire output of 75 tons daily has found a ready market. The demand



O. E. Ellerman

has been so great that additions are being made which will give a capacity of several hundred tons.

It is claimed for the briquet that it affords a more economical fuel, both with respect to cost and heat value than the coals shipped into the state. The grade of the coal at the North Dakota mine is the same as that of our state, and tests made on some of the local material assures as good a briquet. Already some of the operators are making arrangements for the installation of treatment plants, and it is probable that within a few years' time the annual production will be noticeably increased. Even with the satisfactory solution by briquetting there remains one drawback, for until we have an outlet to market South Dakota will not make rapid strides in the increased production of coal.

The State Legislature of 1917 passed a resolution authorizing the appointment, by the Governor, of a commission to investigate the coal deposits on state-owned coal lands. This commission has been named, and during the year will make a report on its findings. It is hoped that the investigations will reveal deposits that warrant development on a large scale of a fuel that is sufficient to supply the needs of the state for a number of years to come. There were no acidents recorded to employees of the coal companies.

Ohio

By L. D. Devore
Chief Deputy and Safety Commissioner of Mines, Columbus, Ohio

FROM reports received from the coal-producing districts of Ohio, the tonnage will show a decided increase over the year 1916, the amount being estimated at 38,000,000 tons, or an increase of 10 per cent.

Not for years was there such a scarcity of railroad cars reported, upon

which the coal industry depends so much to move the tonnage. All mining districts reported the tonnage to have been from 25 to 30 per cent. less, due to this cause. While the question of the supply and demand of railroad cars is always a perplexing problem of the coal industry during certain portions of the year, the year 1917 experienced unusual abnormal industrial conditions not met with in former years, and were in the main responsible for this situation. The "Priority Act" promulgated by the United States Coal Administrator, which diverted all coal to the Northwest until the close of the Lake season, which was unusually late in closing this year, also had its effect upon the situation. Reports seem to indicate that the Eastern Ohio District suffered more from the lack of cars than the Hocking Valley District.

Lake Shipments Were High

Lake shipments of coal for the year 1917, from all reports, seem to have exceeded all other years in point of tonnage, and has furnished a ready market regardless of quality; the demand was also greater than transportation facilities afforded.

During the forepart of the year there seems to have been a scarcity of labor in the coal mines of the state; these conditions changed, however, when the price of labor increased from $3.60 to $5 per day. Labor was also robbed of much of the fruits of the year's prosperity in the increased wages granted by the operators due to the lack of an adequate supply of railroad cars. The scarcity of labor in some instances has affected the efficient operation of some of the mines, but did not materially affect the production.

No serious labor troubles were experienced during the year, and the Ohio miners as an organization have shown a patriotic spirit in responding to all demands made upon them by the unusual conditions met with in the year 1917.

The time reported worked in the various mining districts varies from 60 to 75 per cent.; the greatest loss of time occurred in the months of November and December, when the car situation became so acute, and this condition still obtains at the close of the year.

The output of Belmont County has been estimated at 12,000,000 tons, an increase of 2,000,000 tons; this may not be realized when accurate statistics are received as the car shortage was keenly felt in this district the latter months of the year. Athens County has an estimated tonnage of 4,700,000 tons, an increase of 1,000,000 tons; Jefferson County 6,000,000 tons, an increase of 600,000 tons; Perry County 2,000,000 tons, an increase of 800,000 tons.

Taking into consideration the unusual conditions entering into the coal situation for the year 1917, the total number of fatalities reported is not abnormal as compared with the year 1916, 113 having been reported, an increase of 5, or 4.6 per cent., as compared with the number reported for the previous year, when 108 were reported.

Belmont County reported the greatest number of fatalities, 32 in all, a decrease of 1 as compared with the year 1916; Jefferson County 18, a gain of 4; Guernsey County 15, a gain of 2; Athens County 12, a gain of 2. Jackson and Meigs Counties show losses of 3 accidents each, and Harrison and Carroll Counties a loss of 2 each. Lawrence County, which in the year 1916 reported 4 fatalities, reported none for this year.

Falls of roof caused the death of 65 persons, an increase of 2 over the year 1916; falls of coal show a loss of 3, two being reported; mine cars 21, an increase of 2; motors 3, a loss of 3; electricity 4, a decrease of 1; explosions of powder 4, an increase of 1; due to miscellaneous causes, 10 deaths were reported.

The outstanding feature of the coal industry for the year 1917 was the number of new operations reported to the department. The demand for coal and the attractive prices offered for it was productive of this condition. These operations have been reported from all twelve mining districts of the state.

Portions of mines long since abandoned have been reopened to mine coal, which under previous conditions had been considered unprofitable. Many small mines are being opened along the outcrop of the coal seams of old abandoned mines. Many of these operations will of necessity be of short duration, and will only operate while conditions render them a profitable investment, while others will be of a permanent nature, and will increase their coal territory and add very materially to the mineral resources of the state.

Rapid progress is being made in the tonnage reported from coal territories where the coal seams are adapted to the method of mining known as "stripping." These mines have been opened up in the counties of Harrison, Jefferson, Perry and Tuscarawas, and in the year 1916 reported a tonnage of 533,152 tons mined. The year 1917 will undoubtedly show a much larger production from this method of mining coal.

Several mine fires were reported to the department during the year, but were controlled without the loss of life and any great property damage. The most serious mine fire occurred at mine 268, operated by the Ohio Collieries Co., Toledo, Ohio, located in Perry County; the fire started from an unknown origin, and the mine was idle 60 days awaiting the sinking of an interior shaft, after which it resumed operation with an output of from 450 to 600 tons of coal per day. This mine fire was unusually difficult to control, owing to the fact that it was connected with other mines, some of which had been abandoned for years. The fire section remains sealed at the close of the year.

What gave promise of a very serious mine fire occurred at the Superior No. 12 mine operated by the Superior Collieries Co., located in Jackson County, Ohio. On Dec. 11 the tipple burned down at 4:30 o'clock in the afternoon, the flames communicating to the coal near the bottom of the shaft, caused by the timbers of the shaft becoming fired. Prompt work on the part of the department, assisted by employees of the coal company, arrested the spread of the fire, and it was extinguished without the necessity of sealing the shaft.

On Mar. 20, 1917, the State Legislature in session amended Secs. 929 and 950 of the R. S., regulating the lowering and hoisting of persons in mines by vertical shaft 50 ft. or more, and requiring additional emergency openings for egress from dangerous mines.

On Mar. 21, 1917, Secs. 973-976 and 914 of the G. C. were amended relative to the location of oil and gas wells, abandonment, inspection and the interpretation of "coal-bearing and coal-producing townships."

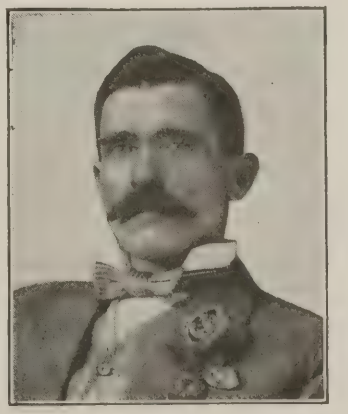
Sixteen prosecutions were reported during the year for violations of the mining laws. For going beyond a danger signal, for entering a mine in an intoxicated condition, 4; operating a mining machine unshielded, 2; for violation of the carbide law, 6; violation of the breakthrough law, 2; riding on moving trips, 1; for fireboss making a false report, 1. These fines amounted to $155.

Considering all circumstances entering into the different phases of coal mining during the year 1917, the outcome of the industry has not altogether been an unsatisfactory one in point of production. With the advent of governmental control of all railroad equipment, marked improvements can be anticipated the coming year of 1918.

Oklahoma

By Edward Boyle
Chief Mine Inspector, McAlester, Okla.

DURING the fiscal year ended July 1, 1917, there was produced from the mines of Oklahoma 3,861,697 tons of coal. This is an increase in production from the previous year of 808,154 tons. Of the 1917 output 2,508,123 tons was obtained by pick mining, while 1,353,574 tons was produced by machine mines. This is



Edward Boyle

an increase of machine-mined coal of 582,820 tons over the production for 1915, which is significant of the progress made in this state in recent years in this method of mining, when it is remembered that in 1910 the production of machine-mined coal was practically nothing.

Oregon

By Henry M. Parks
State Mine Inspector, Portland, Ore.

PRODUCTION of Oregon coal mines for 1917 has not changed materially over 1916. The total of all grades marketed in 1916 was 43,404 tons, which sold at an average price of about $3 at the mines, and it is not expected that the output during the past year will exceed that figure to any considerable degree. The productive mines of the state are limited almost entirely to Coos County, in the vicinity of Coos Bay, where five properties were active during 1917.

The Beaver Hill mine, owned by the Southern Pacific Railway Co., is the largest and best equipped mine in the district. It is located about 12 miles south of Marshfield and is managed by L. A. Wherat. The equipment consists of an up-to-date tipple and a screening and washing plant, which turns out about 150 tons daily of lump, nut and pea grades. At present this mine has about 50 men on its payroll.

The Henryville, or C. A. Smith, mine, owned by the Smith-Powers Logging Co. and leased by R. M. Jennings and associates of Portland, is located 6 miles southeast of Marshfield. The mine has good equipment and produces, normally, about 100 tons daily, 25 men being employed.

The Libby mine, located 3 miles southwest of Marshfield, is operated by the Coos Bay Fuel Co., with George Doll as manager. This mine has produced for 65 years and now employs about 20 men.

The Kay mine, located at Riverton, and formerly operated by the Riverton Fuel Co., has been taken over by J. R. McGee. It has been a steady producer; some 30 men are employed. The only casualty noted during the past year was at this mine and that in February, last, when a miner was killed by falling rock. Another mine is the Pansy Hill, owned by the Coos Bay Water Co. and leased by J. C. Swanson.

The coal mined in the Coos Bay district has been classed by the United States Geological Survey as a good grade of sub-bituminous. The average of 18 samples taken is as follows:

Air-Dried Sample:	Per Cent.
Moisture	9.6
Volatile matter	36.3
Ash	13.2
Fixed carbon	40.9
	100.00
Sulphur	2.05
Calories	5,399
British thermal units	9,720

The North Pacific States, and especially Oregon, are now experiencing general critical conditions in the fuel supply. California oil producers, who have formerly supplied this section with crude oil for heating and steaming purposes, are refusing to make further shipments to meet new demands and decline to renew contracts after present ones expire. Considering the fact that crude oil has been the great competitor of coal, the situation is such as to make conditions more favorable to coal mining. Likewise the scarcity of wood as fuel has favored the same condition. It seems almost incredible that with cities located in the heart of such magnificent forests as Oregon possesses that wood should be nearly prohibitive in price and scarce in quantity. The shortage of labor has made it impossible to get wood to market.

The Federal Bureau of Mines, in cooperation with the Oregon Bureau of Mines and Geology, is conducting experiments on fuel briquetting in an effort to utilize the fines produced by the screening plants in this district which are now being wasted.

The area of Coos County, which is underlain with coal, is about 300 square miles, with an average thickness of coal beds of 4 ft. It is estimated that the district contains over a billion tons of coal which, at the present rate of production, makes the supply almost inexhaustible. A closer study of market conditions and transportation, together with better methods of mining and management, might well be adopted to make this region a greater source of fuel supply. Conditions are generally improving and innovations being made to operate more cheaply and with greater capacity.

Pennsylvania

By Frank Hall
Chief Deputy, Department of Mines, Harrisburg, Penn.

THE output of the coal mines of Pennsylvania in 1917 is estimated at 267,735,001 net tons, of which 97,525,770 tons were anthracite and 170,209,231 tons bituminous. The production of coke reached a total of about 26,000,000.

The year is without parallel in the entire history of the coal-mining industry, not only on account of the unprecedented output of coal and coke, but also on account of the conditions more or less chaotic that prevailed, due to war demands and restrictions. These conditions were so abnormal and impelling in their character as to make it impossible for the operators to cope with them with entire success. New conditions are always difficult to deal with, and when they come as a result of an imperative demand from which there can be no exemption, they place a strain upon even the greatest resourcefulness and highest efficiency.

In spite, however, of the confusion that existed in all the mining centers and the drawbacks of car shortage and labor troubles, the coal and coke production exceeded by many millions of tons the output of any previous year.

In producing the great tonnage of the year the mines employed 335,323 men, and the number of fatalities among the workers was 1062. This may seem like a heavy toll of life, but comparatively, and with the unprecedented conditions considered, it is a good record. In 1915, with a production of 246,797,774 net tons, the fatalities numbered 1030, and in 1916, with a production of 256,804,012 net tons, they numbered 1001. In 1917, notwithstanding the tremendous activity that characterized mining operations and the almost universal disregard of the ordinary rules of safety by the mine workers, the percentage of fatalities shows only a slight increase over those of 1915 and 1916.



J. E. Roderick
Chief, Department of Mines, Harrisburg, Penn.

It must obviously be taken as a tribute to the superb equipment and efficiency of the hundreds of great mines in Pennsylvania and the skill of the workers that no catastrophe of magnitude occurred. When it is recognized that rapid work, long hours and a continual drive tend greatly to a lack of discipline and to increased danger, the small number of fatalities gives evidence of unusual preparedness and of most careful operation of the mines.

The year's activities were hampered somewhat by labor shortage, strikes, disturbances over wage scales and by an inadequate car supply.

ANTHRACITE

District	Production, Gross Tons	Employees	Fatal Accidents	Coal Consumed at Mines
1	3,223,334	6,175	16	281,059
2	2,660,031	5,994	24	174,845
3	3,344,233	5,418	16	354,141
4	2,376,752	5,042	27	194,872
5	3,337,837	6,649	20	294,985
6	3,408,008	6,157	25	186,927
7	2,909,088	5,861	23	169,160
8	4,390,412	9,459	28	269,465
9	3,248,500	5,460	18	364,553
10	3,111,526	6,111	21	340,425
11	3,237,442	5,725	33	298,333
12	3,955,519	6,980	22	163,992
13	4,135,620	6,480	32	288,928
14	4,211,233	7,256	19	370,885
15	4,627,204	6,509	25	516,276
16	3,096,853	5,543	10	315,751
17	4,577,678	6,448	22	367,752
18	3,704,056	5,611	25	419,615
19	2,671,697	4,900	27	430,173
20	3,491,065	7,937	29	476,712
21	4,349,124	7,020	27	78,618
22	4,486,687	6,956	31	629,482
23	2,729,985	5,561	18	399,338
24	3,062,696	5,163	18	309,459
25	2,730,000	5,200	16	570,000
Totals,	87,076,580	155,615	572	8,265,746

Strikes occasioned very little trouble, but in most districts the shortage of labor and cars was keenly felt, although in some instances the handicap of labor shortage was overcome by increasing the number of working hours.

A few districts for some unknown reason seemed to be entirely immune from all untoward conditions and passed through the year without loss of trade or inconvenience of operation. The output, had all conditions been favorable, would probably have reached 300,000,000 tons.

The coke output, great as it was, would have been several million tons greater had labor been more plentiful. During the summer months it was almost impossible to obtain coke drawers, and the conditions became so acute and the prospect seemed so hopeless that some of the companies changed their ovens from hand- to machine-drawn types. The hindrances to the trade, however, serious as they were at times, had the effect merely of reducing somewhat the unusually large profits of the operators.

BITUMINOUS

District	Production, Net Tons	Employees	Fatal Accidents	Coal Consumed at Mines	Coke Production
1	5,876,816	6,668	26	1,162,139	586,336
2	7,223,651	5,895	17	151,000	2,218,330
3	3,900,000	5,470	9	144,475	.....
4	4,500,000	5,120	9	139,000	138,700
5	7,001,312	7,846	12	5,112,852	4,277,186
6	5,117,731	5,813	14	96,089	1,160,657
7	4,531,390	6,126	17	118,753	.....
8	5,287,968	6,050	8	74,945	.....
9	7,130,000	6,505	16	130,000	3,100,000
10	3,813,818	4,778	10	84,810	104,750
11	7,105,236	7,650	19	159,632	2,878,843
12	6,439,264	6,301	13	236,213	519,663
13	4,325,000	4,000	15	90,000	.....
14	3,871,858	4,209	11	278,756	8
15	5,411,836	6,363	15	84,013	23,800
16	9,600,000	8,000	34	200,000	5,200,000
17	5,005,239	5,028	12	96,896	.....
18	4,800,000	7,100	13	100,000	175,000
19	6,252,000	5,200	14	201,000	29,500
20	4,706,800	5,890	10	112,532	.....
21	7,137,132	7,191	24	109,112	194,750
22	4,250,000	4,190	9	70,000	125,000
23	7,540,000	7,390	24	165,000	3,000,000
24	5,546,889	5,737	16	153,370	.....
25	5,839,203	5,518	20	92,493	.....
26	5,019,800	5,053	34	68,100	.....
27	5,951,868	5,313	19	167,276	1,314,425
28	5,484,420	6,014	10	243,333	57,600
29	4,840,000	5,000	18	100,000	.....
30	6,700,000	8,290	22	154,500	219,650
Totals.....	170,209,231	179,708	490	10,096,289	25,324,198

One of the improvements in mining conditions is the gradual adoption of electricity as a means of power and for illuminating purposes. Several of the larger companies are replacing steam power with electric power, hoists are being placed on shafts and slopes with automatic brakes to check over-speed or over-hoists, and electric lights are being placed in the mines along the gangways and at all other places where lights are required. Gasoline motors are being replaced by electric haulage.

The beneficent effect of the recent child-labor legislation is being felt very appreciably in the mining communities, and the good results are not confined alone to the children, who are now in school acquiring an education instead of wearing their young lives out at the hard task of breaker work or in the mills and factories, but into the homes and to the parents have come new ideals and loftier aspirations, brought to them by the children who are daily being taught higher standards of life and the desirability of finer moral and mental equipment for the struggles of the future. It is reported from some sections that the lessons inculcated in the young minds regarding the evils attending the use of alcoholic beverages are being carried home and so impressively presented to the other members of the household that many fathers and brothers are being weaned away from the greatest enemy to health and domestic happiness.

There were very few innovations of note in connection with the mining operations or in the social conditions of the mining communities. Some of the anthracite operators have installed improved breaker machinery by which the number of persons employed in the preparation of coal has been greatly reduced. In the different mining communities many modern houses have been erected for the employees. Equipped with modern conveniences and the additional attraction of yards and gardens they are in every way most satisfactory dwelling places. The educational advantages and social conditions of the communal life of the mine workers and their families are gradually but assuredly improving.

The year has been one of great prosperity to both the operator and the miner. Prices for coal were exceedingly high until near the close of the year when the prices were fixed by the Federal Government, lessening to a great degree the vast profits that were being garnered by the operators. Even under the Government prices, however, the well-conducted mine is profitable and no fear need be entertained as to the results of the coming year. The wages of the miners have risen to almost unreasonable heights and reports of unheard-of earnings are received from all sections of the regions.

The war has called attention to the really modern science of coal mining, particularly in the United States. Pennsylvania, the great leader in coal production, had scarcely an organization as a coal community during the civil war, 1860 to 1865. In 1860 the output of anthracite was about 8,000,000 tons, less than one-tenth of the present production. The output of bituminous coal which was just beginning to make itself felt as a factor in industrial circles was 10,000,000 tons, or about one-seventeenth of the great production of the present time.

With the extraordinary demand for fuel and the stimulus of extremely high wages, the outlook in Pennsylvania is favorable for a record-breaking production in 1918 provided the car supply and car distribution can be maintained with necessary efficiency, and further provided that the men can be kept steadily at work instead of indulging in the too-frequent vacation periods for the purpose of enjoying their munificent earnings.

Texas

By B. S. Gentry
State Inspector of Mines, Rockdale, Tex.

IN TEXAS, during the year 1917, the total production of coal is estimated to have been about 2,650,000 tons, of which 1,400,000 tons was bituminous and 1,250,000 tons lignite. There were in operation during the year 16 bituminous and 30 lignite mines. No new bituminous mines were opened, but the close of the year sees a number of new lignite mines under construction.

Some of the mines have suffered from car shortage and there has been some labor shortage. The bituminous mines, which are located in the northern part of the state, employ principally American and Italian miners, while the workers in the lignite mines are principally Mexican miners. All the mines have been practically free from strikes during the year.

The high price of fuel oil is creating a large demand for lignite, and it looks as if the year 1918 will find most of the large steam plants using lignite. Fuel oil has always been a strong competitor of lignite, and with this competition largely removed there should be an enormous development throughout the lignite fields, which extend practically across the state, beginning in the northeast corner and extending in a southwesterly direction to the Rio Grande, or Mexican border. The seams along this formation are not workable at all points, in many places the seams are too thin, etc. At many points there are known to be three or more seams overlying one another and all of workable thickness. The average cover between seams is between 40 and 50 ft., while the seam nearest the surface has from 10 to 200 ft. of overburden. The largest deposits are probably located in Milam and Bastrop Counties. Other counties where lignite is mined are Titus, Hopkins, Wood, Henderson, Leon, Houston and Robertson.

Each year sees many improvements in the lignite fields, and the primitive methods of a few years ago are giving way to modern systems. Many well

equipped mines have been opened recently. Most of the lignite produced in Texas is pick-mined, and of the bituminous production about one-half is shot off the solid. There are no mining machines in use in the lignite mines, though a few machines are in use in some of the bituminous mines. The lignite mines should offer a good field for future use of mining machines, it being necessary only to find the type of machine adapted to these particular seams.

There were few fatal or serious accidents in Texas mines during the year, little hazard or risk being connected with the mining industry of the state, as there are no gaseous seams of coal and the roof conditions are usually good. The indications are that the output of both bituminous and lignite mines during 1918 will be the largest in the history of the industry in Texas.

Utah

By Robert Howard
State Mine Inspector, Salt Lake City, Utah

THE coal industry of the State of Utah, during the year 1917, has been peculiar in many ways. The year started out with the various coal companies having many more orders for coal than they could possibly fill. The demand was greater than at any other time in the history of the state.



Robert Howard

The mines were in shape to produce a large tonnage, but were handicapped by a shortage of railroad cars.

The slow work in our coal mines had caused many of the miners to leave the mines and go where work was more steady. This caused a shortage of men, which has continued all through the year until during the month of October, when men began to come back, and at the present time most of our coal mines have all the men they can use and some are refusing to hire more men.

The shortage of men was a good thing in that it gave those men who were working a chance to earn more wages, as the miners usually got all the cars they could on workdays, and on idle days they could go in the mine and put their working places in good shape, and probably load some empty cars left from the previous day. Daymen, both in the mine and on the outside, were given as much work on idle days as the companies could find for them, thus helping to hold this class of labor at the mines.

During several months of the year the railroad-car shortage was so bad that the mines worked but little more than half time.

Utah Coal Has Wide Market

Besides furnishing the coal for our own state, the market for Utah coal is found in the States of Idaho, Nevada, Washington, Montana and California—these states looking to the mines of Utah for a large part of their coal supply. In some districts, during the early part of the year, the shortage of coal was felt so keenly that fences, shade trees, etc., were cut down and used for fuel. During the entire year there has been no let-up in the demand for Utah coal. Delegates from the State Council of Defense of Idaho and from other states have visited the various coal companies to check up the coal production and see if it was not possible to get more coal shipped to their respective communities, all to be met with the same cry, that the railroads could not furnish the mines with cars, and the mines were only working about half time.

During the month of November, the Utah Coal Road (which has been under lease to, and had been operated by, the D. & R. G. Ry.) commenced to handle its own railroad and take care of the United States Fuel Company's mines at Hiawatha, Blackhawk, Mohrland and Panther, and, as this railroad is using its own cars and engines, it has taken this amount of work from the D. & R. G. Ry., which is now better able to take care of the balance of the coal mines which are located on its lines. At the present time the mines are working better and a much larger tonnage of coal is being produced than at any other time during the year.

There has been very little labor trouble at the mines during the year. At three mines demands were made for more wages; these demands were settled by giving the men an increase. Wages at the mines have been increased four times during the year, and at the present time wages are from 60 to 70 per cent. higher than they were on Jan. 1, 1916. It is not uncommon to find miners earning $12 to $15 per day, and making between $300 and $400 per month, in the various mines.

The coal mines of this state are chiefly in Carbon, Emery and Grand Counties, and are located on the Denver & Rio Grande Ry. On June 26 the dam of the Mammoth Reservoir, located several miles above Scofield, and built for the purpose of storing water to irrigate about 30,000 acres of land in Carbon County, Utah, broke, and the water rushed down Pleasant Valley, washing out 15 miles of the Scofield ranch of the D. & R. G. Ry. At Colton the water ran into Price River and washed out parts of the main line of the D. & R. G. Ry. between Colton and Helper, Utah, causing a loss of probably more than one million dollars to the D. & R. G. Ry. and cutting off the state's supply of coal.

This caused a delay of two months to the mines located at Scofield, Clear Creek, Utah Mine and Winter Quarters, and the balance of the mines located in the Helper District were delayed about a month as a result of this flood. The loss in the production of coal due to the D. & R. G. tracks being washed out by this flood of water is estimated at 400,000 tons of coal, but notwithstanding this, and the fact that the mines worked little more than half time during a large part of the year, we find that the tonnage has increased and our mines have produced 4,051,210 tons of coal, this being 429,275 tons, or 12 per cent., more than was produced during the year 1916. From the coal produced 668,058 tons was made into coke at the Sunnyside coke ovens.

An average of 3434 men was employed at the mines, and 325 men were employed at the coke ovens, this being approximately the same number as was employed during the year 1916.

There were 20 fatal accidents during the year, this being one fatal accident for each 203,060 tons of coal produced. During the year 159,700 lb. of black powder and 583,166 lb. of giant and permissible powder were used, or 1 lb. of powder for each 5.47 tons of coal mined. The average time worked at 14 of the largest mines was 207 days for the year.

Many "Snow Birds" in State

There are a large number of country banks and wagon mines in the state, some of these having an output of several thousand tons each. This coal is hauled to the railroad and loaded into railroad cars. The tonnage from these mines is estimated at 30,000 tons, but will exceed this figure.

In addition to the number of men actually employed in producing coal, there has been a large number of men at work making improvements, among these are 60 new houses and 84 coke ovens, which have been built at Sunnyside, 20 new brick houses built at Standardville and 25 houses built at Rains. The present mines have been developed for a much larger production, and the operators are looking forward to the year 1918 being a banner year.

There are several new mines being opened up, development and construction work having been going on for several months past. These are the Liberty Fuel Co., the Wattis Coal Co. and the Peerless Coal Co. If the railroads furnish cars, as it is hoped they will, the 1918 production of coal in the State of Utah should be 50 per cent. greater than that of this year.

State-wide prohibition went into effect on Aug. 1, and so far as the mines are concerned it is working out in good

shape. The miners are at work the day after payday, and the output of coal is kept up to normal instead of being reduced for several days after payday, as it was before prohibition went into effect.

Washington

By James Bagley
State Mine Inspector, Seattle, Wash.

PRODUCTION of coal in 1917 promises to be the largest in the history of the state, with the possible exception of 1910, when the production was 3,979,569 short tons. Owing to floods during the present month, the coal production will fall considerably during the current month. According to reports received and an estimate for December, the output will be about 3,965,000 short tons, an increase of over 945,000 tons, or about 32 per cent., as compared with 1916. Approximately 5400 men are employed at the mines at the present time as compared with 4746 in 1916.

The outlook for the industry in 1918 is bright. The demand for coal in the state is due principally to the shortage and high price of fuel oil, and consumers of oil are changing over to coal. There have been no new mines opened during the present year, but some of the old mines have been reopened. No labor troubles occurred during the present year. All the mines in the state are now organized.

Twenty-eight fatal accidents have occurred to Dec. 24 as compared with 21 in 1916. Of this number six bodies have not been recovered, and rescue operations are now proceeding to recover the bodies of six men caught by a cave-in of the pillar workings at the Wilkeson Mine, Wilkeson. This accident occurred on Dec. 17.

West Virginia

By Earl A. Henry
Chief, Department of Mines, Charleston, W. Va.

DURING the past year the coal industry of West Virginia has been in a very unsettled condition. The lack of railroad facilities and shortage in the supply of railroad cars have retarded the progress to such an extent that the production has remained practically at a standstill. A large number of new companies have been organized and quite a few consolidations have been made. The statistics contained herein are for the fiscal year 1917, which began July 1, 1916, and ended with June 30, 1917. During this period 665 companies operated within this state and reported 1186 operating mines, which produced 79,806,652 gross tons of coal as against 79,612,298 gross tons last year—this being an increase of 194,354 gross tons. Two counties, Webster and Wetzel, were added to the coal-producing counties, thus making 35 counties in the state in which coal is mined. Eleven counties within the state producing more than 1,000,000 tons each are as follows:

McDowell	18,671,942
Fayette	9,555,518
Logan	8,859,122
Raleigh	6,304,282
Kanawha	5,577,677
Marion	5,125,390
Harrison	4,675,411
Mercer	3,225,429
Mingo	3,207,162
Barbour	1,306,983
Taylor	1,270,182
Tucker	1,214,964
Marshall	1,119,827
Preston	1,106,378

From this it can be seen that McDowell still heads the list of producing counties in this state with a production of 18,671,942 gross tons, which is a decrease under the production of last year of 327,137 gross tons.

During the year 90 companies within the state produced more than 200,000 gross tons each and seven companies of this number produced more than a



Earl A. Henry

million gross tons. The United States Coal and Coke Co., of McDowell County, has taken first place among the coal-producing companies, it having mined 4,552,132 gross tons. The seven companies mining more than a million gross tons each are as follows:

United States Coal and Coke Co	4,552,132
Consolidation Coal Co	4,021,808
Pocahontas Fuel Co., Inc	2,443,160
Island Creek Coal Co	1,843,742
Davis Coal and Coke Co	1,658,335
New River and Pocahontas Consolidated Coal Co	1,649,876
Solvay Collieries Co	1,102,655

During the period covered by this report, 79 coke plants within the state manufactured 2,533,314 net tons of coke, which is an increase over the previous year of 575,682 net tons, or 29.41 per cent.

During the year there were employed at the mines and coke ovens within the state 88,665 persons, an increase over the previous year of 8607 persons. The total number employed were distributed as follows:

Pick miners	17,839
Machine miners	25,634
Machine runners and helpers	4,905
Inside laborers	21,987
Outside laborers	15,730
Coke workers	2,570

While this shows a large increase in the number employed, yet the number of days worked was reduced to 215, which is a decrease under the previous year of 17 days, and which accounts in a great measure for the small increase in production. These employees were classified as to nationality as follows:

American (white)	48,237
Negroes	18,128
Italians	7,388
Hungarians	4,346
Polish	2,117
Slavish	1,215
Austrian	1,833
Russian	1,362
Other nationalities	4,039
Total	88,665

The mines of the state during the past year worked but 215 days as against 232 days last year, which accounts in a great measure for the small increase in production. The equipment of the coal companies of the state is such as to warrant the production of at least 125,000,000 gross tons annually. I am convinced that this production would have been made had it not been for the lack of transportation facilities and shortage of railroad cars which continued throughout the entire year.

The average price received by pick miners during the year for run-of-mine coal was 69c., which is an increase over the previous year of 17c. per ton. The average tonnage produced by each pick miner was 1649 gross tons, a decrease of 50 tons under the year 1916. The average annual wage of pick miners (all pick miners included) was $1137.-81, an increase over last year of $254.33. This shows that while the miners worked fewer days and produced less coal, yet their wages were increased 28.80 per cent.

The average selling price of coal shipped from the mines in the state was $2.26 per gross ton, an increase of $1.17 over last year. At this price the value of coal produced amounted to $180,363,033.52, an increase over the previous year of $87,969,481.03. During this same period coke was sold f.o.b. at the ovens at an average price of $4.77 per net ton, an increase over the previous year of $2.76 per ton. The total value of coke produced was $12,-083,907.78, an increase over last year of $7,972,880.58, thus making a total increase in value of the production of the state of $95,942,361.61.

During the year there were 394 lives lost in connection with the mine operations. Of this number 348 were killed inside and 46 outside the mines, this showing a decrease in the number of fatal accidents of 22 inside and an increase of accidents occurring outside the mines of 17, making a net reduction in the number of fatalities of 5. During this time there were 993 nonfatal accidents at the mines, 826 of which were inside and 167 outside, which is a decrease under the previous year of 184.

Two explosions occurred within the state, one inside and one outside the mine. On Oct. 19, 1916, a gas explosion at Jamison No. 7 mine of the Jamison Coal Co., in Marion County, killed 10 persons; and on Apr. 18, 1917, five men were killed at Linden mine of the Hutchinson Coal Co., in Mason County, when lightning struck the powder mag-

azine from which they were getting their daily supply of powder.

For each life lost within the mine during the year there was 229,329 gross tons of coal mined, which is an increase over the previous year of 14,650 gross tons for each fatality. The 348 lives lost inside the mines occurred at 262 mines, employing 29,530 persons inside, which produced 36,299,057 gross tons of coal; while the remaining 924 mines worked the entire year without the loss of a single life and produced 43,507,595 gross tons. The causes of fatal accidents are summarized as follows:

Killed by explosions (all forms)	12
Killed by fall of roof and coal	218
Killed by mine cars	51
Killed by electrocutions	20
Killed by other causes	47
Total	348

The ratio of persons killed per 1000 men employed inside the mines during the year was 4.95.

The past year has witnessed considerable improvement in the general condition of the mines of the state. Statistics are not kept of these improvements and it is therefore impossible to give them by item. The coal companies have not only added greatly to their equipment and sidetrack facilities, but have spent millions of dollars during the year for the betterment of the sanitary and safety conditions of the mines, which I am safe in saying places the mines of West Virginia second to none in this country.

In conclusion I desire to say that this department throughout the entire year has received the hearty coöperation of all the coal companies, miners and mine laborers, which has been the chief factor in placing this state in the position it now occupies among the coal industries of the country.

Northern West Virginia

By H. A. Williamson

Fairmont, W. Va.

WRITING a résumé for northern West Virginia for 1917 is like digging a jigger out of your leg—the harder you dig the deeper he goes.

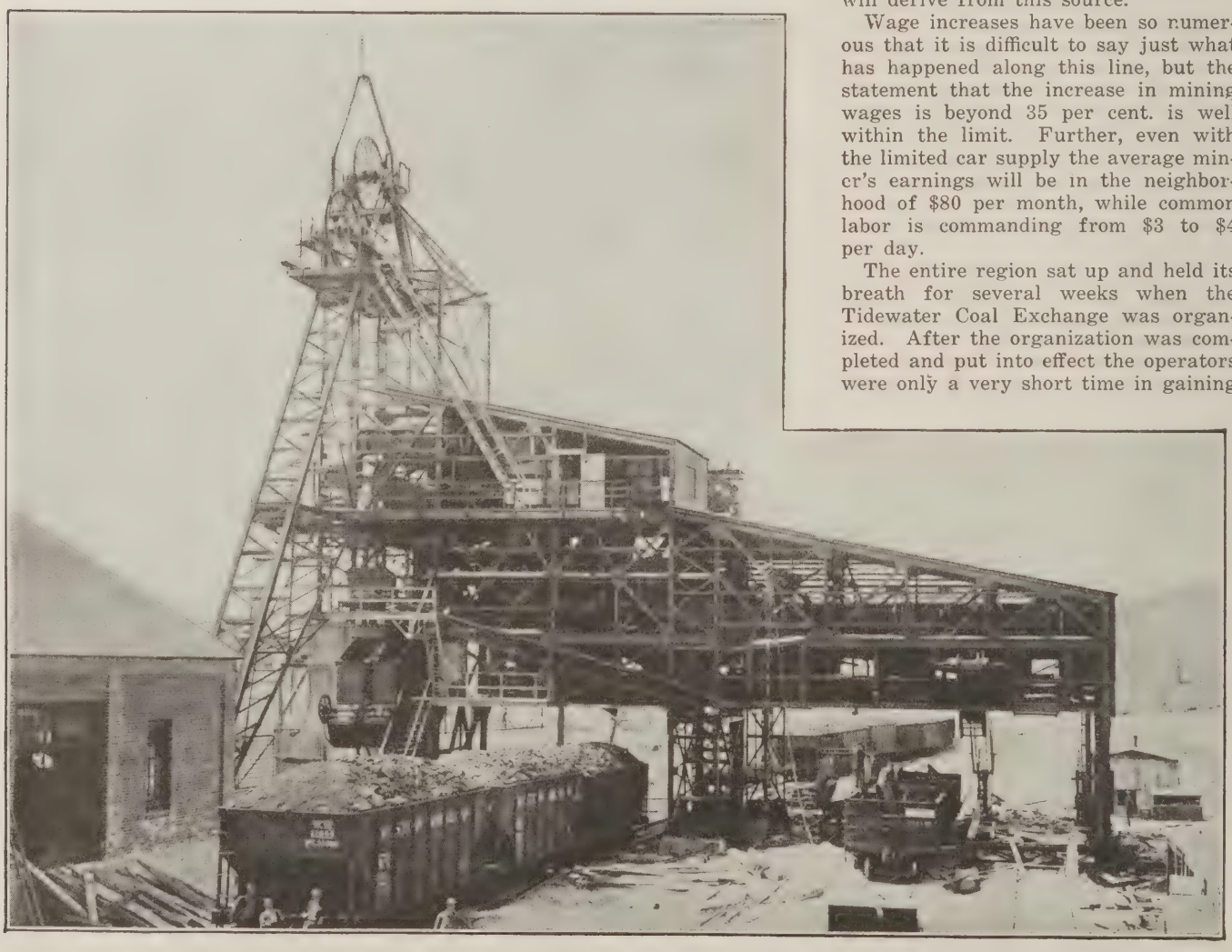
It is unnecessary to enlarge on the car shortage—everyone knows about it. Had there been even a fair car supply the labor shortage would have been serious, but under the circumstances few or no steps have been taken, or needed to be taken, to get the men to work. From present indications it looks as if this condition would continue indefinitely. Should the railroads or Federal Government find means to supply cars, there is no doubt but that the region could and would double its present production, and as the coal is so badly needed it appears to be squarely up to someone to furnish cars. Should these cars be furnished there would immediately exist a shortage of labor, but this could be overcome and in any event does not look imminent at this time.

In regard to Federal price regulation much has been written but little said. It is possible that some small wagon-loading mines or mines working at particular disadvantage may have been forced out, or some disgruntled operator may have curtailed his output. On the whole the output of the region is just as great as the car supply will allow it to be, and the operators are getting out all the coal they can ship. It might be mentioned in passing that there are in the region about 50 mines now loading coal exclusively by use of horse teams or auto trucks.

On the part of labor, the wage regulation so far appears satisfactory. What would happen if there were plenty of work and the Government regulation to fine men $1 for each day they did not work was carried out, is a question, but it is probable that men who did not work their best would get little sympathy; with present scarcity of work, however, it will probably be a small income the American Red Cross will derive from this source.

Wage increases have been so numerous that it is difficult to say just what has happened along this line, but the statement that the increase in mining wages is beyond 35 per cent. is well within the limit. Further, even with the limited car supply the average miner's earnings will be in the neighborhood of $80 per month, while common labor is commanding from $3 to $4 per day.

The entire region sat up and held its breath for several weeks when the Tidewater Coal Exchange was organized. After the organization was completed and put into effect the operators were only a very short time in gaining



TYPE OF MODERN TIPPLE BEING ERECTED IN NORTHERN WEST VIRGINIA



FLOOR OF ONE OF THE DEPARTMENT STORES IN NORTHERN WEST VIRGINIA

confidence, and at present practically everyone seems to be at least sufficiently satisfied as to consider serious objection to any of the commissioner's rulings unnecessary. There are still, however, many details for the Exchange to work out, but this appears to be progressing smoothly and, all in all, one might say that up to the present time the Exchange is a success.

Government control of railroads and mines has been discussed, but in reality has never been seriously considered; and before such an event can actually take place there will have to be many developments not now anticipated. Much more to the point would be some method by which the Government could stimulate river coal traffic. This has been discussed in the past, and to the sorrow of certain parties, attempted. At present no effort is being made to load river coal, and no serious plans of such nature appear under way. Undoubtedly quite an appreciable quantity of coal could be moved in this manner, but every attempt of this nature has failed in the past and there is no wild rush of operators to lose more money on such a venture. It would, therefore, appear to be up to the Federal Government to figure out some plan if such coal would help the situation any.

The Fairmont Lake trade probably suffered as severely as any line of outgoing coal, but here again it has been due to lack of cars. Certain special offers were made if the mines would work continuously on Lake coal for specific periods and then either no effort, or at least no successful effort, was made to furnish such mines with cars. So that after a very short time the matter drifted back to where it had been before the special offer was made. If there is a shortage of coal in the Northwest during this winter it is not to be blamed on the operators, because it is absolutely true that the operators made desperate and continued efforts to get coal to the Lakes.

The coke trade has been revived by the enormous demand for this character of fuel. Every coke oven in the region that was at all possible of repair has been put into operation. The coke tonnage of 1916 increased by half over 1915, and 1917 will probably double 1916. This, of course, is largely due to the high price coke is commanding. Should coke prices be regulated to anything like normal it is probable this production would almost entirely disappear as the region does not appear to be interested in the manufacture of coke except under abnormal conditions.

More or less activity has continued in coal lands and there has continued the strong tendency for this to extend beyond the Pittsburgh seam and take in the Sewickley coal. This Sewickley, lying above the Pittsburgh and running from 5 ft. thick down to nothing, has, in the past, been considered either as worthless or at best a dangerous venture in which to place money. Now, however, purchases of Sewickley coal have been made and several companies are producing this coal. Under present conditions there is ready sale for all the Sewickley that can be mined, but it is a question in the minds of many as to what will happen to these mines in the future, both on account of the general quality of this coal, the erratic natural conditions of the seam and also the possible damage it has suffered, and will continue to suffer through removal of the Pittsburgh seam below it.

Probably the largest single sale of Pittsburgh coal was the transfer of some 11,000 acres in what has been known in past years as "The Empire Field"—this field is largely tributary to the Monongahela Railway.

The Monongahela Ry. has now been opened for over a year, and there are 16 mines operating on it between Fairmont and the Pennsylvania state line. These are mostly in the Pittsburgh seam, although some Sewickley and some Red Stone coal are being produced. There are also some eight or ten "wagon loaders," or "snow bird" mines, operating on this line at and near Fairmont.

On the two branches of the Western Maryland Ry., built during the past two years and connecting with the Baltimore & Ohio R.R., there have been opened some 17 mines, some of these being the finest mines of the region, notably Mines Nos. 86 and 87 of the Consolidation Coal Co. at Ida May and Carolina, and the same company's mines Nos. 88, 89 and 90 at Wyatt.

The continued work along the "safety-first" idea is showing results, and the region is getting into better condition steadily. Unfortunately, however, one accident occurred during the year to which special attention should be called. Two men, supposedly thoroughly trained and of sufficient experience, were killed within one of the mines while wearing an approved type of rescue, or oxygen, helmet. It is said that these men remained underground beyond the time limit of the apparatus. Aside from the deplorable loss of life, this accident serves a good purpose in calling attention and pointing out that entirely too much confidence is placed in this class of equipment and that far more care should be exercised in using

such equipment, no matter how efficient it may be.

The exhaustion of the natural gas of the region is causing some concern, and talk of a byproduct plant still continues. Along this line the Monongahela Valley Traction Co. is erecting a Lymn producer-gas plant, or what is possibly better known as a byproduct-producer plant. The initial plant will consist of seven units, consuming about 75 tons of coal per day and producing the equivalent of 1,500,000 ft. of natural gas in addition to the byproducts. This plant is the second of the kind to be erected in the United States, and if it proves successful will probably lead to large developments along this line. The electrification of the mines of the region continues, and the same company (Monongahela Valley Traction Co.) is adding another unit to its power plant at Hutchinson. This plant being gas driven, it would appear that eventually it will have to be supplied with artificial gas. The Monongahela Valley Traction Co. also has under construction a steam turbine-driven power plant which will produce 100,000 kw. when complete. The building for this plant, 170 x 200-ft., is located at Rivesville, W. Va., and is well under way.

In lines closely connected with the coal trade are noted the Monongahela Powder Co., a new concern located near Fairmont, manufacturing explosives for use in the mines; also the Fairmont Chemical Co., located east of Fairmont, producing sulphuric acid from sulphur balls, or coal brasses. These brasses, formerly a waste product and object of more or less expense at the mines, are now sold to the acid plant. The acid in turn is largely used in byproduct plants and will be available for such a plant should one be erected in the neighborhood.

To undertake to make a statement as to what will happen in 1918 in northern West Virginia coal circles is beyond the power of human mind. Should a way be found to furnish adequate car supply and to move the cars to destination after they are loaded, it appears that the region will be able to supply the demand for its coal. There will, of course, remain the serious question of labor shortage, but this is not nearly so bad as the car shortage and can probably be largely overcome.

By and large, while there is a certain amount of pessimistic talk, there appears to be an undercurrent of confidence that business will continue good in coal lines. It is also to be noted that every man and boy, from the youngest trapper to the most successful operator, is boosting the coal business and striving to make it go. Here there are no unpatriotic speeches or publications, no attempts to keep men from working, no efforts to destroy property or to hamper the Government. It is plain that the entire region is straining at the harness in one mighty effort to do its "derndest" to help win the war.

Wyoming

District No. 1

By George Blacker

State Mine Inspector, Cumberland, Wyo.

THE year 1917 is the banner year in my district, and with the increased tonnage goes the matter of improvements so vital and necessary to the successful management of the coal industry. The demand for coal, especially of the kind produced in this district, has been unprecedented, taxing the capacity of the mines to their utmost and not being able to supply it, with the result that other concerns seeing the unlimited opportunities of these coal fields are investing their capital in the development of new mines in order to meet the present and future requirements of the trade. Therefore new mines are opening on well established coal seams; old prospects are being cleaned out with a view to their development, and the activity all along the line must result in a production of many hundred thousand tons more than our present record shows.

The high cost of living and the mutterings of dissatisfaction incident thereto happily found a solution when the representatives of the United Mine Workers of America and the managers of the different companies met for the purpose of adjusting the wages in this district. The result of the convention was a general and generous increase from the top to the bottom, and I venture to say that the present scale of wages is as great as, if not greater than, that in any district in the Union. The settlement of the wage question has brought about an era of good will and contentment and a further desire on the part of the miners to do their ut-



George Blacker

most toward the production of coal, and in this manner satisfy the demand made upon their energies, with the certain knowledge that in doing so their pay check will read bigger and will be ample to cover all their wants.

Shortage of labor has compelled, in some instances, in order to keep up the output, withdrawing of pillars, which had better be left in under ordinary conditions. To try and reach a higher point of economy and efficiency, the Kemmerer Coal Co. has this year installed a battery of Stirling boilers to replace its old plant, with all modern improvements known to the manufacturers of these boilers for economy and efficiency. Locomotive haulage is being installed in No. 6 Mine, sublet.



PLANT OF THE BIG HORN COLLIERIES CO., CROSBY, WYOMING

By use of a counterbalance at No. 5 main hoist, sublet, the monthly consumption of power has been reduced from approximately 30,000 to 9800 kilowatt-hours.

The tonnage by counties in District No. 1 during the past year, the figures for which were furnished by various operators, is as follows: Lincoln County, 2,651,093; Uinta County, 70,269; Carbon County, 844,331; Sweetwater County, 3,082,055. The number of men killed in 1917 totaled 36; the number of men injured, 194; the number of wives made widows, 14; the number of children made fatherless, 32.

The causes of fatal accidents in the coal mines of this state for the year were attributed as follows: Falls of rock, 14; falls of coal, 11; mine cars and haulage motors, 5; railroad cars, 1; blast, 2; electrocuted, 1; miscellaneous, 2.

The number of men employed in each county is as follows: Lincoln, 1905; Sweetwater, 2576; Carbon, 630; Uinta, 65.

SUMMARY OF COAL PRODUCTION IN DISTRICT NO. 1, WYOMING

Year	Tons	Men Employed	Number of Fatal Accidents	Total Coal for Each Life Lost	Number Employees for Each Life Lost	Number Killed per 1,000 Employed
1911	4,865,761	5,446	22	221,170	248	4.1
1912	5,500,253	5,673	35	157,150	162	6.1
1913	5,229,817	5,670	21	249,038	270	3.7
1914	5,137,843	6,069	43	123,670	141	7.7
1915	4,460,169	5,363	18	247,787	298	3.3
1916	5,526,832	4,838	22	251,220	222	4.5
1917	6,047,748	5,176	36	167,993	144	7.0

SUMMARY OF THE ITEMS SHOWN IN THE REPORT, DISTRICT NO. 1, WYOMING

Number of counties producing coal	4
Number of shipping mines	36
Number of coal miners	2,231
Number of loaders	841
Total number of employees	5,176
Average days of active operation all mines	244
Number tons of coal undercut	3,527,053
Number tons of coal blasted from the solid	2,520,695
Total tons of coal produced	6,047,748
Number of fatal accidents	36
Number of nonfatal accidents	194
Tons of coal produced to each fatal accident	167,993
Number of employees to each fatal accident	144
Ratio of fatal accidents per 1,000 employees	7

Wyoming

District No. 2

By George N. Akin
State Mine Inspector, Sheridan, Wyo.

A CONSERVATIVE estimate of the total coal production in the district for the calendar year 1917, based upon the annual report of Sept. 30, 1917, would be about 2,800,000 tons, exclusive of a large number of small mines, employing less than 10 men, which make no report to the inspector.

This was distributed on the basis of about 43 per cent. to the railroads, 49 per cent. to commercial channels, the remainder being slack shipped or coal consumed locally.

The year has been a prosperous one for the industry in every way, the figures showing an increased tonnage, higher rates of compensation to employees and increased market values. The shortage in railroad cars has greatly reduced the net output. The mines were operated on an average of 18 days per month for the year, with a production of 1247 tons per man employed per year.

Many improvements have been made, and are under construction, at the various mines that will give greater safety to employees and more economical production for the mines. Present indications point to a prosperous period of activity in the industry for the district, and new mines are under development and others are in prospect of development. The success of the industry will depend largely upon the ability of the railroads to furnish enough cars for the output.

The total number of men employed during the fiscal year was 2197, being an increase of 138 over the previous year. The men shared in the general prosperity, there being an increase of 26 per cent. in the number of days worked, and of 19 per cent. in the number of tons produced per man employed.

There were seven fatal accidents during the year, making one man killed for every 391,608 tons produced and 3.18 killed for each 1000 employed. There were 51 nonfatal accidents reported for the year. Of these 44 per cent. were due to fall of rock or coal and 27 per cent. to moving cars. There was one man injured for each 49,850 tons produced, and 25.13 injured for each 1000 employed.

Alberta, Canada

By John T. Stirling
Chief Inspector of Mines, Alberta, Can.

IN THE province of Alberta, Can., the quantities and values of the various coals entered at the ports of entry, for consumption for the first three quarters of 1917, are as shown in Table I.



John T. Stirling

TABLE I—PRODUCTION FOR THREE QUARTERS OF 1917

Quarter	Lignite, Tons	Bituminous, Tons	Anthracite, Tons
First, ending Mar. 31, 1917	744,700	649,318	37,817
Second ending, June 30, 1917	227,879	177,579	11,387
Third, ending September 30, 1917	619,467	670,935	33,643
Totals	1,592,046	1,497,832	82,847

The figures which are given in Table I make a total of 3,172,725 tons of coal from all fields for the first three quarters of 1917.

The following table shows the number of tons of anthracite and bituminous coals sold and their value for the first three quarters of 1917:

Quarter	Tons	Value
First	571,739	$884,574
Second	525,807	1,569,224
Third	1,115,955	3,987,979
Totals	2,213,501	$6,441,777

British Columbia

By George Wilkinson
Chief Inspector of Mines, Victoria, B. C.

DURING the year 1917 there was mined in the Province of British Columbia 2,408,027 long tons of coal, a decrease of 77,553 tons in comparison with 1916. Of this amount 1,696,235 tons was mined by the collieries of Vancouver Island, 151,817 tons by the collieries of the Nicola Princeton district and 557,975 tons by the collieries of the Crow's Nest Pass district. The following are the comparative tonnages for the various companies and districts for 1917-16:

COAST DISTRICT VANCOUVER ISLAND

	1917	1916	
Canadian Collieries (D), Ltd	800,348	705,966	94,382*a*
Western Fuel Co	658,001	554,610	103,391*a*
Pacific Coast Coal Mines, Ltd	150,517	153,112	2,595*b*
British Columbia Coal Mining Co	61,547	78,443	16,896*b*
Nanoose Collieries, Ltd	27,822	630	27,192*a*
Totals	1,698,235	1,492,761	205,474*a*

(*a*) Increase. (*b*) Decrease.

The production of the Vancouver Island collieries for 1917 was increased 205,474 tons over the output of 1916.

COAST DISTRICT, SUB-DISTRICT OF NICOLA PRINCETON

	1917	1916
Middlesboro Collieries, Ltd	83,459	49,005
Merritt Collieries, Ltd	14,000	338
Inland Coal and Coke Co., Ltd	7,349	31,295
Pacific Coast Colliery		453
Princeton Coal and Land Co	46,919	29,458
	151,727	110,549

An increase of 41,268 tons.

CROW'S NEST PASS DISTRICT

	1917	1916
Crow's Nest Pass Coal Co	451,652	813,250
Corbin Coal and Coke Co	106,323	69,020
	557,975	882,270

A decrease of 324,295 tons below 1916.

Of the total amount of coal mined, approximately 291,755 tons was converted into coke. The total coke production for British Columbia was approximately 175,053 long tons. Of this amount the Crow's Nest Pass collieries made 144,654 tons. The Canadian Collieries (D), Ltd., made 30,399 tons at its ovens at Union Bay, Comox.

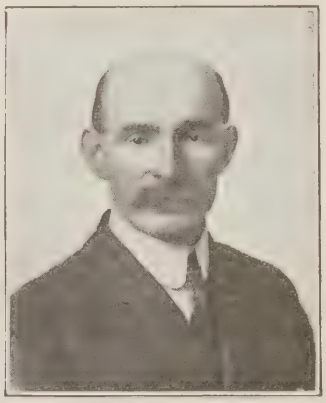
The prospects of a large production of coal in British Columbia were bright at the beginning of the year, and the

maximum tonnage for any month of the year was reached in March, when 244,145 tons was mined. In April a strike was declared at the Michel colliery, and on Apr. 5 a disastrous explosion occurred in No. 3 mine at Coal Creek colliery whereby 34 lives were lost. The men of the Coal Creek colliery were thereby thrown idle, and when operations were ordered to be resumed in the unaffected mines of the Coal Creek Colliery the men refused to report for work and joined the other parts of the Crow's Nest Pass district in a general strike. This strike was not settled until July and was responsible for a large reduction in the output of the Crow's Nest Pass collieries. No. 3 mine, Coal Creek, was unproductive for the balance of the year through the damage caused by the explosion.

Coupled with the explosion and strike as a factor in reducing the output is the shortage of labor, which has existed all the year. This has resulted in the closing down of some of the mines and the working of only single shifts in many of the others. The loss of output through various causes was very large.

Accidents for the Year

The number of fatal accidents for the year is great, due to two explosions, 34 being killed in one accident in the No. 3 mine of the Crow's Nest Pass collieries on Apr. 5. Six bodies yet remain in that section of the mine to which indications point as being the point of origin of the explosion. It will take several months to penetrate into this district as the roadways are badly caved and completely blocked. Wolf safety lamps were used exclusively in this mine and no blast was allowed, so that origin of the explosion remains a mystery.



George Wilkinson

Another explosion occurred in the No. 6 mine of the Canadian Collieries (D), Ltd., Cumberland, B. C., whereby four lives were lost. This mine was a naked-light mine, explosive gas rarely being found. Three surveyors went out on Sunday morning, June 3, to make a survey of the mine, a fireboss being detailed to accompany them and examine any of the places they wished to enter. In going into one of the places, one of the surveyors followed too closely on the heels of the fireboss and ignited a small accumulation of firedamp, which in turn started the dust, the place having been freshly cut the night before by a Sullivan chain cutter. None of the men was burned sufficiently to cause death, but all four died from carbon monoxide poisoning.

The other fatal accidents for the year are as follows: By falls of roof and rock, 3; by mine car and haulage, 2; by electricity, 1, making a total of six by other causes than explosion and a total of 44 in all.

The Canadian Collieries (D), Ltd., is opening a new mine at South Wellington which will be known as No. 5 mine. This mine is being opened in the Douglas seam and should be a large producer during 1918.

In the same district the Granby Consolidated Mining, Smelting and Power Co. has acquired a large area and is proving by diamond drilling. The Douglas seam has been proved in this area, and a large mine will be opened. This mine should also be a large producer during 1918.

The coal produced in this mine is to be coked for use in the company's own smelter at Anyox, where the company is erecting a large battery of byproduct coke ovens at an estimated cost of a million and a half dollars.

During the year the Western Fuel Co. reopened the Harewood mine. This mine is producing an average of 600 tons daily. Several other properties are being looked over by prospective purchasers and the outlook is good for Vancouver Island during 1918.



No. 1 Shaft and Pithead, Reserve Mine, Western Fuel Co., Nanaimo, B. C.

The Nanoose mine increased its output from 630 tons in 1916 to 27,822 in 1917, and should considerably increase its production the coming year. In the Nicola Princeton district the Tulameen mine and the Coalmont mine are both being reopened.

Many improvements were started in the mines of British Columbia in 1917. Some 2000 new Edison electric cap lamps were installed. The Burrell gas detector was introduced into the Crow's Nest pass mines for testing for small percentages of methane. A series of tests were made with the detector and samples for analysis taken at the same time, the detector checking very closely with these analyses. In no case was there a difference of more than three-tenths of 1 per cent., and in most cases there was no difference whatever. A good deal of work was done toward the treatment of coal dust. Rock-dust barriers were erected at the entrances of the districts of many of the mines, many of the roadways were treated by second burned ashes and sprinkling systems were installed.



Concrete Headworks, Morden Mine, Pacific Coast Coal Mines, Vancouver Island, B. C.

New Zealand

By Peter A. Yast

Melbourne, Australia

THE full report of the New Zealand state coal mines for the year ended Mar. 31 last is as follows: Two properties are being worked—namely, Point Elizabeth and Liverpool. The Point Elizabeth is now almost exhausted, and prospecting work is being carried on in other localities with a view to opening up a new mine. The probabilities are that an area at Charming Creek, Leddonville, will be selected. A seam of coal over 20 ft. in thickness has been proved and samples show the following average analysis: Fixed carbon, 55.14; volatile hydrocarbons, 41.89; water,

1.61; ash, 1.36. The sulphur content averages 5.04, but this is not greatly in excess of other coals on the market.

The gross output of the mines for the year ended Mar. 31 was 265,782 tons, as compared with 249,839 tons for the previous year. Of this total Point Elizabeth contributed 132,769 tons and Liverpool 133,013. The net tonnage was 252,810 tons. The total sales for the year amounted to 256,558 tons, value $1,209,251. The average price per ton was $4.71½, an increase of 64½c. The bulk of the coal is disposed of to the Government railways and for retail distribution through Government depots.

The net profit for the year, after making full provision for interest, depreciation, war bonus and all annual charges, amounted to $90,012. The bulk of this profit was earned by the Point Elizabeth colliery, and the official report states this "is partly due to the decreased amount charged as depreciation as compared with former years, and to the cessation on development work in view of the approaching exhaustion of the mine."

The property stands at the nominal book value of $7222, so that it was unnecessary to allow for further depreciation; but it hardly seems right under the circumstances that the expenditure so saved should be classed as profit for the year. In regard to the Liverpool property the profit was only $1239.30 as against a loss for the preceding year of $44,138. In this connection the report states: "While the figures indicate a good recovery, the result is disappointing in view of the tonnage produced and the large capital expenditure ($843,150) on which interest has to be earned. In order to place this colliery on a sound footing it is imperative that the present f.o.b. rates for coal should be increased to such an extent as to provide a reasonable net profit on the undertaking and to permit a sufficient sum to be set aside annually as a sinking fund for the redemption of the debenture and loan capital. It must not be overlooked that Point Elizabeth colliery is rapidly approaching the exhaustion stage, and when it ceases operations the whole of the interest charge, at present apportioned between the two mines, will have to be borne by Liverpool."

Nova Scotia

By D. A. Anderson
Halifax, N. S.

THE coal trade of this province continues to be hampered by the scarcity of men and shipping, as evidenced by the great falling off in coal shipments to the St. Lawrence River and the United States. The production for the fiscal year ended Sept. 30 is about 5,804,000 long tons, about 693,000 tons less than in the last previous year.

The price of soft coal has advanced to $7.75 a ton in Halifax, and a shortage for consumers is at present imminent.

A number of coal seams were opened during the year, notably in Cumberland County, where the Fenwick Coal Co. opened the Blight mine on the Chignecto seam, and the Sterling Coal Co., a mine on areas held by Sherwood & Swanson. The Strathcona Coal Co. and the Fundy Coal Co. (successors to the Atlantic Grindstone and Coal Co.) and the Eastern Coal Co., which have been idle for a few years, are again operating.

In Pictou County the Greenwood Coal Co. appears in the list of producers for the first time. In Inverness County much prospecting has been done about St. Rose and Chimney Corner. The latter mine, which has been idle since 1873, will produce coal this coming year.

An explosion on July 25 in No. 12 mine of the Dominion Coal Co., at New Waterford, by which 65 men were killed and one side of the mine damaged, and the destruction of the Bankhead by fire at No. 1 mine belonging to the same company, tended to decrease materially the production of coal in 1917. Pictou County increased its output over the previous year by about 73,000 tons.

Obituary in 1917

E. L. Shepley, of St. Paul, Minn., vice-president, Northwestern Fuel Co.

Jones G. Moore, of Birmingham, Ala., general superintendent of coal mines, Sloss-Sheffield Steel and Iron Company.

J. L. Wentz, of Philadelphia, former active member of J. S. Wentz & Company.

Benjamin Braznell, of Pittsburgh, Penn., coal operator.

William S. Hughes, of Scranton, Penn., safety-lamp inventor and manufacturer.

Charles M. Dodson, president, Weston Dodson & Co., producers of anthracite and bituminous coal.

George W. Schuederberg, of Pittsburgh, Penn., general manager Pittsburgh Coal Company.

Thomas D. Jones, of Hazelton, Penn., independent anthracite operator.

Joseph Milton Christy, of Moline, Ill., inventor of the box-car loader.

James Pease, of Chicago, president of the Chicago & Carterville Coal Company.

James F. Beavers, of Matewan, W. Va., vice president and general manager, Matewan Coal and Coke Company.

W. H. Wain, of Calgary, Alta., mining engineer and former manager, Georgetown Collieries.

Thomas M. Wilden, of Lansford, Penn., general inside superintendent, Lehigh Coal and Navigation Company.

Dennis H. Sullivan, of Coshocton, Ohio, former president, United Mine Workers in Ohio, former commissioner state board of arbitration and deputy mine inspector.

Andrew C. Bryden, of St. Louis, one-time operator of Murphysboro and Harrison mines, which are now the property of the Big Muddy Coal and Iron Company.

Alexander Bryden, of Scranton, Penn., consulting engineer, Pennsylvania Coal Co., the Hillside Coal Co., and New York, Susquehanna & Western Coal Company.

Thomas Russell, of Michel, B. C., mine manager, Crow's Nest Pass Coal Company.

E. Franz Roeber, of New York, editor *Metallurgical and Chemical Engineering.*

John McBride, of Columbus, Ohio, one-time president, United Mine Workers of America and one-time president of the American Federation of Labor.

Alex. Richards, of Esserville, Va., coal operator.

William Donald, superintendent, Stockton collieries, of Lehigh Valley Coal Company.

D. C. Roberts, of Marion, Ky., mine operator.

Marshall Sangrelet, of Belleville, Ill., superintendent of St. Louis & O'Fallon Coal Company.

Joseph V. Birtley, of Scranton, Penn., formerly superintendent of Pancoast mine of Price-Pancoast Coal Company.

Frederick F. Saward, of New York, editor of *Coal Trade Journal.*

P. J. Rogers, of Ensley, Ala., president, board of convict inspectors and formerly superintendent, Pratt City division of Tennessee Coal, Iron and Railroad Company.

J. Blair Kennerly, of Johnstown, Penn., mine operator.

Joseph B. Woodward, of Birmingham, Ala., president, Woodward Iron Company.

Williams H. Davies, of Hazelton, Penn., superintendent in Lehigh region of Lehigh Valley Coal Company.

Paul B. Cosgrove, of Johnson City, Ill., partner of firm, Cosgrove & Company.

James A. Phillips, of Cleveland, Ohio, one-time manager, Windsor Coal Co. and Steiner Coal Company.

John Thomas Morgan, of Birmingham, Ala., president, East Pratt Coal Company.

Lafayette Lenz, of Mauch Chunk, Penn., coal operator and railroad builder.

Anthracite Industry in 1917

By EDWARD W. PARKER
Director, Anthracite Bureau of Information, Philadelphia, Penn.

AS IN many other lines of industrial activity, the year 1917 in the anthracite industry was of such an abnormal character and was affected by so many conflicting conditions that a comprehensive discussion of it in the space permitted in an annual review and statistical number of even so elastic a medium as *Coal Age* is scarcely possible. It is necessary, therefore, to limit this review to the more important features to touch, as it were, the high spots only, and leave the preparation of a more detailed history until later.

It is common knowledge that the production of anthracite in 1917 exceeded any previous record in the history of the industry, for the monthly reports of shipments issued by the Anthracite Bureau of Information have kept the public informed on this subject and never before, probably, has there been so much interest taken by the public in the "statistical situation" of coal, both anthracite and bituminous. There were six months in 1917 when the shipments exceeded those of any month in previous history, and in three of these months the shipments amounted to over 7,000,000 tons, a record hardly deemed possible until it was accomplished. At the end of November the shipments of anthracite had exceeded by nearly a million and a half tons the record made in the twelve months of 1911, the year of previous high water mark in anthracite shipments. The total shipments for the year amounted to 77,133,305 tons, as compared with 67,376,364 tons in 1916, and with 69,954,299 tons in 1911. The increase in 1917 was accordingly 9,756,941 tons, or 14.5 per cent., over 1916, and 7,179,006, or 10 per cent., over 1911. Estimating the colliery consumption at 9,200,000 tons, the local sales at 2,000,000 tons, and the Sullivan County semi-anthracite production at 600,000 tons, it is found that the total output amounted to approximately 89,000,000 tons, an increase of more than 10,700,000 tons over 1916 when, as reported by the United States Geological Survey, the production was 78,195,083 tons. The production in 1917 was within less than 1.2 per cent. of the maximum (90,000,000 tons) output, estimated as obtainable in any one year from the anthracite mines. The shipments by months as reported to the Anthracite Bureau of Information is shown in the following table:

Month	Tons	Month	Tons
January	5,940,725	July	6,724,252
February	5,178,432	August	7,013,996
March	6,989,075	September	6,372,756
April	5,592,299	October	7,110,950
May	6,917,525	November	6,545,313
June	7,049,037	December	5,698,945

The total shipments for the last ten years have been as follows:

Year	Tons	Year	Tons
1908	64,665,014	1913	69,069,628
1909	61,696,885	1914	68,342,601
1910	64,905,786	1915	67,883,776
1911	69,954,299	1916	67,376,364
1912	63,610,578	1917	77,133,305

The record production of anthracite in 1917 was made in spite of a dwindling labor supply which, other conditions being equal, would have resulted in a decreased instead of an increased output. High wages and favorable conditions of employment offered by munition and other manufacturing establishments and by the Government in the construction of cantonments, shipyards, etc., caused many, particularly of the younger men, to desert the mines, and this migration combined with the voluntary and compulsory enlistments in the army and navy reduced the labor force in the anthracite region. At the close of the year the number of employees in the anthracite mines was absolutely at the irreducible minimum if the rate of production secured in 1917 is to be maintained.

There is, of course, some graduation from the mines every year, but heretofore this has been offset by new recruits drawn from the surplus labor market in Europe. In 1917 there was no inflow of foreign labor, and all the labor movement at the mines was outward. To have obtained the tonnage won in 1917 with the seriously depleted labor supply is almost to have achieved the unachievable, and the coal-consuming public owes a debt of gratitude to the operators and to the loyal anthracite mine-workers who have bent every effort during the trying months of 1917 to meet the needs of the country in fuel supply. The results were accomplished, and could only have been accomplished, by keeping the mines and breakers at work every possible working day, the mine workers denying themselves many customary holidays, and by having a practically adequate supply of railroad cars which prevented any serious broken time on that account.

"Community of Interests" Favors Anthracite

The "community of interests" between the anthracite carriers and the mining operators gave that branch of the coal-mining industry, so far as transportation is concerned, a decided advantage over the bituminous operators, many of which it was stated by officials of the mining companies, had not been able to work more than two or three days a week because of lack of cars, when the demand was such that, provided with ample car supply, they could have worked six days a week. In the anthracite region "the stone (that community of interest) rejected by the (political) builders became the corner stone of the temple."

Early in the spring, the anthracite operators, realizing the seriousness of the lure of higher wages offered by other lines of employment, met the representatives of their employees and, on Apr. 26, after a comparatively brief conference, reached an agreement, supplemental to the agreement of May 5, 1916, by which wages were advanced from 10 to 20 per cent. in different classes of labor, the aggregate effect of which was to increase the cost of production by an average of about 30c. a ton, which was, with the approval of the Federal Trade Commission, added to the price at the mines. The commission, after a thorough investigation of the anthracite industry, had found that the prices obtaining were not extortionate nor were profits, on the average, unreasonable, and on Aug. 23, when the President by proclamation fixed the prices for prepared sizes of an-

thracite, he practically adopted those then prevailing for the larger companies and allowed the "individuals" a differential of 75c. a ton. The prices fixed by the President's order were as follows:

	White Ash Company	White Ash Individual	Red Ash Company	Red Ash Individual	Lykens Valley Company	Lykens Valley Individual
Broken	$4 55	$5 30	$4 75	$5 50	$5 00	$5 75
Egg	4 45	5 20	4 65	5 40	4 90	5 65
Stove	4 70	5 45	4 90	5 65	5 30	6 05
Nut	4 80	5 55	4 90	5 65	5 30	6 05

The price of pea coal was fixed at $4 per ton for white ash with equivalent differentials for red ash and Lykens Valley and "individuals," and this was probably very near the average price obtaining in the region; but by a later order (Oct. 1) of the Fuel Administrator, who had in the meantime been appointed, the price of white ash pea coal was reduced to $3.40, the differentials for red ash, Lykens Valley and the "individual" operators being maintained.

In the fall of the year, as conditions became aggravated, further concessions to labor were found necessary in order to provide for the increased costs of the commodities they bought and to prevent further desertions from the mines, and a conference was held at Washington, the result of which was a further supplemental agreement by which wages were advanced to an extent that increased the average cost of production about 45c. a ton, this agreement being predicated upon the approval of the Fuel Administrator to an equivalent advance in the selling price. The proposition was submitted to the Fuel Administrator immediately upon the signing of the agreement, Nov. 17, and on Nov. 28 he submitted his recommendation to the President. As this incident is somewhat of a history-making character, the letter of Doctor Garfield to the President, the President's order, and the acknowledgment thereof by the committee representing the anthracite operators is given in full.

The following is Doctor Garfield's letter to the President on which the order was based:

Nov. 28, 1917.

Dear Mr. President:

The labor problem in the anthracite mines is not different in any material respect from that in the bituminous fields. Most of the comment in my letter of Oct. 26 is applicable to the anthracite situation. It is therefore unnecessary to repeat it here.

On Nov. 17, after a conference of about two weeks, the anthracite operators and miners reached an agreement, a copy of which I inclose.

In response to my request, the operators' association furnished statements showing in detail the tonnage and actual labor costs since the last wage increase, May, 1917, and the additional cost per ton if the increase of Nov. 17 is added. These figures were based upon an examination of over 68,000,000 tons, or 85 per cent. of the total tonnage estimated for 1917. If the proposed wage increase becomes effective, the increased cost placed upon the operators will range from 26c. per ton to 56c. per ton. A small high-cost tonnage shows additional costs per ton as high as 70c. The weighted average of the above-mentioned tonnage, accurately figured, is 37.2c. per ton. The increased cost to operators producing about 41,000,000 tons, or substantially one-half of this year's tonnage, will be 35c. and upward per ton.

I, therefore, respectfully recommend that the prices fixed by your proclamation of Aug. 23, 1917, as modified with respect to the price of pea coal by my order of Oct. 1, 1917, be uniformly increased in the sum of 35c. per ton, provided, however, that these increases shall not apply to any coal sold at the mine under existing contract containing a provision for an increase for the price of coal thereunder, in case of an increase in wages to miners.

In this connection, I desire to say that it is my expectation to order the reduction in anthracite prices which has been regularly given beginning Apr. 1, 1918.

I desire also to call attention to the fact that the Board of Conciliation created by the Commission appointed by President Roosevelt in 1902, has performed its tasks so acceptably to all concerned that there is no occasion for the introduction of an automatic penalty clause as provided in the case of the bituminous field, nor was the inclusion of any such clause provided for in the agreement of Nov. 17 between the operators and the mine workers.

Respectfully submitted,

H. A. GARFIELD,
United States Fuel Administrator.

PRESIDENT WOODROW WILSON,
The White House,
Washington, D. C.

THE PRESIDENT'S ORDER

Dec. 1, 1917.

Acting on a recommendation from Dr. Harry A. Garfield, Fuel Administrator, the President has issued the following executive order:

THE WHITE HOUSE,
Washington, D. C.,
Nov. 28, 1917.

The scale of prices prescribed Aug. 23, 1917, by the President of the United States for anthracite coal at the mines, adjusted as to pea coal Oct. 1, 1917, by order of the United Statess Fuel Administrator, is hereby amended by adding the sum of thirty-five (35) cents to each of the prices so prescribed or adjusted, provided, however, that this increase in prices shall not apply to any coal sold at the mines under an existing contract containing a provision for an increase in the price of coal thereunder, in case of an increase of wages paid to miners.

This order shall become effective at 7 a.m. on Dec. 1, 1917.

WOODROW WILSON.

ACKNOWLEDGEMENT BY OPERATORS' COMMITTEE

New York, Dec. 3, 1917

HON. H. A. GARFIELD,
United States Fuel Administrator,
Washington, D. C.

Sir:

Although our committee has received no formal notice from you respecting the advances in prices of anthracite authorized by the President upon your recommendation to offset the proposed increases to labor, we have observed the press announcement which we assume to be accurate. In the present crisis we have felt it incumbent upon us to act promptly and have today held a meeting of as many as possible of the operators affected by this price order.

The great difficulty we have encountered, you can well appreciate, arises from the fact so well stated in your letter to the President that "the increased cost to operators producing about 41,000,000 tons, or substantially one-half of this year's tonnage, will be 35c. and upward per ton"; or, in other words, that the permitted increase compels these producers to assume from their own pockets without possibility of recoupment, the excess allowed to labor above 35c. per ton.

This posture of affairs, so clearly and frankly indicated in your letter, left us only one ground of appeal to those producers whose demonstrated increased costs exceed the allowance—namely, an appeal to their loyal spirit of cooperation in the public interest even in the face of a substantial financial loss to themselves.

We are pleased to say that that appeal has been successful, and we are in a position to advise you that those operators have undertaken to sell at the prices named in the President's published order notwithstanding the fact that they dissent from your conclusion as being without justification on the record submitted to you.

Mindful of the period of uncertainty which followed the bituminous settlement, and believing that our employees and the consumers of our product are entitled to prompt information of this settlement, we are giving this letter to

the press simultaneously with its dispatch to you in the confidence that you will approve our course in this respect.

Respectfully,

(Signed) S. D. WARRINER,
W. J. RICHARDS,
J. B. DICKSON,
Committee.

No changes were made in the differentials for red ash or Lykens Valley coal, nor to the individual operators, and the prices for prepared sizes, including pea for the last month of the year, were as follows:

	White Ash Individual	White Ash Company	Red Ash Individual	Red Ash Company	Lykens Valley Individual	Lykens Valley Company
Broken	$4.90	$5.65	$5.10	$5.85	$5.35	$6.10
Egg	4.80	5.55	5.00	5.75	5.25	6.00
Stove	5.05	5.80	5.25	6.00	5.65	6.40
Nut	5.15	5.90	5.25	6.00	5.65	6.40
Pea	3.75	4.50	3.85	4.60	4.10	4.85

The prime factor in producing the abnormal conditions that affected the anthracite industry, as well as all other industries in 1917, was, of course, the entrance of the United States into what is now the world war, but this factor, however powerful as it was, was indirect in its influence on the demand for and production and distribution of anthracite. Anthracite is now relatively unimportant as a manufacturing fuel. Including the steam sizes that are used for the heating of office buildings, hotels and apartment houses as domestic coal (and where so used they really are domestic fuel) and considering all the lump and broken coal, most of which is used in the manufacture of water gas, as industrial fuel, probably 70 per cent. of the output may be considered as used for domestic purposes.

Naturally, therefore, anthracite would not be so immediately and directly influenced by the sudden expansion of our manufacturing industries, due to the war's demands, as would bituminous coal. But the bituminous mines, the coke ovens and the railroads were not prepared for, and could not respond to, the unexpected demands upon them, and these conditions have created an industrial demand for anthracite, particularly from brass foundries and similar industries, that could not secure needed supplies of coke. It is not believed, however, that the quantity of anthracite which was used to make up the deficiencies of bituminous coal and coke for industrial fuel has been equal to or even approximated the increased production of 10,000,000 tons over the output of 1916.

Other causes contributed more significantly to the shortage that prevailed in anthracite-consuming communities throughout the year. In the first place it must be remembered that at the close of the winter of 1916-17 the storage yards of the larger companies were practically bare, whereas at the corresponding period in 1916 there were from 4,000,000 to 5,000,000 tons of coal on hand. The "coal year" of 1916 opened with a good surplus in stock; that of 1917 opened with storage yards empty, and the same conditions obtained in the bins of the consumers. The winter of 1916-17 was unusually severe, and was followed by a "late" spring, coal-burning weather continuing in the principal anthracite-consuming territories until well into June. In the Upper Lake region, which is an important anthracite market, there is ordinarily carried forward some 400,000 to 500,000 tons from one year to the other; in the spring of 1917 the docks at the head of the Lakes were bare, and navigation was not opened until a month later than usual. The year, here, then began with a shortage and with a shortened season of navigation in which to make it up. The failure of the supply of natural gas in Ohio created a demand for anthracite from the residents of the affected districts, while of no small importance along the same lines has been the suddenly expanded populations of such manufacturing cities as Detroit, Mich.; Bridgeport, Conn.; Bethlehem and Chester, Penn., and the capital city of Washington. In practically all of these cases the increased demands for anthracite has been for household use. The chief augmentation in demand except for domestic purposes has been from gas companies which, unable to secure their customary supplies of coke for use in the manufacture of water gas, have called upon the anthracite mines to make up the deficiency.

Complaints have been made that undue quantities of anthracite have been taken by the Government to provide for the officers and men at the army posts and cantonments. The total quantity of anthracite requisitioned by the Government up to Dec. 31, including orders from the Navy Department for delivery during the entire fiscal year, had not amounted to 500,000 tons, and there has not been a time since the anthracite operators volunteered to see that the Government needs should be promptly filled that any of the camps have had more than ten days' supply on hand. No injustice has been done to the public by this action of the anthracite operators.

Enough has been said here to show how and why the 10,000,000 tons of increased production has been absorbed. If the mild weather of November had proved a forerunner of similar temperatures for the remainder of the year, little inconvenience on account of coal supply would have been experienced. Unfortunately the last two weeks of the year were made notable by blizzards and by almost unprecedented low temperatures for that season. There was, as a result, much suffering from lack of fuel in some quarters and from apprehension of not being able to obtain supplies in other quarters. There was, however, an abundant supply of coal in transit or tied up at junction points or on sidings to have met the emergency if it could have been moved to destinations and distributed. On Dec. 27 the Government took control of the railroad, and it is now hoped and believed that a freer movement of coal cars will be maintained; it is also hoped that by coöperation of dealers with local administrators an equable distribution to consumers will be effected and panicky conditions brought to an end.

In a review of the anthracite industry in 1917 one action on the part of those in control of the greater part of the production should not be overlooked. And that was the holding down of prices at a time when, if the general tendency had been followed, consumers might well have had cause for complaint. As it was, however, anthracite price circulars were not only not advanced more than the cost of production had increased, but the usual spring discounts were put into effect when there would have been no difficulty in obtaining full circular prices. The United States Bureau of Labor Statistics in its monthly review for October, 1917, presents a table in which it is shown that out of a total of 50 necessary commodities only one shows a lower percentage of advanced price than anthracite, and that exception is one for which the demand is on the decline.

Coal-Mine Accidents in 1917

By ALBERT H. FAY
Mining Engineer, U. S. Bureau of Mines
Prepared and published in "Coal Age" through the courtesy of the Director of the Bureau

THE abnormal conditions under which the coal mines were operated during 1917 are reflected in the accident records to the extent of an increase of about 20 per cent. in fatalities over 1916. There has been and is still an unusual demand on the operators for an increase in coal production, which has been hampered by a congestion in freight traffic and a shortage of labor.



ALBERT H. FAY

Complete data are not available to show definitely whether or not the increase in production will equal the percentage of increase in accidents, nor is it possible to give the number of men employed in 1917. Preliminary reports to the United States Geological Survey indicate that in some states there is a slight increase in the number of men employed, but for the United States as a unit, it is doubtful whether the total number employed will equal the number employed in 1916, which was 734,008. Those mines which were able to secure cars to market their coal were operated on a full-time basis, which adds to the number of days the individual miner could work, thus lengthening the time he was exposed to the mining hazard. The risk encountered by the individual is proportional to the time exposed. Other mines which were not so favorably situated as to dispose of their coal operated only part time. This condition results in an increase of certain dangers, especially those due to gas and falls of roof, which would not obtain in the case of the mine operating full time.

Cause of Labor Shortage

The shortage of labor at the mines is due to the attractive wages in munition factories, enlistments and drafts into the army, a relaxation in immigration and to emigration of many miners early in the war. It has been necessary, therefore, to employ new and inexperienced men from other fields to replenish this shortage.

Many of the experienced mine foremen and safety engineers have either enlisted or been drafted into the army, or secured more remunerative employment elsewhere, with the result that less experienced foremen have been placed in charge of some of the workings. With the exceedingly large demand for coal it has not been possible for the operators and others concerned to give as much attention to accident prevention at the mines as was being done in previous years under normal conditions.

The reports of the coal-mine inspectors to the Bureau of Mines to the close of October show 2104 fatalities at the coal mines of the United States, as compared with 1748 for a like period in 1916, representing an increase of 20 per cent. There were four explosions in November and December which killed 65 as compared with two in 1916 which resulted in the death of 50 men. The returns so far received for the last two months of the year indicate that the percentage of increase will hold for the entire year. The total number of fatalities in 1916 was 2226, to which must be added 20 per cent. for 1917. During 1916 there were 11 mine disasters in each of which five or more men were killed, while in 1917 there were eight such disasters. The 11 disasters in 1916 killed 154 men, while the eight in 1917 killed 256. Table I gives a list of the above disasters.

Table II shows the actual number of fatalities reported to the bureau in 1917 during the first 10 months of the year, together with the fatalities for the corresponding period in 1916. Falls of roof show an increase of 116, or 13.7 per cent., while mine cars and locomotives underground show an increase of 19.75 per cent. Haulage on the surface, which includes both mine cars and railway cars and locomotives, shows an increase of 68.63 per cent., while the total increase for the entire coal-mining industry is 20.37 per cent. The foregoing figures indicate clearly that eternal vigilance is the price which must be paid if accidents are to be kept at a minimum. The least relaxation of safety measures, inspection and supervision; the disorganization of the industry, or an unusual demand for coal, immediately result in higher accident records as shown by the experience of 1917.

TABLE I. COAL-MINE DISASTERS IN THE UNITED STATES IN 1916 AND 1917 IN WHICH FIVE OR MORE MEN WERE KILLED

Date	Name of Mine	Location of Mine	Nature of Accident	Killed
1916 Feb. 8	Lance	Plymouth, Penn.	Mine explosion	7
1916 Feb. 11	Jefferson and Clearfield No. 2	Ernest, Penn.	Mine explosion	27
1916 Feb. 29	Davis No. 42	Kempton, W. Va.-Md.	Mine explosion	16
1916 Mar. 9	Hollenback	Wilkes-Barre, Penn.	Mine explosion	6
1916 Mar. 28	King	Kimball, W. Va.	Mine explosion	6
1916 Mar. 30	Robindale	Seward, Penn.	Mine explosion	8
1916 Aug. 8	Woodward	Wilkes-Barre, Penn.	Mine explosion	6
1916 Oct. 19	Jamison No. 7	Barrackville, W. Va.	Mine explosion	10
1916 Oct. 22	Roden	Marvel, Ala.	Mine explosion	18
1916 Nov. 4	Bessie	Palos, Ala.	Mine explosion	30
1916 Dec. 13	Fidelity No. 9	Stone City, Kans.	Mine explosion	20
1917 Mar. 13	Henderson No. 1	Hendersonville, Penn.	Mine explosion	14
1917 Apr. 18	Lynden	Mason, W. Va.	Lightning exploded powder in powder house	5
1917 Apr. 27	Hastings	Hastings, Colo.	Mine explosion	121
1917 June 2	Rend No. 2	Herrin, Ill.	Mine explosion	9
1917 Aug. 4	West Kentucky, No. 7	Clay, Ky.	Mine explosion	62
1917 Nov. 29	Old Ben, No. 11	Christopher, Ill.	Mine explosion	17
1917 Dec. 15	Yukon, No. 1	Bluefield, W. Va.	Mine explosion	17
1917 Dec. 20	Nemo	Harriman, Tenn.	Mine explosion	11

TABLE II. FATALITIES AT COAL MINES FROM JANUARY TO OCTOBER, INCLUSIVE, 1916 AND 1917

	Number Killed 1916	Number Killed 1917	Increase or Decrease	Percentage of Increase or Decrease
Underground:				
Falls of roof or face	846	962	+116	13.71
Mine cars and locomotives	314	376	+ 62	19.75
Gas and dust explosions	160	287	+127	79.37
Explosives	119	85	— 34	28.57
Electricity	71	62	— 9	12.68
Miscellaneous underground	86	94	+ 8	9.30
Total underground	1,596	1,866	+270	16.92
Shaft:				
Total shaft	39	44	+ 5	12.82
Surface:				
Haulage	51	86	+ 35	68.63
Machinery	17	41	+ 24	141.18
Miscellaneous surface	45	67	+ 22	48.89
Total surface	113	194	+ 81	71.68
Grand total	1,748	2,104	+356	20.37

Bituminous Coal in 1917

By C. E. LESHER
United States Geological Survey, Washington, D. C.



C. E. LESHER

THE production of bituminous coal in the United States in 1917 is estimated at 544,000,000 net tons, an increase of 41,000,000 tons, or 8.3 per cent. over 1916, thus establishing a new high record. Early in the year the mark was set at 600,000,000 tons, and for the first three months after the United States entered the war the increases in the rate of output were such as to warrant the belief that that mark might be attained. Beginning in July, however, a number of factors were introduced that adversely affected production, and by the middle of October it was apparent that the most that could be expected would be 550,000,000 tons, which record would have been reached had it not been for the extremely severe weather in December, affecting not only transportation but to some extent surface operation at the mines. The estimated output in December was the lowest in any month of 1917, except April.

A quantitative measure of the increase in demand for bituminous coal is, of course, difficult to obtain. The largest consumers of coal are the railroads, and their increase in consumption was between 15,000,000 and 20,000,000 tons over 1916, of which from 2,000,000 to 3,000,000 tons was taken up from storage on hand at the beginning of 1917. The increased demands for coal by the railroads may be considered to have been supplied.

Coal used in making coke increased 3,100,000 tons, the estimated output of coke in 1917 being 56,600,000 tons, of which 22,600,000 tons, or 40 per cent., was byproduct, and 34,000,000 tons, or 60 per cent., was beehive. This increase in production does not, however, measure the increase in demand, for throughout the year the output of Connellsville coke was below that for 1916, and the byproduct output was at times seriously curtailed through lack of coal.

The largest increase in demand and in consumption was in general industry. Comparable figures collected and compiled for the United States Fuel Administration show that the increase in consumption in 1917 over 1916 by manufacturing and industrial plants consuming about 60 per cent. of the bituminous coal in that part of the country east of Illinois and north of Maryland (exclusive of New England) was between 14 and 15 per cent.

The percentage increase shown by these figures, by states, are as follows:

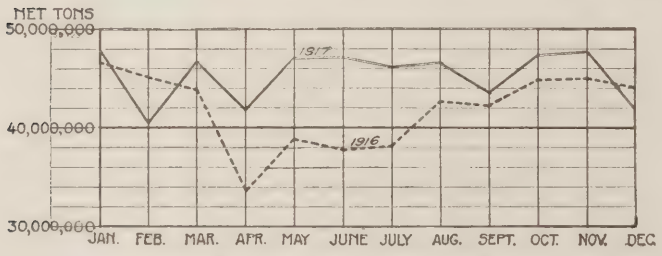
State	Percentage	State	Percentage
New York	4.9	Maryland	21.4
Pennsylvania	21.6	Ohio	15.4
New Jersey	16.8	Michigan	6.9
Delaware	31.4	Indiana	9.1

Weighted average increase, 14.6 per cent.

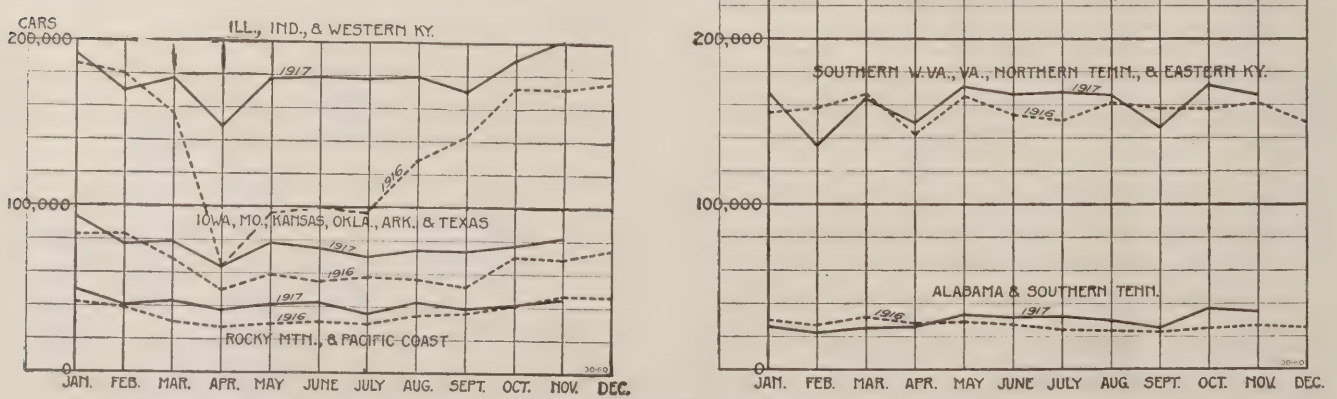
These figures are of course subject to modification as more complete returns become available.

It is significant that the territory reporting the largest increase in consumption—namely, the Atlantic seaboard from Baltimore to New York—is the region in which the shortage of coal, during the past few months, has been the most acute, and that the coal fields on which this territory depends mainly for its supply; that is, those in central Pennsylvania, Maryland and West Virginia, did not show a gain in proportion to that of the country as a whole.

In explanation of this it is to be noted that the



MONTHLY OUTPUTS IN 1916 AND 1917



COMPARATIVE PRODUCTION IN DIFFERENT COAL-PRODUCING DISTRICTS BY MONTHS

coal for consumption in the region supplied by Pennsylvania, Maryland and West Virginia was about 4,000,000 tons in excess of the gain in production in those fields because coal for the Northwest via the Lakes, and coal for foreign export and foreign bunker from the producing districts of Pennsylvania, Maryland and West Virginia was less by that amount in 1917, compared with 1916.

The most notable gain, and the greatest in total tonnage, was in Illinois and Indiana. In Alabama production beginning in May was greater than in the corresponding months of 1916; in all the coal-producing states west of the Mississippi production in 1917 was at a higher rate than in 1916, and Michigan recorded an increase.

The World's Coal Production

Much interest attaches to a comparison of figures on world coal production compiled in the normal period just preceding the war by the Research Division of the Bureau of Foreign and Domestic Commerce.

These figures show that Belgium, small as it is in territory, had the second largest per capita coal consumption. This evidences the wonderful industrial activity of Belgium, especially as a great deal of its industrial work involves hand labor.

The United States has been producing practically twice as much coal as the next largest producer, the United Kingdom, and more coal than the United Kingdom, Germany and France combined. England and Germany were important exporters of coal before the war period, supplying much coal to the West Indies and South America who now obtain it from the United States.

Canada has imported heretofore more coal than it has produced. Austria-Hungary has also been a heavy importer of coal as well as Italy, Sweden and Spain. Japan has been a fairly heavy exporter, and Belgium in its earlier days both imported and exported in considerable quantity. The production and per capita coal consumption of the nations of the world is as follows:

Countries	Annual Production Tons	Consumption Per Capita Tons
Australia	11,730,000	1.17
Austria-Hungary:		
Austria	15,544,000	
Hungary	1,269,000	0.52
Belgium	22,603,000	3.35
British India	14,706,000	0.50
British South Africa:		
Cape of Good Hope	67,000	
Natal	2,469,000	
Orange Free State	469,000	0.95
Transvaal	4,243,000	
Canada	12,958,000	3.32
France	39,745,000	1.48
Germany	172,065,000	2.12
Italy		0.28
Japan	17,349,000	0.24
New Zealand	2,178,000	2.23
Russian Empire	25,998,000	0.19
Spain	3,605,000	0.31
Sweden	355,000	0.96
United Kingdom	260,416,000	3.83
United States		

The Bureau of Foreign and Domestic Commerce also notes that the definitely known coal deposits of the world total 716,154 million (metric) tons, and the probable and possible coal deposits are 6,682,139 million (metric) tons.

The total of the definitely known deposits, the probable, and the possible deposits, is therefore 7,397,533 million (metric) tons. Of this total, Australia has 170.41 billion, Asia 1,279.58 billion, Africa 57.85 billion, America 5,105.53 billion and Europe 784.19 billion metric tons. Thus, America has about seven tenths, Asia not quite two tenths, and Europe about one tenth of the world's coal supply.

The following figures represent coal deposits of Europe in millions of metric tons:

Country		Country	
Germany	423,356	Bulgaria	388
Great Britain	189,530	Italy	243
Russia	60,106	Sweden	114
Austria-Hungary	59,169	Denmark	50
France	17,583	Greece	40
Belgium	11,000	Roumania	39
Spain	8,708	Portugal	20
Holland	4,402	Spitzbergen	8,750
Serbia	529		
		Total	784,190

The principal coal deposits of North America are held by the United States with 3,838,657 and Canada with 1,234,209 millions of (metric) tons. It is calculated that the entire coal supply of the world will be exhausted in 2000 years.

Workmen's Compensation Awards Are Higher Than in 1916

Accident reports indicating the injury of 232,425 workers in Pennsylvania were received during the year 1917 by the Department of Labor and Industry, according to an announcement made by Acting Commissioner Lew R. Palmer. Of the total number of injured workers, 3152 died from their injuries, an average of approximately one death for every 74 industrial casualties reported.

From the accident records compiled in the Bureau of Statistics and Information, and Bureau of Workmen's Compensation of the Department of Labor and Industry, up to Jan. 1, the total amount of workmen's compensation awarded and paid for industrial fatalities and disability cases in 1917 amounts to $7,161,094. The same total in 1916 was $4,224,875.

The total amount of compensation paid in nonfatal cases during 1917 was $2,480,581, while $645,281 was paid in fatal cases. Compensation awarded in fatal cases during 1917, and payable during a term of years, was $4,680,513, an average of $2272 compensation cost for each industrial accident.

Compensation costs for permanent disability of workers during 1917, according to agreements filed in accordance with the compensation law, are as follows: Loss of hand, 182 cases, total cost, $259,943; loss of arm, 52 cases, total cost, $84,866; loss of foot, 71 cases, total cost, $108,616; loss of leg, 49 cases, total cost, $81,753; loss of eye, 447 cases, total cost, $475,954.

The total number of workmen's compensation agreements approved during 1917 was 75,076. The same total in 1916 was 54,500. Of the 1917 agreements, 73,016 covered nonfatal cases, while 2060 were for fatal cases. Claim petitions for compensation filed in 2964 cases during 1917 were referred to referees and disposed of as follows: Awards, 799; disallowed, 650; dismissed, 993; withdrawn, 228; pending, 294. During the year 1916 there were 1730 claim petitions filed. Other petitions filed during 1917 include 612 for termination; 337 for modification and a total of 112 for reopening of cases.

The National Coal Association

By J. D. A. MORROW
General Secretary, National Coal Association, Washington, D. C.

A CONCRETE realization of a long deferred hope is the National Coal Association. For years coal men felt that a national organization would be distinctly beneficial, but it was not until the industry came under Government control that such an association was formed. The National Coal Association began its work about Oct. 1, 1917. Its membership is composed primarily of local associations of operators such as the Indiana Coal Trade Bureau, the Pittsburgh Coal Producers' Association, the Central West Virginia Coal Operators' Association, and other similar organizations throughout the producing fields. In addition it has individual members in fields where there are no local associations or where it is not practicable for some good reason for a company to hold membership in a local association. It is the desire of the association to include every coal operator in the United States, and the door to membership is always open. When first organized its members had a total annual production of approximately 120,000,000 tons; at the present time, the annual output of its members is 300,000,000 tons, and this total is increasing every day.

The affairs of the association are managed by a board of sixteen directors, intended broadly to represent the larger producing districts. Its purposes are two-fold: First, to give the United States Fuel Administration and other agencies of the Government the fullest coöperation and assistance in the present national emergency; and second, to carry on constructive work of definite and substantial benefit to the industry.

With peace it is now expected that the industry will return to private control, as before the war, but it is hoped that a better understanding will have been established between the coal producers and the authorities in Washington which will be lasting, and it is certain that in the readjustment of industrial activity in the United States after the war the National Coal Association may be of great value to every producer of coal.

Information Service to Members

One of the most important features of the association's work is its information service. This service endeavors to inform the members accurately as to developments in Washington which affect their interests. They are informed of Fuel Administration rulings and announcements, reports of the Federal Trade Commission, the Internal Revenue Bureau, the Interstate Commerce Commission, and of other governmental agencies which affect the industry, through the *Daily Digest*, which publication is mailed to each member every day.

The information service also undertakes to answer specific inquiries of members for information. Another branch of its work is the dissemination of facts of general educational value to the public. The association collects from its member associations telegraphic advice daily as to the car supply and car shortage, and conditions of railroad transportation in their respective districts. This information is assembled daily into a report which is utilized by the Fuel Administration, the Director General of Railroads, the Interstate Commerce Commission, and other Governmental bodies, in the effort to obtain improvement. This material is also utilized in press announcements and statements emphasizing the causes of the coal shortage, giving an accurate portrayal of the conditions in the coal-producing districts and impressing upon the public the all-important fact that the failure to obtain coal is not due to any fault or incapacity of the mine operators, but has been directly and solely due to the failure to furnish sufficient transportation to the mines.

This is typical of the educational work which the information service is carrying on. It is undertaking to make the public understand the difficulties and costliness of coal production under present conditions so that the consumer will have a better understanding of the fact that mine prices for coal must be, of necessity, higher than heretofore, and that after all the price paid to the mine operator is but a small proportion of the final cost to him.

Association Has Traffic Department

It is the conviction of every enlightened coal operator today that the unfortunate public sentiment toward coal operators is due largely to a misunderstanding of the conditions under which they are now working, and that the only cure is to give the fullest publicity to the facts. The National Coal Association is undertaking this work.

In order to obtain better treatment for the coal-mining industry from the railroads the association has organized a traffic department. It has been contended by coal producers for months that the industry was being discriminated against in favor of other classes of shippers. The traffic department has been instrumental in bringing convincing facts in support of this contention to the attention of Dr. Garfield, Judge Lovett, the Director General of Railroads and the Interstate Commerce Commission. Moreover, many matters relating to embargoes, mine supplies, mine ratings, car distribution, railway fuel supply, priority and other general transportation and traffic features are being constantly brought to the attention of the various Federal, state and local boards and commissions, all for the purpose of assisting in increased production of coal.

One of the fundamental causes of the extremely difficult competitive conditions which have previously prevailed in the coal business was the lack of proper cost-accounting methods on the part of the producers. That condition still prevails, and unless remedied will be the cause of as much trouble in the future as in the past. The National Coal Association has had a splendid committee of coal cost accountants and practical coal men devising a cost-accounting manual for the use of the industry. It is desired to make this manual conform as closely as possible to the form of report required by the Federal Trade Commission. When that report form is issued the committee will publish its manual and the association will establish a cost-accounting department to assist local associations and individual operators.

Connellsville and Byproduct Coke Industries in 1917

By B. E. V. LUTY
Pittsburgh, Penn.

SYNOPSIS—*The year 1917 was at once profitable and unpleasant. The production from the Connellsville region has steadily decreased because of insufficient transportation. The byproduct production on the other hand steadily increased with good prospects of still further large advances to be made in the coming twelvemonth.*

THE Connellsville coke industry had a remarkable career in 1917—one that was profitable indeed, but not altogether pleasant. It was late in November, 1916, that the railroads first failed to move all the Connellsville coke that required movement, and from then until the end of 1917 there was no time at which the coke movement was adequate to the requirements of consumers, chiefly the blast furnaces of the Pittsburgh Valley and Lake front districts.

By the beginning of 1917 spot furnace coke had already advanced to $10 a ton, and at no time in the early months of the year did it drop much below that figure. Just after Independence Day there were sales at $16, the top point not only in 1917 but in the whole history of the Connellsville coke industry. There were a few contracts in force for the first half of the year at $2.75, secured by consumers who had had the courage, the preceding September, to enter into contracts at such a high price. Those who did not have the courage paid the other prices.

Why Was There a Shortage of Coke?

There was a question all the year why there was not more coke and the various interests answered the question each according to his fashion. Consumers were strongly inclined to the opinion that the operators were purposely restricting production and the only flaw in the argument was that that would be the first time Connellsville operators had ever been able to agree among themselves on anything. The operators attributed the scant production at one time to labor shortage and at other times to car shortage.

In June the priority authorities at Washington issued an order on the railroads in favor of the movement of Connellsville coke, but there were no discernible results. The railroads insisted that when they furnished more cars the coke operators did not load them, the coke operators rejoining that their labor had migrated to other employments when there were not enough cars, and that the only thing to do was to continue full car supplies until the labor could be gotten back. Toward the close of the year the operators insisted that they had ample supplies of labor, but by that time the railroads were powerless to do anything, all divisions being badly congested.

Statistics presented by the Connellsville *Courier* of shipments from the Connellsville and lower Connellsville region will show how the movement fell off in 1917. The figures refer to net tons:

	1916	1917
First quarter	5,613,831	4,422,714
Second quarter	5,641,215	4,821,399
Third quarter	5,326,192	4,574,772
Fourth quarter	5,073,264	3,987,296
Year	21,654,502	17,806,181

The decrease from 1916 to 1917 was 17.7 per cent., while the decrease from the best quarter of 1916 to the poorest quarter of 1917 was 29.4 per cent.

Decreased Pig-Iron Production

In 1916 about 45 per cent. of the coke consumed by iron blast furnaces was Connellsville. The blast furnaces of the country operated practically full, the total production of pig iron, including small quantities of anthracite and charcoal iron, being 39,434,797 gross tons. In 1917 the production was about 38,600,000 tons. There should have been a large increase, for in 1916, in May and later, four new blast furnaces were completed, and in 1917 14 additional furnaces were finished, the major portion of them in the middle months of the year. The 18 new furnaces had a capacity to produce more than 3,000,000 tons of pig iron, and it is safe to assert that if there had been a full supply of coke throughout the country the 1917 pig-iron production would have been 41,000,000 tons.

There was some shortage of coke apart from the shortage of the Connellsville product, but if the Connellsville region had shipped as much coke in 1917 as in 1916 there would have been plenty for all the furnaces. The region was not really required to ship altogether as much, because a number of furnaces that had been depending on Connellsville coke completed byproduct ovens. In several cases, however, they took Connellsville coal instead, and the railroads had to haul that coal, so that it would not be fair to blame the shortage of coke entirely upon the railroads, even though it were proved that the coke works would have been able to ship the coke if the cars had been provided.

Government Prices

The Lever, or "food control," act approved Aug. 10, 1917, empowered the President to fix prices on coke. He had no such authority with respect to iron and steel, except such as would be bought by the Government. An agreement was sought with the iron and steel producers, on the basis of their naming "one price for all," the Government, its Allies and the general domestic trade. A meeting of the iron and steel interests was called for Sept. 21, the coke producers being also invited. The War Industries Board sought the lowest prices the producers would offer, and a schedule was drawn up covering certain prices for iron ore, pig iron and steel products, coke being included, at $6.50. This schedule was presented to the President, and on Saturday, Sept. 22, it was confidentially announced to those

who had remained in Washington that the President had approved the iron and steel prices, but had cut 50c. off the coke price. On Sept. 24 public announcement was made by the Government.

Thus it was the President who set the price of $6 on coke. It was not an agreement, as $6.50 was the price the coke producers had agreed upon. The Lever Act did not prescribe the manner in which the President should reach his decision, nor the manner in which he should announce it. The quibble that a few coke operators afterward raised, that they were not bound by the $6 price, did no credit to their intelligence, and still less to their patriotism.

On Nov. 10 the Fuel Administration made its own announcement, fixing maximum prices on beehive coke east of the Mississippi River, at $6 for furnace, $7 for foundry, 72-hr. selected, and $7.30 for crushed, over 1-in. On Nov. 21 byproduct coke prices were announced, except for New England, at the following base prices: Run of ovens, $6; selected foundry, $7; crushed, $6.50, the freight from the nearest competitive beehive production to the byproduct ovens to be added to these base prices to arrive at the price for byproduct at the byproduct ovens. On Nov. 27 a special rate was made for New England byproduct coke, there being an extra allowance of 7c. per ton of coke for each 5c. per ton of coal over 60c. per long ton of water freight on the coal used. On Dec. 31 it was prescribed that the prices already set should continue, with the mandate that "no producer or vendor of coke shall ask, demand or receive a higher price than the maximum price established by order of the Fuel Administration for any coke delivered on contracts or sales on or after Sept. 24, 1917."

Byproduct Coke Industry Growing

The following table shows approximately the growth of the byproduct coking industry in the past four years, the figures referring to the number of retorts:

	Increase	At Close
1914	321	5,809
1915	459	6,268
1916	488	6,756
1917	739	7,495

At the end of 1917 there were about 1700 byproduct ovens being built, fully three-fourths of them being expected to be completed during the first half of 1918.

In the past two years the average output per oven has been approximately 3000 short tons a year. Making allowance for lost time not caused by conditions at the byproduct plant itself the capacity would be several hundred tons greater. Inasmuch as some of the ovens are quite old, as byproduct progress goes, the most modern plants undoubtedly have a capacity of fully 4000 tons a year.

The largest byproduct plant in the world is being built at Clairton, Penn., by the Carnegie Steel Co., and yet the plant being built, comprising 640 retorts, is only one-half the size of the plant as contemplated eventually. It is expected that the 640 ovens will be completed about Apr. 1, 1918. The estimated output is 2,740,000 short tons of coke a year, equal to 4280 tons per oven. The coal consumption is figured at 4,100,000 net tons, showing the modest expectation of a 67 per cent. recovery. Apart from the standard coke to be made it is expected there will be produced 245,000 tons of coke breeze, 43,000 tons of sulphate of ammonia, 37,500,000 gal. of tar and 9,000,000 gal. of light oil. The surplus gas, which will be used at the company's steel works in the neighborhood, is set at 60,000,000 cu.ft. a day, or nearly 7000 cu.ft. per ton of coke produced, almost double the expectations of a few years ago on the basis of the coal then in favor.

Apart from its size this plant is of particular interest. The Steel Corporation, although it owns Connellsville coke ovens, and many of them, had lighter blast furnace operations in 1917 than almost any other important interest, by reason of there not being enough coke, the shortage being attributed to insufficient railroad service. The Clairton plant will provide much more coke than the amount by which the Steel Corporation has been short and it will provide it without requiring any service whatever on the part of the railroads, as the coal will be brought to Clairton by water and the coke will be moved by the Carnegie Steel Co.'s own railroad to its nearby blast furnaces.

Connellsville Coke in 1917

The Connellsville coke region never operated for a continuous twelvemonth under so great a stress as during the year 1917. The demand for its product exceeded in volume any previous experience, and continued for a longer period. Stimulated by phenomenal prices; harassed by a labor shortage; held down by inefficient operation of plants and by interrupted and inadequate transportation—under all these handicaps the region has made a record and maintained its supremacy as a producer of the standard metallurgical fuel of the world.

Although the Connellsville region's output of 17,806,181 tons of coke in 1917 was less by 3,848,321 tons, or 13.1 per cent., than in 1916, its value was $111,288,631, which is $55,520,016, or 99.5 per cent. more than the value of the output of 1916.

The Connellsville and Lower Connellsville regions produced coke in relatively the same proportions in 1917 as they did in 1916—namely, 54 per cent. by the former and 46 per cent. by the latter. The operating conditions which prevailed during the year may possibly be well expressed in the words of a plant manager who stated: "Have all our ovens fired and are running them the best we can."

The following table notes in detail Connellsville production:

PRODUCTION OF CONNELLSVILLE COKE—BOTH REGIONS—FOR 1917

	Merchant	Furnace	Total Tons	Connellsville Region	Lower Region	Both Regions
January	597,765	966,408	1,564,173	877,313	686,860	1,564,173
February	518,254	770,509	1,288,763	686,908	601,855	1,288,763
March	614,119	1,004,850	1,618,969	918,226	700,743	1,618,969
April	594,506	963,741	1,558,247	868,796	689,451	1,558,247
May	616,622	1,033,367	1,649,989	912,035	737,954	1,649,989
June	580,616	983,000	1,563,616	859,947	703,669	1,563,616
July	581,154	958,777	1,539,931	841,354	698,577	1,539,931
August	598,931	956,004	1,554,935	842,130	712,805	1,554,935
September	566,145	898,055	1,464,200	784,884	679,316	1,464,200
October	584,060	925,843	1,509,903	809,667	700,236	1,509,903
November	535,583	814,791	1,350,374	721,190	629,184	1,350,374
December	481,255	740,002	1,221,257	680,468	540,789	1,221,257
Total	6,869,010	11,015,347	17,884,357	9,802,918	8,081,439	17,884,357

As regards oven activity, both the merchant and furnace interests began the year with 89 per cent. of their ovens in blast, increasing slightly to a maximum in midsummer and dropping off gradually toward the close of the year.

Never before in the history of the Connellsville coke trade has coke been delivered at such widely varying

prices as during 1917. The average price realized for the furnace and foundry coke shipped from the Connellsville regions during 1917 was $6.25 per net ton at the ovens. Compared with the average of $2.58 for 1916 output, the increase was $3.67 per ton, or 142.2 per cent. over the previous year.

The transportation situation dominated the oven activity, for only once did the car supply really catch up with the region's capacity to produce; and that satisfactory state of affairs was merely a matter of about ten days. The car supply maintained from month to month an average rarely exceeding 65 to 70 per cent., some months falling to 54 per cent. and lower. Because of the chronic shortage of cars the actual operating efficiency of the coke plants was rarely above 70 per cent. and most frequently around 60 to 65 per cent. of the region's capacity.

Governmental regulation of the price of coke was effected on Sept. 24 when it was announced on behalf of the President that the coke price would be $6. It was not until Nov. 10 that the Fuel Administration settled the question of a differential on foundry coke announcing $6 for furnace, $7 for foundry coke (72-hour selected).

One of the most important achievments in the history of the Connellsville region was brought about after numerous hearings before Government commissions. This was the removal of all differentials against the Connellsville regions eastbound and westbound on both commercial and Lake cargo coal—thus securing more equitable freight rates on coal shipped to the byproduct coking plants in both eastern and western sections of the United States.

Coal Production in the United States in 1917

The following table has been compiled largely from data communicated by the various state mine inspectors, estimates having been made only where no such statistics were available, but in all cases upon the basis of reliable information:

PRODUCTION OF COAL IN THE UNITED STATES

States	1916* Quantity, Short Tons	1917 Quantity, Short Tons
Alabama	18,086,197	21,000,000
Alaska	13,073	61,000
Arkansas	1,994,915	1,867,802
California, Idaho and Nevada	7,240*	5,000
Colorado	10,484,237	12,433,129
Georgia	173,554	135,000
Illinois	66,195,336	(e) 85,700,000
Indiana	20,093,528	25,013,021
Iowa	7,260,800	7,500,000
Kansas	6,881,455	7,500,000
Kentucky	25,393,997	26,125,000
Maryland	4,460,046	4,000,000
Michigan	1,180,360	(a) 1,308,947
Missouri	4,742,146	5,000,000
Montana	3,632,527	(c) 4,400,000
New Mexico	3,793,011	(b) 4,113,544
North Dakota	634,912	689,000
Ohio	34,728,219	38,000,000
Oklahoma	3,608,011	3,861,697
Oregon	42,592	43,000
Pennsylvania, bituminous	170,295,424	170,209,231
South Dakota	8,886	10,848
Tennessee	6,137,449	6,500,000
Texas	1,987,503	2,650,000
Utah	3,567,428	4,051,210
Virginia	9,707,474	(c) 9,000,000
Washington	3,038,588	3,965,000
West Virginia	86,460,127	(a) 79,806,652
Wyoming	7,910,647	8,847,748
Total bituminous	502,519,682	533,796,829
Pennsylvania anthracite	87,578,493	99,604,960
Grand total	590,098,175	633,401,789

* United States Geological Survey figures. (a) For fiscal year ending June 30. (b) Fiscal year ending Oct. 31. (c) Fiscal year ending Nov. 30. (e) Estimated.

Minecdotes

The Story of the Helpless Helper

The superintendent and the master mechanic were in the shop arranging for the repair of a broken casting when they were interrupted by a helper asking information over a trifling detail in regard to the repair job he was working on. After the master mechanic had explained at length, and the man had left, the former remarked with a sigh: "I declare, I wish I knew what to do with such fellows as that. He is a hard worker; always does what I tell him, but I swear he can't screw a nut on a bolt without I make a plan of it for him."

"Let me tell you a little story," replied the superintendent, "and maybe it will help you out. Several years ago I had a job as mine boss in a mine in New Mexico, and as it only rained down in that country about once every two years, the company had a couple of men—*mozos* they call them down there—to water the grass and take care of the yards around the houses.

"Well, the fellow I had was an old Mexican who would do anything in the world you told him—provided you told him often enough. I suppose he had watered the grass for 20 years, but nevertheless I would still have to tell him every day to water it.

"Finally, I got peeved at him one day when I found him piddling around instead of doing his work, and proceeded to bawl him out. I told him that the first day I had to tell him to water the grass again I was going to get rough with him, and I meant it.

"Well, everything went along smoothly for a month or so and old Poncho was as regular as a clock. I did not have to tell him once. Then a miracle happened one day; it started to rain, a good soaking downpour, and when I went home about five I be dog-goned if the old sinner was not out in the yard in all the wet still watering the grass!

" 'For the love of the Virgin, Poncho,' I told him, 'what in the world do you want to water the grass for when it rains?' "

" '*Pues, Senor,*' he says, 'didn't you tell me if I didn't water it every day you would knock my block off?' "

"I told him that maybe I had, but that the Good Lord had provided him a head, even if it was empty, to use in such emergencies. So you see Poncho was like lots of men who get the habit of allowing the other fellow to do their thinking for them. That is the trouble with your helper. I expect if you would refuse to allow him to depend on you for every little detail and make him work out his own problems, even if he makes mistakes some times, it would make a better man of him."

[*Coal Age* will pay for and publish anecdotes such as the foregoing, provided the stories are of the mine and have the proper coal-mining "flavor." If they point a moral, so much the better. Dig down into your experiences and share with the many readers of *Coal Age* the humorous incidents you have witnessed in your duties around the mine, whether it be above or underground.—Editor.]

The 1917 Coal Trade of the Northwest

By W. L. KIDSTON
Seattle, Wash.

SYNOPSIS—*The Northwestern coal industry during 1917 rose from the estate of pauper to that of prince and was then dethroned, through Government price fixing. The year was an active one and scarcely ever did the supply equal the demand.*

WHILE the coal trade was probably the first industry in the Northwest to feel the effects of the world war, the stimulation of greater demands did not make itself apparent until well along in 1916, or until the orders for manufactured goods which flooded the Eastern markets began to overflow toward the West. It was not therefore until the commencement of 1917 that coal mine operators in the Northwest began to materially increase the production of their mines in order to meet the ever-increasing orders for fuel from new and enlarged manufacturing plants and transportation companies.

New flour mills were established and existing ones were enlarged, the shipbuilding industry in Seattle alone increased from $5,000,000 in 1916 to $150,000,000 worth of ship contracts in 1917; the copper and other metalliferous mines of the Northwest increased their production tremendously, practically the entire cycle of industry suddenly found every wheel turning and the consequent demand for the fuel to turn them as suddenly increased. Railroads were taxed to capacity and every available car and locomotive was placed in service. High rates for coastwise and overseas tonnage drew idle ships from their berths and brought every hull which would hold together from the tideflats of the Coast to be converted into steam cargo carriers. The increased coal consumption of railroads and ships alone taxed the operators and the early months of the year witnessed demands greater than the supply. This was accompanied by a steady increase in coal prices.

Coal Has to Compete with Fuel Oil

For years it has been freely predicted that the coal mines of the Northwest would go out of business as a result of the development of hydro-electric energy and fuel oil, and as a matter of fact coal production has shown a reduction from year to year. With coal from British Columbia entering the Northwest duty free and selling at lower prices than local operators could produce it, added to the encroachment upon its natural field by oil and electric energy, and the gradual increase of wood as a fuel, the coal business of the Northwest previous to 1917 faced a doubtful future.

Coal was an enigma. Late in 1916 the California oil fields began to experience a greater demand than they could supply and gradually curtailed their shipments to the Northwest. The placing of huge orders for fuel oil for the Navy caused a sudden withdrawal of this fuel and this section suddenly realized it was in for a cool winter if sufficient coal could not be secured. As a result there was a wild scramble for what was then literally "black diamonds." Apartment houses, industrial plants and others hastily converted their boilers to coal burners, pocketing their chagrin, and in some cases huge expense, with as good grace as could be expected under the circumstances.

Labor strikes in British Columbia tied up production, the Canadian coal surplus was needed at home and shipments across the border ceased almost entirely. Northwest users of British Columbia coal were cut off from supplies at a time when their plants were running to capacity and making greater profits than ever before.

"Local Mines Will Come To Rescue" stated a headline in a Seattle newspaper, and the Washington coal operators enjoyed another laugh for already their mines were producing to capacity. The demand on Northwestern mines increased over 50 per cent. in the first three months of 1917 and this had mounted to 100 per cent. in the first six months and the prophecy of *Coal Age*, in the July 21 issue, that "The Washington coal field soon will be asked to supply eight or ten million tons of coal annually instead of three or four million" appeared a fact.

Coal Comes Into Its Own

Prices began to climb with the indication of a certain shortage. Lumber mills were tied up by a strike for weeks and wood for fuel became scarce. Wood burners began to look to the coal operator, as had all other fuel users who had contributed to the precarious position of Northwestern coal mines in years previous. The coal operator who did not enjoy the humor of the situation thrust suddenly upon him was indeed a sober one unless his sense of the fitness of things had been dulled by months of worry, continual trouble and the constant contemplation of a future which was doubtful in the extreme, or because of the gravity of the situation which early manifested itself.

From the depths of dejection over the ever-decreasing demand, narrowing lines of their markets, labor troubles, increasing cost of production and lower prices for coal, to a full flood of prosperity, with high prices, mines operating full time and orders far in excess of production is the brief summary of the advance of the coal trade in the Northwest in the past twelve months. Verily Old King Coal, after many years of ups and downs came into his own with a vengeance during 1917.

The coal business had hardly recognized its new prosperity when the contract with labor in Washington, with several months yet to run, was broken. The demand was met only to be again broken in a few months and met again until Washington mines were paying a higher scale of wages than any other state in the union and before the year was through Government orders permitted a general wage advance to hit the operators again. During this time two wage advances were made in Montana and one in British Columbia.

Not content with absorbing most of the extra profit in this manner fate decreed that the war demand and quarrels of railroads should take every available railroad car out of the Northwest, and coal production

began to decrease to such an extent that toward the close of the year many mines were operating at 50 per cent. capacity. To put the finishing touch to ups and downs the Government regulation of coal prices came along and administered the knockout punch—almost. Coal, once a pauper, then a king, with all paying homage, is once again at the bottom of the heap, with the consumer, the Government officials and the railroads occasionally delivering a healthy wallop for good measure.

Harassed by all, its profits negligible, it continues to do its "damndest" to get busy, for the operators realize that coal is the one product upon which practically every industry in the Northwest depends and upon these depend, in no small measure, the ships, the food, the clothing, the steel and the supplies the Government needs to prosecute the war.

Operators in a State of Quandary

While the coal operator in the Northwest is being stood on his head until he does not know whether he is running a coal mine as a business proposition or as a charitable institution, he continues to do his bit, the while asking only that he be not legislated out of business entirely for he can see that with a cessation of hostilities in Europe there will be an unprecedented expansion in the coal industry in the Northwest. The enormous expansion of industry will continue to draw upon the coal mines for power during years to come and the coal business will again be back upon the plane from which it has been denied for many years.

While the foregoing is a general resumé there are matters which transpired during the year which deserve special mention such as the adoption of a new mining code in the State of Washington.

As a result of an understanding between representatives of District 10 United Mine Workers of America and the associated coal operators of the state the legislature adopted a new mining code which became effective during the year. It provided sweeping reforms in the coal-mining laws and its adoption marked the achievement of an end to which many years of effort had been devoted.

Previous attempts to secure the adoption of a mining code had been defeated because the mine workers sought to add to it provisions for an 8-hour day "from bank to bank" and a 2,000-lb. ton as a basis of payment. At the last session the Coal Operators Association interposed no opposition to the various mine-safety provisions for the exclusion of the eight-hour provision. This secured its speedy passage. While it has not been in effect long enough to give a report on its success it may be said that it has proved satisfactory so far though the expense to the operators has been enormous.

Evidence of a coal shortage in the Northwest began to manifest itself as early as last April and a more acute shortage was indicated in Oregon, Washington, Idaho and Montana than in any previous year. Dealers in Oregon were forced to turn to Utah mines for adequate supply but owing to the fact that Australia had ceased to ship to California that state began to take 85 per cent. of its needs from Utah instead of 15; higher prices prevailed in California and Oregon consequently suffered.

Washington mines which had produced 2,400,000 tons of coal in 1915 and 3,038,000 in 1916 bid fair to pass the 4,000,000-ton mark with demands approximating 8,000,000 tons, and where before Utah and Wyoming mines as well as those in Montana had been able to supply the Idaho, Montana and eastern Washington markets, shipments from the first two states to California and to points east of Salt Lake City resulted in Idaho and eastern Washington looking to western Washington for their supply. In the third week in November 4,000 tons of Washington coal were shipped out of the state, 73 cars during that week were shipped to Oregon, 10 to Idaho, 4 to California and one to British Columbia.

The state fuel administrator in Idaho estimated that 680,000 tons of coal were shipped into that state from the Utah and Wyoming mines between May 1916 and May 1917 and during the first five months of 1917, 338,000 tons, but shipments were greatly reduced during the next five months. In November 1916 Idaho received 50,800 tons of coal from Utah and Wyoming but in last November this had fallen to 9,400 tons, as a result of California's demands on these mines. In other words, the year's demand in Idaho increased from a little more than 700,000 tons to 850,000 tons with less than 600,000 tons being shipped in 1917 to meet the larger figure of demand. It is likewise estimated that the demands next year will be increased 30 per cent.

Winter needs of eastern Washington, which are between 90,000 and 110,000 tons, are usually met by the Utah and Wyoming mines, but owing to the discontinuance of shipments from that district the demand will have to be met by Montana and western Washington mines.

While the 1917 production of British Columbia coals will equal if not exceed the production of 1916, the demands were greater by 40 per cent. last year. The production for the first ten months of last year follows: January, 197,636 tons; February, 212,050; March, 244,145; April, 167,033; May, 155,617; June, 150,870; July, 192,610; August, 218,037; September, 195,487; October, 230,996, a total for 10 months of 1,962,481 tons as compared with 2,026,672 tons for all of 1916 and 1,611,130 tons for all of 1915. Production for 1917 is considered remarkable in view of the fact that the coal mines in the Crow's Nest district were tied up wholly or in part during April, May and June.

Union Pacific Withdraws from Market

During the early summer the Union Pacific Railway Co. withdrew from the commercial market, stating that it would use for its own engines practically all the output of the Rock Springs district of Wyoming. This threw a greater burden upon the Montana mines whose output has been estimated as being almost 800,000 tons above the output of 1916. In April the Oregon Short Line refused to supply the Denver & Rio Grande Ry. with its cars, and while action was taken to compel their release nothing definite was done and the car shortage became acute. Without cars the mines of Montana toward the latter part of the year had to curtail production, some as much as 50 per cent. The Rock Springs district of Wyoming during the month of October operated to but 30 per cent. of capacity. It is variously estimated that had the car supply been adequate the mines of Montana would have produced

over 1,000,000 more tons last year than the year previous.

Although coal was selling for $2.40 a ton at the Utah mines in May an offer of $3.50 a ton for 10,000 tons to supply western Idaho was refused because of the lack of cars. Prices in Boise at that time were $9.70 a ton for lump coal and $5.75 per ton for screened slack delivered.

Prices in Washington at the mine in May were: Carbonado steam stoker, $3.25; Mendota mine-run, $2.88; South Prairie mine-run, $4.85, steam, $4.75; Wellington steam, $3.03; Roslyn pea, $3, mine-run, $5; Renton mine-run, $4.70.

Government officials in Oregon in June placed orders for Washington coal at the following mine prices: Black Diamond steam, $3.50; Carbonado steam, $3.50 per ton.

Estimates made in that month gave the 1917 value of coal to be used in Washington as $8,000,000 as compared with $5,000,000 in 1916 and as a result of demand all dealers went on a cash basis June 1 and the railroads announced that coal for retail would not be forwarded after Aug. 1, which immediately resulted in another upward boost to price. An order for Nanaimo Wellington lump was placed at $6.25 and one for Carbonado lump at $6.65 per ton at Everett, Wash.

Prices in Seattle at the time which did not include delivery charges of from 75c. to $1 were as follows: Newcastle mine-run, $5.50; Renton steam, $4.10; Renton lump, $6; Wingate steam, $4.90, lump, $7.75; Grand Ridge, mine-run, $4.25, lump, $5.40; Black Diamond steam, $4; South Prairie, $4.50. Prices the year before in June were: Renton steam, $3.85, lump, $5.50; Newcastle mine-run, $5; Wingate steam, $4 and lump, $5.55.

Prices in Idaho rose 60c. a ton between May 1 and June 1, and on the last-mentioned date dealers announced a further advance of 50c. a ton, effective July 1. The cheaper grades of coal on June 1 were selling at from $5.50 to $8 a ton as compared with $4.50 and $6 the same month in 1916. On July 1 prices went to $6, $8.50 and $8.75 a ton.

Dealers Refuse to Make Long-Time Contracts

Coal in Seattle advanced 50c. a ton on July 1. Portland dealers quoted the city departments the following prices on that date: Tono lump, $7 per ton; Carbon Hill fire engine coal, $12; Carbon Hill steam, $8. At the same time the year before prices on the above were from 50c. to $1.50 less. On this date coal dealers throughout Oregon announced that thereafter no orders would be taken for any coal on specified amounts or delivery nor would the price be guaranteed for more than 10 days.

During July the price of coal in British Columbia advanced $1 a ton, the second advance of that sum since May 1. Lump coal sold at $9 and nut at $8 a ton.

On Aug. 1 steaming coal advanced $1 a ton in Seattle at the bunker tips, going from $4.50 to $5.50 a ton as compared with $3.50 at the end of the winter of 1916.

On Sept. 22 C. S. Magrath, fuel controller for the Dominion of Canada, fixed coal prices at Vancouver as follows: Screened, delivery in sacks, $8.50 a ton; screened at wharf, $7.50, delivery in bulk, wagonside, $8; at wharf in bulk, $7 a ton. Lump prices were the same.

Reports during July and August in the Northwest of the proposed fixing of coal prices discouraged the purchasing of coal until some definite announcement was made by the Government, the impression being general that prices would be much lower with the result that at a season of the year when consumers were usually laying in their winter's supply of fuel little if any coal found its way into the consumers' bins. The panic communicated itself to the dealers who refused to store in the face of possible lower prices with the further result that less coal was on hand in the Northwest during July, August and September than in any other like period in its history.

Fixed Prices Cause a Wild Scramble

With the announcement of coal prices as fixed by the Federal Government a wild scramble resulted but few orders were filled because of lack of supply. Some orders then placed were only being cleared up in December. Mines in the meantime had curtailed production because of the lack of demand and at a time when hundreds of railroad cars could have been made available few were used. But in August when cars were unavailable for coal, as they were then carrying perishables, the demand for coal suddenly mounted as the result of price fixing. The operators were then unable to secure enough cars to meet the demand.

To further complicate matters the Government indicated its intention of further changing the price scale and as the public was ready to believe the revision would be downward it again withheld its orders at a time when it might have been supplied without undue trouble. Instead of prices being lowered they were raised. The original prices for Washington of $3.25 for mine-run, $3.50 for prepared sizes and $3.20 for slack or screenings were increased to $3.70, $3.95 and $3.45 respectively, with prices in King and Pierce Counties of $4.15, $4.40 and $3.75. Montana prices were increased from $2.70, $2.95 and $2.45 to $3.15, $3.40 and $2.90. Still later prepared sizes advanced to $4.05, a price higher than had ever prevailed in the state before.

The Government disregarded entirely the difference in prices that has been attached to the various grades of coal. While fixing the price at the mines for run-of-mine, the premium commercially placed on lump, egg and other prepared sizes was reduced. Simultaneously, the price chargeable by the mines for slack and screenings which formerly was almost nominal was radically increased under the Government rates. The theory no doubt was that the householder would be given the benefit of increased charges to industrial plants and establishments which have used the lower grades of coal at nominal prices. The mines unable to get the higher price with consumers demanding prepared sizes, which were but little more in price, practically discontinued shipping anything but run-of-mine. In consequence the fuel user is getting a much inferior grade of coal than formerly and is paying a high-quality price. The Government price fixing on coal is not a popular subject with the Northwestern man who pays the bills this winter.

Following the Government price setting local com-

mittees throughout the Northwest set the retail prices for the various cities based on the price of coal at the mine, plus transportation charges with a margin of profit no greater than obtained in July and in no case to exceed 30 per cent.

The final adjustment of coal prices in the Northwest resulted as follows in Seattle, the prices quoted being delivered to the nearest district from the bunkers. The top price is that set for the district difficult of access and prices for other districts ranged between:

Black Diamond lump, furnace mixture, $7.68@8.75; Carbonado lump, $8.75@10.25; furnace, $7.70@8.70; Gale Creek lump, $7.45@8.50; Grand Ridge lump, $7.55@8.35; Issaquah lump, $7.55@8.65; pea and screenings, $5.70@6.60; Renton lump, $7.55@8.75, pea and screenings, $5.70@6.65; Roslyn lump, $7.30@8.45; South Prairie lump, $7.50@8.50. The above do not include stowage.

Owing to the great demand for coal during the year and before Government regulation of prices more development of existing mines was undertaken and more new properties were started in the Northwest than probably in any other year in the past 15. Particularly is this true in Washington. Some of this work may be briefly noted as follows: The Washington Portland Cement Co. purchased the Cokedale mine in Skagit County and started development work the latter part of the year. It will use the output in the operation of its large mill at Concrete. The Wenatchee Orchards Land Co. has started the development of a recently discovered coal bed at Moses Coulee. The Pacific Coast Coal Co. of Seattle is reopening the Issaquah mine at Issaquah, Wash. Denny & Denny of Ellensburg, Wash., leased the Tanum coal property near that city and have started a crew reopening the workings which have been idle for several years. Development work has been started by L. R. Abraham T. Jones and John Waugh on a coal property on the White River near Auburn, Wash. The Washington Collieries Co., owned by Frank Waterhouse & Co. of Seattle, has started the development of a newly discovered property near Newcastle said to contain 12,000,000 tons of high-grade coal.

The Anaconda Copper Mining Co. is opening a new coal mine at Tracy, Mont., and will have 100 men at work by Feb. 1. A Great Northern Railway Co. subsidiary, the Cottonwood Coal Co., is doubling the output of its mines at Lehigh, Mont., which are expected to be producing 3500 tons daily by the end of January. New electrical machinery is being installed at the mines of the Merkle Coal Co. at Belt, Mont., which will increase the output from 400 to 1000 tons a day. Robert Smirl has started to open a coal field near Roundup, Mont., and is already selling coal to the farmers in the neighborhood for $3.50 a ton.

The projects noted have all been undertaken within the past four months.

Anthracite in New England in 1917

By G. G. WOLKINS

Boston, Mass.

SYNOPSIS — *Slow and inadequate deliveries, especially by water. Shippers of "independent" coal gradually reduced their tonnage for this market. Many barges diverted into other trade. Some sections well served all-rail. Federal regulation. Increased costs.*

DURING the whole of 1917 shipments of anthracite were slow and in most parts of New England inadequate. The trade no longer had the benefit of the large storage pile that had saved the country from extreme shortage in 1916. It was a case of depending upon the distributors to give this territory a fair quota of the output from day to day. A series of price advances, the considerate attitude of the Government toward anthracite, and the increasing difficulty of getting water shipments were the chief developments.

In general, all-rail deliveries were far better than those by water. On the Boston & Maine R.R. most retailers received 100 per cent. of their average tonnage for 1914-16. The New England railroads handled a considerable tonnage that moved to dealers who had normally depended upon delivery by water. Domestic sizes were railed as far as eastern Maine to make good the deficit, but it was soon found that cars could be more serviceably employed on shorter hauls. One of the largest shippers was able to deliver by water only about 70 per cent. of what had been its normal allotment for New England, although rail shipments from the same source were larger than ever before.

Shipments were exasperatingly slow. The prudent part of the public was so well aware of this that hoarding was typical the first six months. Early in the year broken and pea were the sizes in shortest supply, but by fall it was a question of getting anything. Deliveries from the regular companies on the "circular" basis were entirely inadequate and retailers were obliged to pay the premiums asked for what "independent" coal was available. Water freights were so high that most of the inquiry for individual output was for rail delivery. The volume of other traffic increased so heavily during February and March that anthracite dribbled through in discouraging fashion. At Tidewater, for the same reason, barges were detained at loading ports a week at a time and the assortment of domestic sizes was irregular and unsatisfactory.

New England suffered, too, through enormous demands of the Government and of cities like Philadelphia and New York, and frequently coal intended for this territory was diverted. The Tidewater dealers here leaned so heavily upon water delivery from Philadelphia that interruptions were most disappointing. The cold spell in February was the worst since 1904, eight inches of ice forming on Boston Harbor. It was apparent there would be no chance for dealers to accumulate stocks, at least until mild weather, and probably not then. By April the outlook was poor for anything like normal requirements by water, and there began a wide-

spread scramble to get rail coal. With conditions as they were, it was hard to see how the deficiency could be made up and all sorts of expedients were resorted to in the effort to get supply in any volume. Small tonnages of "independent" were offered. The dull spot near the end of March quickly disappeared, and the "ultimate consumer" tried hard to get his dealer to bind himself on season supply.

During the spring individual operators were selling at the full winter circular on prepared sizes, and the way prices were tending it was felt certain the Government would step in. There were brokers making 50c. per ton on large consignments that involved practically no risk. Egg coal was getting short because of large shipments to gas companies and iron foundries, not to speak of certain railroads, all of whom were using it in place of broken. A large tonnage of hard coal was also diverted for purposes where bituminous would normally be used. Retailers would only accept orders for delivery if and when the coal could be had and at the price current at time of delivery.

The accident to the Mahanoy plane curtailing Reading shipments to Tide and the commandeering of three Reading tugs were heavy blows to this market. Receipts decreased rapidly. All-rail cars were not to be had in quantities required, and the railroads would have been powerless had the cars been forthcoming. Most of the serious aspects were in evidence early in the season. The conservative part of the public was alarmed. By May there were only four companies delivering in barges with any regularity. Through embargoes a large part of northern New England was unable to get domestic sizes. The price of anthracite screenings at retail advanced in Boston from $4 to $6 per net ton, and "independent" stove sold at $7 gross, f.o.b. mines. There was also an advance in Reading barge rates from 75c. to 85c. from Philadelphia—the first advance in more than 20 years.

A large number of dealers in Maine were down to bare boards. Those whose usual sources of supply had withdrawn found it difficult to get cargoes forward. "Independent" shippers preferred to accumulate for small boats in New York harbor rather than try to accomplish shipment in larger bottoms; movement to Tide was erratic. By June 1 several of the "independent" factors that had been active were scarcely heard from, this being largely due to the attitude of the Federal Trade Commission.

The dealers hardest hit were those whose usual shippers had disposed largely, if not altogether, of the barges through which they were in position to name competitive prices. So much coal from these sources had been withdrawn, and the dealer had so little standing with the companies that still continued to ship, that he had been obliged to buy speculative coal to keep in business. Now even this source was failing.

During the rest of the year the situation got progressively worse. A certain percentage was maintained by the larger shippers until October, when there was a marked falling off, both rail and water. December was the lightest month of all.

The strong arm of the Government was evident early in the year through the broad authority granted the Federal Trade Commission. Prices and distribution of anthracite were closely scrutinized through weekly reports, and some pointed questions were asked. The investigation with retail costs was particularly thorough, although mistakes were made in abundance. It was well known, for instance, that the reserves of the larger companies were all that prevented famine a year ago, yet the commission stopped at a comparison of actual mining, drawing inferences therefrom that coal supply would be ample. There were various local flurries over reports as to retail prices, and these paved the way for the appointment of fuel committees under the Lever Act. By the end of the year retail prices had been established officially in most of the cities.

The New England Coal Committee did good service in facilitating rail deliveries during the summer through the so-called "solid train" movement. The aggregate tonnage was not large, but it helped the all-rail territory.

April prices of the Philadelphia & Reading Coal and Iron Co. were 50c. less than the Nov. 1, 1916, circular, but quotations were not so comprehensive as in other years. Broken and pea prices were not announced at that time. The other companies did not follow so closely as in other years. Notice was given that sales were thereafter to be f.o.b. barge at loading port, delivery being at risk of consignee. The wage advance in April foreshadowed a material advance May 1, followed by the usual monthly scaling up month by month to Sept. 1, when the Government-prescribed schedule went into effect. This latter was increased Dec. 1, when a 35c. wage increase was granted. Beginning Sept. 1, operators other than the larger companies named in the order, were allowed to charge 75c. more on domestic sizes.

APPROXIMATE COST OF READING COAL ALONGSIDE BOSTON DURING 1917

White Ash	Jan. 1, 1917	Apr. 1, 1917	May 1, 1917	Sept. 1, 1917	Dec. 1, 1917
Broken	$5.60	$6.13	$6.63	$6.93	$7.61
Egg	6.10	5.63	6.23	6.83	7.51
Stove	6.35	5.88	6.48	7.08	7.76
Chestnut	6.40	5.93	6.53	7.18	7.86
Pea	3.85	4.23	4.73	6.18	6.86

New rules governing demurrage went into effect on Reading barges Nov. 1. On cargo capacity of 1500 tons or less but two days were allowed for discharging, demurrage being 7c. per ton per day, no premium allowed.

Reading barge rates again advanced Nov. 2 from $1 to $1.25 on anthracite to Boston points, and Nov. 1 a war tax went into effect, amounting to more than 7½c. per ton.

Pittsburgh District in 1917

By B. E. V. Luty

Pittsburgh, Penn.

As the Pittsburgh district produces a considerable proportion of the country's total coal output, it is not altogether easy, in a review of the district, to cover the developments that were strictly local in character and exclude those that were of national importance. Indeed, there is no generally accepted definition of what is included in the Pittsburgh district. There are two concrete conceptions as to "Pittsburgh coal." One is coal mined from the Pittsburgh seam, the other is coal originating within the Pittsburgh freight district. One is a genealogical, the other a railroad definition, but in common parlance the term "Pittsburgh" takes on a broader and a much vaguer interpretation. The Geological Survey does not attempt to differentiate. It calmly adopts, when referring to the bituminous coal

production of Pennsylvania, the convenient geographical lines, and gives the state's production by counties.

At the beginning of the year operators were considering the naming of a "circular price" for contracts for the twelvemonth beginning Apr. 1 and were disposed to settle upon $2.75. This price did not seem attractive to buyers, considering that it was about double the normal price and deliveries would not end until a date nearly 15 months distant. Operators were not encouraged to name a price and as time passed and the railroad congestion continued they became less disposed to seek buyers at all, feeling that perhaps the spot market would afford them larger profits and would certainly relieve them of worries, transportation conditions being such that no operator would be safe in selling anything like his entire output.

It can hardly be said that any regular circular price was set at all. Some old contracts were renewed at $2.75, but not as open market transactions, the operators picking those customers who had been the most indulgent with them in the latter part of 1916, when it was impossible to fill contract requirements in full. Other contracts were made at $3 and higher prices as Apr. 1 was approached, the spot market generally ranging from $4 to $5, while toward midsummer it was $5 and higher. When Apr. 1 arrived contracting, as a regular market operation, practically stopped, and such contracts as were made thereafter represented special cases, where buyer and seller chanced to be able to get together. There was considerable contracting after the so-called "Peabody agreement" in June, operators claiming it was no agreement as the Secretary of War and the Secretary of the Navy both repudiated it, and these contracts remained in force after the Fuel Administration set prices.

On Aug. 22 the Fuel Administration fixed prices, the Pittsburgh district price being $2, per net ton at mine, for mine-run, with 25c. less for slack and 25c. more for screened. The revision of prices made in connection with the general wage advance carried all these prices 45c. higher.

Lake Coal Contracts Went Begging

A particularly difficult matter was that of contracts for Lake coal. Operators did not want them, as they foresaw that by far the strongest coal market would fall during the Lake shipping season, and the Lake interests in many cases had to content themselves with contracts for fixed tonnages, settlement to be made against the spot market from week to week, whatever it might be.

One of the causes of the continued high price of coal was the fact that the buyers, in the case of Pittsburgh district coal, were largely steel interests which were making fabulous profits and had to operate, no matter what the coal cost, and in their buying operations they made no effort to conceal the fact that they would pay any price necessary for fuel. Much of their coal they bought through brokers, whose margin was likely to be larger the higher the price. Usually the instructions to brokers were to secure a certain number of carloads on a certain day. To the broker thus instructed there was no tomorrow, and prices had no opportunity to recede. Occasionally the steel mills would stay out of the market a few days, but only long enough for their needs to accumulate, not long enough for coal to accumulate. Operators and brokers had sufficient courage—it did not require a great deal—to hold coal for a few days, and the railroads seemed to be content with the demurrage they received. The condition presented was certainly such as to invite Government interference.

Various opinions may be held as to the Lake trade. For many years Pittsburgh operators had claimed the railroads discriminated against them, by charging them rates that figured out much more, per ton-mile, than were accorded West Virginia and southern Ohio operators, but these rates had been equalized, and one of the complaints of the Pittsburgh operators in 1917 was that they were given altogether too much of the Lake trade. The interests of the Northwest and the Lake vessel interests early reached an understanding, whereby they went to Washington and secured a priority order in favor of the movement of Lake coal on the railroads. When the West Virginia operators were unable to ship as much Lake coal as they had contracted to ship, the Pittsburgh district was called upon for more. The railroads carried out the priority order in favor of Lake coal quite fully, but coal operators charged that they found means to do so because the long haul was particularly profitable, as compared to the haul to Youngstown and other important points of line consumption.

The Pittsburgh district, quite irrespective of what Connellsville did, shipped a great deal of coal in 1917 for byproduct coking. Only a few years ago Pittsburgh coal was not supposed to count in the matter of byproduct coking, but the byproduct industry has advanced and while it does not even now know nearly as much about coal as it should, it knows much more than formerly, and Pittsburgh coal is being used more and more for byproduct coking. It is a relatively new thing to consider coal marketwise in connection with coking. Before the byproduct oven practically all the coke coked was mined at the site of the ovens, and the common conception was that the district produced coke, not coal.

One of the stimuli to the erection of byproduct ovens was the fact that since the ovens were naturally built at the blast furnaces, in order that the surplus gas might be used, and for other reasons, it was unnecessary to carry large reserves of coal land, and thus while the byproduct ovens cost much more than beehive ovens, there was a saving in capital investment because the ovens did not need to be built on extensive coal holdings. The byproduct ovens buy coal where they like, and can experiment. Some have made three-year and five-year contracts for coal, while others have preferred to buy for shorter periods. Several millions of tons a year of Pittsburgh coal is now going into byproduct ovens under various sales contracts.

More Review Articles Next Week

Every effort was made this year to get all of the general reviews in this special number of *Coal Age*. Notwithstanding that additional pages were added, it has been impossible to accomplish this aim. Our next issue will contain a number of the most interesting reviews that were prepared for us. Most of these articles that were necessarily held over cover the mechanical and operating end of the industry for the past year. One such article reviews developments in the anthracite industry and was prepared by H. M. Crankshaw, mine manager, Hazleton, Penn. Another article covering anthracite was prepared by John Haertter, division superintendent of the Lehigh Valley Coal Co. An extremely interesting résumé of Western coal mining has been written by A. C. Watts, chief engineer of the Utah Fuel Co. Other reviews will cover St. Louis coal trade, market conditions in New England, etc. Be sure and bind up the next issue of *Coal Age* with this one, and you will have the full story of coal mining in 1917.

Southern Illinois in 1917

By E. J. WALLACE
St. Louis, Missouri

SYNOPSIS—*In spite of many uncertainties and labor troubles the year was a prosperous one. Many of the labor troubles and petty strikes and walkouts were found to have been of enemy origin and toward the latter part of the season the I. W. W.'s became unpopular even in districts containing many Teutonic aliens.*

INASMUCH as it is impossible to forecast the future, it is not a positive statement to put 1917 down as the greatest coal year on record in the Illinois field, but it is likely that its equal will never be.

It was a successful year, not as successful as some operators had expected, but it out-distanced all previous years as a money-maker for everyone in the operating end. It was a most uncertain kind of future that the trade looked forward to at the beginning. Record prices then prevailed—$4 to $4.50 for screened sizes in a general way. These prices had all winter been a thorn in the side of the miner. He didn't participate, and that is not according to the law that the socialistic leaders preached. There was unrest, and to the lay opinion, there was some justice in this. The operators pursued in many instances a policy of "gouge" and the miner learning of it adopted the system as his own. This began to assume concrete shape in February and March in the talk of more money.

The demand for coal was so strenuous that even in periods of mild weather there was no letup. It was a shortage of cars, minor labor disputes and many little things that in the whole made the work a problem, and while prices were high, the task was not congenial.

Operators in the southern Illinois field south of the Springfield district, which is known as the central Illinois field, began speculating in February with contracts and as time wore on they grew more optimistic until on Apr. 1 there were no contracts to speak of being discussed.

Several big operations, however, had sold their outputs before this time for the year ending Apr. 1, 1918, on a mine-run basis to railroads for engine fuel. These prices were about $1.75 for mine-run, cars furnished by the buyer.

On Apr. 1 came the demand for a further increase and the demand to annul the wage agreement which was good for another year. About the middle of the month the men got about a 20 per cent. increase to machine miners and 13 per cent. to pick miners. This did not increase production; there was congestion on the railroads and embargoes tied up traffic.

Reports that the French and Italian governments were after millions of tons of Illinois coal set the field aflame with anticipation of one glorious reign of unbridled and unlimited prices. Owing to strikes in fields west of the river there was always the incentive to reach out for business in these sections that the railroads refused to furnish equipment for.

There were no serious accidents in the first quarter in the southern Illinois field. The few minor affairs here and there helped in a measure to keep down the figures that loomed up as a record breaker for the year.

Only one fully equipped mine in the Williamson-Franklin County field (hereinafter called Carterville) remained idle and it was being put in shape for work. This was the Keystone mine at Pittsburgh. Strip and slope mines along the outcrop of the No. 6 seam all the way from Belleville south to Marion blossomed forth to add their mite, and all secured good prices.

The old C. & C. mine at DeSoto was taken over and work started on it. Several changes of ownership came about in the various districts south from Springfield. This was especially so in the Standard field adjacent to East St. Louis on the east and south. These old, small shafts began to get under the control of operators who took over several of them and their output sold to northern railroads. Every old shaft available was opened up, and the same thing pertains to the DuQuoin field south of the Standard district and north and west of the Carterville field. Options were taken here on several thousands of acres and strip mine operations prepared for. Later the Union Colliery Co. of St. Louis took over a large tract at the new town of Dowell and is now sinking a large mine.

New Developments in Many Counties

In Williamson County a few old abandoned shafts were prospected and plans made to bring them in. Franklin County was with one exception going full. This exception later opened up. There were many shutdowns in April and May for repairs and in some cases a rebuilt plant.

In Franklin County the Old Ben Corporation bought the four big mines at Christopher, giving this firm six mines producing about 25,000 tons daily.

The Harrisburg field in Saline County came forward with new mines and an increased tonnage. This is the only southern Illinois field that ships no coal to the St. Louis market. Its output moves up through western Indiana to Chicago and the Northwest. There was more activity in this field than in all of the others combined.

The matter of mine supplies was a serious one. There were delays of many months in securing equipment to fit up mines for the increased tonnage. Railroad coal was the order in the spring months for almost the entire southern end of the state. It is still a mystery at the end of the year as to where all of this railroad coal went.

With the opening of many mines there came an acute shortage of miners and mine help, and this has continued. Toward the last of the first half of the year the car supply became serious, but for the first time since last fall the operators except in the Standard field began to see the light of day over their order files. There was as a result of this a break in the market, but not for long.

An attempt was made by the U. M. W. of A. to have a bill passed by the Illinois legislature to prevent courts from granting injunctions in labor disputes. There still continued minor strikes here and there, and the miners began murmuring that the increase granted them was not sufficient in view of what the operator received. There was at the close of June a letup in the demand. This had been noticeable since May in domestic sizes.

The U. S. Government had in some manner promised the public lower coal prices, and inasmuch as coal was going up all of the time the papers got to kicking in, with the result that the Government intervened and the so-called "Peabody" prices went into effect. These had a tendency to stiffen up the market and it became as active as possible, considering that everything was against it.

July 1 saw Standard coal hanging on the ragged edge of production cost again.

Labor Troubles Were Numerous

There seemed to be a tendency to seek cause for strikes on the part of the miners throughout the midsummer. In Montgomery County they went out in an attempt to unionize a glass factory that used their coal. When ordered back and fined, they struck because the fine was deducted.

In the Springfield district labor troubles of this character were in the making and later came to a head in the street railway strike, when all of the miners went out. This attitude on the part of the miners, and contrary to the orders of their officers, was prevalent in a general way in the entire field.

Labor trouble in the mines of Montgomery County and in the Mt. Olive and Standard fields was evidenced by petty grievances. These were later traced to the activities of pro-German miners and others influenced by them. The I. W. W. movement was found to be getting a footing all the way from Springfield down to Franklin County. This was opposed at many places where socialism had a good start, and it was folly in a short time for an I. W. W. to show up in a mining town unless the workers were of German extraction. Even then it was not popular.

In the 5th and 9th districts, the Standard field, too much prosperity to many of the miners began to assume a serious aspect, and at a joint meeting of the operators and union officials the latter agreed to do everything possible to keep the miners at work. At Nokomis, the miners quit because of the unsafe condition of the North mine there. State inspectors verified this contention.

On July 1 the compulsory compensation act went into effect. The efforts of organized labor for years were directed toward this. Illinois is the second coal mining state and the fourth state in the Union to pass such a law. The Illinois U. M. W. of A. maintain a legal department where all compensation cases are handled free of charge.

These legal bureaus are maintained in all mining districts and about once a month the miners receive lecture instructions on the compensation and other laws relative to miners and their rights. This is the first and as far as is known the only labor organization in the world providing such service.

August saw much unrest in the Springfield and Standard districts. As a rule the employee does not know the market on coal. The uncertain prices of slack when lump is high usually makes it difficult for him to figure whether the operator is losing or making money. With the price of coal known, and higher than ever before at that time, the miners got the idea that there was some logic in the socialistic talk they heard. They felt underpaid; they wanted to participate in the general prosperity that they figured their labor helped to produce, and inasmuch as it was evident that there was no patriotic spirit in the manner that some operators played the market, they saw no reason why they should not get into the "self-centered" game too.

The mule drivers were the most aggressive and started a small strike in the Springfield and Mt. Olive districts that spread in a few days to nearly the entire field. The manager of a mine at Virden presumably gave the drivers nine hours' pay for eight hours' work. When other mines refused this, they all went down. Almost 60 mines were idle and over 100,000 tons per day was lost.

The officials tried to get the men back, but they went back when they got tired of loafing or at the insistence of their fellow workers. This was forced by President Farrington threatening to expel from the union all who failed to go to work. He notified the Coal Production Committee of the Council of National Defense and charged that the Illinois Council was to blame by claiming that the operators were making enormous profits, thus inciting the men. The operators stood firm against any concessions. It developed that President Farrington had been negotiating for a new day-wage scale when this trouble broke out. Settlement of this was delayed by the strike.

President Puts Stop to Speculating

President Wilson's proclamation of Aug. 21 broke up the tea party of high prices and also many other things. It put a stop to speculating in old and abandoned mines and brought the coal industry down to business with a jar that is still felt. It was a hard affair for many to get over, but in nearly every instance it was agreed as the beginning of a method that was right in war times. The jobber was hit hardest. Many mine agents who held verbal contracts were shut off and conditions were chaotic for a few days.

Sept. 1 saw peace in all of the fields. The movement for a new scale was well under way and the operators felt that this was in many respects just. Many of the younger men in the mines had previously left for factory employment, making munitions, where the pay was much better on account of steady work.

President Farrington of the Illinois U. M. W. of A. kept his men in line and proved one of the best aids that the Federal Government had in securing maximum tonnage, under trying conditions. Many locals had figured on a walk-out Sept. 1 for more money, but decided to wait. The miners at the old Hart-Williams mine at Benton refused to permit its reopening unless their future pays were insured by the Taylor Coal Co. They had lost through the failure over a year before of the Hart-Williams Company.

Attorney General Brundage appeased Governor Lowden by contending that the State of Illinois had the power to seize coal properties and operate them.

Governor Lowden complained that the new prices of Aug. 21 were not low enough. This caused a feeling of uneasiness in many places, both among miners and mine owners.

About the middle of the month while President Farrington was in Washington in an endeavor to get the Government approval for an increase the "I Won't Work" element in the Springfield district broke away and went out "until they got an advance." This displeased the authorities at Washington and put Farrington in a most embarrassing position. The Springfield affair was a continuation of the labor troubles in that city in other lines for many months. The union planned a big Sunday parade and when the authorities ordered police and militia to prevent it on account of the danger of riot, the miners became incensed over the "denial" of "their constitutional rights and free speech." They lost $18,000 per day while they stayed out and the public lost 25,000 tons of coal each day.

Farrington came back and ordered this irresponsible rabble back to work, contending that 4000 to 5000 miners in the ill-famed labor-ridden Springfield district should not override the rules made by 80,000 other members of the union in the state.

There were other strikes of various kinds for all kinds of causes throughout the field, and these seemed to spring up as fast as they were settled or overruled.

The acts of the miners in several places bordered on open disloyalty. At Nokomis, a miner who defamed the Government and talked against the continued production of coal was arrested. A deputy sheriff who assisted in the arrest was a member of the union. The 600 men went out until he was discharged. He stayed away from work so as to keep the miners working. There was a general "laying down" by the miners. A nice, quiet way of keeping down tonnage by staying at home, that kept the honest miner idle and meant a loss to everybody concerned.

New Scale Causes Strikes in Standard Field

The new wage agreement settled the matter except in the northern Illinois field where general dissatisfaction prevailed over the new scale. Up until now this had been the peaceable field. There were strikes over the new scale in the Standard field because it didn't go into effect when announced on Oct. 16, and in a few days the entire state almost was out without the authority of the union officials. This was the flagrant violation of all of their agreements and President Farrington was again forced to threaten expulsion to bring the men back to work. This lasted over a week and proved a serious handicap to the public. Any further delay in resuming work would have meant a coal famine to St. Louis and many other near-by cities.

It was evident through the recent strike that a well-trained group of agitators was at work. This became apparent after the new scale went into effect, when it became known that there was dissatisfaction over the penalty clause.

November was the most peace-loving month of the many that had passed. Only a few small occurrences disturbed conditions and then not seriously.

December found peace prevailing. There were a few arrests for the I. W. W. activities of the past few months and the Springfield local acknowledged the unworthiness of some of its members and backed up the union officials. Thus the year to the Illinois operator was one of labor troubles.

The few abandoned shafts that were not working at the dawn of 1917 were taken over during the year and fixed up at least temporarily. A few local mines were opened in Williamson County. Saline County was the greatest boom in new shafts, and Franklin County got a couple. The DuQuoin field "came back." There is a big mine going in at Dowell, a new mining town near-by, and much activity over some prospective shafts as well as strip mines. In the Mt. Olive field at the new town of Wilson, what will be one of the largest mines in existence will soon be complete.

There were no real serious accidents until the latter part of the year. A few small explosions resulted in the loss of one or two lives each.

The Christopher mines are dry. Dust and gas is the danger there and in November came the first mishap, with 18 lives lost. Shortly afterward the Zeigler mine at Zeigler suffered a series of explosions with the loss of three or four men.

Top works destroyed by fire were numerous throughout the state, and many of these fires were of suspicious origin.

Birmingham Coke Market, 1917

By H. B. McLaurine
Birmingham, Ala.

Coke producers in the Birmingham district during 1917 had the best year in their history. The market having attained a strong position during the latter part of 1916 and at the beginning of 1917, the demand was strong and steady. Quotations on spot foundry ranged from $10 to $11 per net ton ovens as against $3.75 and $4 during January, 1916. Furnace coke was quoted at $5 to $6 per net ton ovens in the spot market.

The anticipated production of foundry coke was practically covered by contracts, which did not expire until July 1, 1917. Almost all of these were renewed for another year for increased tonnage at prices ranging from $8 to $12.50 per net ton ovens, the price being dependent in a degree on the tonnage required and the length of time the customer had been on the books of the producer. The scarcity of this grade of coke continued throughout the year, being accentuated more and more as the demand strengthened with inquiries from every section of Southern and Western territory, and quotations gradually advanced to $14 to $16.50 per net ton ovens at the time Government figures were announced by Administrator Garfield. The regulative figures of $6 to $7 per net ton ovens did not affect market conditions materially on account of the scant supply of coke over contract requirements, and the full force and effect of Government regulation will not be felt in this market before the middle of 1918, when the majority of contracts expire.

The heavy consumption of furnace coke in the immediate district by the iron makers, who drove their plants at full capacity during the year, left little of this grade of coke available for the spot trade, quotations ranging from $6 to $8 per net ton ovens prior to the date Government schedules became effective.

The abnormal and unprecedented demand for coke

from every quarter in 1917 caused rapid enlargement in the producing facilities, and hundreds of old-style ovens which had not been operated since 1913 were repaired and placed in commission with as much dispatch as possible. Numbers of others were forced to remain idle on account of the inability to secure coal for consumption. During the latter half of the year batteries of byproduct ovens on which construction was begun in 1916, were placed in service by the Woodward Iron Co. at Woodward, Ala., and the Gulf States Steel Co. at its Gadsden plant. While these new and rehabilitated plants added a heavy additional tonnage to the normal output of the district it apparently had no relative bearing in lessening the inquiries, the needs of the trade being insistently pressed upon the attention of the producers to the end of the year.

Production was crippled to some extent by the shortage of equipment for loading, and consumers on the gulf coast and in Texas and Pacific coast territory, who depend on Alabama for practically their whole foundry coke supply, were unable to secure schedule deliveries on their contracts on account of an insufficient and irregular supply of foreign line equipment on which the movement to such territory was dependent. The output was also curtailed by labor shortage at the mines, where coal production was interfered with. Many ovens were thus lost on account of insufficient coal for regular charging.

It is estimated that the output of Alabama ovens in 1917 will closely approximate 5,000,000 net tons. Accurate figures will not be available for some weeks yet. The tonnage for 1916 was 4,385,493.

The Cincinnati Coal Trade in 1917

By KENNETH C. CRAIN
Cincinnati, Ohio

SYNOPSIS — *From the standpoint of price received the year was satisfactory to the trade; from the standpoint of supply it was unsatisfactory. The railroads hold the key to the situation and upon their ability to handle traffic depends the prosperity of the trade.*

THE current year's coal business has been characterized in Cincinnati, as elsewhere, by unprecedented conditions, calculated to make coal men remember 1917 for a long time to come. Outstanding among these conditions were the extraordinary demand for coal by manufacturers; the extremely high prices received up to the date when prices were fixed by Federal authorities; and, above all, the inability of the railroads to transport all of the coal offered. To crown the year, Cincinnati and the surrounding territory south of the coal fields of Ohio, west of the West Virginia fields, and north of the fields in eastern Kentucky, faced an actual fuel famine, for the first time in its history.

This condition, unique in its extensiveness, its severity, and the almost complete helplessness of the coal men, may well serve as a text from which to work back to conditions throughout the year, as well as to point the moral which may be drawn from the trade's experiences. This moral is, of course, the failure of the railroads to supplement the efforts of the mine operators to produce enough coal to meet the country's necessities, and the imperative necessity of seeing that it does not recur.

At the year's close measures were being taken which should have been taken months ago. These embrace the elimination of competition among carriers, and the accomplishment of pooling arrangements, designed to relieve congestion and to expedite the movement of loaded cars and the return of empties. Indications are that this plan of facilitating the movement of coal will be measurably successful, and that in 1918 the coal trade, the public and the railroads will not be forced to face such a condition as has existed during 1917.

It would require much labor to collect figures showing in detail the extent of the car supply, as compared with the capacity of the mines and full working time. Without such detailed figures, however, and from reports made from time to time through the year by various operators, especially in the several West Virginia fields, it can be said, with a fair degree of certainty, that the car supply throughout the year has averaged more than 50 per cent. of requirements; and this is said with full knowledge that the records of the railroad companies show loading figures surpassing those of former years.

In other words, the operators, in spite of Government prices lower than were desirable to stimulate production, have none the less been prepared to ship an amount of coal which would have kept every factory well supplied, and which would have given every domestic consumer all the coal required to supply warmth. That they have not been able to do so, while at the same time mining and shipping more coal than in a normal year, if not more than ever before, seems to be in no way the fault of the operators, but rather that of transportation.

It should be said, in turn, that the railroad companies have been severely handicapped by the necessity of handling record-breaking traffic of all sorts, without the opportunity, either as to finances or time, to equip themselves to meet the emergency. This is the opinion, based on generally-known conditions, advanced by local coal men and appears to be close to absolute fact.

Federal action has complicated the business of the year in more ways than one for Cincinnati. The effect of this action has perhaps been more strongly felt here than elsewhere on account of the fact that the city is the gateway through which passes the greater part of the coal destined for Lake ports. In particular, the so-called priority order by which coal destined for the Northwest was given preference both in loading and in transportation over coal for way points, has been charged by many with having operated to bring on the famine from which Cincinnati and the greater part of Ohio have suffered.

The principle of the order has not been widely controverted. It is generally agreed that it was reasonable to expedite Lake shipments while Lake traffic was open, and before severe weather drew seriously upon available supplies in the territory closer to the mines. Ohio state officials however have specifically charged that more coal than was necessary was shipped to Lake ports, and that, in the meantime, Ohio, including Cincinnati, has been prevented from obtaining even its minimum fuel requirements, with the result that widespread distress has been felt.

That this was actually the case remains a matter of controversy. The essential facts are that the Federal Fuel Administration has secured the movement to the Northwest of what is said to be an adequate amount of fuel, estimated to be 1,250,000 tons over the volume shipped last year, and that, unfortunately, early December weather in Ohio was of a severity unparalleled for 45 years. The inevitable result was a tremendous emergency demand for coal, which could not be satisfied; while the railroads, already struggling with an unmanageable congestion of traffic, wherein coal was an important factor, were confronted with the usual reduction in operating efficiency produced by heavy snow and severe cold. The net result was the coal famine referred to.

Prices High at Beginning of Year

The first half of the year will probably be long remembered for the prices received for coal, with bituminous screenings, the usual fuel of industry, bringing as high as $4.50 a ton f.o.b. mines. It was the continuous heavy industrial demand, which was never satisfied during the entire year, which drove prices to this figure, and placed screenings, for the first time, at the top of the list, above prepared grades. It will be recalled that this condition was clearly forecasted during the latter part of 1916, when the industrial call for fuel was steadily increased, and prices as steadily rose in response to this demand.

With current consumption approximating production, or, at least, the shipments forwarded, it followed that large consumers were unable to lay in any substantial reserves of fuel, and the peak of consumption, when cold weather arrived, unseasonably early in October, rapidly brought on the condition described above. At the same time, the unusually high prices prevailing led many dealers, wholesale and retail, to refrain from making commitments for future supplies, and from purchasing coal for storage during the summer months, until it was too late. This, again, was a prominent factor in bringing about famine conditions. It seemed, in fact, that everything combined to produce a situation which, although it might have been expected to result from the conditions prevailing, was rendered far more acute than it would otherwise have been by unseasonable weather and by transportation complications.

The anticipation of Federal regulation of prices was early a factor in the situation. It became evident during the summer that the Government would attempt to control prices, and this was done in August, when mine prices were announced. These prices were materially lower than those tentatively fixed at the meeting of coal operators with Secretary Lane, when he enthusiastically declared that the operators, in agreeing to prices materially lower than those prevailing in the open market, had made a patriotic sacrifice.

The public, naturally, waited to get coal at the prices thus announced. As coal men pointed out, however, the fixing of prices did not automatically produce coal, and there seems to be no doubt that many small operations found it unprofitable to do business at the Federal prices, and therefore closed down. However, in view of the inability of the railroads to handle the coal offered, and of the heavy shipments forwarded in spite of this, it cannot be said that this factor contributed materially to the general shortage of fuel.

As many large operators were fully sold up before the Federal order went into effect, they were obviously not affected by it, since this order could not invalidate existing contracts or alter prices for coal sold. On the other hand, much coal went forward, under the priority order, at prices not affected by the Government schedule. Thus while the trade did not attempt to evade the Federal figures, as to coal to which they could apply, conditions generally were such that the first season of Federal regulation was hardly a complete success. At the same time, prices would have soared to even higher levels had not some check been imposed, and the shortage would have occurred just the same, on account of transportation conditions.

Cincinnati profited, as it always does, by the fact that the Ohio River furnishes a transportation medium for coal which is independent of railroad congestion. The volume of coal moved on the river does not compare with that handled by rail, but it is none the less a decidedly useful addition to the amount received at this point. In 1917, however, unusual interest was attached to river shipments by reason of the use for the first time of the partially-completed system of Government dams as an active factor in facilitating traffic.

Make Ohio Navigable All Year Round

These dams are intended eventually to provide a river stage of not less than 9 ft. the year around from Pittsburgh to the mouth of the Mississippi. There will be no such thing as a low-water, non-navigable stage of the Ohio when the dams are finished. On the river above Cincinnati many of the dams are completed, and in 1917, for the first time, their services were called into use other than as means of providing a series of relatively deep pools. This is what is meant when it is stated that they were actively used.

The upper river dams were used on several occasions to neutralize a non-navigable stage. By carefully timing the movement of coal fleets, and releasing the water from dam to dam as required, artificial waves of several miles in length were created. On the crest of these waves good-sized coal shipments moved down the river to Cincinnati and other points, supplementing the limited supplies of coal on hand.

There were times when the river was so low that these artificial rises or waves were not possible. At the same time, they illustrated in a highly practical manner the usefulness of the Ohio River improvements and gave point to the assertions of supporters of inland waterway improvements that at least a partial solution of traffic difficulties lies in this direction.

What has been said above applies, in a general way, to the retail trade in Cincinnati as well as to wholesalers.

operators and operators' agents doing business in and around the city. The retail trade has had repeatedly the unusual experience of being entirely without coal to deliver to its customers, and of refusing orders because it could not fill them. The year's business for the retailers was entirely satisfactory as to price, as the first half of the year was without Federal or other restriction in this respect, and for some time after Federal prices were fixed, the retail trade was without coal bought at the new figures, and was therefore immune from compulsory sales at figures based on the Government mine prices. Conditions cannot be called satisfactory from a business standpoint, however, when the trade is prevented from doing business by lack of coal; and this was the position of the retail, as well as the rest of the trade, when the year closed.

Prospects for 1918 are that demand will continue on a heavy scale. It remains to be seen whether pooling and other forms of coöperation among the carriers, with Federal aid, will enable the coal trade to supply that demand. The key to the situation is now, as it has been for more than a year, the ability of the carriers to supply cars for loading, to move the loads promptly, and to return empties to the mines after delivery and discharge.

Baltimore Trade in 1917

There will probably be little regret in the coal trade here over the passing of 1917. The New Year has been entered with the fervent hope that business, under various Government regulations and restrictions, will soon work down to an equitable basis. The old year was not without its good points, but there was so much of uncertainty as to the entire situation, so much of mental and physical strain in many cases to meet Government demands or threatened acts that would have proved detrimental, that the coal men can get little pleasure from retrospection.

There were few business failures and changes were unimportant. And while the coal man had numerous slack periods because he could not get the fuel to dispense to the tremendous demand that faced him, he at other times made larger profits than ever before and the year worked down to a pretty fair earning basis, at least for the soft-coal interests. The hard-coal men, bound tighter by price regulations, had more of difficulty to overcome, but the majority managed to pull through in good shape.

The year 1917 was ushered in in unusual form for the bituminous interests, since even at that time the demand was running far ahead of the deliveries because of inadequate transportation, and prices for spot coals had mounted to $5 and $6 mine basis in many cases. Low- and high-grade coals all looked alike in this selling. Producers and middlemen held tight to high contract rates, and closings over the year between Jan. 1 and Apr. 1 mounted in many cases to $4.50, and even at these figures the consumers could not be given all they sought.

Around the first of April, while a number of usual contract makers proved price shy and decided to buy in the open market in the hope that the prices would break during the summer, there was no over-supply of offerings of contracts. Many of the consumers who remained out have since paid dearly for the move, both in high prices for spot coals before Government rates began and in enforced curtailment of work afterward by reason of inability to get fuel as desired.

The story of the trade here over-summer was about the same as with the rest of the country. The first Government request-price at the mines of $3 saw consumers rushing to coal offices demanding fuel at that figure, only to learn that the coal men, with transportation slow, were unable to cover even their contracts at much higher prices, and could not sell the new-price coal. Three-dollar coal was rather a myth in this section, as was also the $2 coal price later set by the Government. The summer and early fall, in fact, saw practically no movement outside of contract coal, or Government-priced coal, plus haulage and other charges, in order to "beat the devil about the stump" and make possible a production at the $2 mine basis. The coal men here were among the first to protest that many mines could not produce at $2 and the numerous closings in Maryland and West Virginia proved the case.

The fall and early winter proved a grand scramble to the trade. Much of the time was spent in readjusting office forces because of the military demands of the nation, and in working out numerous Government reports and schedules. Contract business continued the overpowering feature, where coal could be secured at all, although there was some little Government-priced coal, under the third price arrangement, disposed of in this territory.

Winter saw a big test of every energy, with coal men distracted, transportation interests plainly much at sea, and with Fuel Administration orders by the quarter of a peck to keep things bubbling. Throughout all the turmoil the coal men have kept the industrial works here supplied, at times with almost famine-like supplies it is true, but while there were plants that had to cut down service and lay off men, no actual closings for any length of time were recorded.

During the year the jobbers of Maryland formed an association, and they are waiting for the final Government-control plans, which may be delayed until April, to find out just what their status is to be. That these men are needed as a distributing factor has become more and more patent, and the final shakedown will probably give them official recognition.

The anthracite dealers here worked through the early months of 1917 without being able to get anything like the amount of coal they needed, and almost from the first paid considerable premiums for the fuel they desired promptly. The delay in the spring schedule of wholesalers caused June to roll around before there were any deliveries on spring orders. Meanwhile an unusual spring consumption had caused a distinct shortage and had wiped out practically all the yard reserves. Simultaneously the sales had been continued on the old winter basis, plus certain size advances at the mines.

During the summer there was a heavy receipt of hard coal here, despite the poor railroad conditions generally, and the winter might not have approached with so severe a shortage had it not been for an unusually early fall and a consequent early consumption. The receipts from Jan. 1 to Oct. 1 were about 57,000 tons in excess of 1916, but as there was an estimated additional consumption of 90,000 tons before winter set in here, the

trade found real cold weather at hand with a shortage of 37,000 tons or thereabouts, and with the receipts under the rail congestion down to about one-half of what they should be in normal times. In December the receipts dropped back to about one-third of normal, and yard supplies were so far depleted that the city faced a fuel famine. Only the most judicious work, with the retail coal exchange aiding the fuel administrators, prevented real hardship and alleviated much of the existing suffering.

With such a record, it is small wonder that the coal trade here says "Welcome 1918."

Birmingham Coal Trade in 1917

By H. B. McLAURINE
Birmingham, Ala.

CONDITIONS affecting the Alabama trade at the beginning of 1917 were most favorable, and gave promise of affording the largest volume of profitable business that the industry had enjoyed in several years. Heavy contract bookings made during the previous 12 months, on which deliveries extended over the first half of 1917, and some through the entire year (taken for the first time in quite a while at figures fairly remunerative to the operators), and undelivered tonnage on open sales, brought forward from the last quarter of 1916, during which prices reached an unusually high level, were factors which seemed to warrant an optimistic view. The shortage of equipment and labor, which had appreciably curtailed production for the past six months and held the output near a parity with the consumption, supplemented by the natural sequence of high prices, had discouraged—in fact precluded—the accumulation of any stocks in the hands of consumers. The abnormal industrial activity and heavy railroad traffic were additional factors which clearly indicated a continuous and increasing demand for fuel, which would further tax the producing and transportation facilities of the country, and maintain price stability.

The above-mentioned conditions, which augured well, materialized to a marked degree with a satisfactory period of business which extended through the first seven months of the year, and up to Aug. 21, when Government schedules carrying drastic reductions in prices at the mines were promulgated. Deficiency in equipment and labor supply were continuing factors in preventing the elimination of the disparity between production and consumption during the above period. The ever-increasing demands of industry and additional fuel requirements of the railroads above contract deliveries made inroads on the already limited free coal supply and precluded the possibility of any material recession in the prices, which never fluctuated more than 50c. one way or the other, on an average, from the mine-run quotations ranging from $3.50 to $4.50, which prevailed at the first of the year.

This situation confined the trade to practically spot channels. While of course some contracts were executed, they were based on prices closely approximating spot figures, and were intended primarily as a means of securing priority shipments over the spot customer, or securing for the mines a more liberal supply of cars, the lack of which caused much loss of time to operations during this period.

Domestic coal sales were confined rather closely to current and near-future requirements during the first quarter of the year, prices ranging from $4 to $5 per net ton mines for lump and egg grades. Unseasonable weather caused a spasmodic demand and a slight decline in prices during the latter part of this period, but inquiries stiffened sharply in April. The usual schedule on domestic coal issued Apr. 1 was not announced until about the first of May, prices being as follows per net ton mines:

	Lump and Egg
Big Seam	$2.40
Carbon Hill	2.65
Cahaba and Black Creek	3.40
Montevallo	3.65

Contracting by retailers at the above figures was more limited than in previous years, the usual eagerness to cover reasonable stocking requirements being little in evidence. In the meantime the steam market had taken on increased activity and a strong buying movement developed which could not be fully supplied. Domestic mines withdrew the above schedule and placed their free coal on the open market at prices ranging from $4 to $5 per net ton mines for lump and egg grades. This somewhat checked domestic inquiry, and much of the output was diverted to steam channels where mine-run was quoted at from $3.50 to $4.50 per net ton at mines. Stipulated deliveries on contracts through the spring and summer months could not be adhered to on account of shortage of equipment for loading, and labor shortage and disturbances which materialized more noticeably during the summer. As a consequence, accumulation of stocks in retail yards did not assume 50 per cent. of the usual tonnage.

On July 1 the first efforts of the Federal Government at price regulation in the coal fields were noted by the naming of the so-called "Peabody" schedule, fixing a maximum mine price of $3 per net ton on Big Seam and similar grades, $3.50 for Carbon Hill, Pratt and Corona, and $4 for Cahaba and Black Creek. These regulative figures were accepted by the mines with little or no complaint, and did not visibly affect trade conditions, as they closely approximated the current quotations.

However, much dissatisfaction was expressed by certain Government officials over the Peabody figures, it being claimed that they were too liberal to the producers, and steps were taken for a downward revision, which was announced by Administrator Garfield on Aug. 21, when the following mine prices were named:

	Mine-Run	Prepared Sizes	Slack or Screenings
Big Seam	$1.90	$2.15	$1.65
Pratt, Jagger and Corona	2.15	2.40	1.90
Cahaba and Black Creek	2.40	2.65	2.15

The effect of this schedule was to paralyze the trade, and during the period intervening between Aug. 21 and Oct. 1, when mines were reclassified and revised figures

issued, very little coal was sold. In the meantime the mines had ample business in hand to absorb their output, which had been curtailed considerably by labor troubles (culminating in a strike Aug. 20), and by car supply. Deliveries on contracts were much delayed, and only slight interruption to the output was occasioned by lack of new business.

Vigorous protests against the new schedule were immediately made to the Fuel Administration to the effect that its enforcement would cause the closing down of many mines where cost figures exceeded the selling prices named, and in other instances where the margin of profit would not justify operations. Mine owners were instructed to compile cost sheet data justifying their claims of the unfairness of the schedule, and such information was prepared and placed before the Federal Trade Commission and Fuel Administration by a committee of operators. This resulted in a reclassification of some of the mines and a revision of prices, as shown in the following schedule issued Oct. 1:

	Mine-Run	Prepared Sizes	Slack or Screenings
Big Seam	$2.15	$2.45	$1.85
Pratt, Jagger, Jefferson, Nickel Plate, Coal City	2.35	2.65	2.05
Cahaba, Black Creek, Brookwood, Blue Creek	2.85	3.10	2.45
Corona	2.40	2.75	2.05
Montevallo	2.40	4.00	2.15

The readjustments effected by these revised figures afforded in the main a fair measure of relief to the producers, and were accepted as satisfactory under conditions obtaining, except that in a few instances operations were carried on under peculiar conditions, which increased the cost over other mines in the same class. Also wagon mines claimed that provision should be made for absorbing in the mine price the expense of hauling their output to railroad cars. These complaints are now pending adjustment.

Trade Rapidly Readjusted Itself

The trade rapidly adjusted itself to the revised figures, but during the last quarter the shortage of steam grades was further accentuated by the ever-increasing demands, and efforts of both producers and distributors were taxed in taking care of contract obligations and, so far as possible, supplying the spot demand. Only a judicious and careful distribution of the supply prevented loss of time in plant operations and closing down of public utilities. Much confusion and perplexity were occasioned by the many regulatory instructions issued by the Fuel Administration affecting the handling and distribution of coal output.

The fixing of prices of coal at the mines was followed later by the issuance of instructions regulating the retail prices on domestic fuel, based on the gross margin of profit made by dealers in 1915, plus 30 per cent. This caused much confusion among the retailers as to the proper price to be charged householders under this ruling. Dealers were finally summoned before the local fuel boards, which were empowered to fix a schedule of rates to be charged by each yard, and the prices named by these boards were made effective. The further troubles of the retailers the balance of the year were confined to efforts to get a sufficient coal supply to fill orders of their customers. Yards were kept in a practically cleaned-up condition during the last quarter of the year, much suffering being occasioned by the scarcity of domestic coal both locally and throughout territory supplied from this field. The prices fixed by the fuel board on domestic coal only effected slight reductions in some grades, and served chiefly to prevent further increases in quotations on account of the acute shortage. Schedules ranged about as follows:

	Lump or Nut
Montevallo	$6.25@6.50
Cahaba and Black Creek	5.60@5.90
Carbon Hill and Corona	5.00@5.50

Production in the Alabama field for 1917 will approximate 21,000,000 net tons according to the estimate of Chief Mine Inspector Nesbitt. This is 2,750,000 tons in excess of the 1916 output, the previous maximum production of the state. The demands made upon this field caused great expansion in coal-producing facilities and scores of old abandoned operations were rehabilitated, improvements made at established mines to increase output, and many new operations started. New developments, other than those merely contemplated to meet present market conditions, were not material factors in adding to the output during the past year, due to the great delay experienced in securing material and equipment for permanent and substantial construction. A number of new mines will, however, be in position to add a heavy increase to the state's production in 1918.

Buffalo Coal Trade in 1917

By J. W. Chamberlain
Buffalo, N. Y.

The year 1917 created many and wide changes in the coal trade, especially the bituminous branch of it. Not a day passed without complaints of shortage, and the year closed with the situation worse than it had been before and the prospect that many branches of the manufacturing trade must speedily curtail operations.

For a long time the complaint was chiefly of lack of miners, but at the end of the year the car shortage was said to be responsible for the difficulty. The roads are not blamed, however, for they have not felt able to increase their equipment while fuel consumption is much greater now than ever before. Thus far Buffalo has contented itself with trying to urge coal forward and has not taken up devices for reducing the consumption in those cases where the need is a minor one. This, however, will have to be done soon.

The great difficulty at the close of the year was that the bituminous jobbers could not get coal at Government prices and practically will have to go out of business until a change is made in their favor. Some business is still being done with Canada, especially as the margin allowed to jobbers is larger there than it is here. The great scarcity of uncontracted coal will doubtless be a handicap while the present state of things lasts.

In anthracite the close of the year showed better conditions than formerly. Coal could be brought here by big train loads from the mines any day, and this was done often enough to convince consumers that no real famine is possible, even if natural gas failed.

With no figures to confirm it, the opinion is that Buffalo has handled and transmitted more coal in 1917 than in any former year, both anthracite and bituminous. The coal authorities still refuse or neglect to compile figures to show the actual movement.

In the Lake trade Buffalo has been more active than

usual, having shipped 4,106,598 net tons to the Upper Lakes as against 2,800,740 tons from home docks and 750,000 tons from Erie, Penn., in 1916. The season was closed by the big storm of Dec. 9, or the amount would have been increased considerably.

The year has made few changes in the trade personnel. Several new jobbing firms started up early in the year and did a heavy business till the Government price was fixed in August, when they dropped to a low level and are now waiting for further developments. They include W. B. Nicol & Co., the Century Coal Co., the Montour Coal Co., the Frontier Coal Co., and the Wistar Coal Corporation. All the active members of these concerns were already in the business before. No old firms have gone out of business during the year.

The only mining change of account was the organization of the Corson Byproduct Coal Corporation, of Buffalo, with property at Elkhorn City, Pike County, Kentucky. This company has completed its developments and is now ready to make shipments.

The New York Coal Trade in 1917

By R. W. MORRIS
Brooklyn, N. Y.

SYNOPSIS — *Hardships, uncertainties and disappointments characterized the year 1917. While receipts were heavier than during the previous year, yet the demand was such as to more than absorb all coal arriving. Never was bunker coal so scarce or so many ships tied up in New York Harbor awaiting bunker coal.*

THE year 1917 has been one of many hardships for the coal trade. In no previous year in the history of the industry has the coalman encountered so many difficulties. It has been a twelvemonth of trouble which kept the trade in a continual state of unrest and uncertainty, and it cannot even now be said that these troubles are near their end. And, facing these troubles, the trade has not had the support of the public which, not knowing the underlying reasons, took occasion to put the blame entirely on the dealers without investigation and without trying to learn the true facts before passing judgment.

At no time was the local trade able to get all the coal needed. The year started with stocks depleted and there have been days when not a cargo of either free anthracite or bituminous could be picked up in the harbor. This condition of affairs was aggravated when the Government in August fixed the price at $2 per net ton at the mines for bituminous fuel. Operators promptly diverted their product, which was already down to almost actual needs owing to labor and car shortages, to their contracts which had been closed early in the year at higher prices. This created a still greater shortage of spot coal.

In addition, priority orders issued by the Railroad War Board directing preferential shipments to the west and later to New England took more coal from this market.

The announcement that the Federal Government had fixed coal prices was no surprise to the trade, it having been the belief that such action would be taken. But when the price of $3 at the mines agreed upon at a conference with operators was upset and the $2 price fixed by President Wilson, the operators appeared to lose heart, as it was already costing some of them more than that sum to produce coal.

The anthracite industry fared better although there was a continual heavy demand during the entire year. Temperatures were below normal most of the time and fires which under ordinary weather conditions would have been extinguished early in April were kept burning until June. Bins were empty and the coal which would have been stored during May for the coming winter was consumed, thus creating an increased demand which the operators could not overcome.

At no time were the producers able to send to this market all the coal needed. While the tonnage figures showed shipments during some months larger than ever before, other sections of the country were just as anxious to get coal as was this market.

Market conditions were little affected by anthracite price fixing since the Government practically indorsed the existing prices for the domestic coals and advanced the price of pea to $4 per ton at the mine, an increase to some operators of $1 a ton. Later on this order was modified to the extent of reducing the price for pea coal to $3.40 per ton at the mines. Still later, early in December, following a series of conferences between the operators and representatives of the mine workers, wages were increased and the operators were permitted to add 35c. per ton to the prices as fixed by President Wilson.

There were several investigations during the year both of the wholesale and retail interests, none of which resulted in anything being accomplished. Almost throughout the entire year the local trade has been under the supervision in one way or another of representatives of the Federal Trade Commission or of the Fuel Administration, who have always received the hearty coöperation of the dealers, both wholesale and retail.

An indication of the seriousness of the coal situation here may be found in the fact that in April last when bids were asked by the Government for furnishing between 60,000 and 100,000 tons of bunker coal for the Panama R.R. no proposals were received.

The situation with regard to the smaller anthracite sizes used for steam purposes was extremely serious all year. There was a heavy demand and prices remained high. Operators were not inclined to make their usual contracts and retail dealers were thus unable to close their usual agreements with the owners of the office buildings and similar structures where the buckwheat coals are used in large quantities. It was a "hand-to-mouth" trade and in the early fall it became necessary to curtail consumption wherever possible. In November many of the owners of office buildings sent notices to

their tenants setting forth the situation and requesting that wherever possible electricity and heat be saved.

An important movement during the year was the organization of the Wholesale Coal Trade Association with a membership of more than half the wholesale dealers located in New York City. This organization, although newly formed, has already taken a prominent part in coal matters both here and in Washington.

The Anthracite Situation

The year opened favorably for anthracite consumption. Weather conditions, however, interfered greatly with the handling of coal at the docks and supplies were scarce. These conditions were reflected in the quotations for individual coals of from $8.75 to $9 for mixed domestic sizes. Offers to furnish the New York City departments with buckwheat No. 1 were submitted at a price of $7.69 per ton.

Low temperatures kept prices for individual coals up and supplies tightened to such an extent that when the city asked for bids for domestic coal the best it could get was from $9.98 to $10.87 and from $8.85 to $9.48 for pea coal.

In February conditions became worse. A heavy snowstorm caused a sharp advance and there was a general clearing out of all speculative coal at the New York Tidewater. Retail dealers who had been for several weeks finding it harder and harder to obtain coal began to get anxious as to their future supply. Few contracts for the buckwheat coals that were closed showed advances of from $1.25 to $1.50 per ton over the previous year's figures.

By March conditions outrivaled any previous situation with regard to supplies. Stocks were at their lowest ebb and individual coals were quoted at about $1 above the regular company schedule. Under ordinary conditions demand would have fallen and individual coal would have been selling below the usual April prices.

The coal year opened on Apr. 1 without the usual activity in coal movement, for the reason that there was none to move. Stocks were depleted and although the Spring discount had been applied to egg, stove and chestnut coals, the wholesale interests had none to offer for immediate delivery, although they were willing to accept orders subject to delivery up to May 1. Dealers' books were filled with orders and buyers were hard after deliveries. Prices for individual coals were governed almost entirely by the weather temperatures. There was a heavy call from the West and the producers diverted considerable tonnage to western points.

In May there was an advance of 25c. per ton for domestic coals to cover an increase in wages granted the mine employees although their agreement with the operators had three years yet to run. This was in addition to the usual monthly advance of 10c. made during the five summer months to cover the spring discount. This made the prices for white ash coal at the lower loading docks in this harbor as follows: Broken and egg, $5.30; stove, $5.55, and chestnut, $5.60.

Inquiries were plentiful but receipts were below normal. Coal was being sent into New England to meet the increased demand. Individual operators were getting more for their coal from inland dealers than they would have gotten on a Tidewater basis and their coal moved accordingly. The daily newspapers began to print scare articles of a possible coal famine and this resulted in a more urgent demand.

There was a let-up in demand in June but this did not relieve the situation sufficiently to head off an appeal from the up-state mayors to the President to make it possible to purchase coal at reasonable prices. In spite of the heavy production the law of supply and demand prevailed and the individual operators had no trouble in getting rid of every pound of coal produced by them. The retail dealers too were getting more than normal tonnage but were filling their customers' bins. Stocks were low at Tidewater and middlemen who depended upon free coals found little to pick up.

The first quarter of the coal year showed a good increase in production, much of which was attributed to the distribution and use of the small sizes. Market conditions were reversed for this time of year. Instead of a practically dead market conditions were as tense as they usually are in the middle of winter. There was no easiness in the trade. The mines were striving to get out a maximum tonnage and dealers were endeavoring to relieve themselves of the many orders on their books, some of which had been entered in April. The situation assumed a more serious aspect. Instead of the usual surplus of coal everybody was short and the bulk of the receipts were being stored in cellar bins. The steam coal situation continued to be strong but prices were easier.

Conditions did not show any improvement in August. Producers were making a record for themselves while the dealers were as busy as if it had been mid-winter instead of mid-summer. As was to be expected, there was a let up in the call for the buckwheat coals, but even at that there was little opportunity for the operators to place these sizes in storage.

On Aug. 23 President Wilson announced the prices at which the anthracite coals could be sold, permitting individual operators 75c. more than the prices for company coals. There was practically no change made in the existing schedule, which to many indicated that the Federal authorities were satisfied that the producers had not taken advantage of the public in setting their prices.

For several weeks dealers had been waiting for the Washington announcement and they were now satisfied. The industry seemed to take on greater activity and operators did their best to increase production. The situation in the bituminous market was being reflected in the demand for the buckwheat coals and the surplus of these sizes was soon removed.

Dr. Garfield Cautions Buying Public

About this time Dr. Garfield, in a statement, cautioned the public about buying too freely at the then existing retail prices but to wait for the announcement of the retail prices to be fixed under Government supervision. This advice was to all intents not followed, for consumers kept on clamoring for fuel.

With the approach of late fall conditions did not improve and it was apparent that the trade was to face a hard winter. The domestic coals were scarce and the authorities had ordered heavy shipments to relieve the western situation before the close of Lake navigation. This resulted in the receipts at New York Tidewater being further reduced and appeals were made to the Fuel Administration for relief.

Reports of factories and various other plants closing down because of the scarcity of fuel became current and some had to suspend operations temporarily. This relieved the situation with regard to barley coal but this relief was only temporary.

November and December proved to be active months. Supplies were extremely scarce and many middlemen had no coal to offer. The companies were scarcely able to take care of their regular customers here, much of their output being sent to the West and to New England.

Local conditions were extremely serious, particularly among those who live in the poorer sections of the city and who buy their coal by the pail or hundred-weight.

The year ended in a whirlwind rush. In the first place two heavy storms tied up shipping and deliveries, and one of these storms was followed by intensely cold weather for the early part of December, while during the last few days of the month the mercury registered near or below the zero mark, causing much suffering.

Early in the month the operators were given permission by the Federal Fuel Administration to increase their prices 35c. per ton, the mine employees securing an advance in wages at the same time which practically absorbed the entire increase in the price of coal.

Coal movement was at low ebb. No one had anything to offer and the retail dealers were being rushed for fuel. The situation became extremely serious and the fuel administrators called in the dealers to assist in solving the problem. Committees were appointed and it was agreed to adopt the fuel card system, whereby a buyer had to signify the actual condition of his bin. It was also agreed that the coal peddlers would be given a certain tonnage weekly.

Many yards were without stocks most of the time and there were intervals during which the city contained less than two days' supplies. Efforts were made in all directions to conserve fuel, such as keeping dark the electric signs along Broadway two nights each week, and tenants in the big office buildings and elsewhere were asked to be as saving as possible with heat and light.

The Bituminous Situation

Conditions in the bituminous market paralleled the anthracite situation in many ways. There was a shortage of coal nearly the entire year, together with a labor shortage and poor car supply. At the opening of the year there was a sluggish demand and congestion at the piers. Contract making was not brisk at the prevailing quotations of from $2.75 to $3.50, with most of the larger companies closing at the last named figure. Some buyers hesitated before signing for the year's supply believing that better bargains would be had later on.

The question of providing bunker coal was brought to the front early in the year by the crisis in international affairs. Congestion at the piers crippled the railroads and the lack of bottoms for export trade caused a serious blockade and numerous embargoes. The railroads began to pick up heavy tonnages of fuel for their own use. Manufacturers began to feel the pinch early in March and numerous complaints were made. There was a stiffening of prices.

The threatened railroad tie-up caught New York with less bituminous than had been on hand for some time. Shipments had been light for several weeks and operators were getting behind on their contracts. The settlement of the impending railroad labor trouble caused a downward trend in prices, car supply showed a slight change for the better and there was an easier feeling all around.

In May the high grades were scarce for the spot buyer, all of these coals being applied on contracts. Car supply showed a slight improvement but this was only temporary. Indications pointed to strenuous times ahead. Stocks were low and there were no prospects of production being increased until the railroads were able to supply more cars. The market was over-run with buyers, many houses having sent representatives to the mines.

Buying which had been largely governed by weather conditions began to ease up in June and there was a slight sagging of prices.

The question of pooling all shipments of coal to Tidewater was agitated at this time and the announcement was made that it would go into effect on July 1. At this time the towing rates were advanced, adding another burden to the shippers' troubles. The miners were also granted an increase in wages although their contract did not expire until April of 1918.

Revocation of Price Agreement Upsets Market

Two innovations to the trade, that of Government price fixing and the pooling of Tidewater shipments, which it was expected would be put into effect early in July, were temporarily postponed. The agreement as to the $3 coal and its subsequent revocation upset the market. Operators showed themselves dissatisfied with the outcome and the supplies did not increase. Middlemen, as a rule, were without coal early in August. Movement was slow and the railroads were confiscating everything they needed for their own use. Demand was on the increase.

Operators were asking the Government to fix a price of about $3.75 when the President announced the schedule of $2 per net ton at the mines. There was much confusion, many operators claiming they could not afford to mine coal at that price and many were already paying more than that to produce it.

Manufacturing plant owners were appealing to Washington because of the lack of supplies and those who had neglected to make contracts prior to the President's announcement realized that they would be hard-put later in the season.

The issuing of the priority order providing for shipments to the West tended to remove more coal from this market. Operators were taking care of their contracts as best they could and spot coal was a real scarcity. Poor car supply and the shortage of labor had become serious.

Labor conditions were relieved somewhat when the operators were allowed an increase of 45c. per ton which was at once absorbed in wage increases. But this did not increase the quantity of spot coal, the operators being no better off financially than they were with the $2 price.

A better car supply was promised early in November, but it was not obtained. The ruling of the Fuel Administrator permitting jobbers to add a 15c. commission to coal which they contracted to buy previous to Aug. 21 proved to be of some slight benefit to the market. At about this time the scope of the Tidewater Pooling Ex-

change was enlarged by an order including in its membership all shippers of bituminous. This resulted in about 10 per cent. of the shippers here, who had not already joined, becoming members of the Exchange.

Business was practically at a standstill the latter part of November. Middlemen who depended upon free coals had no business except to look after their contracts. Some light was seen, however, by the cancellation of the priority order on shipments to the Lake ports, which went into effect Nov. 30.

Bituminous Prices

The following table shows a comparison of prices for bituminous coal, f.o.b. at the various loading piers in New York harbor:

Month	George's Creek	Clearfield	Nanty Glo	Quemahoning	Fairmont	Mine Price
January	$7.25 to $8.25	$6.75 to $8.00	$6.75 to $8.00	$6.75 to $8.00	$6.75 to $8.00	$4.25 to $6.75
February	7.00 to 8.00	6.50 to 7.50	6.75 to 7.75	6.75 to 7.75	6.25 to 7.25	4.50 to 6.50
March	7.25 to 8.25	6.75 to 8.00	7.00 to 8.00	7.00 to 8.00	6.50 to 7.75	4.75 to 6.50
April	6.75 to 7.25	6.25 to 6.75	6.75 to 7.25	6.75 to 7.00	6.25 to 6.75	4.00 to 5.25
May	6.75 to 8.25	6.25 to 8.00	6.50 to 8.00	6.50 to 8.00	6.25 to 7.50	4.50 to 6.75
June	7.25 to 7.75	6.75 to 7.25	7.00 to 7.75	7.00 to 7.75	6.75 to 7.25	4.75 to 6.25

With the mine price at $3 net ton, the f.o.b. price to consumers, gross tons, for screened coal was $5.85; mine-run, $5.29, and slack, $5.29. Coal for bunker and export was selling on the basis of $6 to $7 alongside.

The fixing of the price at $2 by the President's order, made the f.o.b. prices for coal from Pennsylvania, Maryland and northern West Virginia, consumers, as follows: Screened coal, $4.83; mine-run, $4.53, and slack, $4.27.

The most notable feature during December outside of the extreme shortage of coal was the increase of $1.35 net ton allowed on coal for bunker or export trade.

At no time was there any free coals available at this market. Industrial plants were closed on account of having no fuel and conditions were unprecedented. Shipping conditions were unparalleled. Vessels aggregating close on to 1,000,000 tons were tied up in New York harbor because of the lack of fuel and among them were several transatlantic passenger steamers, some of which waited five days for supplies.

The hopes entertained by shippers that the close of navigation on the Lakes would bring more coal to this market were not fulfilled up to the end of the year.

The Retail Situation

The New York retail trade had anything but a rosy time in 1917. After going through several investigations out of which nothing developed, the year ended with conditions worse than at any previous time in the history of the trade. There was very little coal to be had, many yards were closed and there were reports that the drivers were ready to make demands for an increase in wages which if granted would result in changes being made in the calculations of the dealers upon which were based their contentions for the fixing of a gross margin, including profit, for handling coal and which was at the time, being considered by the Fuel Administration officials.

At no time during the 12 months did the dealers have sufficient coal to meet demands. Coal-burning weather continued well on to the first of June and the coal which under ordinary circumstances would have been in some consumers' bins was burned. Some dealers booked orders early in April, as usual, but carried them unfilled until well into the fall.

The shortage of coal began to make itself felt with consumers early in the fall and when the public got ready to light its fires and learned the true conditions, it became excited and demanded coal. Other sections of the country were in the same position as regards supplies as was New York, and the local dealers got no more than their share.

Government reports showed that the New York market from April to October had received from 6 to 8 per cent. more of the domestic sizes than during the corresponding period of 1916, but this increase had been absorbed by heavy consumption in April and May while heavier tonnages had been stored by house owners who had realized the conditions.

Conditions became such in November and December that efforts were taken by the fuel administrators and the dealers to protect the small buyer in the poorer sections of the city, and after several conferences it was stipulated that a certain tonnage would be sent into these sections each week.

New York Coal Exports in 1917

With the exception of coke, exports from this port were smaller for the twelve months ending Nov. 30, 1917, than for the twelve months ending Nov. 30, 1916. For 1916 there were exported 201,691 tons of anthracite with a valuation of $1,112,377; 40,181 tons of bituminous, valued at $154,102; and 17,311 tons of coke with a valuation of $128,996.

During the 12 months ending Nov. 30, 1917, the exports were as follows:

1916	Anthracite	Value	Bituminous	Value	Coke	Value
December	9,474	$62,298.00	4,430	$25,358.00	535	$9,317.00
1917						
January	7,934	65,068.00	2,049	9,246.00	1,660	10,972.00
February	4,981	35,362.00	1,731	6,796.00	1,211	11,383.00
March	13,720	105,657.00	3,224	19,649.00	505	6,273.00
April	8,339	53,106.00	171	1,774.00	1,325	18,107.00
May	16,714	133,327.00	995	7,147.00	1,900	38,063.00
June	14,693	106,173.00	1,939	14,466.00	3,650	49,646.00
July	15,967	108,986.00	448	2,767.00	3,434	33,238.00
August	3,942	29,317.00	967	7,786.00	1,763	26,359.00
September	26,988	205,470.00	593	3,354.00	2,901	40,736.00
October	3,288	21,956.00	43	487.00	1,539	20,512.00
November	10,856	75,502.00	1,229	9,830.00	304	7,709.00
Total	136,856	$1,002,222.00	17,819	$108,840.00	20,727	$272,245.00

The average cost per ton received for the anthracite coal was $7.32; for bituminous, $6.10, and for coke, $13.13, as compared with $5.52 for anthracite, $3.83 for bituminous and $7.45 for coke in the corresponding months of the previous 12 months.

Coal Carried on New York State Canals in 1917

During the season of 1917 there were carried on the canals of the State of New York 169,107 tons of anthracite and 65,834 tons of bituminous. During the 1916 season there were carried 163,647 tons of anthracite and 49,747 tons of bituminous. There is thus a slight increase in the carriage of anthracite and a decided increase in the carriage of bituminous.

Philadelphia Coal Trade in 1917

By W. D. HAMMER
Philadelphia, Penn.

SYNOPSIS — *The year just past was unsatisfactory from several standpoints. The demand was never satisfied and margins of profit were often small. Although more coal was received than ever before receipts were not sufficient to meet increased industrial and domestic consumption.*

Anthracite

THROUGHOUT the year 1917 the dominating factor in the anthracite trade was the question of supply. This was always behind the demand, even in the usually dull summer months. The year started with all interests clamoring for more coal, yet never being able to catch up with their needs. During the month of January the weather was somewhat mild and this helped the trade during what otherwise promised to be a trying season. The sizes in strongest demand were stove and pea, and at times the individuals were able to obtain premiums as high as $1.75 for these sizes. In the steam coals there was a particularly heavy demand for buckwheat, with many premium sales around $3.75, and some reported at $5 occasionally, as against the company circular of $2. During this month many of the individual shippers advanced their prices 25c. a ton to their regular customers.

With winter weather in February the demand became heavy and premiums became quite common, with a flat price of $5.50 being paid for egg, stove and nut coal. Pea was especially scarce and many dealers were unable to obtain anywhere near the quantity required. During this month the Philadelphia & Reading Coal and Iron Co., the leader in the trade, issued a new circular in which it eliminated quotations on all sizes except egg, stove, nut and pea coal. The quotations on broken and steamboat coal, together with all the steam coals, were given on application. A surprising feature was the advance of the buckwheat price to $2.50 per ton to those not covered by contracts. This brought this size close to pea coal at the circular price of $2.80, and gave the indication that the new contract prices on steam sizes would be considerably advanced.

During the month the District Attorney began an investigation to learn if collusion existed among the retailers to advance prices. The dealers were so busy trying to get coal that this investigation gave them but little concern. They had been investigated at least three times within the two previous years, the latest inquiry only showing that they were working on a narrow margin of profit.

The demand for buckwheat coal continued strong throughout the month, with many users of soft coal evidencing a desire to contract for this size.

March was a particularly exciting period in the trade. Early in the month all sizes were so scarce that the dealers were asking for coal regardless of size. In addition there was much speculation as to what the new contract steam prices would be for the year beginning Apr. 1. Premium prices, the highest of the season, were being paid for all domestic sizes; some of these quotations were as follows: Chestnut, $5.50; stove, $5.40; pea running from $4 to $4.50. Buckwheat continued to be heavily sold around $2.50, while reports were heard of several contracts being made for large tonnages at $3.

At this time there was a reduction of 25c. per ton in freight rates to Philadelphia, making the prepared coal rate $1.40 and that on pea $1.25. The demand for steam coal became so brisk that large quantities of pea were contracted for by manufacturing interests at a price of $3.50. This was 70c. in advance of the current circular price on this size. Toward the close of the month there was much speculation as to whether the companies would make the usual 50c. spring reduction from the circular prices.

Usual Reduction Shocks Dealers

During the last week of the month the dealers almost ceased buying prepared coal, seeming to want as little of these sizes on hand as possible because of the reduced freight rate taking effect in April. There was great surprise when the Philadelphia & Reading company announced its spring circular with the usual 50c. reduction, pea coal being offered by this company at $2.30 at the mines.

The individual shippers were shocked at this price. The other large companies followed the lead of the Reading except as to pea coal, which some priced at $2.80 and others at $3. It was felt, however, that there would be little coal for sale in view of the heavy contracts entered into by the large companies. As to steam coals the same prices that had been in effect all winter were adhered to. Several of the large companies announced that they expected to contract their coal to a very limited extent, something entirely new to the trade.

With the announcement of the 50c. reduction in April the retail men were flooded with orders. The general public had become convinced that coal was going to be scarce during the coming winter and therefore ordered for spring delivery in a greater volume than ever before. Yet within a week of the announcement of the new prices the shipments on the dealers' orders were so small that they refused to book any more orders until it was seen whether they would receive sufficient coal to fill them. Pea coal was particularly hard to get and as the retail price was based on the Reading company's figure of $2.30 many dealers faced filling orders at a loss. As the month wore on the demand upon the wholesalers became so strong that they no longer solicited business and most salesmen were withdrawn.

Toward the end of the month with war imminent the people became particularly anxious for coal, especially on early orders. The miners also demanded an increase in wages and the retail men feared if this were granted they stood to lose considerable money on orders booked during the first part of the month,

as there was small doubt that if the miners received an increase this would be added to the wholesale price of coal. Shipments to this market did not improve and the individual shippers in particular seemed to have deserted this district in favor of New England where dealers were willing to pay $1 above the winter circular in order to secure coal.

With the granting of an increase of 20 per cent. to the miners an entirely new circular was issued for May. This showed increases averaging about 30c. on all sizes, and made the new prices as follows: Broken, $4.90; egg, $4.05; stove, $4.30, and nut $4.40. Pea continued to vary, ranging from $2.70 to $3.10, with the individuals from 10c. to 40c. higher. Deliveries to dealers were so limited that some only took orders subject to delivery within a month or six weeks, while others refused to make a price at all. During this month some of the larger companies changed their attitude as to not contracting on steam coals and closed business with some large plants at good figures.

During this month there was a considerable reduction in the premium asked for coal by the individuals. This was solely because the Federal Trade Commission at this time made suggestions as to prices. While the commission did not have the power to enforce its suggestions, yet there was quite a tendency to heed its edicts. Even at that most of the coal mined was rushed to the New England market and the dealers here received but little tonnage. Dealers who for years had been accustomed to lay in a stock of pea coal now became considerably concerned since they had not as yet been enabled to store any of this size.

Trade Being Placed on Cash Basis

One of the few cheering features of the trade was the fact that business was rapidly being placed on a cash basis. Shippers were insisting that accounts be paid when due and dealers in order to meet obligations refused to make deliveries without prompt payment.

With the coming of June and the first warm weather there was some slackening in the demand from the consuming public, but dealers did not slacken their efforts to secure every ton possible. A fair average of retail prices at this time was as follows: Egg, $8.25; stove, $8.50; nut, $8.75, and pea, $6.75. Premium wholesale prices were within the 75c. maximum over the circular prices as suggested by the trade commission.

During the month the courts declared the last of the anthracite tax laws unconstitutional. Although the dealers are thus entitled to a refund, the repeal attracted practically no attention whatever and it may be years before anyone asks for a refund.

Shipments were severely impeded all this month by various car restrictions and as a consequence receipts here continued to be light, but with promises that good deliveries would soon be forthcoming.

The individuals advanced their prices generally to the full 75c. maximum above company circular as allowed by the Federal Trade Commission. This made their prices as follows: Egg, $4.90; stove, $5.15; nut, $5.25, and pea, $4.45. While the companies' shipments to this city were light, yet because of the increased prices the individuals made good deliveries.

The local coal trade had expected good shipments during July, after repeated promises to this effect. However these failed to materialize. The retail dealers now also realized that they would not be able to get any pea coal for storage, the current demand being far in excess of receipts. The prices of the individuals for this size now ranged from $3.70 to $4.55 at the mines, as compared to the circular figure of $3.20. There was some weakening of steam coals at this time, particularly barley, which at times became so heavy that some of the big companies stored quite a quantity of it, as well as rice. The quantity was, however, meager compared to that stored in former years. The car supply was at this time quite troublesome and all companies began shipping in box cars. This was a distinct innovation, but the readiness with which dealers took coal in this class of equipment was a strong proof of the need of fuel.

The Federal Trade Commission continued its activities throughout this month, requiring statements of various kinds from the dealers and in many instances had representatives getting information first hand from their books.

One of the most important events in the history of fuel occurred in August, when the President issued his order fixing the price of coal at the mines. The order which was handed down on Aug. 23 gave the following prices, which were to become effective on Sept. 1.

	Broken	Egg	Stove	Chestnut	Pea
White ash	$4.75	$4.45	$4.70	$4.80	$4.00
Red ash	4.75	4.65	4.90	4.90	4.10
Lykens Valley	5.00	4.90	5.30	5.30	4.35

These prices were fixed for the so-called "companies" or those popularly supposed to be closely affiliated with the carrying roads. For the other shippers, who are usually classed as "individuals," a maximum price not exceeding the above prices by 75c. could be charged. The jobbers' margin was also fixed at not exceeding 15c. per ton of 2000 lb., or 20c. per ton of 2240 lb. when coal was intended for delivery at or east of Buffalo, N. Y. West of Buffalo the margin was fixed at not more than 30c. An additional brokerage charge of 5c. per ton was also fixed for such coal as had to be re-screened for trans-shipment at an Atlantic or Lake port. Coincident with the price-fixing order the President appointed Dr. H. A. Garfield as National Fuel Administrator. Dr. Garfield immediately set about appointing a coal administrator for each state, who was instructed to appoint local committees for each community.

Due to extremely warm weather during the month the trade lost some of its nervousness, although there was a demand for every ton of the domestic sizes produced. If there was one weak size it was chestnut, but even this was eagerly taken by the retail men, as they realized that nut would be called upon to fill orders that usually called for pea. With the exception of buckwheat the steam coals continued somewhat weak throughout the month. At times rice could be purchased freely at $2.15 per ton, while in many instances barley sold around $1 a ton. The circular prices of these sizes at this time were $2.40 and $1.90 respectively. Many concerns took advantage of the situation and stocked heavily of both sizes. The companies also turned a fair tonnage into their own storage yards.

The trade quickly adjusted itself in September to the new wholesale prices as fixed by the President, although

much surprise was manifested at the pea coal price of $4 as against the $3.10 figure which had previously been fixed upon by the Reading company for fall and winter. This company finally issued a circular embodying this price. While most of the individual shippers took the full maximum of 75c., there were a number that did not add the full amount, while one added 15c.

As the month opened with summer weather there was no real activity until about the middle of the month, when the arrival of cold weather sent buyers scurrying to the coal dealers. Conditions at times bordered on panic as the people endeavored to assure themselves of a supply of fuel. Retail prices advanced under the new wholesale rates and one of the representative companies issued the following retail prices: Egg, $8.25; stove, $8.50; chestnut, $8.75, and pea, $7.75. Shipments from the mines in no way increased and many of the dealers with heavy orders taken at the April prices were becoming anxious about their ability to fill these orders.

While the steam coals opened the month with the same weakness that characterized them in August, they began to pick up noticeably with the coming of the cool weather. As the Government price-fixing order did not include the steam sizes buckwheat was selling at this time for as much as $3.75 a ton, although barley and rice could be bought close to circular, not having entirely recovered from the weakness manifested all summer.

Throughout the month there were persistent rumors that the Government had realized its error in fixing the pea coal price at $4 f.o.b. mines. Many protests had been made to Washington and when the President issued a supplemental order on Sept. 30 reducing this price to $3.40 for the white ash grade, it evoked no particular surprise. The price became effective the next day, Oct. 1.

The real event of this month, however, was the order issued the same date, Sept. 30, fixing the retail price of coal. This was to be determined under the plan promulgated by Fuel Administrator Garfield as follows:

"The retailer ascertains his retail margin in the year 1915, when more normal conditions prevailed than at present. To this he may add not to exceed 30 per cent. of that margin, which, of course, includes his profits at that time. It is provided, however, that in no case shall the gross margin added by any retail dealer exceed the retail margin added by him during July, 1917."

Dissatisfaction Comes with Price Fixing

There was much dissatisfaction over the retail price order, as many claimed they could not do business on such a close margin, and that they should at least be allowed a gross profit of $2.50 a ton. Under the new plan prices were also to be fixed every two weeks based upon the coal which had been purchased in the preceding two weeks.

The dealers were somewhat slow to adopt the new price schedule during the early days of October. The reduction of the wholesale price of pea coal also caused much confusion, for while the consuming public expected cheaper fuel there was really little pea coal to be had and many dealers were at times without this size for weeks.

During October the steam coals became quite strong again, with buckwheat early in the month bringing $4, and rice and barley freely taken at $2.85 and $2 respectively. There was also quite a demand for culm for mixing with bituminous coal at a price from 75c. to $1.

On Oct. 3, William Potter, former minister to Italy, was appointed state fuel administrator, and on Oct. 10 he appointed Francis A. Lewis chairman of the Philadelphia coal committee. Coincident with this appointment the retail men adopted the retail price schedule as directed by the National Administrator, although still claiming they could not do a profitable business on the margin allowed. The demand for fuel now became so strong that the dealers ordered regardless of size, simply asking that coal of any size be sent to them. Under the new system there was a great variety of prices, hardly two dealers quoting similar figures.

Government Complicates Distribution

Throughout the month the amount of coal received in the city was far less than the dealers demanded, although the claim was made by the companies that the tonnage delivered was much in excess of the previous year. The matter of distribution of the output was further complicated at this time by the heavy demands of the Government for domestic sizes for the various army cantonments throughout the country.

The shortage of coal began to be quite acute with the coming of November and the various coal bodies pleaded with the people to use every economy to conserve the supply. Embargoes on the various lines entering the city became more numerous and greatly interfered with coal movement. Many yards were entirely bare of supplies.

The appeal of the retail men for a flat gross margin of $2.50 per ton was this month taken up with Washington, but the plea was denied. The dealers, however, continued to appeal for an increase. Some representative retail prices at this time were as follows: Egg, $8.35; stove, $8.40; nut, $8.65, and pea, $6.90, all per gross ton.

The steam coals kept increasing in strength as the season progressed and some individual prices were: Buckwheat, $4 to $4.25; rice, $3 to $3.25; barley, $2 to $2.25, as compared to company prices of $2.80, $2.30 and $1.80 respectively.

In this month the mine workers despite a previous agreement demanded an advance in wages amounting to 25 to 30 per cent. Many conferences were held in Washington by the representatives of the men and the operators. The miners and operators finally reached an agreement whereby the former were to receive an average wage increase of 20 per cent., provided the Government would consent to an increase of 35c. per ton in the mines' price of coal. On Dec. 1 the President issued another order granting an increase of 35c. in the wholesale prices. The operating interests protested the order, but finally accepted the advance. In addition to ordering the advance the President in this order also took occasion to state that he would also order a reduction in prices on Apr. 1 next in conformity with the usual custom.

With the new price circular taking effect on Dec. 1

the wholesale prices of white ash coal were as follows: Broken, $5.90; egg, $4.80; stove, $5.05; nut, $5.15, and pea, $3.75. The steam coal prices of the companies were also increased, those of one of the largest shippers being: Buckwheat, $3.15; rice, $2.65; boiler, $2.45.

The coal situation became extremely critical during December, and despite the system of ordering by card there was much actual suffering. People had the money to purchase fuel but the dealers had not enough coal to meet the demand. Winter weather set in during the second week of December accompanied by numerous snow falls. In the coal region there were zero temperatures and several heavy snows. In one week on this account the production was cut almost 50 per cent. Toward the end of the month conditions became so serious that an appeal to Washington was successful to the extent that the authorities there directed that 15,000 tons a day be sent to Philadelphia, although the normal requirements were 18,000 tons. This had the effect of affording much relief.

On Dec. 21 Chairman Lewis of the local fuel committee, with the approval of State Fuel Administrator Potter, issued an order eliminating the plan of fixing the retail prices every two weeks. In its stead the dealers were allowed a gross margin of $2.50 per ton, to date from Jan. 1, 1918. This decision was arrived at after a report had been made by the expert accountants who had gone over the books of about a dozen representative dealers. The new rule occasioned considerable protest on the part of the public and attempts were made to have it rescinded. It was figured that the new method of figuring the retail prices would allow the dealers from 35 to 50c. profit on a ton of coal. At the same time Chairman Lewis recommended to the Federal Fuel Administrator that the plan of allowing the individual shippers 75c. in excess of the company wholesale prices be withdrawn.

While there had throughout the year been some intimation made that this city had been neglected by the shippers, it has been shown by actual figures that more coal by 400,000 tons had been received up to Dec. 1 than ever before. This, however, was not sufficient to meet the increased consumption with industrial plants working 24 hours a day instead of eight, together with the needs of many thousands who came to the city during the past year.

Bituminous

The high price movement that was exhibited in bituminous coal started in the year 1916 and continued into 1917. During the first week of the year prices ranged from $5.25 to $6.75. Labor was restless and even after many operations had granted a bonus of 10 per cent., still further increases were asked. The car supply did not run better than 40 per cent. and was often as low as 20 per cent.

Early in the year one of the largest mining companies announced its contract price as $3.50. There was a rush on the part of consumers to get protection, but most shippers confined their contract tonnage to not more than 50 per cent. of their output and others even lower. Concerns with low-grade coal, however, showed some anxiety to get the top price for contract fuel. Prices of spot coal softened after the first week and closed for the cheaper grades $4.50 to $4.75, and $6 to $6.25 for the best coal.

During the second month of the year there was considerable fluctuation in prices, with a downward tendency somewhat in sympathy with the contract of $3.50. Producers showed more willingness to contract and some business on fair coals was reported closed at $2.75, although the greater portion was taken around $3 to $3.50. Numerous local strikes continued throughout the mining districts, while the car supply at times was so short as to cause operations to suspend for short periods. The price range for the month was from $4.75 to $6.

Because of rail congestion and threatened strikes of the trainmen the fore part of March saw a sudden upturn in prices, the average advance being about $1 a ton. Upon the settlement of the threatened railroad strike prices softened a bit. The demand continued heavy for all grades, but particularly for slack. Considerable sluggishness existed in the export trade on account of high freight rates, scarcity of bottoms and rising insurance. During the month prices ran from $4.50 to $6. Some contract business was reported as high as $4.

Concerns Anxious to Stock Coal

The entry of this country into war in April did not produce any appreciable change in the trade, except that the demand from concerns anxious to stock coal became stronger. Contract prices became firm around $3.50 to $4 and with no particular desire on the part of shippers to seek the business. Wage increases to the amount of 20 per cent. became general in the Pennsylvania districts and affected prices, although with the frequent fluctuations during the month the general average of prices was lower than in the preceding period. There seemed to be a closer grouping of all prices, hardly a dollar separating the highest from the lowest, with an average range of $4 to $5.25.

On account of a threatened strike among the miners prices began to move rapidly upward in May. At this time the Government through the Federal Trade Commission offered to mediate the troubles. This had a calming effect upon the situation, yet prices continued at a high level, approximating $7 in some instances, with the lowest figure around $5.75. The car supply continued unsatisfactory, hardly ever running higher than 40 per cent. of requirements.

The extraordinary demand for coal showed no diminution in June, although on account of the continued rail restrictions the supply hardly met the demand within 50 per cent. Prices had a tendency to move lower during the month, labor troubles having been settled through the Government. Shippers of tide coal, at the suggestion of the trade commission, held many meetings to arrange for a system of pooling tide shipments in order to expedite unloading. Prices in June ranged on an average from $5.25 for the lowest to $6.25 for the best grade of coal.

In July after a conference in Washington between the leading bituminous operators and the Government an agreement covering a fixed price for all bituminous coal, regardless of grade, was entered into. The prices fixed were $3 for mine-run coal and $3.50 for lump, with 25c. additional allowed for coal sold through commission houses. The above prices were for the net ton of 2000 lb. It was further arranged to inaugurate

the pooling system on Aug. 1. There was also considerable improvement in the car supply this month, with allotments as high as 60 per cent. The demand continued heavy, with most of the production being applied on contract business.

With the passage of the Food Control act in August, persistent rumors were afloat that a lower price for coal than the figures agreed upon in July would be fixed. While the larger operators strictly adhered to these prices, numerous sales were reported made at figures from $1 to $1.50 above them, and there was constant newspaper agitation for Governmental regulation. The car supply ranged from 50 per cent. to 60 per cent., with all heavy users making strong efforts to stock coal. On Aug. 21, the trade was stunned by the President's price-fixing order. The prices allowed were $2.25 for screened coal, $2 for mine-run and $1.75 for slack, with 15c. allowed for brokerage on coal thus handled.

With the price of coal thus fixed practically the entire production beginning with September was applied on contracts, which had been taken at figures around $2.75 to $3.50. Even then contract orders were far from being filled. Throughout the month the operators spent much time preparing cost sheets and sending their representatives to Washington in an endeavor to effect a change in prices, which they claimed were ruinous.

Government Starts to Issue Priority Orders

On account of the increasing congestion of rail movement in October the Government began to issue priority orders for shipments of coal to various sections of the country. It also allowed wagon mines to add 75c. a ton to the Government price of $2. This led to the hope that there would be a general increase of prices. New demands were also made by the miners for increased wages and upon an agreement with them being reached the President revised his price order, allowing an increase of 45c. per ton. This it was still claimed by the operators was far short of affording a reasonable profit.

In November the real pressure on the coal trade began. With the car supply worse than at any previous time many small plants at times were closed for lack of fuel. At this time the Fuel Administration made a ruling that coal used exclusively for smithing purposes could be sold at the market price, which in this month ran from $4.25 to $5.75 per ton.

The operators never ceased their efforts to get an increased price on mine-run coal, advocating a figure of $3 as one that admitted of a fair profit. The situation as to supply became so critical that practically all coal toward the end of the month was being shipped on priority orders. In addition regulations were issued cutting down the hours for the lighting of electric signs.

Conditions on the railroads were even worse in December. The Fuel Administration announced early in the month that all new contracts entered into must be supervised by that body. An interesting development of the month was an increase of $1.35 allowed by the Fuel Administration in the price of bunker fuel. During the last two weeks of the year the shortage became so acute that large industrial plants were closed down for a day or two at a time, even those working on Government material. The chief trouble was the inadequate service on the railroads, which were badly congested by freight of all kinds.

Taken in a general way the year 1917 in Philadelphia was one of the most unsatisfactory seasons ever experienced, both from the standpoint of production and investment return. It has been estimated that for the year there would be a shortage in this city alone of a million and a quarter tons.

Ohio Trade in 1917

By J. W. Lehman
Columbus, Ohio

The year 1917 in Ohio, as in other parts of the country, has been quite unusual in every respect. With the country fully launched in the world war and with every effort being made to prepare for the conflict, the coal industry was called upon to do unusual things. While it failed partially under the stress of circumstances, still on the whole the industry responded to the patriotic call of the country, and had it not been hampered by a lack of transportation would have been equal to the occasion.

It has been a strenuous year for the operator, the jobber and the retailer alike. With the public pleading for coal and with transportation congested, it was necessary for the Federal Government to adopt regulatory measures. At first these simply embraced the regulation of prices, but later national and local fuel administrators were appointed and steps taken for the regulation of distribution.

On the whole the year has been a prosperous one for the producer and distributor. In other words the operator has been able to make a fair return on his investment, the jobber because of heavy demand has been able to make rather large profits and the retailer was able to make good profits until restricted by governmental regulation and even afterward the returns were fair. Generally speaking prosperity has reigned in the coal industry in Ohio and the trade is in a better position than ever before.

Prices of course were one of the big features of the year. The year opened with an almost unprecedented demand for coal from domestic and steam users alike. This was the legacy from the preceding year. Prices at the mines ranged around $6 in all fields. There was little distinction made between the various sizes as mine-run, lump and screenings were quoted at about the same figure. This condition was due to the fact that buyers were bidding against each other for available tonnage and price was of little consequence as long as the fuel was secured.

The $5 to $6 price and even higher figures prevailed until the latter part of March when the falling off in domestic demand caused a temporary slump. Prices were rapidly reduced to $3 for mine-run and at one time lump was quoted at that figure. But the recession was only short lived and the unusual demand coupled with lack of transportation caused quotations to soar again. In June operators confronted with the serious conditions met at Washington and under the charge of Chairman Peabody of the National Defense Council agreed to a price of $3.50 for lump and prepared sizes and $3 for mine-run and other grades.

When these prices were fixed, apparently under the approval of the Federal Government, operators settled down to their work, believing that some permanency had been instilled into the trade. But it was only a short time that price stability prevailed and in August the price fixing decree of President Wilson was announced.

Much lower price levels were named and there was considerable complaint on the part of operators. None, however, gave up in despair but continued to push production as much as possible and immediately started work on a plan to secure higher quotations. This work resulted in success and in October advances were given and fair prices have been maintained for the remainder of the year. In October 45c. per ton was added to take care of the increased mining scale and to repay operators for other increases in the cost of production. During the latter part of the year production in Jackson, Burkholz and Palmyra districts was still further stimulated by an advance in price of $1.40 from the previous levels.

As for car service, conditions in various parts of the state varied considerably. Up to October the Hocking Valley district and more especially that section served by the Hocking Valley R.R. had a fairly adequate car supply and production was generally good. A part of the time the car supply was approximately 100 per cent. On the other hand the Toledo & Ohio Central had fewer cars and some curtailment of production resulted. Pomeroy Bend was in fairly good shape until the latter part of the year when car service was curtailed. In Jackson there was a fairly good car supply until the later months and the same is true of Crooksville and Cambridge.

In the eastern Ohio district the car supply was probably worse than in any other section. During the period of the Lake trade there was a considerable supply, but after the priority order was lifted the car supply was reduced to a low ebb. A large part of the available cars were used to load railroad fuel and this cut off the supply for commercial purposes.

The Lake trade was one of the active features of the year. Owing to the priority order, a large tonnage for the Northwest was secured in Ohio. Much of this coal passed through sections which were entirely without fuel and considerable ill feeling resulted. But the net result was that the Northwest was fairly well taken care of from Ohio, West Virginia and Kentucky mines.

The total loadings at the Lake ports in Ohio were larger than in any previous years. It was partly due to the pooling arrangement that such efficiency was attained in the Lake trade.

The year was marked by bad feeling between the public and the coal trade. Early in the year the operators were charged with many offenses, among which was combination to maintain high prices and as a result the public press, especially the newspapers, contained many columns of acrimonious writings. The jobber also came in for his share of criticism and the same can be said of the retailer. But the coal situation gradually became more thoroughly understood and it is now the general belief that the shortage of fuel is due almost entirely to lack of transportation facilities.

Market Conditions in Middle West in 1917

By O. M. BURNETT
Chicago, Ill.

SYNOPSIS—*A continuous coal shortage, a continuous unrest of labor, a continuous excessive demand, a continuous shortage of adequate transportation and almost continuous difficulties in the matter of price mark the past year in the Middle West coal trade. "And the end is not yet."*

THE coal trade has never, nor will likely soon again pass through a more complex and record-making period than the past 12 months. In the beginning of the year, the trade was upset as there was a big coal shortage, and the highest prices ever before heard of prevailing on all grades. This naturally made the buying public wonder when there would ever again be a normal market, when coal would be plentiful, and people would be able to purchase their needs as of old—at their own figure. Unless one has followed closely, and noticed with care the different turns of the market from time to time, it is extremely difficult to understand how so many events worthy of note could be crowded into one single year.

During the first half of 1916 there was considerable coal stored, all of which was consumed in the last half of the same year, thus leaving the storage stocks at the beginning of 1917 practically exhausted, and throwing into the market many large steam buyers, who had rebelled at paying the market price. This added to an already feverish market a wild clamor for coal.

About this time there was started considerable agitation against both the producer and jobber because of the high price. The agitators claimed that coal was being held at various railroad terminals throughout the country, in order to bull the market. This in realty was caused by railroad congestion and was not the fault of the coal men, but a result of conditions. Summing up the situation that prevailed at the end of January, we conclude:

1. The shortage of coal had become national—no city nor state was exempt from the scarcity. Should there be a surplus in one territory, the demand in some other section of the country would immediately absorb it and cause a movement to a more distant market, unheard of heretofore, and the regular market of this territory would be shut off until such a time as it was in distressing need itself.

2. The visible supply of coal had been exhausted. The steady increase in consumption over production had completely wiped out all storage stocks, and consumers were dependent entirely on open market offerings.

This caused purchasers to bid against their competitors in open market for coal to supply their trade or keep their plants in operation. This resulted in a price of $4 per ton in many instances on Illinois and Indiana coal, that in the same month of former years scarcely ever exceeded $2.

3. To increase the fuel supply had now become a national ambition. This resulted in the coal people, railroad companies and all public agencies bending every effort to increase coal production, move cars faster, and unload and return equipment more promptly.

About this time it began to dawn on every one that prosperity was not temporary, and that the expansion spirit of the American people had come to stay. Admitting that the war abroad had, in a measure, reflected on the American trade expansion, there was a noticeable tendency, at every turn, toward home expansion.

February: With cold weather prevailing, the demand for coal had established a price, which was no recession from that which had prevailed during the first month of the year. With the season approaching when warmer weather was naturally expected and when prices were accustomed to take a tumble, the drift of the market was the reverse, and was only held in check by the influence of the deep thinkers among the coal men, who contended that prices were sufficiently high, and must not be allowed to get beyond control, as this would eventually result in what happened later—the Government fixing the prices. At this time the contract price had been strengthened by the danger of war, the realization of the need of large tonnages to replenish depleted stocks, and the constantly increasing current needs. At this time the constant strain that had been on the various coal-carrying railroads began to show perceptibly. It resulted in badly delayed shipments and congested yards everywhere, hence cars that ordinarily made a trip in 30 days, were now in transit double that time. The shortage of Eastern coal was at no time prior to February so marked as during this month; in fact, the trade had become reconciled to the belief that if it got coal of any character, it would have to be from the Western field. This increased an already heavy burden on the coal-producing West as well as the Western coal roads.

Fluctuating Market During March

March: The market was up and down during the month of March. The occasion for a price slump was a more efficient car supply during the first two weeks, and warmer weather. The news that put the market up was that the railroad brotherhood was likely to declare a strike at any time, and the market moved back to the price that had prevailed in the earlier months.

The month as a whole was one of excitement to the coal trade. That cars had become more abundant after several months of shortage, seemed to the coal men as only temporary. However cars continued plentiful for several days. The coal men had been saying all along, "Give them cars, and price would regulate itself." This prophecy had almost been realized, when the threatened strike drove prices again upward. The threat of the total absence of cars was much worse than a mere shortage, hence prices drifted quickly to higher levels.

April: America entered the world war. It was a noticeable fact that the coal industry lost heavily of its labor during the first two years of the war abroad, not only on account of immigration to America being stopped, but by the return to their native countries of a large number of coal miners. The absence of immigration and the increased production of all classes of commodities had shortened materially all classes of labor; particularly had this affected the mining industry in the Middle West.

At this stage of industrial activity the miners became restless, and asked for an increase in their wage agreement made Apr. 1, 1916, which did not expire until Apr. 1, 1918. A new wage agreement was made that became effective Apr. 16, which gave the miners an advance of 10c. per ton for pick mining—day labor, monthly men and all other classes of labor 60c. per day, except trappers and boys who received less than $1.57 per day. These were advanced to $1.90 per day. This agreement established a precedent, which later resulted in another substantial advance.

The Industry Begins to Mark Time

During the first half of April the price of coal had in most centers been circularized for the month at $3.25 per ton at the mine for prepared sizes, fine coal ranging around $3. This was an unusually high level for Illinois and Indiana coal at this season of the year. Contract negotiations had been at a standstill, no one seemed willing to accept the responsibility of making a contract that would later result in further negotiations with customers, and everyone seemed to be content to delay making contracts until all wage disputes were settled. The fact that there was a ready market for free coal seemed to warrant an indifference among the coal men about new obligations; thus, fewer contracts were made during this month than any previous April within recollection.

May: Early in May the Federal Trade Commission, headed by Chairman Harris, shifted its inquiry—which was started in Washington—to Chicago. Mr. Harris informed the coal men that the commission had started, under special instructions from Congress, several months before to inquire into the coal situation, but was compelled to abandon this work to look after other pressing matters. He asked the operators why prices were high, and what, in their opinion, were the future prospects, and the remedies for the then existing situation. During this time prices on all grades had advanced from $3.25 to $3.75 per ton for Illinois and Indiana, with a wild and unruly market prevailing. Large corporations had purchased some large producing mines; various railroads that had in former years purchased their fuel from other fields were seeking coal in large quantities. This, no doubt, reflected to a great extent on the general market conditions.

When war was declared it was realized that one of the first and prime considerations for the successful carrying on of hostilities was coal; therefore, it became necessary for the Government to have someone that was familiar with this industry to look after its interest, and F. S. Peabody of Chicago was appointed head of the sub-committee of the Council of National Defense in charge of coal, with the privilege of selecting his own committee. It was the understanding of most coal operators that this body was to be charged

with the responsibility of expediting production, arranging, and if possible, simplifying the distribution of coal for both the Government and commercial use. This committee's work was broad and efficient, and the members continued their activities until the appointment of Fuel Administrator Garfield.

June: The price for prepared sizes settled at $3.50 per ton, with fine coal ranging 50c. lower. This indicated that the minimum for the year had been reached. June in normal years is a time used to repair mines and get properties in shape for the fall and winter campaign. Not so this year; urgent demands compelled most operators to make but few changes, and to continue the operation of their plants to the limit.

Public price agitation was now at its height. This resulted in the calling by Chairman Peabody of the Committee on Coal Production, of nearly 500 coal operators, to Washington, to discuss the seriousness of the situation and see what might be done to prevent coal from soaring to unreasonable figures during the fall and winter months.

At an open session Secretary of the Interior Franklin K. Lane, Secretary of the Navy Josephus Daniels, and J. E. Fort of the Federal Trade Commission, explained to the coal operators the fundamental necessity of coal in winning the war and appealed to them for an established reasonable price. The result of the meeting was a tentative agreement between the operators and the Government, fixing the price of bituminous coal at $3.50 per ton at the mines. After the meeting had concluded, operators hurried back to their home, thinking that matters were settled for a while at least, only to learn that Secretary Baker thought the prices exorbitant. Thus, it will be seen the end was not yet in sight, and the solution for the big basic problem had not yet been obtained.

July: Little occurred during this month out of the ordinary. Prices remained as fixed by the Washington agreement, with operators running their mines to capacity when there was equipment available. Most of them had enough orders ahead to keep them going for an indefinite period, and were putting forth their best efforts to increase production and supply the demand; in other words, they sought to show by their action that they were trying to make good the promise made at the Washington conference. Even in July cars were still scarce with the exception of those mines loading railroad fuel, with a guarantee of a full car supply. Some signs of domestic buying for storing purposes had manifested themselves.

Strong Movement to Lower Prices

In the meantime, various public agencies were busy, trying to beat down prices, but the demand for steam coal was so great that little headway was made. Beginning July 21, the operators of Illinois were for almost a week in conference with the State Council of Defense; under ordinary circumstances, a meeting of coal operators with a local committee of one state would not be considered of much importance, but in this case a national issue had been raised, which had to do with the price of coal made by the Federal Government, through its agencies. The situation produced nothing but confusion and the conference finally adjourned.

August: The market continued to be strong with prices steady. The passing of the Lever Food Bill by both branches of Congress and becoming a law by the signature of President Wilson, made the President the coal autocrat. The bill in question gave the President power to control food, feed and fuel, and to fix the price of coal whenever and wherever sold.

Naturally all coal operators were much interested to know how the President would view the coal problem, and some of the operators even predicted that in view of the action of various state councils, the President would soon after the passage of this bill, "show his hand."

Lowered Prices Discourage Operators

On Aug. 21, President Wilson announced prices for bituminous coal in the various producing districts. For Illinois and Indiana, the price of prepared sizes was fixed $2.20 per ton; mine-run $1.95 per ton; screenings $1.70; all at pit mouth. Although the operators accepted the decision with apparent good grace, it was noticeable that they were discouraged and disheartened. In some instances there were exceptions made and claims formulated, showing that coal could not be produced, prepared properly, and sold at the above prices, so as to give the owners any profit. Operators everywhere began the preparation of cost data to present to the Government, showing precisely what they were doing, and what it was actually costing them to do business. Following the price proclamation, Dr. H. A. Garfield was appointed Fuel Administrator by the President, with full power to act in accordance with the power granted under the Lever Law. With this appointment, the status of the Peabody committee would seem to be at an end; however, Mr. Peabody stuck for some time and rendered valuable service to Fuel Administrator Garfield.

September: The price having been fixed, there was nothing left for operators to do except produce coal, whether in so doing they made a profit or sustained a loss. Regardless of their sore disappointment, association secretaries were busily engaged with their membership, trying to have each operator prepare and present to Dr. Garfield accurate cost data, in order to show they were warrantably entitled to more money.

Cars continued to be scarce on all coal-carrying lines in the Middle West sections, with each mine operation loaded down with orders, and customers urging shipment, fearing that the price would be raised before they could get coal. Little or no headway was made on the market, and September closed, with an increased feeling that the public was face to face with a coal famine.

October: Coal miners having worked almost six months since they received an advance, had become restless, and were, in many localities, refusing to work. This discontent spread so rapidly that production fell off and appeals to many miners for patriotism had little effect; they claimed that the advance in the cost of living was far in excess of their April increase, and requested another conference with the operators. This was arranged and held in Washington, resulting in another and a more substantial increase than the one granted in April. The wage agreement was based on the premise that the operators were to be allowed an advance by the Government. On Oct. 29, President

Wilson issued his second price proclamation, granting the operators an increase of 45c. per ton, and fixing the maximum for Illinois and Indiana coal at $2.65 for the prepared sizes, $2.40 for mine-run, and $2.15 for screenings, allowing the jobbers 15c. per ton over and above the operator's price. Based on the agreement previously made between the operators and miners, the miners' wage advance became effective Nov. 1.

November: As a result of the wage advance made to the miners, many operators who had made contracts in April, 1916, for a period of two years, were sorely affected because of their failure to properly protect themselves with a clause in their contracts that would permit them to advance their price to their customers. On this account, prolonged and lengthy negotiations were necessary. In some cases, price contracts have been adjusted with a compromise agreement, others are still pending. During the month of October, when discord and discontent among the miners were at their height, the production of bituminous coal fell to the lowest point it had reached, with one exception, for 12 months. The effect of the agreement, however, was soon felt, and production gradually rose until in the third week of November, it had again reached high.

December: The advent of severe winter weather saw the absolute collapse of the railroads—a contingency that the operators had steadily maintained would materialize. Before the month was half gone, with zero weather prevailing, and snow drifted from 3 to 5 ft. deep in the coal field, it was apparent to the best informed that the Government would soon be compelled to take immediate steps to remedy the situation.

While summarizing the past year in a few words, we cannot but wonder what the future has in store.

Mines in every locality worked every day that they could get cars and the miners would work—they were never without orders ahead to protect their operations with immediate disposition of their product, for from 30 to 90 days; two wage agreements were made at a period when there was supposed to be no changes; the Government is absolutely in control of prices, and may eventually operate the mines; a National Coal Association has been organized and is in good working order; we have now a National Jobbers Association, as well as retail dealers working together, and a fuel shortage unheard of heretofore.

"Where do we go from here, boys, where do we go from here?'

Colorado's Forecast for 1918

By F. W. WHITESIDE
Chief Engineer, Victor-American Fuel Co., Denver, Colo.

THE books of the year 1917 have just been closed, and we are now laying upon the trestleboard our designs of the fabric of the new year. The hovering war cloud dims our perceptions and curbs our usual confidence in our ability to do and to overcome. We know that in this war we must succeed, but by what means or in what manner this victory will be consummated we cannot with accuracy foresee.

We know that to win the victory at least four great commodities will be required—food, clothing, steel and coal; and not the least of these is coal, for each of the others is greatly dependent upon it. From this humble substance we must not only obtain heat to prepare our food; manufacture our steel; propel our transports; but from it we must also obtain material for the manufacture of explosives; drugs and medicines for our hospitals; dyestuffs for our clothing, and paints, oils and preservatives to cover and protect our products of wood and steel.

Colorado's production of coal in 1917 was 12,433,129 tons, or 1,910,944 tons greater than that of the year 1916. In 1916 the average number of days worked was 175.8 and the average number of men employed 12,598. In 1917 the average number of days worked was 204.5 and the average number of men employed 13,570.

Many of our miners and men about the mines have joined the Government service in one capacity or another. As the demand for coal will be far greater during the coming year than ever before, the operator will therefore be confronted with the problem of delivering more fuel with fewer men and a greater shortage of railroad cars. Probably the car situation will be helped by systematic Government regulation and control, but the man problem affords but one method of solution, and that solution will be reached by the installation of additional machinery for the mining and loading of coal. That this is being done throughout the state is proved by the difficulty in obtaining mining machinery of all kinds.

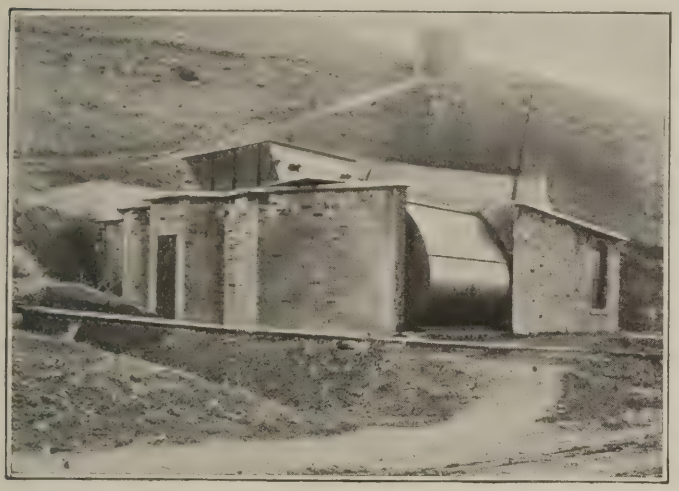
Whenever possible the mining machine is being introduced. In the northern, or lignite, field, practically all the coal is top cut, bottom cut or rib sheared with some type of punching machine. In the various other districts of bituminous and sub-bituminous coals the chain machine is now in greater demand and more widespread use than ever before. While hand mining and shooting from the solid is still carried on in some of the smaller properties, the practice of both is discouraged and is falling rapidly into disuse. A great



A COLORADO MINER'S COTTAGE

deal more attention to efficient methods of gathering, hauling, dumping and screening the coal is given in order that each man's efforts will be productive of maximum results.

The first bank of byproduct coke ovens designed to furnish smelter or steel coke to be installed in Colorado are now in course of construction by the Colorado Fuel and Iron Co. at its steel plant at Pueblo. One hundred and twenty ovens capable of carbonizing 2200 tons will



TYPE OF FAN ERECTED BY VICTOR-AMERICAN FUEL CO. NEAR TRINIDAD, COLO.
The fan shown is a 90 x 90-in. Sirocco

be ready for service about Mar. 1 of this year. From these will be derived gas for the steel plant, and among the first of the byproducts to be obtained will be tar, ammonia, benzol and toluol. To charge these ovens a washery with a daily capacity of 3000 tons is building near-by. Both the ovens and the washery are so designed and constructed that duplicate plants can be added to each. Slack for the combined plant will be hauled from Trinidad, 100 miles distant.

The Victor-American Fuel Co. is preparing to install at one of its mines a rotary dump with a capacity of dumping 12 pit cars simultaneously. This operation is expected to eliminate much of the expense of dumping and screening coal at the tipple. A 700-ft. rock tunnel has recently been completed and the grading of the 2800-ft. gravity tramline, which will handle the pit cars from the tunnel to the tipple, is now in progress.

The Victor American company has recently completed an 850-ft. tramline bridge across the Yampa River to its new tipple at Wadge mine in Routt County.

Workman's compensation has greatly assisted the state coal-mining inspector and his deputies in the work of inspection and making safe the coal properties. Comparatively little difficulty is experienced in getting the men to work steadily. Due to the car shortage, a large per cent. of the mines are unable to work six days a week, even though the men are so inclined. In one district especially the car shortage has been so great that a week sometimes goes by without the mines turning a wheel.

It is difficult to state what effect, if any, Government regulation has had, as it has not been in effect long enough to receive a thorough tryout. The first noticeable effect was when the probability of Federal regulation was announced; many dealers and consumers thinking that the price would be very appreciably reduced, postponed turning in their orders with the result that when the matter was finally settled the operators were able to handle but a small percentage of the business, so great was the demand for coal.

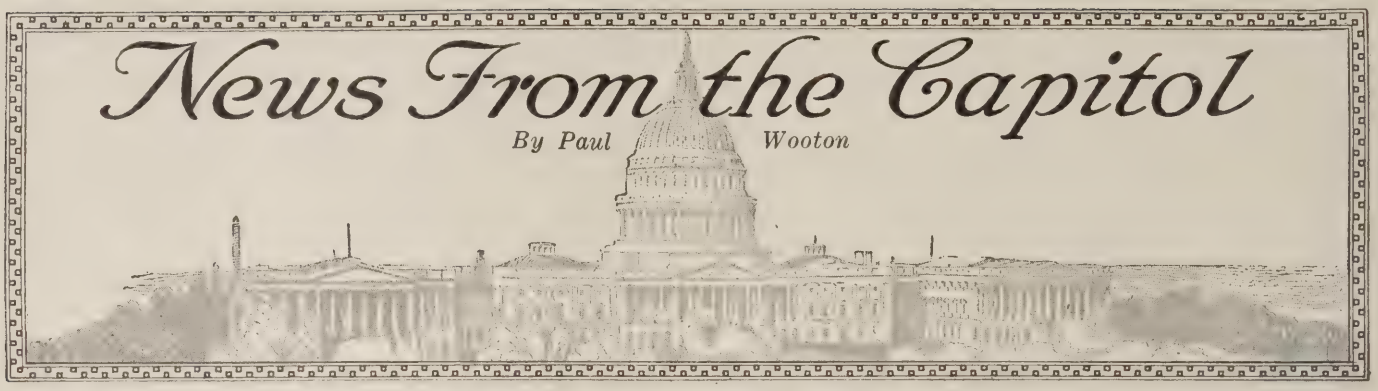
The outlook for 1918 is problematical. There is every possible reason to expect the greatest demand in the history of the coal industry. There are abundant grounds for the belief that the average daily tonnage per man can and will be increased by the installation of labor-saving machinery.

There remains the railroad transportation situation with which all industries, as well as that of coal, must reckon. Colorado has no navigable waterways. She is



COLORADO MINE TIPPLE IN THE MAKING
This tipple is being erected near Canon City, Colo.

entirely dependent upon some form of land transportation. Our Uncle Sam will, without doubt, work wonders in the solution of our present and future transportation difficulties. But even the great things he has done, which he is now doing, and which in the future he proposes to do, require time; and the most significant feature about our present solution is that to accomplish the desired result whatever is done must be done quickly. The entire country is short of power and railroad equipment. If our worthy Uncle can with his mighty arm relieve this unfortunate situation, Colorado pledges herself to break all her previous records for the mining of coal.



[Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Metropolitan Bank Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 703, Metropolitan Bank Building, Washington, D. C., while at the capital.—Editor.]

Peabody Testifies Before Senate Investigating Committee

Division of the country into producing and consuming zones; cleaning coal; a definite price schedule to extend during the war and six months thereafter, and a restriction of priority orders were the four points outlined by Francis S. Peabody on Jan. 14, before the Senate Investigating Committee, as being the most necessary steps to be taken to improve the coal situation. Members of the committee regard Mr. Peabody's testimony as having been of exceptional value. Throughout his presence on the stand he was accorded the closest attention by the members of the committee and by the audience.

In reply to direct questions, Mr. Peabody stated that he was not consulted by the Fuel Administration when it took over many of the functions which his committee on coal production was attempting to perform. Despite Mr. Peabody's offer to assist the Fuel Administration he was not consulted on matters of moment. Mr. Peabody stated that he had nothing at all to do with the conferences which resulted in the adoption of the schedule which received the approval of the President. As an incident to the questioning in this regard, Mr. Peabody stated that he would expect under present conditions to receive cost plus 15c. per ton for coal taken from his mines.

A zone system following the English plan is perfectly feasible in this country, Mr. Peabody told the committee. He stated that he had given this problem considerable thought and had consulted with transportation experts and with experienced coal men. Such a plan, he declared, will increase the country's output of coal by 20 per cent. The plan divides the country into 30 districts. No coal is to be sent out of one zone into another without a license from the Fuel Administration, according to the Peabody plan. This license will have to be resorted to in some instances, Mr. Peabody pointed out, using as an example the necessity of having a good coking coal at byproduct ovens.

The necessity of clean coal was emphasized strongly by Mr. Peabody. Next to the zoning of the country, he regarded it as being most important. A statement compiled by the Bureau of Mines was introduced into the record which showed that, in some cases, coal now being shipped contains as much as 37 per cent. ash. A long list of analyses brought out clearly that there had been a very large increase in the amount of refuse being shipped in coal. Mr. Peabody called attention to the tens of thousands of cars which are being used in this time of stress to transport entirely worthless material, to say nothing of the losses to the consumers. So great is the quantity of refuse that is being shipped with coal that Mr. Peabody believes it will more than offset any increased tonnage which may have been shown since September.

Third in the point of importance Mr. Peabody placed the necessity for a definite statement from the Government as to the length of time the price schedule will be maintained. That prices should be subject to change without notice, as they are at present, Mr. Peabody asserted to be a "death blow" to production. With the existing uncertainties as to price and to contracts, there is such hesitancy on the part of capital to improve existing mines and to open new ones as to constitute an element of the gravest danger in the situation, he said. If the price schedule should be made permanent for the period of the war and six months thereafter, and allowance be made for any increase in wages, great stimulus would be given coal production. Mr. Peabody declared that he was very well satisfied personally with the Government's prices, but that any price schedule to be entirely fair should be based on the thickness of the seam.

Several times, when questions were asked, which seemed to imply a criticism of the Fuel Administration, Mr. Peabody would bring out his opinion that little good could come from criticism. He expressed his conviction that this is the time for constructive suggestion, rather than a consideration of that which has "gone over the dam." Pressed by the Senators, however, Mr. Peabody stated that the necessity of cleaning coal had been brought by him to the attention of the Fuel Administration shortly after it began work, but that no action was taken and that he rarely received any replies to his communications other than an acknowledgment of the receipt of his letter. The ruling

with regard to new mines also was criticized as was the effort to go into intricate cost accounting when the country is at war. He advocated the use of the broad ax and the tearing away from the detail and red tape which is hampering production and distribution.

The use of the priority order in a way which will do justice to all, Mr. Peabody thinks, can be brought about only by its application after it has been passed upon by expert railroad men and by those who would be familiar with every ramification of its influence. The too frequent and ofttimes short-sighted use of priority orders has been one of the most disturbing elements of the present situation, it was brought out in Mr. Peabody's testimony.

Mr. Peabody expressed his disapproval of the pooling plan authorized by the Federal Trade Commission. He said that he and Mr. Colver had argued in support of their respective views in this regard for two months, but that Mr. Colver was unable to answer his question as to what he would do when supply caught up with demand and the pool began to overflow.

Mr. Peabody criticized the inequalities of prices in the Northwest and stated that this section of the country is being allowed to drain Illinois and Indiana of coal.

Franklin K. Lane, the Secretary of the Interior, also appeared before the committee. His testimony was confined largely to an explanation of his participation in the adoption of the Peabody schedule. He defended the action taken by the operators at that time but did not take advantage of an opportunity offered him by Senator Lodge to criticize the action of Secretary of War Baker in undoing the operator's action by making public a letter criticizing the schedule. Secretary Baker's letter, however, was introduced into the record.

Weekly Production Statistics

Coal production during the week ended Jan. 5 exceeded all expectations when 9,236,000 tons was mined. This is an increase of 3.6 per cent. over the production of the preceding week. Beehive coke to the extent of 515,000 tons was produced during the week ended Jan. 5. Forwardings of anthracite coal were 27,517 cars, as compared with 36,083 cars during the preceding week. The anthracite production for 1917 is estimated as having been 77,133,305 tons, as compared with a total production of 67,376,364 tons, which made 1917 the banner year in the history of the anthracite industry.

Observance of holidays during Christmas week made labor shortage a much more prominent limiting factor in coal production than has been the case in many weeks. Reports to the Geological Survey show that labor shortage and strikes were responsible for loss of production to the extent of 10.2 per cent. This compares with 2.6 per cent. for the week ended Dec. 22. During the week ended Dec. 29, the losses from car shortage fell from 24.7 per cent. to 8.8 per cent. As fewer miners were at work during that week, the railroads had less difficulty in supplying the needed cars.

Commenting on the general situation, during Christmas week, the report says:

> From all states except southwest Virginia, Alabama, Iowa, Arkansas and West Virginia Panhandle improved working conditions were reported. In each of these states an increase in losses due to labor shortage was responsible for the decline in output. In southwestern Virginia and Alabama the ratio of tonnage produced to capacity was the lowest on record since the weekly bulletins were begun; losses attributed to labor shortage in southwest Virginia were 24.1 per cent. and in Alabama 23.6 per cent.
>
> A general improvement in working conditions was reported from Illinois, Indiana, Ohio and Pennsylvania. West Virginia, both high- and low-volatile, which had suffered from the bad weather longer than other districts, showed a marked improvement during Christmas week. The most striking improvement was reported from eastern Kentucky. Losses in the Hazard field dropped from 63.1 to 19.3 per cent. of the full-time capacity; and in northeastern Kentucky from 62.5 to 32.0 per cent.

Convinced that its weekly statistics on coal, coke and anthracite production are helpful to the industry, the Geological Survey has extended its work to include byproduct coke. These figures as well will be compiled by C. E. Lesher, the geologist in charge of coal statistics. The first report, which covers "a seven-day period in late December," shows production to have been 384,207 tons, which is found to have been 80.4 per cent. of the full-time capacity of the country's ovens. Practically all the loss was due to inability to obtain coal.

Fuel Shortage in the United States Not Due to Exports

During the first eleven months of 1917 the United States exported 19,647,671 tons of bituminous coal. This compares with 17,740,391 tons during the corresponding period of 1916. These figures, which are compiled from the official returns to the Department of Commerce, set at rest the widely circulated report that an important factor in the fuel shortage in the United States this winter is due to increased exports. The greater part of the coal exported went to Canada, which country received from us 14,912,698 tons. The report had it that specially large quantities had gone to Italy. This is not the case, as the forwardings to that country for the entire eleven months were only 553,423 tons. This is one-third of the exports during the same period of 1916. Exports of coke, as well, showed no important increases during 1917 over those of the preceding year.

Exports of coal during 1918 probably will be somewhat less than were those of the year just closed, as the War Trade Board expects to be very strict in the application of its power to grant licenses for coal. It is admitted, however, that exports to Canada, which constitute the bulk of this country's forwardings, cannot be curtailed greatly.

United States Fuel Administration Now Has Control of Oil Matters

United States Fuel Administrator Harry A. Garfield on Jan. 10 announced the appointment of M. L. Requa, of California, to handle oil matters for the United States Fuel Administration. Mr. Requa will have full charge of the activities of the Fuel Administration in connection with oil under the direction of Fuel Administrator Garfield.

Since the organization of the United States Food Administration, Mr. Requa has been an assistant to Food Administrator Herbert Hoover. His transfer has

been arranged with Mr. Hoover, who has consented to the change because of Mr. Requa's qualifications for his new position. Mr. Requa leaves the Food Administration only because it is believed his services are of more value to the Government in connection with oil.

Mr. Requa is a consulting engineer to the Bureau of Mines on Petroleum; is vice president of the American Institute of Mining Engineers, and is a member of the Council of the Mining and Metallurgical Society of America. He has been connected at various times with the oil industry in California.

The first activity of the new Oil Division of the Fuel Administration will be to undertake an investigation of the entire petroleum situation and to recommend to Dr. Garfield such action as may be necessary to handle petroleum matters.

Three More District Representatives Appointed by Garfield

Additional district representatives have been announced as follows by the Fuel Administration: W. B. McKinney, Columbus, Ohio, for the Crooksville, Hocking, Jackson, Pomeroy and Ironton coal fields of southern Ohio and in Mason County, West Virginia; C. G. Hall, Terre Haute, Ind., for all the Indiana coal fields; E. A. Holmes, Birmingham, Ala., the Alabama coal fields. Accompanying this announcement was the following, from the Fuel Administration: "Inadvertently district representatives in the mine fields have heretofore been called deputy distributors. Please note the change in designation."

No Radical Steps Contemplated as Regards Distribution of Coal

A manager of coal distribution to have direct supervision over the representatives of the Fuel Administration in the various producing districts will be named by the Fuel Administrator in the near future. It is known that every effort is being made to secure for this highly important place the most capable coal operator available. This step is being taken as a part of the reorganization of the distribution portion of the Fuel Administration. Officials at the Fuel Administration are complimentary in their references to the help they are receiving from the operators in the decentralization of distribution. There is much controversy over details, but a plan which, it is believed, will be generally acceptable is being worked out. Many are confused by the idea that a zone will be laid out which will limit the markets for coal. The plan under consideration does not, in itself, contemplate such action. The idea is to get the machinery set up and to appoint representatives in the different districts and then decide if it is advisable to limit markets. Before Pocahontas coal is cut off from Illinois and Indiana or eastern Kentucky coal from Michigan, or Kanawha coal cut off from New England the Fuel Administration expects to be sure that such a step is for the best. It can be stated on the best of authority that no radical step in the matter of distribution is contemplated.

Government Calls for Heavy Machines

We are asked to transmit to our readers the fact that the United States Government is in immediate need of large machine tools—60 x 60 x 20-ft., 48 x 48 x 20-ft. and 36 x 36 x 14-ft. planing machines, Nos. 4 and 5 plain milling machines and vertical milling machines of like number, 30 in. by 20 ft. and 36 in. by 20 ft. engine lathes, 4-ft. and 5-ft. radial drilling machines, 10-ft. and 5-ft. vertical boring mills; 6-in. floor type, horizontal boring and milling machines and 4-in. milling machines of the same type.

It is hardly likely that ordinary coal-mine shops have these large tools, but many of the coal-mining officials have friends and acquaintances to whom they can make this imperative need of the Government known. Those who can supply these machines should write or wire at once to the Machine Tool Section of the War Industries Board, Council of National Defense, Washington, D. C.

Brief Washington Notes

Chicago consumers have been able to make such a good case that the Fuel Administrator has issued orders to operators in the Pocahontas field which will result in a considerable movement of low volatile coal to the Illinois metropolis.

With authority to divert shipments of coal from the original consignees, the Fuel Administrator has appointed a number of representatives of the Fuel Administration to coöperate with the railroad authorities in clearing up congestion. This step was taken at the request of the Director General of Railways.

P. B. Noyes, who is in charge of the conservation division of the Fuel Administration, has been sent to New York to coöperate with Albert H. Wiggin, the State Fuel Administrator, in the curtailment of coal supply to certain classes of consumers. This action has been made necessary by congested terminals and transfers in the vicinity of New York.

Coal supply in Ohio and Michigan is such that on Jan. 12 the Fuel Administration instructed operators in a number of districts to ship all coal possible to these states. The districts affected by the order are Pittsburgh, Fairmont, Kanawha, Kenova, Thacker, eastern Kentucky, Jellico and Ohio. The operators were asked to suspend shipments to other points for ten days in order to divert into the states mentioned as large volume of coal as possible.

No fuel of any sort is to be used between 7 a.m. Saturday and 7 a.m. Monday of each week by manufacturers engaged in the making of box board, paper board, straw board, binder board, tag board and other boards made from waste paper or rags. An order to this effect has been issued by the Fuel Administrator after a majority of the manufacturers engaged in the making of these articles agreed to abide by it. This limitation will result in a saving of 780,000 tons of coal per year.

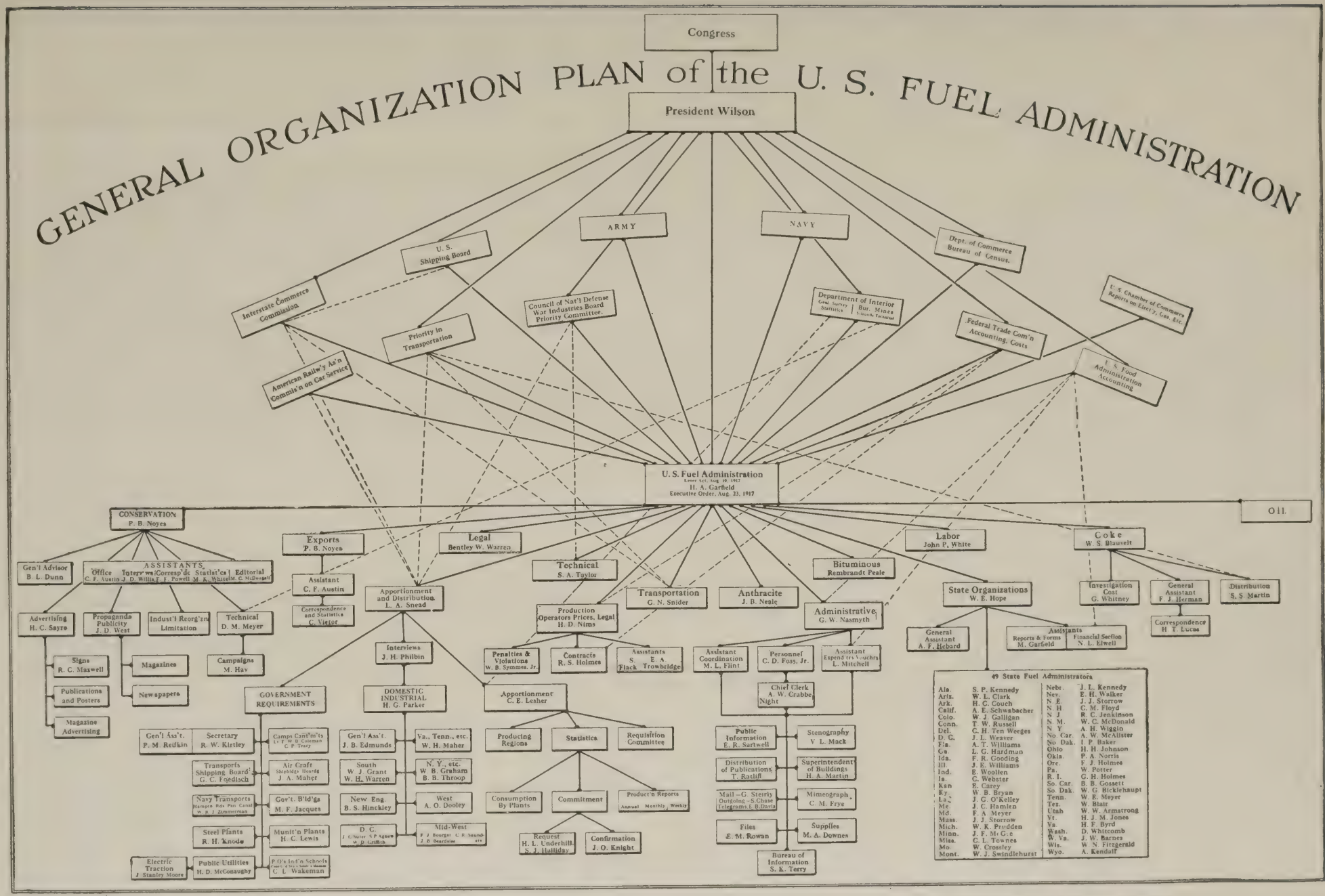


CHART SHOWING THE OFFSHOOTS AND EXECUTIVES OF THE MANY BRANCHES OF THE UNITED STATES FUEL ADMINISTRATION

EDITORIALS

Delays in Postal Deliveries

"BETTER late than never," seems to have been adopted as a maxim by the Post-Office Department in the delivery of mail of all classes. When we pause for a moment to consider that train schedules have been curtailed, that thousands of postal clerks are now in military service, that severe weather has caused numerous tie-ups—we can readily see why copies of *Coal Age* are slow in reaching our subscribers. We have received many complaints on this score. Taking up the matter with the postal authorities, we were assured that every effort is being made to bring the service back to normal.

Coal Age itself is also suffering considerable inconvenience from the breakdown of the postal service. Articles which were mailed "special delivery," and in ample time to reach us for this annual review number, have not yet been received, necessitating the procuring of much data by means of the telegraph.

Patriotism demands that we exercise a little patience at the present time in matters such as these. The necessary readjustments in service will soon be made, and new clerks are being trained to take the places of the men who have enlisted. We are helping all we can to deliver the paper on time.

To Every District Its Troubles

IF THE coal industry had but one head, that the public might behead it; if it had but one district with uniform conditions, so that the public might know just what those conditions were and who was to blame, all might be well. But, as it is, we are faced with an infinite complexity.

There is the anthracite region—with a sufficiency or nearly a sufficiency of cars—working steadily and unable to supply demands because of shortage of mines and miners. There is the generality of bituminous mines, desperately short of cars, run infrequently, with enough miners to supply the demand if they were all working steadily or even if they were operating with a little more steadiness than at present.

But no one would believe that here in America was a field with too many mines, too many cars and too many men, looking for orders for the coal it is producing. Yet there is such a field, in witness of which read this letter from D. S. Hanley, general manager of the Carbon Coal and Clay Co., Bayne, Wash., under date Dec. 21, 1917:

> In view of the serious coal situation that must exist in the East according to press reports and the articles appearing in your publication, it would be interesting to you to know that in the State of Washington there are several mines, particularly those located west of the Cascade Mountains, that are suffering acutely from lack of business.
>
> The mine of the Carbon Coal and Clay Co., with a capacity of approximately 10,000 tons per month, has been able to run but two or three days per week since the latter part of November because there has been no demand for its product. This condition is not peculiar to us, for other mines in this vicinity have been similarly affected.
>
> The question has been taken up with the Federal fuel administrator for this state, and I think he is doing everything possible to urge the industrial and domestic consumers to take advantage of the present lull in the market by stocking coal. He has also discussed the question with the Federal fuel administrators of adjoining states, where a coal shortage exists, suggesting that they take advantage of our capacity to supply coal, but so far there have been no definite results.
>
> I think it can safely be stated that the mines referred to west of the Cascade Mountains can, if they have the market, produce and ship from 40,000 to 50,000 tons of coal per month more than they are now producing and shipping. The railroads have been doing good work in the matter of furnishing empty equipment, and even when the demand for coal was good there were but two or three days when the production of the mines was curtailed for lack of cars.
>
> Apparently in eastern Washington and northern Idaho a preference is shown for the Wyoming and Utah coals. But it is now expected that the Government will compel the people of the state to use the coal of the west Washington mines, the coal of Utah and Wyoming being diverted to Montana and Oregon, thus keeping everybody at work and shortening railroad hauls.
>
> Some of the coal of King County is rated as sub-bituminous. The moisture content of the field varies considerably, but sometimes exceeds 16 per cent. The ash also is occasionally quite high. The Bayne mine, from what we can learn, has a far better analysis both as to moisture and ash than many of the King County operations, and it is rated as bituminous coal. But whatever the coal is, without doubt Tacoma and Seattle should seek its supplies from the mines in the King County field because it is near-by. Seattle itself is located in that county, and Tacoma is just barely outside its line. In these days of the need for short hauls the King County field should be given every consideration.

Cutting Our Suit To Fit the Cloth

SO far we, as a nation, have been principally busy in this war making requisitions like some young superintendent just on the job. We have figured on all we wanted without forming a real budget. We added the totals, it is true. They looked alarming, but we did not let it trouble us seriously. It was unpatriotic to question whether we could raise the money or secure the workers or find the material.

There was no head to direct and no brain to steer this big business proposition. But after all war is a business, a big business, and something more than enthusiasm is needed. We cannot requisition without limit, and so we must be careful to evaluate our abilities and our needs, being prepared to spend liberally on what we need most and to be niggardly in spending even nationally—and certainly personally—in those things that we need but little.

As it is, every one who has a department that can aid in the war looks toward getting the utmost expan-

sion of that department in the least possible time. There is no limit but the sky. Suppose a mining operation had a superintendent of motive power who had a morbid fear of being found with a shortage of locomotives and cars and, on the other hand, had an utter indifference to the possibility that it might be found that he had bought more equipment than the mine would ever accommodate or the men would ever be found to need.

Suppose, at the same mine, we had a power-house superintendent who ordered so generously that he could never by any eventuality be called upon later to enlarge his plant, and so on. If then there were only these energies for disbursement and no energies provided for control, there would be no limit to the purchasing till the property went into the hands of the sheriff. The analogy to the conduct of our affairs in the present war is obvious and need not be pointed out.

Our net income has been about $2,000,000,000; probably we can raise it by economy to $15,000,000,000 and later perhaps to $20,000,000,000. Of course, out of this we have to make some loans. Let us keep them down to the irreducible minimum. The less we lend to the British and French, the more we have to spend on ourselves. The money we lend to foreign governments we make them pay interest on. For what we spend on our own preparation, we collect neither principal nor usury. We put both capital and interest into the war without charge to the Allies.

Our loans are not matters to be boastful of. It is to be regretted that we have to put our tools into the hands of other people that they may do the work that we, ourselves, are spoiling to do and don't do solely because we, ourselves, just at present can't do it. The Allies have to borrow money and pay us interest only because we are not ready to put it into the fight ourselves. This is a thought from which we cannot draw much encouragement.

However, it is true that loans must be made and the amount we have to spend on our preparation will be by that amount diminished. Having arrived at that amount, whatever it may be, let us inquire what we want most for our own preparation. Perhaps the most vital, though not by any means the largest, of our needs is an appropriation for certain purely local improvements.

Do not let us forget that Great Britain has spent much money on herself since she went to war—building homes in and around munition centers, enlarging and modernizing terminal facilities and providing conveniences for her large training camps. And we may have to do the same. We may have to put the railroads right before we go far along with the war. Whatever must be expended to make them adequate must be provided.

That is one reason why government ownership is not so much to be regretted. It changes our viewpoint. It is no longer unpatriotic or un-Ally, if we may coin a word, to spend money on the railroads. One, without being labeled pacifist and profiteer, can now venture boldly to say out loud that expenditures on railroads with a view to military and proper civilian needs during the war are more important than expenditure on munitions.

The shipping question is also a paramount problem not to be shelved for anything which is less important even if more distinctively warlike. Then comes the army, the aviation service and the mosquito fleet in the navy. The United States Navy has proved one of the departments of which we have most to be proud. But there is a risk that we shall lay too much stress upon it. We are quite likely not to follow the lead of our Allies who regard the increase in the number of large units in the navy as of inferior importance to the increase of the mercantile marine.

We need a level-headed man to lead in the war preparation. We do not want every man to think that if his department is extended to the beggaring of other departments the war will be won. There must be no crowding for first place. Rather there must be coördination. Sometimes a man advances his own interests and the interests of others best when he doesn't try to do it all himself or to put the interests of his own work first, but pats his neighbor on the back and gives him encouragement.

The Order Shutting Down Industries

IT IS probable that the Jan. 16 order of the Fuel Administrator, shutting down business for five days and closing up industries on every Monday until Mar. 25, is not only the most drastic, but the most arbitrary ruling ever issued by any authority in the United States. If it were not stated that this order came after a White House conference, we would feel certain of its revocation.

The pity of it all is the shame it casts upon the Nation. Here are we, a people noted for our industry and energy and having within our boundaries coal mines that this year will produce six hundred and thirty-three million tons of coal, or practically one-half the world's fuel output, yet we must do a thing that no other nation has had to do, not even Germany, shut off from the world and having suffered nearly four years of war.

It is difficult for those of us who do not know all the facts of the situation to pass judgment. However, we find it hard to agree that this ruling is a wise one. The whole question is one of transportation. The mines can produce the coal. Even today collieries in many regions are working only from one-half to three-fourths full time. Is it any wonder that the mine owners experience difficulty in keeping a sufficient supply of labor at hand when the men are obliged to be idle so many days each month!

We know now that a great deal more coal could have been hauled during recent months with the same number of cars if those in charge of the railroads had only compelled the immediate unloading and return of cars. This problem was not met in the stern manner that was necessary. It is also a fact that the Government should have exercised certain discriminations in recruiting and drafting miners. Now the entire industrial life of America is asked to pay the price for the mistakes of a few individuals.

We earnestly hope that the closing-down order of the Fuel Administrator is quickly revoked. We do not feel that such a move is necessary to relieve the present distressful situation. Nothing could be done to more greatly hearten the German people and to discourage our allies.

THE LABOR SITUATION

General Labor Review

The three great events of the week are the demand on the part of the Fuel Administrator that the mine operators in Alabama accept the scale adjustment already approved by the mine workers; the meeting of the United Mine Workers twenty-sixth consecutive and third biennial convention in Indianapolis, Ind., and the citation on June 14 of Frank J. Hayes, the president of the United Mine Workers and nine other officials of the union, to show cause why they should not be declared in contempt for violating an injunction restraining representatives from attempting to organize employees of the Hitchman Coal and Coke Co., of Wheeling, W. Va. The officials are to appear in court to answer these charges at noon, Mar. 4.

With regard to the first item it must be acknowledged that the operators will be well advised to accept the mandate of the Fuel Administration, which was not really unfair. They can battle out the question as to who are and who are not bona-fide employees of their respective companies when they apply for work. This is not the time for resisting any reasonable solution of a pressing labor problem.

As for the Hitchman case, we hope that some way may be found to quiet matters down, at least till after the war. The decision of the Supreme Court came as a great surprise. Few, indeed, expected that so severe a blow would be administered to the practices of organized labor.

The long report on the biennial conference appearing in other columns of this issue makes it unnecessary to discuss that meeting at length. Everyone will surely regret to read in the statement of President Hayes that he intends to go on with the work of progressive unionization during the war. He says: "We intend to carry on these campaigns of education and organization until every coal field in the country is thoroughly organized." He discusses the Colorado Coal Co. case against the union and says it was "a far-fetched inference" to hold that the controversy between the plaintiffs and the miners of Hartford "must have grown out of a gigantic conspiracy to interfere with the production and commerce of nonunion coal." He adds: "It was shown by the constitution of the United Mine Workers of America that the strike was outside of the jurisdiction of the international organization, its officers, and that the executive board had nothing whatever to do with it."

Mr. Hayes in his speech recommended that in the order of business of every local union the following inquiry be incorporated: "Are there any members present who desire to become citizens of the United States?" Mr. Hayes made an excellent address, showing that he is a worthy successor of the long line of competent and intelligent men who have preceded him.

On Dec. 1, 1915, the union had $120,441.63; a year later it had increased its balance to $417,018.91. On Dec. 1, 1917, the union's funds had dropped again to $209,747.55, barely 50c. per member. The income during the year has been $1,759,727.34 and the expenditures $1,966,998.70. The aid to District No. 23, western Kentucky, was $120,500. In Alabama $108,400 had been expended up to Dec. 1. To Colorado, union aid to the extent of $66,850 was extended. Both bituminous districts in Pennsylvania received aid, the central Pennsylvania district being helped to the extent of $23,000 and the western Pennsylvania district to the tune of $58,000. But the lion's share of all went to eastern Kentucky and Tennessee. That district received $252,125 in aid of its protracted strike. The income of the *Journal* for the past year was $28,143.93 and the expenditure was $66,014.40. In the two years from Dec. 1, 1915, to Dec. 1, 1917, the loss on the publication of the *Journal* was $103,253.05. There has been an improvement in the last year, but still the balance sheet is unfavorable.

There have been a few small strikes, among them being a strip-pit in Pittsburg, Kan., operated by Smith, Scott & White Co., which went on strike Jan. 4. Of course, it is not termed a strike. To so announce it would be to invoke the penalty. Men do not strike any more, they quit work nowadays.

Alabama Operators Must Accept Fuel Administration's Decision

On Jan. 12, H. A. Garfield, the Fuel Administrator, wired the Alabama Coal Operators' Association that they must accept the Fuel Administration's decision, as approved by the United Mine Workers of America in Alabama at their meeting, held Dec. 20 and 21 of last year. At this meeting 269 delegates were in attendance. They represent 97 local unions.

By practically unanimous vote they accepted the proposition which was "*recommended* to them by the Fuel Administrator and which the same administrator now *commands* the operators to accept." The attitude is quite typical of a standing which is not quite equal. Mine workers *may*, mine operators *must!*

The contract presented the mine workers by Rembrandt Peale as representing the Fuel Administration had the following provisions:

1. Recognition of right of employees to join any union, labor organization or society without discrimination in distribution of work, providing that nothing is done to disturb the relations of employer and employee by intimidation or coercion and providing that every man is allowed by the employees perfect freedom to join or to refrain from joining the union at his pleasure and providing also that no employee shall use the company's time for any other purpose than that for which he is paid nor may he "interfere with the operation of the mine or knowingly do that which will reduce the output."

2. Reëmployment upon application of all men discharged because of affiliation with the union, excluding, however, men who have made unlawful threats or committed unlawful acts, unless the employer is satisfied that the acts will not be again committed by the applicant. Disputes under this clause to be submitted to the umpire.

3. Right of employees to meet shall not be interfered with or abridged.

4. Committees of workmen, selected at meetings, called for the purpose not more frequently than once every three months, shall be received by the managers and shall be privileged to present the grievances of the employees, which shall not be waived, rejected or postponed as far as any matter is concerned covered by this agreement. If no agreement is reached with the superintendent, the grievances are to be referred to the highest official of the company available, who shall pass on the question within 10 days. If not then adjusted satisfactorily to the committee, they may appeal to the permanent umpire, whose decision shall be binding and made within 30 days. Either or both parties may present their case by duly authorized representatives. The mine committee shall consist of three mine workers from each mine, selected by the employees at the mine after written notice, stating the place and time of meeting, has been posted at the tipple or tipples at least three days prior to the date of such meeting and before any later election meeting.

5. Mine committees shall only attempt to adjust disputes which the miner or miners affected have endeavored to adjust without success. These grievances shall not be discussed during working hours. All parties involved must continue at work while the investigation and adjustment are being made. Only rules and regulations in conflict with those in this contract shall be changed by this agreement.

6. A checkweighman selected as required by law from among the mine workers employed at the mine may be placed on each tipple at the expense of the miners. His duties shall be those prescribed by the state law. If a suitable man cannot be found, an outsider may be employed with the mutual consent of the operator and miners. An election shall be held at the mouth of the mine or tipple after three days' notice, posted at the mouth of the mine or tipple, which elections shall be free from the interference of the company's officers or agents. The operator at each mine, when so requested by a majority of the mine workers, shall collect the wages of the checkweighman in such manner as is prescribed by the men so long as same is not in conflict with the laws of the state.

7. In view of the fact that a large proportion of the coal produced in Alabama is sold under contracts that do not expire until July 1, 1918, the consideration of the following matters, namely, the uniform readjustment of tonnage and yardage rates, all day labor and deadwork rates, the increase or decrease of the existing wage rates, it is agreed shall be postponed until July 1, 1918.

8. The umpire herein provided for shall be appointed by the Judge for the United States District Court for the Northern District of Alabama, from a list of six names, three of which shall be submitted by the coal operators and three by the mine workers, said appointment to be subject to review by the United States Fuel Administrator on appeal by either the mine workers or the coal operators, and the United States Fuel Administrator shall have the power to disapprove said appointment, in which event six names, which may include the names originally filed, except the one whose appointment has been rejected, shall be submitted as herein provided for in the first instance to the Federal judge, who shall make another appointment, and which appointment so made by him shall be subject to review by the United States Fuel Administrator, as herein provided.

In the event of a vacancy the Federal judge shall appoint a new umpire under the same procedure herein provided for. The umpire shall serve during the term of this understanding. The umpire so appointed shall receive suitable compensation, to be agreed upon, one-half to be paid by the coal operators and one-half by the mine workers.

9. This understanding shall be in effect and binding upon the coal operators and mine workers during the continuation of the war, and not to exceed two years from Apr. 1, 1918.

10. The semi-monthly pay day shall be established at all mines.

11. The rules of the company shall provide for a square turn in the distribution of cars. The operator, and his superintendent and his mine foreman shall be respected in the management of the mines and the direction of the working force. The authority to hire or discharge shall be vested in the mine superintendent or mine foreman.

12. The United States Fuel Administrator urges upon the operators and mine workers of Alabama that the question of the hours of labor that constitute the day's work be settled and agreed upon in the terms set forth in the operators' public statement of Dec. 6, 1917, published Dec. 10, 1917, as follows:

"The operators are willing to put in effect in Alabama, for the duration of the war, if you desire it done, the working hours now in force in the Tennessee-Kentucky field; that is, employees shall be at their working places at 7:30 a.m., and shooting time in the mines shall be 4 p.m., with not more than thirty minutes to be consumed by employees in lunch or dinner hour. Day labor necessary for the transporting and dumping of coal that may be in transit at quitting time shall continue working until such coal is loaded on railroad cars, it being understood that no more than one-half hour may be required for this work, which will be performed by the necessary day labor involved without additional compensation."

13. It is expected that a penalty provision satisfactory in its terms to the United States Fuel Administration shall become a part of your common understanding.

14. This understanding is made subject to the ratification of the coal operators of Alabama, or those who indicate their acceptance by their signatures, on the one part, and by the mine workers of Alabama on the other part, due notice of which shall be served upon the United States Fuel Administrator.

Mine Workers Convention Assembles

On Tuesday, Jan. 15, the convention of the United Mine Workers of America actually managed to meet at Indianapolis, Ind. For a while it seemed likely there would be a delay in the assembling of the delegates and that the date of the session would have to be advanced several days. But that did not prove necessary.

The committeemen, who, as a rule, have their reports practically completed two days prior to the convention, were on Sunday still somewhere en route. John L. Lewis, the vice president, and Frank Farrington, the president of the mine workers of Illinois and chairman of the constitution committee, were snowbound at Springfield, Ill., the Big Four having cancelled all schedules between Indianapolis and Illinois points.

John P. White, who came from Washington, arriving on Sunday, was 21 hours late. He announced that Harry A. Garfield, the Fuel Administrator, would be unable to be present to address the convention as planned. It was, however, pressure of business and not the snow which prevented the consummation of his promised visit. At least, the snow was not the direct cause except as it affected the pressure of his business. President Frank J. Hayes was confined to a local hotel nursing a bad case of "La Grippe."

But all these unfortunate difficulties were, fortunately, removed, and the mine workers met as planned. Patriotism was the keynote of the meeting. Governor James P. Goodrich and the representative of the Mayor of Indianapolis made speeches, as did also several labor leaders. All of them paid tribute to the mine workers for their work in meeting the demand for coal as far as opportunity permitted. The report of the credential committee was held pending the arrival of belated delegates.

Meanwhile the reports of the officers of the organization —Frank J. Hayes, president; William Green, secretary-treasurer, and John L. Lewis, vice president—were duly read, all being well received. Alex. Howat, however, is still continuing his buttonhole campaign for the defeat of the penalty clause in the Washington agreement. He has but a small following outside his own delegation.

It seems certain that the Washington agreement will be overwhelmingly ratified. No amendments will be tolerated, the stand being taken that the agreement must be ratified as negotiated or rejected entirely. The agreement cannot be amended. The opposition which might conceivably muster enough force to register a vote against some feature in the new contract could not possibly be strong enough to condemn it as a whole.

It is likely that a defense fund of 50c. per month will be levied to prepare the union for a defense of its position as soon as the war is over. There will also be, in all probability, an increased per capita tax of 50c. per month. The measure will certainly be offered for vote and will probably be carried.

It looks as if Indianapolis will unquestionably lose the convention for the year 1920. Cleveland appears the most likely place to be chosen, though Scranton and Kansas City are advocated by the delegations from the vicinity of those cities.

John Walker has not yet arrived, but his friends say he will be a rival for the position of president. Thomas Kennedy, of Hazelton, Penn., president of district No. 7, is mentioned as candidate for vice president in place of John



FRANK J. HAYES
President, United Mine Workers

JOHN J. LEWIS
Vice president, United Mine Workers

WILLIAM GREEN
Secretary-treasurer, United Mine Workers

L. Lewis. Alex Howat, who is president of district No. 14, claims that John Walker will support his policies, but Walker's friends hardly regard that prospect as likely to assist their candidate and they are declaring that Walker is a safe man who will steer clear of the rocks. Meanwhile he occupies an inconspicuous place among the delegates and awaits the scale fight.

The losses incurred in the running of the *United Mine Workers' Journal* are likely to create a hot test fight. An outsider might suggest that the *Journal* would be a better seller if it were much less radical. It misrepresents the sentiments of the average mine worker, who does not believe that the mine workers are a lot of tin angels or the operators a crowd of hoofed devils. The paper is improving. It is furnishing more news and less diatribe, but it has a past to outlive and that will take some time. No one today wants a rabidly one-sided uncharitable sheet. Unfair journals have to be subsidized by someone. The *United Mine Workers' Journal* has been subsidized by the union. It is not necessary that it should be so if it will give the news in all its completeness and fairness.

The officials from most districts are going to make a determined fight to eliminate foreign languages from the *Journal*. "American English for all" is their slogan. They want to aid in the establishment of schools and are prepared to assist the Americanization committee in conducting a nation-wide campaign for 100 per cent. citizenship.

John P. White addressed the convention, outlining the aims and the plan of operation of the Federal Fuel Administration. He declared that officials of the United Mine Workers had assured President Wilson that the agreement they had made on behalf of the mine workers would be approved. He felt that the mine workers' organization was bound by that pledge of honor. The hour of debate ceases, he declared, when the Government declares war. The decision of the Government becomes the patriotic duty of every loyal citizen.

He declared he would defend the agreement against all comers. The penalty clause might be criticized, but all it did to the mine worker was to take away from the local union the right to do wrong by declaring local and unjustifiable strikes. Mr. White reviewed his administration, commended Doctor Garfield and served notice that he was going to the bat with those who would destroy the high standing in public won by the mine workers. Secretary of Labor Wilson wired his regrets that he could not be present, owing to pressure of business. He urged the mine workers to remain loyal and outlined the reasons for the war, predicting that victory would be assured by the unswerving devotion of the workers.

Dr. H. A. Garfield sent the following message: "I appreciate sincerely the loyal response made by mine workers to appeals for coöperation with the Government in the present emergency. The steady decrease in the tonnage lost by labor shortage since August is eloquent testimony to this coöperation. I have ventured to state on many occasions that both mine workers and operators have displayed a laudable purpose as American citizens to put aside differences in the present emergency and to unite during the war in a common purpose to increase the production of coal. The successful prosecution of the war depends as much on the men in the mines as on the men in trenches. I regret I cannot be with you."

Dr. Garfield added that John P. White would speak for the Fuel Administration. After the speeches and the messages just reported were read the convention adjourned to await the reports of the committees for the day.

Walker and Howat are said to be in a deal to fight for the reopening of the contract on Apr. 1. They are said to entertain no hopes that the mine workers will secure an additional increase at that date, but they hope to force the Administration into a conference into which they could not enter without certainty of failure. Then the leaders having failed, it will be possible to circularize the membership alleging that if Walker's and Howat's advice had been taken an increase of from 20 to 50 per cent. could have been secured. Continuous propaganda would follow in the hope that when the election came in December, 1918, it would find Walker and Howat in high favor with the voters

Low Coal Gets Higher Scale

Kansas has two seams of coal, the upper or Lightning Creek seam, which ranges from 20 to 25 in. in thickness, and the lower or Weir-Pittsburgh seam, ranging from 28 to 46 in. in thickness, to quote the 1915 inspection report of the State of Kansas, and from 33 to 42 in. thick, to quote Eugene McAuliffe's account of the Kansas field (September issue, 1917, American Institute of Mining Engineers, page 1392).

The United Mine Workers and operators of Kansas agreed Dec. 22 to grant a differential of 6⅔c. per ton in favor of the upper bed. The coal, though thin, is said to be of higher grade than that in the lower bed. It covers thousands of acres in Crawford and Cherokee Counties.

This long line of shivering women rejoices to hear that the anthracite miners are doing their utmost to produce the coal for which there is so much need.



Courtesy of New York Tribune

A long coal line at Fishman's yard, in Goerck Street, New York City, extending around the corner into East Houston Street. The line forms before the yard opens at 7 o'clock in the morning and continues until the yard closes its doors at 6 o'clock in the evening.

DISCUSSION BY READERS

First Aid to the Uninjured

Letter No. 1—I have read with increasing interest the many letters appearing in *Coal Age*, under the head "Discussion by Readers," and can say that I have gained a large amount of useful knowledge from the many spicy contributions.

Since the closing of the discussion on "Qualified Mine Foreman," it has occurred to me that space would be available, in these columns, for hearing what readers have to say on an important subject that is of vital interest to all foremen and, yet, is largely neglected by the great army of men who are in charge of coal mines. We read much about "First Aid to the Injured," and great attention is paid to giving all needed instructions in rescue work and holding first-aid contests.

I remember, however, that Mine Inspector P. J. Moore, a few years ago, prepared an interesting paper entitled "First Aid to the Uninjured." The paper was read at the annual meeting and was published in the proceedings of the Mine Inspectors' Institute of the United States of America, 1914, and contained many pertinent remarks. May we not have, in *Coal Age*, a thorough discussion of the many points involved in giving first aid to the uninjured?

Statistics Compiled by the Bureau of Mines

For the purpose of showing the need of energetic efforts to reduce the loss of life in coal mining, in this country, the United States Bureau of Mines shows that over 9,800,000,000 tons of coal have been mined in this country since the first inspection law was passed following the great Avondale disaster of 1869. That law was passed by the Pennsylvania State Legislature in 1870.

The records show that from the year 1870 to the present time, 54,543 men have lost their lives in coal-mining accidents. During the same period, the death rate is given as 3.30 per thousand men employed in the mines; or 55 lives have been sacrificed for every 10,000,000 tons of coal mined, which corresponds to a production of 180,676 tons of coal per life lost.

That the conservation of human life, in coal mining, is of paramount importance no one will deny. Each fatal accident in the mines leaves its impress on the community, in the loss of a useful citizen who is too often the bread winner of a family. With a view of reducing to a minimum the number of accidents occurring in mines, most coal-producing companies conduct campaigns of education employing different methods to impress upon their employees the need of more care in the performance of their work for their own protection and the security of the mine.

Notwithstanding the great efforts that have been made in this direction, we are forced to admit that while the number of accidents have been reduced, it is practically impossible to eliminate them entirely. There will always be a certain number of so-called "unavoidable accidents," which cannot be foreseen or guarded against.

The consideration of ways and means to reduce the number of accidents in mining work constitute what may be called "First Aid to the Uninjured," and it is this phase of the subject that I would like to see discussed thoroughly in *Coal Age*. Let our mine foremen express their opinions freely along this line and suggest ways of reducing mine accidents to a minimum. I have a few suggestions to make, myself, in the near future, which I hope will aid in this direction.

Carbondale, Penn. CHARLES ARNOLD.

Coal Production and Booze

Letter No. 3—I had hoped to see this subject attract more attention than it did when first presented for discussion, a short time ago. I feel that it is as great a curse as any with which coal mining is afflicted.

It is common for men who are not given to the drink habit, and are good loyal citizens in other respects, to reason that, since it does not make any difference to themselves whether liquor is sold or not, there is no reason why they should care to make an effort to prevent its manufacture and sale to others. If such men would look about them and reflect on the many evil effects of the booze habit, and realize to what an extent it controls production in all industries, but particularly in coal mining, they would be forced to another conclusion and be induced to take an active part in stamping out this great evil.

Effect of the Drink Habit

Men and women addicted to drink will not only spend all they have to satisfy their appetite for liquor, but will often sell their tools and other available possessions to secure enough drink to quench their thirst. I have known miners to part with their tools, seemingly unmindful that these are their only means of earning a livelihood. Women have sold household goods and pawned articles of jewelry and wearing apparel to satisfy the appetite of which they are the victims. Can anything be more deplorable?

The result to be most dreaded from the yielding to this habit is the condition of the drinker in which he is led to do things that he would never be guilty of doing when in a sober state. The spread of the drink habit in any community drives out the better class of residents, who are forced to seek a home among more respectable associates. Such a condition prevailing in a mining camp is a decided loss to the industry and a menace to the safety of mining operations in that locality.

It will be generally acknowledged that the only satisfactory way of combating the drink habit in a community is to remove the cause. As long as the

saloon is permitted to remain in a place, it gives to those who cannot control their appetite for drink an opportunity to satisfy their thirst, which they continue to do daily.

The present is a time when every man should feel it his duty to aid his country in every way possible. He can do no more effective work, in the present crisis, than to take his share in driving out the causes of wastefulness, incompetency, sickness, and shortage of coal production, all of which are the direct result of booze. To win the war for democracy and make the world one great republic, we must drive out this curse of our country.

Intemperance and the War

The war has taught the people of Europe that booze is their greatest enemy, and they have not been slow to take steps to reduce its effect in their midst. Mine officials and miners should realize that the same is true in respect to the coal-mining industry. All mining men will agree that the booze habit is the direct cause of men losing many days' work, and the output of the mine is reduced in the same proportion. It goes without saying that this condition is unnecessary.

The drink habit lowers the standard of morals among mine workers, who are made more reckless, thereby, and the safety of the mine menaced, while the quality of the coal produced falls below the standard. At times, it happens that the drinker is a man in charge of some important operation or work; and, as a result of his temporary incapacity for the proper performance of his duties, an accident results that shults down the mine for days or weeks at a time. Let us then do what we can to remove this shameful cause and strengthen the coal industry and make the mines safer for work.

Hooversville, Penn. J. H. Tipton.

Surveying and Mapping

Letter No. 2—Referring to the article of W. L. Owens, *Coal Age*, Dec. 8, p. 960, I note he takes exception to the system of using the same station numbers, in different entries in the same mine, and advocates a continuous numbering system for the entire mine. Mr. Owens gives as his main reason for this procedure that it is a great help in locating one's self in a strange mine, by noticing the station number marked on the rib and finding that number on the mine map, a blueprint of which is carried by the person.

My own preference, in this regard, is to adopt a system of stationing each entry, beginning at zero and numbering each station of 100 ft. consecutively; thus, 0, 1, 2, 3, etc. These even stations may or may not correspond to a transit point which, in the latter case, takes its number from the last station plus the distance to the transit. All station numbers are marked with whiting on the rib.

For example, station numbers on the main heading start from zero at the shaft and continue, in the manner described, to the face of the entry. The butt headings driven off the main entries, likewise, starting from zero on the main heading, are numbered consecutively to their face. Also, the room headings, starting from zero on the butt entries, are numbered consecutively in the same manner.

This system of numbering stations enables the distance between any two points or the length of the entry to be ascertained at once. Also, by adding the plus of any entry to the plus on the main heading at its mouth, the required distance from the shaft is obtained.

Elevations are taken at each of the even stations and at any intermediate points where the grade changes. These elevations are marked on the map, and the difference between the elevations of two consecutive even stations gives the grade of the entry for this stretch. This is a great help in planning ditches, or grading for permanent track, where the irregularities are not too great, in which case the engineers must set grade points. By heading the traverse sheets of each entry with the name of the heading there can be no confusion of station numbers, either in the mine or on the map.

Curtisville, Penn. G. G. Long.

Setting Timber on a Pitch

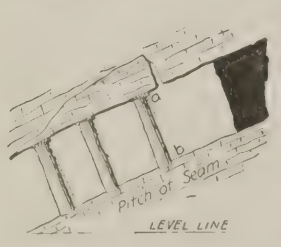
Letter No. 1—Referring to the inquiry of W. T. Hale, *Coal Age*, Dec. 22, p. 1072, asking how timber should be set on a pitch of 20 or 25 deg., when the roof and floor of the seam are hard and smooth, permit me to offer one or two suggestions in addition to the points touched upon in the reply made to this inquiry.

It can be assumed from Mr. Hale's description that the roof of this seam is strong and will be apt to break in a large mass covering a considerable area. In that case the tendency of the roof to slip down the pitch will be manifested to a much less degree than where the roof is frail and breaks in smaller pieces.

Where the roof is strong and supported against slipping by strong gangway stumps and pillars, the principal roof pressure will be in a direction normal to the seam. In that case the resistance of post timber will be greater if the props are set to correspond more nearly to a normal position in the seam.

On the other hand, if it is assumed that the roof slate is friable or contains joints, which cause it to break in smaller pieces and increase the tendency to slip down the pitch, it is necessary then to give each post a slight inclination up the pitch from the normal. As stated in the reply to this inquiry, such a position of the post will cause it to tighten when the roof begins to move.

Again, with a frail roof such as I have just mentioned, a break will often occur a short distance back from the face of the coal, as illustrated in the accompanying figure. As here shown, this will leave a large piece of rock that is ready to fall vertically. In that case, if the posts supporting the rock were set normal in the seam, the loose piece would have a tendency to ride the props and fall in the direction of the dip. If, however, the supporting posts are underset slightly at the bottom and the foot rests in a hole cut in the floor of the seam a few inches below the normal line *ab*, drawn through the top of the post, any slip of the loose piece will tend to tighten the post and bind the rock against the roof, holding it secure.



Experience teaches that it is wiser to give the props too little rather than too much underset. In case the

underset of a post is too great, a loose piece of top will tend to ride the post and fall in the direction up the pitch. This cannot occur if the underset is less than it should be, as the tendency of the rock to ride the post is then checked by the loose piece being wedged against the solid formation.

The amount of underset of a post will vary with the inclination of the seam and the general character of the roof strata. A good rule, in practice, is to set the post so that the angle it makes with the normal in the seam will vary from one-fifteenth to one-fifth of the inclination of the seam. In the present case, taking the inclination of the seam as 25 deg., the post should be underset to an angle varying from 2 to 5 deg., according to the nature of the roof. In mining practice the tendency is to give a post too much underset and care should be taken to avoid this.

In order to prevent posts from being knocked out by coal blasted from the face, the foot of each post should be sunk at least 2 in. in the floor of the seam and the head of the timber tightly wedged against the roof.

Oak Hill, W. Va. WILLIAM DICKINSON.

Answering Examination Questions

Letter No. 1—I have always been interested in the question of blasting coal, and it has seemed to me when reading over examination questions that bear on this subject that there is not sufficient time given to candidates to answer such questions properly.

A question relating to blasting appears in *Coal Age*, Vol. 11, p. 1134. The question is divided into three parts—a, b, c—and while the answer given is clear and mentions many important points in reference to blasting coal, the answer does not meet my idea of how a candidate should reply to such a question. It has always been my practice to study carefully the mine law and arrange a key to the different articles and sections of the law that will enable me to answer fully certain questions that may be asked.

PENNSYLVANIA LAW REGARDING BLASTING

Speaking of blasting coal, my key, as I remember it, was the following: Art. 4, secs. 9, 10, 14; art. 7, sec. 4; art. 9, sec. 1; art. 11, secs. 54 and 87 to 97, inclusive; art. 16, secs. 1, 2, 3; art. 25, Special Rule 1; General Rules, 3, 13, 14 and 18 to 25, inclusive. It was my habit in examination to take up each of these references in order and comment on the requirements of each. Only in this way can a complete answer be given to important questions such as blasting.

It is true that there are many duplications in the several references just mentioned; but, in my opinion, there is no other way of giving a complete answer to such a question, as the mining law is drawn with the intention of making the work of blasting coal safe.

If blasting in coal mines was carried on according to the requirements of the Pennsylvania Bituminous Mine Law, there would be little cause for anxiety when the work is performed under dangerous conditions. Trouble arises wholly or chiefly from illegal practices in blasting. Some miners are in ignorance of the requirements of the law and face these dangers unknowing, but many others are reckless and disregard both the law and the mine regulations—they take a chance.

In closing, let me say that during the five years when I worked at Monckton Main, Yorkshire, England, there was no shot fired in all that time. The coal was broken down by what was then known as the "plug and feather" method of mining. This regulation forbidding the blasting of coal was enforced in that mine more completely than in any mine in which I have worked in this country. Although no coal was blasted, better results were obtained in producing a good output per man than is realized in the mines here, and the dangers of blasting were wholly eliminated. JOSEPH A. GREAVES,

Macdonaldton, Penn. Mine Foreman.

Wagon Mines vs. Patriotism

Letter No. 4—A short time ago, several letters appeared in *Coal Age* regarding the advisability of operating small coal mines that cannot be worked to the same advantage or with the same efficiency as larger mines furnished with up-to-date equipment.

There are two sides to the question, which must both be considered before a correct judgment can be given. In favor of the continued operation of such mines, it can be argued that they commonly represent the invested savings of practical mining men who through frugality and hard work have managed to accumulate a few hundred dollars. With this capital they have secured the control of a small piece of coal land, which is generally isolated from any railroad or other means of shipping the coal.

CONDITIONS SURROUNDING SMALL MINES

In most cases the coal lies near the surface or outcrops on the property, which enables it to be reached by a drift or slope at small expense. The seam may be thin and the coal of an inferior quality that would offer no inducement to a company of large means. The small capital invested will not permit of the erection of a tipple or the construction of a sidetrack, and the coal must be transported from the mine to the railroad by wagons. The expense of handling the coal in this manner is great and leaves only a small profit.

In the present crisis these small mines are face to face with the difficulty that they cannot secure cars for loading, the railroads being compelled to refuse them this service owing to the scarcity of flats, which can be loaded more promptly at the larger mines. That the railroads are guilty of discrimination is true, but a little reflection seems to make this justifiable. Knowing several of these small operators who have invested their all in the undertaking and are now compelled to shut down their mines, I sympathize deeply with them in the present condition.

Looked at from another angle, however, the situation presents a different aspect. The thought of every man, woman and child is, or should be, that America is at war, and everything must give place to that condition. When we are told that the output of the coal mines the past year is 50,000,000 tons short of the demand, we realize that not a shovelful of coal should be turned over twice except it be absolutely necessary. Unless every effort is made to conserve the means of producing coal, what can we expect in the coming year, judging from the shortage of 1917, and knowing that America has as yet scarcely fired a shot?

Labor is scarce in all industries throughout the country and men are needed everywhere. As little foreign labor is available, it is more than ever important that the men now employed in the coal mines should be used in the most effective manner possible. By way of illustration, compare the results in the operation of wagon mines with those obtained in larger mines equipped with every needed appliance to handle the coal quickly and at the least expenditure of money and labor.

In the small mines the work is almost wholly pick work, and a miner can mine, say six tons of coal a day, which is hauled to the surface by mules or pushed by hand. The mine is, perhaps, a mile from the railroad, and the loading of a 50-ton car, standing there on the siding, will require six two-horse teams making four trips a day. Thus, the entire operation of mining and loading this coal will include the work of eight miners, two mule drivers and six teamsters, making sixteen men, two mules and twelve horses, to say nothing of other bosses and helpers.

Conditions in the Larger Mines

Look now, for a moment, at an up-to-date machine mine where a miner will mine from 12 to 14 tons of coal a day, which is hauled out of the mine by motors and loaded by machinery into the railroad cars standing under the chutes at the tipple. In this comparison we are not interested in the relative cost of production, which is much less per ton of coal mined in the larger mines than in the smaller operations. My desire here is to refer to the most effective use of all available labor, in the effort to secure the largest possible output of coal and the greatest economy in the distribution and use of railroad cars for its transportation to market.

In the thoughtful consideration of this question, no one who is loyal to our country can reach but one conclusion, although that may seem to work a hardship on many small operators. The present is a time when individual interests must be sacrificed to the general welfare and safety of the country.

Heilwood, Penn. Thomas Hogarth.

Clearing a Heading of Gas

Letter No. 5—In common with other writers who have discussed the matter of clearing a heading of gas by hanging a canvas on the return airway, 90 ft. back from the face, as described in the inquiry of "Mine Foreman," *Coal Age*. Nov. 10, p. 823, I was inclined not to take the suggestion seriously. But, as someone has expressed it, the plan appealed to me at first as "a joke."

It seems natural to suppose that probably four men were working at the head of these two entries, and if such was the case, since gas was being generated, the law would require a circulation of 200 cu.ft. per man per minute, which would mean a current of 800 cu.ft. per minute passing through the last crosscut. Practically all firebosses will agree that the proper thing to do to clear these headings of any accumulated gas would be to carry the air current up to the working face, by extending a brattice from the outby rib of the crosscut.

If a brattice was set 18 in. from the rib, the coal being 6 ft. thick the air space behind the brattice would be about 9 sq.ft. Then, if the required quantity of air was in circulation, the current would have a velocity of 200 ÷ 9 = say 88 ft. per minute, which would be ample for the removal of gas in most cases. However, in order to effect the complete removal of the gas, it may often be necessary to extend the canvas at the end of the brattice toward the roof so as to deflect the air against the gas.

In the present instance, however, this plan appears to have failed, and recourse seems to have been had to a most unusual scheme—namely, shutting off the return airway by hanging a canvas on that entry, 90 ft. back from the face. It is little wonder that such a plan is commonly condemned as bad practice, and I am not ready, myself, to say otherwise.

For the sake of argument, however, let us view the case from another standpoint. It is well known that firebosses frequently adopt unusual expedients to overcome difficulties with which they are beset. A fireboss is charged with the duty of quickly removing any dangers existing in working places, so as to permit the men to proceed to work without loss of time. It is rare that trouble results from the neglect of carelessness of firebosses, who are naturally more cautious and feel greater responsibility than other men working in the mine.

Suggests a Possible Explanation

There is just one aspect of this proposition that gives it a more reasonable appearance. Consider, for a moment, there are two airways, say 6 x 8 ft., each 90 ft. long, giving an air space of nearly 9000 cu.ft., which is filled with air and gas. It may be assumed that the body of gas it is desired to remove is lodged at the head of these entries. Now, it is possible that the fireboss, in this case, reasoned that the closing of the return airway would allow the gas accumulated at the face to diffuse throughout the entire air space and thus be diluted below the explosive point. The question is, Was he correct in making this assumption?

When the return airway was closed there would still be a gentle circulation of air, owing to the cooler air at the bottom of the entries rising toward the roof, and this would have a tendency to assist the diffusion of the gas working along the roof. My idea is that, finding the brattice did not remove the gas, this fireboss sought to dilute the latter by giving time for diffusion to take place.

I would like to ask what other gas inspectors and firebosses would do to effect the complete removal of gas located at the head of a pair of entries going to the rise, provided the brattice extended close to the face failed to accomplish the desired result.

Worley, Ky. Gas Inspector.

The Handling of Men

Letter No. 5—Mine officials, for some time, have recognized that the efficient handling of men is one of the largest factors in the economical mining of coal. This was never more true than at the present time when labor is growing more scarce every day, owing to the decreased immigration and because many of our best, most ambitious and intelligent miners have left the mine for work in factories or on the railroads. Also, a large number of reservists have returned to

their own country to take their share of the burden of war.

Miners and daymen working in the mine have taken advantage of this condition and have made demands that are often unreasonable. The day is past when you can show a miner a wet place, which they have learned to call a "dog hole," and tell him to "work that or nothing." The mine foreman is no longer, as formerly, the company's "slave driver," and the worker his slave. In the present order of things the successful mine foreman must be a good general. He must know his men and understand human nature.

Successful mining requires a good organizer in charge of the work. The great problem is to get the right man in the right place. There are many misfits both in coal mining and other industries. If some great power could take these misfits and place them where they belong—in other words, give them work suited to their capability and nature—what a great change would result in our industrial enterprises.

The story is told of a minister and one of his elders —a farmer—whose views differed widely. The minister had been contemplating the heavens and remarked that he had received his first inspiration to preach the gospel from tracing the letters G. P. C. among the stars. These letters, he said, meant "Go preach Christ." At this point, the elder interrupted the minister by suggesting that, to his mind, the letters meant "Go plow corn."

Conditions Then and Now

Our older mining men who have established a successful record for themselves, by reason of their habit of driving men and forcing them to do the work before them or quit, are not as successful today when conditions are so greatly changed. An incident that illustrates conditions a few years ago is the following:

On making application for work, a man was asked by the foreman, "Are you a good miner?" His reply was, "I believe so." "Well," said the foreman, "will you tell me what qualifications a good miner should have?" The man hesitated a minute and then replied, "A strong arm and a weak head."

At that time, there was more fact than fiction in the miner's reply. The more intelligent mine worker could not stand the abuse that was commonly heaped upon him by the foreman, and it was the fellow with the "weak head" that got along the best in the mine, while the better class of men were forced out of the mine to seek work among more congenial surroundings.

It was this trend of affairs in coal mining that is largely responsible for the present scarcity of labor, since it resulted in the necessity of the employment of a large proportion of foreign labor that has not only been subject to the call to arms, from their home lands, but forms a class with whom our mine officials do not naturally mix.

Yes, present conditions make the tactful handling of men a most important feature in the operation of the mines today. By such means I have been able to get men to work a back heading, in low coal going to the dip and where the water ran in streams from the roof, so that the men were obliged to wear gum suits.

These were young men, however, and equal to the task. The work required the constant use of a hand pump, and it was necessary to push the cars in and out of the place. At the end of the day the men would be wet to the skin, but they both stayed by the job until, finally, they were forced to quit, being so stiff that they could scarcely get about.

My remarks may arouse the question of mine discipline being set aside, but such is not the case. Discipline is strengthened when the men realize that the work must be done, and the honest worker is more inclined to take his share in serving the interests of the company when treated kindly.

No rule can be given for the use of tact in handling men. I could not follow another's plan nor expect another to adopt mine. The main point, however, is that mine officials and miners regard each other's interests more than is common at the present time.

Osceola Mills, Penn. S. D. Hainley.

Relative Size of Intake and Return Airways

Letter No. 2—In discussing the question of which should have the larger sectional area, the intake or the return airway of a mine, F. E. Schroyer states, *Coal Age,* Jan. 5, p. 32, "The haulage road should be the larger airway, regardless of whether it is the intake or the return."

Mr. Schroyer claims that the resistance of the moving cars to the passage of the air on the haulage road demands an increased sectional area. In this regard, it would be well to remember that trips are hauled in both directions on the haulage road and, while they obstruct the passage of the air when going in one direction, they assist it when passing in the opposite direction.

In considering conditions affecting the size of haulage roads, the safety factor calling for a good uniform clearance at the side of the track is important and may require an increased sectional area of the haulage road.

This question naturally suggests another of equal importance, which must be answered before it can be determined whether the area of the intake or return airway of a mine should be the larger. The question is one on which there has been some difference of opinion. It is, Should the haulage road of a mine be made the intake or return airway?

Some have argued that the answer to this latter question depends on whether the mine is or is not generating gas in dangerous quantity. Most mining men agree that, in the case of a mine generating gas, haulage should be performed on the intake airway, for the reason that greater safety is insured where this work is performed on the fresh air current, which is free from gas.

Making the intake airway the haulage road, however, necessitates the use of an exhaust fan for ventilation. On the other hand, since the blowing system of ventilation possesses certain advantages, and as this system requires that haulage be performed on the return airway, it seems better to adopt this plan in a mine not generating gas.

We must therefore conclude that, in the operation of a non-gaseous mine where haulage is performed on the return airway, all considerations point to making the sectional area of that airway larger than the area of the intake, since it has been pointed out that the return air is generally larger in volume than the intake.

Thomas, W. Va. W. H. Noone.

INQUIRIES OF GENERAL INTEREST

Boiler Horsepower

I have a somewhat hazy idea of the meaning of the term "boiler horsepower" and its relation to the indicated horsepower of an engine. Kindly explain the use of this term and state whether a boiler of 25, 50 or 100 hp. will furnish sufficient steam to operate an engine designed to develop the same horsepower. In other words, when estimating the size of boiler required to operate an engine of a given rated horsepower, is it correct to take the horsepower of the engine, as the required horsepower of the boiler? MINE ENGINEER.

Charleston, W. Va.

The term "boiler horsepower," used to express the capacity of a boiler to supply the necessary steam to operate a particular engine for a given service, has no reference whatever to the indicated horsepower developed by that engine in performing the specified service. A boiler horsepower is an arbitrary standard that has been adopted for the rating of boilers. It has reference to the weight of water evaporated per hour or the weight of steam generated in that time. The standard boiler horsepower adopted by the Society of Mechanical Engineers and now in general use is the evaporation of 34.5 lb. of water per hour, from a feed-water temperature of 212 deg. F. to steam at the same temperature. This arbitrary standard serves merely as a unit or basis for rating the evaporative capacity of a boiler.

The capacity of a boiler to generate steam differs widely in different types of boilers and in boilers of the same type designed for different service. It depends primarily on the extent of heating surface, but is modified very largely by numerous other factors, such as the quality of the coal burned, its rate of combustion as influenced by the draft, grate area and depth of fuel, manner of firing, the character of the feed water and the care taken to keep the boiler in proper condition.

A boiler rated at 100 hp., under proper care and management, should be capable of generating the equivalent of $100 \times 34.5 = 3450$ lb. of steam per hour, from and at 212 deg. F. The consumption of this weight of steam per hour, by an engine, however, does not mean that the engine is developing 100 hp. An engine developing that horsepower may consume more or less steam per hour, according to its type of construction and numerous details that render the engine more or less efficient in the development of power.

For the sake of illustration, we will consider, here three types of steam prime movers represented by the steam turbine, the Corliss condensing engine and the simple, noncondensing, slide-valve engine. Every engine has a specified water rate, which is guaranteed by the manufacturer. This water rate differs widely in different types of engines and with different manufacturers.

The term "water rate" refers to the weight of steam consumed by an engine, per indicated horsepower-hour. Of the three types of prime movers mentioned, the steam turbine has the lowest water rate, which ranges from, say 8 to 15 lb. of steam consumed per indicated horsepower-hour. A Corliss, condensing engine, has a rate commonly ranging from 18 to 25 lb. of steam consumed per indicated horsepower-hour, while a simple, noncondensing, slide-valve engine, may have a water rate ranging from 30 to 60 or more pounds of steam consumed per indicated horsepower-hour. In any of these types of engines, the actual steam consumption, per indicated horsepower-hour, depends upon the degree of efficiency in the design and workmanship of the engine.

Now, applying these facts to determine the size of boiler required to operate, say a 100-hp. simple, noncondensing, slide-valve engine, using dry, saturated steam, at 120 lb. pressure and having a guaranteed water rate of, say 40 lb. of steam per indicated horsepower-hour at full load, the actual steam consumption will be $100 \times 40 = 4000$ lb. per hour.

Then, assuming a feed-water temperature of, say 70 deg. F. and reducing this steam consumption to its equivalent evaporation from and at 212 deg. F., by multiplying by the corresponding factor of evaporation, which is 1.192, for the given temperature and pressure, we obtain $4000 \times 1.192 = 4768$ lb. per hour. The required boiler horsepower, in this case is, therefore, $4768 \div 34.5 = 138$ boiler-horsepower.

To produce the same indicated horsepower when using a Corliss condensing engine having a water rate of, say 22 lb. of steam per indicated horsepower-hour, which corresponds to a steam consumption of $100 \times 22 = 2200$ lb. per hr., would require an equivalent evaporation of $2200 \times 1.192 = 2622$ lb. of water per hour, and the required boiler horsepower, in this case is $2622 \div 34.5 = 76$ boiler-horsepower.

Increase in the Emission of Gas Following an Explosion

I have noticed, on one or two occasions, that there appeared to be an increase in the quantity of gas given off in the mine immediately after an explosion, as working places contained considerable quantities of firedamp that should have been consumed if present previous to the blast. If this is possible kindly explain its cause.

———, Colo. FIREBOSS.

Immediately following an explosion of gas or dust in mine workings, there is formed a more or less vacuous condition of the air in the mine. While this is owing, in part, to the rush of the explosive wave toward the mine entrance, it is chiefly or largely due to the cooling of the atmosphere remaining in the mine, owing to the rapid absorption of heat by the strata. The vacuous condition thus created has a tendency to reduce the pressure and invites a greater outflow of gas from the strata, which may frequently occur at the face.

EXAMINATION QUESTIONS

Difficult or Unpractical Questions Asked in Examinations

Ques.—A sample of firedamp taken from the mine is found to have a specific gravity of 0.9; what are the proportions of the mixture? Please show the method of working.

Ans.—In order to arrive at any satisfactory solution of this question, it is necessary to assume that the firedamp is composed wholly of methane (CH_4) and air. Then, denoting the percentage of methane by x, 100 volumes of the mixture will contain x volumes of gas and $100 - x$ volumes of air.

But, since the specific gravity of methane, referred to air as unity, is 0.559 and the weight of gas or air is found by multiplying its volume by its specific gravity, that of air being 1, the relative weight of gas, air and mixture, in 100 volumes of the firedamp, is as follows:

Weight of methane, $0.559 \times x = 0.559x$
Weight of air, $1(100 - x) = 100 - x$
Weight of mixture, $0.9 \times 100 = 90$

Finally, since the sum of the weight of the gas and air is equal to the weight of the mixture, we have

$$0.559x + 100 - x = 90$$
$$x(1 - 0.559) = 100 - 90 = 10$$
$$x = \frac{10}{1 - 0.559} = \frac{10}{0.441} = 22.67 \text{ per cent.}$$

A firedamp mixture consisting of pure methane and air and having a specific gravity of 0.9, therefore, contains 22.67 per cent. of gas.

Ques.—A gravity plane has an inclination of 7 deg. and is 1800 ft. long; the rope weighs 3800 lb. A loaded car weighs 2800 lb. and an empty car 1500 lb. What number of cars must be in the trip to start it?

Ans.—The angle of inclination being 7 deg., its tangent is 0.12278, and the grade of the incline is, therefore, say 12.3 per cent. or 0.123, expressed decimally, which is the gravity factor in this calculation. Also, assuming a track resistance of, say 30 lb. per ton, the frictional factor resisting motion is $30 \div 2000 = 0.015$.

In the operation of a gravity plane, the number of empty and loaded cars is equal and the weight of these cars is therefore balanced, while the weight of the rope and the coal hoisted is unbalanced. Hence, the force acting to produce motion is the gravity pull due to the weight of the coal hoisted, in a single trip, while the forces acting to resist motion when starting the trip are the gravity pull of the rope and the friction pull of the entire moving system.

Calling the number of loaded cars in a trip n, the weight of coal hoisted in a single trip is $(2800 - 1500)n = 1300n$. The gravity pull due to this weight of coal is, therefore, $0.123 \times 1300n =$ say $160n$, which is the force acting to start the trip. But the weight of the rope being 3800 lb., its gravity pull is $3800 \times 0.123 =$ say 467 lb. The combined weight of one loaded and one empty car is $2800 + 1500 = 4300$ lb., which makes the weight of the loaded and empty cars, in a single trip, $4300n$ lb. Adding to this the weight of the rope (3800 lb.) gives for the weight of the entire moving system $4300n + 3800$. This must then be multiplied by the frictional factor 0.015, to obtain the frictional resistance to motion, which added to the gravity pull of the rope (467 lb.) gives the total force resisting motion.

Finally, equating the force producing with that resisting motion, we have,

$$160n = 0.015(4300n + 3800) + 467$$
$$160n = 64.5n + 57 + 467$$
$$95.5n = 524$$
$$n = \frac{524}{95.5} = 5.4, \text{ say 6 loaded and 6 empty cars.}$$

Ques.—What is the safe working load of a crucible steel rope 1¼ in. in diameter, on a slope 500 ft. long and dipping 35 deg.?

Ans.—The safe working stress, in a six-strand, crucible-steel haulage rope, 1¼ in. in diameter, assuming a factor of safety $f = 8$, for hoisting on this long steep slope, is

$$S = \frac{37d^2}{f} = \frac{37(1\frac{1}{4})^2}{8} = 5.85 \text{ tons}$$

Since this question gives the inclination and length of the plane, it evidently intends to ask for the maximum safe load that could be hoisted. To ascertain this load, let W = the combined weight of the loaded trip and the rope. The gravity pull due to this weight resting on an incline making 35 deg. with the horizontal is W sin. 35 deg. = 0.573 W. Again, assuming a track resistance of 30 lb. per ton, and allowing this to apply likewise to the friction of the rope resting on the rollers, the normal pressure on the plane due to the entire load being W cos. 35 deg. = 0.819 W, the friction pull is $30(0.819\ W) \div 2000 = 0.012\ W$. The total pull, or the sum of the gravity and friction pulls is, therefore, $(0.573 + 0.012)W = 0.585\ W$.

Finally, equating this last result with the safe working stress of the rope, found previously, gives for the total weight of the loaded trip and the rope $W = 5.85 \div 0.585 = 10$ tons. But a 1¼, six-strand wire rope weighs 2 lb. per lineal ft., which makes the total weight of the rope resting on the incline $2 \times 500 = 1000$ lb., or ½ ton. Deducting this from the total weight just found gives 9.5 tons as the weight of the loaded trip or the maximum allowable load hoisted.

Ques.—What is meant by the "equivalent orifice" in mine ventilation?

Ans.—This question has little practical bearing on the question of fan ventilation to which it is usually applied. It expresses the ratio of the quantity of air in circulation to the square root of pressure or water gage. Practically it is impossible to measure the water gage due to passing a given quantity of air through a fan, and for this reason the use of the term in ventilation is limited and of little value.

Coal and Coke News

For the Busy Reader

For the first time in its history, the Thomas A. Edison plant was closed recently. Lack of fuel was the cause.

* * *

No excuses will be received from coal concerns under contract to furnish coal to the camps and cantonments. Fuel for this purpose will, under an order just issued, have priority over all other requirements except railroad fuel.

* * *

By definite order of the Fuel Administrator all industries east of the Mississippi must be closed for five days, beginning Friday, Jan. 18. After that period not a plant in the affected district must burn fuel for ten consecutive Mondays. The order has met with much criticism.

* * *

The Federal fuel administrator of Iowa is performing a service that is worthy of emulation elsewhere. He has secured the services of six expert firemen, who visit every city of consequence in the state and give instructions to the firemen in the apartment houses, hotels, etc., as to the proper method of using their coal.

* * *

To expedite the movement of coal into New York City an arrangement has been made to utilize the car floats of the Pennsylvania R.R. to carry coal cars from Jersey terminal points through New York Bay to coal yards on the Harlem River. Plans are also being made to handle coal by all-rail routes to New England up the west bank of the Hudson River.

* * *

M. A. Hanna & Co., of Cleveland, Ohio, which controls the Susquehanna Collieries Co., with operations in the Shamokin, Wilkes-Barre, Nanticoke, Pottsville and Lykens regions, announced a 75c. a ton increase on all sizes of anthracite coal. The increase, it is said, follows Governmental satisfaction that the collieries have actually passed from Pennsylvania R.R. control to independent ownership.

* * *

The Chesapeake & Ohio has lost part of its bunker business because of the recent Government order requiring vessels to load from barges in the stream instead of from alongside piers. This had proven such slow work masters of a number of ships, instead of stopping at Newport News, have gone on to Norfolk for coal. There has been filed with the Government a protest against the new order, it being claimed that the port is being injured as a result.

* * *

The reports received from Deputy Fuel Distributor D. R. Lawson, of Fairmont, W. Va., show that the new plan of the Fuel Administration of decentralizing the distribution of emergency orders for coal is working admirably. Under the new plan every mine in the district has been receiving at least partial supplies of cars, and the daily loss of tonnage, which formerly ranged from 32,000 to 38,000 tons has been reduced to from 1500 to 2500 tons.

* * *

No. coal will be exported from the United States during 1918 "except for purposes contributing materially to the conduct of the war." This policy, it was announced on Jan. 7 after a conference of officials of the State Department and War Trade Board with Dr. Harry A. Garfield, Federal Fuel Administrator, inaugurates a sweeping control of the export coal situation, which may throw into the discard all existing contracts for deliveries this year. Bunker coal is not affected by this decision.

HARRISBURG, PENN.

"Ten million dollars annually will be the direct loss to the State of Pennsylvania under Government ownership of the railroads," said Chairman Ainey of the Public Service Commission of Pennsylvania, on Jan. 11. He stated that a similar loss was almost sure to follow if railroads are to be Federally incorporated. For the years 1915-1916 the railroads paid into the State Treasury nearly nine millions of dollars, and that amount has been increased until it now reaches the enormous sum of about ten million. The loss of such an amount would seriously affect the revenues of the state and could only be met by imposing larger burdens of taxation upon coal, oil and other minerals, and an increase in taxes upon public utilities, coal companies, etc.

Chairman Ainey, after a conference with Director General McAdoo, on Jan. 11, issued an order increasing demurrage rates on cars on railroads in Pennsylvania effective Jan. 21.

Demurrage charges per car per day or fraction of a day are to be $3 for first day, $4 for second day, and for each succeeding additional day the charge to be increased one dollar in excess of that for the preceding day until a maximum of $10 per car per day shall be reached on the eighth day of detention beyond the free time, the charge thereafter to be $10 per car per day.

The Clearfield County Dry Federation, in half-page advertisements, has started its fight to drive the saloon out of Clearfield County, and everything possible is going to be done to give the knockout blow at the coming license court to be held Jan. 21. Remonstrances were signed in all the churches of the county, and from now on a house-to-house solicitation is to be made to get signers to the remonstrances.

In its half-page advertisements the Federation says: "Quit kicking about coal. Of course there is a coal famine, but what of it? During the last fiscal year the breweries in America produced 60,729,509 bbl. of beer. It requires 248 lb. of coal to produce a barrel of beer. A pound of coal for a pint of beer. In other words, the breweries in America used up 7,530,395 tons in coal during the year in making beer. One hundred and forty loaded ships were lying idle in New York harbor unable to sail for lack of coal. Have you heard of any breweries lying idle for lack of coal? Schools and factories are closed for want of coal. Have any breweries closed for want of coal? Booze or coal?"

Every effort is being made to put 500 saloons out of business in Schuylkill County in the interest of a greater production of coal in the county. A movement has been under way for the last two months to have the Government refuse Federal license to two-thirds of the saloons in the coal region, because of the effect of their business on the efficiency of the miners.

It is said that many collieries are affected from two to four days by lack of workers after pay day, and it is proposed to abolish this condition. The matter has been taken up with the Government because there was little hope for any radical reduction in the number of saloons by the action of the court.

Scranton's biggest legal victory, so far as the mine-cave problem is concerned, came on Jan. 11, when Judge James J. O'Neil, in equity court, granted the City of Scranton an injunction restraining the People's Coal Co. from mining and removing coal and endangering the support of all streets and public highways in the mine-cave area of West Scranton, excepting Main Ave., which was covered by a suit tried in the courts several years ago.

In addition to granting the injunction, Judge O'Neil awarded the city approximately $30,000 damages. Court finds the city is entitled to $23,935.81 for damages to sewers and $5265 for damage caused to paved streets by reason of subsidences.

From the standpoint of establishing certain facts relative to the mine-cave situation, the findings of court make the victory the most sweeping that has yet been won by the people in the fight for surface support. The facts as found by Judge O'Neil have long been considered the crux of the legal end of the mine-cave problem, and they should do much toward helping an early solution of the entire question.

Not only does Judge O'Neil grant the injunction as prayed for, but finds that the city is entitled to 100 ft. of lateral support on each side of the street for the first two surface veins and 1 ft. additional in support for each foot in depth of the other veins. This is what is known as the foot-for-foot rule, or the one-for-one rule. Rough estimates made allow the streets included in the bill lateral support ranging from 100 to 175 feet.

Along with other things, the decision established the constitutionality of the Davis mine-cave act, which established a city bureau of mine inspection and surface support, and required coal companies to file maps of their workings with the city authorities. The case in question was based to a large extent on the powers vested in the city by the Davis act.

Should the views of Judge O'Neil stand in the Supreme Court it will mean that in the future mine-cave suits will have a substantial basis on which to be started. The case decided was started Aug. 23, 1916, and was on trial almost continuously until December of the same year.

The retail coal dealers versus the city of Philadelphia is to be the title of the next chapter in the story of Philadelphia's coal troubles, according to Francis A. Lewis, city fuel administrator. It is stated that one of the coal dealers is about to institute proceedings against the city to recover the loss sustained by him through the coal raids.

In the opinion of Mr. Lewis everything is on the side of the complainant. The city fuel administrator explained the status of dealers who were robbed by saying: "The Act of Assembly of 1844 provides that the county must pay for property destroyed by rioters. The law was clearly upheld at the time of the Pittsburgh riot case of 1877 by Chief Justice Paxson."

During the last few weeks many cars loaded with coal were raided in Philadelphia yards of the Pennsylvania railroads. Crowds numbering as high as 1200 or 1500, equipped with bags, buckets, wash boilers and baby coaches stormed the cars and made off with anywhere from a few tons to the whole carload. Arrests were few. In most instances the police watched the proceedings without offering to interfere, and even magistrates who arraigned those who were arrested were lenient.

PENNSYLVANIA

Anthracite

Pittston—The death toll of the Barnum mine cave, which it was hoped on Jan. 7 had been averted altogether, has now been found to number two miners. Rescuers came upon the body of Steve Jarvis on Jan. 9, and Frank Ciezechski is still missing and small hope is entertained of finding him alive. The shifts of 15 men each are bending every effort to locate the missing man.

Cumbola—In line with the further development of the Schuylkill Valley coal fields, among which is the reopening of the Kaska William colliery, the Lehigh Coal and Navigation Co. is having surveys made and boreholes put down for reference in the location of other collieries, one of which will be at the eastern end of Port Carbon. This will be followed by other operations by that company and by the Delaware & Hudson Co., which owns coal lands near here. These operations will be allied with the New England & Lehigh R.R. over which the product will be hauled to market. An extension from Tamaqua, a distance of 17 miles to Pottsville, will be constructed.

Pottsville—The Philadelphia & Reading Coal and Iron Co., the largest producer of anthracite, on Jan. 10 stated in a document filed in court its intention of opening a number of new collieries and washeries in the Gilberton region. In connection with this the Harleigh Brookwood Coal Co. filed permission for the Philadelphia & Reading Coal and Iron Co. to deposit culm in the streams flowing over the Harleigh tract. Officials of the Reading Coal Co. said that a dozen collieries idle in the Shenandoah and Mahanoy City region for lack of water will resume at once.

Scranton—All owners of property overlying the area affected by the proposed operations of the Se-Rob Mining Co., engaged

at present in removing surface vein coal through a drift opening in the 100 block, driven early last fall, have prepared to institute injunction proceedings against the concern. The injunction will seek to restrain the company from mining, by means of surface processes, the recently discovered top vein of the Price-Pancoast tract.

Retreat—Mining of coal from the Susquehanna River on a large scale is a matter now occupying the attention of officials of the Central district poor board. New equipment is being bought and next spring, or as soon as the weather permits, the work of making the river give up its coal, which was started last year, will be resumed. For some years past the poor board has been mining the coal from the section of the river bed adjoining its property.

Lansford—The Lehigh Coal and Navigation Co. is erecting for its clerks, engineers and superintendents six detached and four semi-detached reinforced concrete dwellings. The houses are located on ground in the center of the town formerly occupied by a culm bank. As a departure from the old way of building all houses alike, this group will consist of five different types of houses. Each house will be situated in a lot from 40 to 45 ft. in width and 150 ft. in depth. The total cost complete, exclusive of ground of the ten dwellings, will be $35,000.

Freeland—A fire of unknown origin was discovered in the Sandy Run mine of M. S. Kemmerer & Co., and caused considerable excitement for several hours. The flames had made great headway through one of the gangways, and the entire fire-fighting force of the colliery was called out. The company is now maintaining a close watch on the affected sections in order to prevent any fresh outbreaks from the smoldering timbers.

Honeybrook—The strippings of the A. E. Dick Co. have been closed down on account of the cold weather. Strippings and all other outside operations have been severely handicapped so far this winter.

Morea—The Morea mine of the New Boston Land Co. is the latest to discard steam for electricity. This mine has just reverted to the control of its original owners after being leased for 30 years to the C. M. Dodson Coal Co.

Beaverbrook—The A. S. Van Wickle estate has started a policy of retrenchment as its Coleraine colliery, where several assistant foremen have been put back to mining.

Bituminous

Punxsutawney—Approximately 50,000 tons of coal is being shipped to New England daily from this district as the result of an order from the fuel administrator to mine operators, commandeering a heavy percentage of their output to relieve the coal shortage in New England. The order is the largest demand made on the mine owners since the fuel administration was formed. Nearly every mine in Jefferson, Indiana, Clearfield, Armstrong and Clarion counties are affected, and many operators have been forced to cancel profitable contracts made months ago to enable them to send coal to New England at the Government price of $2.45 net ton.

Jeneau—The Jeneau Coal Mining Co. has completed several additional miners' houses at its plant here. It is also installing a large set of boilers and an air compressor. The mine has only been opened nine months and now has a capacity of 500 tons per day.

Brisbin—The Franklin Coal Mining Co., on Jan. 11 made a claim on the Pennsylvania R.R. for $6000 damages in a complaint filed with the Public Service Commission. The action grows out of a controversy over a siding, and the claimants allege that the railroad tried to prevent the coal operators from doing business.

WEST VIRGINIA

Clarksburg—The Imperial Gas Coal Co. has made application for a sidetrack at its new operation near here. The company is preparing to put in and operate a modern mining plant. The largest cash payment to be made in a coal deal here in some time was disclosed recently when a deed was filed for record at the county clerk's office transferring approximately 300 acres of the Pittsburgh vein of coal near Lumberport from the Cambria Coal Co. to F. K. Gatch for a consideration of $243,075.15. The cash payment acknowledged by the deed is $176,775.15. Eleven separate tracts of the coal lying on Ten-Mile Creek and Jones Run thereof in Ten-Mile district, and three tracts aggregating about 15 acres in fee simple on Ten-Mile Creek in the same district, are covered by the deed. The property was acquired about a year ago by the Cambria Coal Co. from the Lumberport Coal Company.

The Cambria Coal Co. has completed its tipple at its Lumberport mine and started last week to load coal. This is one of the important new operations in this field in the Clarksburg district.

KENTUCKY

Whitesburg—Severe weather conditions prevailing throughout this section has delayed construction, grade work, building and opening of mines by the coal companies starting new work. Many men are out of employment as a result, and all business seriously hampered. Many carpenters and other laborers are going into the mines as a result of the long delay in outside work.

OHIO

Zanesville—According to a circular received in local railroad circles open-top coal cars are to be furnished wagon coal mines in this vicinity in the future. This will do away with the old method of furnishing box cars for the mines and will result in the loading of more coal which will greatly assist in relieving the present coal shortage.

Bellaire—The Brooks Run coal mine located on the Brooks Run pike southwest of this city, has been sold through the James L. Linard agency of this city to B. R. Sutliff of Shadyside. The consideration was not made public but is said to be in the neighborhood of about $10,000. The Brooks Run Coal Co. employs about 25 men.

ILLINOIS

Harrisburg—The 25 coal mines in Saline County were idle four days during the week of Jan. 7 for lack of cars and on Saturday, Jan. 12, no cars were in sight. The mines average about 50,000 tons a day and the loss of output was therefore 200,000 tons. Five thousand miners were idle.

Pana—North Mine No. 2 of the Pana Coal Co. resumed operation a few days ago after having been abandoned since Jan. 27, 1914. It was made ready for reopening at a cost for labor and materials of $50,000. Repairs had been in progress ten months. A cave-in at the bottom of the shaft which left a cavern 35 ft. wide and tore out 100 ft. of casing had to be repaired. New engines and equipment were installed. At full operation the mine will employ 300 men and its output will be 1600 tons daily.

Edwardsville—Simon Kellermann, Jr., explosive license agent for Madison County, has received a ruling from the Bureau of Mines at Washington that coal miners buying powder or fuses must have a license and that merchants must not under any circumstances sell without a license.

Duquoin—Thomas Holmes, general mine superintendent of the Chicago & Wilmington Coal Co., at this place, was presented by the company with a check for $5000 on New Year's Day in recognition of his successful administration of the past year.

Marion—A suit brought by the miners of the Taylor Coal Co., operating a mine near Herrin, for neglecting to furnish the miners with a suitable washhouse was decided against the company with fine and costs. The miners contend that the tonnage of coal produced would be much heavier if the operators would show a willingness to coöperate by complying with the law.

Carterville—The Carterville Big Muddy Coal Co., operating a mine at Cambria, made arrangements with its miners that if the men would work on New Year's day the mining company would donate the entire output for that day to the Y. M. C. A. Fund. The miners agreed and as a result something like over $3000 was sent to the Y. M. C. A.

Springfield—Joseph Castagno has sued the Chicago, Wilmington & Franklin Coal Co. for $3000 for injuries alleged to have resulted from the failure of the company to mark as dangerous a part of the mine roof that was loose and rotten.

OKLAHOMA

Krebs—The Osage coal mine No. 5, was forced to close on Jan. 5 on account of damage to the large fan that supplies fresh air and draws foul air from the mine. About ten days will be required to make repairs, which must be finished before operation is resumed.

Personals

H. H. Stockett, superintendent of the Locust Mountain Coal Co. at Weston, Penn., has been made general superintendent of the Dodson interests in the anthracite field and will make his headquarters at Shenandoah.

J. F. Smith, of Knoxville, Tenn., has been given a position with the Smooth Creek Coal Co., at Roxana, Ky., as store manager and general office man. He is well known among the coal operators and retailers in east Tennessee.

P. C. Gunion has been appointed advertising manager of tne Industrial Bearings Division of the Hyatt Roller Bearing Co., Newark, N. J. Mr. Gunion has been in the sales department of the Hyatt company for two years. Just previous to his recent appointment he was manager of the Pittsburgh office.

James B. Neale, of Minersville, Penn., a prominent coal operator and assistant to Fuel Administrator Garfield, was on Jan. 16 appointed by Governor Brumbaugh a justice of the peace for Foster Township, where the mines of Mr. Neale are located. No election was held in the township to fill the vacancy.

Frank Carter, formerly connected with the Smooth Creek Coal Co., at Roxana, Ky., has accepted a position as store clerk for the Red Ash Coal Co., at Red Ash, Ky. Mr. Carter was also former mine man at the plant of the Whitley Elkhorn Coal Co., at Sergent, Ky. He is popular among coal operators in eastern Kentucky.

H. A. Cochran, general coal freight agent of the Baltimore & Ohio Railroad Co., at the request of United States Fuel Administrator Garfield has been granted a temporary leave of absence in order that he may assist G. N. Snider, transportation adviser to Dr. Garfield, in coördinating with the Director General of railroads the transportation requirements of the United States Fuel Administration.

E. B. Sutton, who has been in charge of the Federal mine-rescue station at Birmingham, Ala., for the past four years, has tendered his resignation and will enter business at Elkins, W. Va. Mr. Sutton is considered exceptionally well versed in mine-rescue work and his departure from the district is regretted. W. T. Burgess, assistant engineer, will be in charge of the local station until Mr. Sutton's successor is named.

Robert Z. Virgin, of Wheeling, W. Va., has resigned his position as superintendent of the mines of the Wheeling Steel and Iron Co. to accept a chair in the College of Mines and Mining of West Virginia University at Morgantown, W. Va. Mr. Virgin entered upon his new duties Jan. 15. Before coming with the Wheeling Steel and Iron Co. he was superintendent for the Cambria Steel Co. at Johnstown, Penn., and was identified with several mining operations in Somerset County, Pennsylvania, and West Virginia.

E. A. Holmes, a well-known coal salesman of Birmingham, has been appointed district representative of the National Fuel Administration to handle the distribution of all priority and Government business apportioned to this district. This appointment is the initial step in placing in operation the plan of distribution suggested by the coal operators' association, and will enable the district to care for priority shipments with the least possible interruption to the movement of coal to essential industries and public utilities, such order being placed wth mines which are not overly burdened with the above class of business.

Obituary

William Harrison, mine examiner at the Summit Mine, near Belleville, Ill., was killed in an explosion which wrecked the municipal electric-light plant at Swansea, a Belleville suburb, last Saturday night.

Nicholas Moyer, Locust Gap, Penn., the oldest breaker foreman in the anthracite region, died, Jan. 9, aged 80 years. He was foreman at the Locust Spring colliery breaker for 40 years and declined to be placed on the pension rolls.

W. H. Thomas, a well-known operator, and president of the McDowell Coal and Coke Co., died at Bramwell, W. Va., recently at the age of 54 years. He was formerly from Columbus and engaged in operations in the Hocking Valley for 12 years.

Marcy MacDonald Price, aged 48, vice president of the Hartland Collieries Co., with operations at Hartland, W. Va., died on Jan. 9 of pneumonia. Mr. Price was one of the best-known men in the coal business in the eastern part of the United States. He is survived by his widow, two brothers and two sisters.

Christopher W. Levalley, founder and chairman of the board of directors of the Chain Belt Co., died suddenly of heart fail-

ure at his home in Milwaukee on Friday, Jan. 4. In 1907 Mr. Levalley conceived the idea of driving a concrete mixer with a steel chain and using a cast semi-steel drum. These ideas were incorporated in what was known then as the Chain Belt mixer, but which name has since been changed to Rex mixer. Mr. Levalley would have been 83 years old in April had he lived. From 1891 until 1916 he was president and general manager of the Chain Belt Co. In 1916 he was elected chairman of the board of directors and held his position up to the time of his death. He was also interested in the C. O. Bartlett & Snow Co. of Cleveland, and the Federal Malleable Co. of Milwaukee.

Industrial News

York, Penn.—A number of business men, headed by J. F. Riest, F. H. Brubaker, and C. B. Yost, have bought the Louise Coal Co., with a 600-acre property in Bedford County and Fulton County, and have organized the Lenora Coal Co., with $600,000 capital.

Buffalo, N. Y.—The Pittsburgh coal shippers, B. Nicoll & Co., who have maintained an office here for several years, have discontinued it on account of the peculiar condition of the coal business. Thomas B. Dunbar, the representative, has returned to the home office.

Cincinnati, Ohio—The Himyar Coal Corporation, of Perry County, Kentucky, has filed in the United States Circuit Court of Appeals its appeal from the judgment of the district court for eastern Kentucky awarding to Vernon Lawson, a miner, damages of $5000 for injuries said to have been sustained while in the company's employ.

Jefferson City, Mo.—State Fuel Administrator Crossley has appointed the following to compose the State Fuel Advisory Committee; W. K. Kavanaugh, St. Louis; H. A. Buehler, Rolla; John R. Kirk, Kirksville; Houck McHenry, Jefferson City; R. T. Wood, Springfield; John T. Barker, Kansas City; Louis B. Houck, Cape Girardeau; D. R. Frampson, Moberly.

Columbus, Ohio—B. F. Nigh, secretary of the M-O-I Coal Association, in a report covering the month of December shows that a total of more than $4300 was collected for the members through the claim bureau. This is the largest sum ever collected during one month since the establishment of the bureau. During the month a total of 41 new members were received.

Columbus, Ohio—It is estimated by figures of operators that car and labor shortage, the latter incident to the holidays, caused a loss of 600,000 tons in coal production in Ohio during the last week of December. W. D. McKinney, secretary of the Southern Ohio Coal Exchange, places the loss in the field embraced by that organization at 48.86 per cent., or 198,000 tons.

Columbus, Ohio—The purchasing agent for the Ohio Board of Administration, which controls 25 state institutions, announces for the first time in several months that operators have been offering to sell fuel to the state. One company offered tonnage in any quantity required and others offered large amounts. He regards this an indication that the situation is improving.

Columbus, Ohio—W. D. Ranney, Columbus Smoke Inspector, is having his troubles because of the poor quality of fuel used by many factories and business houses. He claims that it is impossible to enforce the rigid smoke restrictions to keep Columbus a spotless town. He further states that many Columbus factories are working 24 hours daily, which vastly increases the volume of smoke.

New Philadelphia, Ohio—The Brown Coal Mining Co. has increased its capital from $20,000 to $40,000.

Terre Haute, Ind.—Articles of incorporation have been filed with County Recorder John T. Grace by the Riley Coal Co. The capital stock of the company is fixed at $10,000. The directors for the first year are Charles T. Kintz, James Drum and Pius F. Kintz, all of Vigo County. The principal place of business of the firm will be Terre Haute.

Raton, N. M.—The Superior Coal Co., of Raton, N. M., is in the market for a second-hand storage-battery locomotive, with a dozen nickel-iron batteries, preferably Jeffrey make.

Belle Vernon, Penn.—Government agents, continuing their drive against coal men charged with profiteering, arrested Joseph W. Vance and E. F. Wilson, coal operators in Fayette County, trading as Vance & Wilson. They were released in $1000 bail for a hearing. There are now seven coal operators and brokers of this vicinity charged with profiteering, and at least eight more arrests are expected.

St. Louis, Mo.—The fourth annual banquet and entertainment of the St. Louis Coal Club was held last Monday night, at the American Annex Hotel. Lieut. Gov. Wallace Crossley, Missouri fuel administrator, spoke on "War and Coal." John P. Reese, vice president and general manager of the Superior Coal Co., spoke on "The Relation of Government-Controlled Railroads to the Coal Industry."

St. Louis, Mo.—Plans for four towboats and 24 barges to be built for the Government at a cost of $5,360,000 and operated on the Mississippi River between St. Louis and St. Paul, have been prepared in the office of the United States Engineers here. Bids will be opened the latter part of this month and construction will be rushed. The barges have been designed to carry coal, ore, steel, cement, lumber and oil. They will be 300 ft. long, 48 ft.-beam and 10 ft. depth.

Pittsburgh, Penn.—What is believed to be a move by the stockholders of the First National Bank of Uniontown to regain control of the institution of which Josiah V. Thompson was the president, was made in the United States District Court on Jan. 11 when former Judge Robert E. Umbell, representing creditors and stockholders, asked the court to set aside the order granting John H. Strawn, receiver, power to sell the real and personal property of the bank.

St. Louis, Mo.—Reports that efforts were being made to have St. Louis and Missouri placed in the Chicago fuel district raised a storm of protest, and Fuel Administrator Crossley of Missouri and Chairman Nims and C. E. Morrow of the St. Louis Fuel Committee hurried to Washington to resist such action. The Chamber of Commerce took a hand and Mayor Kiel sent a telegram of protest. Word came from Washington that the opposition would prevent the carrying out of the plan.

Huntingdon, Penn.—Twelve carloads of bituminous coal from the Huntingdon and Broad Top R.R. siding here was seized on Jan. 7, by E. M. Greene county fuel administrator, to relieve the shortage in Huntingdon County. More than 1000 loaded cars are now said to be on sidings of the Huntingdon and Broad Top R.R. and the accumulation is constantly increasing while it is waiting for the Pennsylvania R.R. to take over its shipments to New England and other parts of the East.

Clayton, Mo.—Chairman Hodgdon, of the St. Louis County fuel committee, at a meeting of 75 coal dealers of the county warned them revocation of license would be the penalty for failure to make daily reports. After the meeting the dealers organized the St. Louis County Fuel Dealers' Association. The association will ask the Government to put into effect as quickly as possible a uniform freight rate in the county. They complain that one road is charging 75c. for switching a ton of coal two miles.

Pittsburgh, Penn.—Notwithstanding the statements by many Government officials to the contrary, there has not been a great deal of improvement in the coal-car or coal situation in this district. The extremely cold weather is probably responsible for a considerable part of the condition. The rivers are frozen solid and river loading out of the question.

The Baltimore & Ohio mines in Somerset County have been particularly short of cars, except some that have been getting some western Maryland cars.

St. Louis, Mo.—Payment of dividends aggregating $40,000 in six months by the new Staunton Coal Co., of Livingston, Ill., to the Mercantile Trust Co., of St. Louis, on the $50,000 stock in the company held by the estate of George Lincoln Sands has been brought into question by proceedings begun in the Circuit Court at Edwardsville, Ill., by Public Administrator Frank B. Sanders of Madison County. He contends that the dividends on the stock of an Illinois mine should have been retained in Illinois for the payment of creditors and for settlement of the inheritance tax.

Cincinnati, Ohio—The Matthew Addy Co., of Cincinnati, sued by J. A. Hinchey and others, doing business as the Gem Collieries Co., has filed its answer in the United States District Court, denying the allegation that it delivered contract coal intended for delivery to plaintiffs at Chicago and sold it in the open market. The Addy company admits the agency connection, but charges that the plaintiffs themselves broke the contract, and failed to supply coal contracted for, causing actual cash damge of $1775, and additional damage to the company's good will amounting to $10,000, for which judgment is asked.

Clayton, Mo.—Sam D. Hodgdon, chairman of the St. Louis County fuel committee, will recommend to the Fuel Administration that railroads be forced to pay the same demurrage for shipments of coal detained by them that is charged consignees. The State Public Service Commission recently promulgated an order increasing demurrage charges, effective Jan. 21, as follows: After 48 hours, first day $3, second day $4 and each additional day $1 until the demurrage reaches $10 a day. Hodgdon asserts that nineteen cars have been standing on tracks near University City for eight days and that several cars have been at Kirkwood seven days.

St. Charles, Mo.—Prices fixed by R. M. Thomson, chairman of the St. Charles County fuel committee, approved by State Administrator Crossley, are as follows: Illinois, group No. 1, including Belleville, Freeburg, Coulterville, Glen Carbon, Litchfield, Logan, Marissa, Mount Olive, New Athens, Pinckneyville, St. Clair, Tilden, Wilderman and Winkle, $5.50 a ton delivered; group No. 2, including Duquoin, Paradise and Sunfield, $5.55; group No. 3, including Murphysboro district, $5.62; group No. 4, including Benton, Carterville, DeSoto, Eldorado, Gallatin, Marion and West Frankfort, $5.65. The prices for St. Charles County have not been determined.

Birmingham, Ala. — Announcement is made of the acquisition by G. H. Stevenson and associates, of Bessemer, Ala., of the Bamford mine, located in Shelby County, about 21 miles south of Birmingham on the Southern Ry. This is a slope opening on the Gould seam of coal and has not been operated for a number of years. The deal covers about eighty acres of fee simple coal lands and all plant and mine equipment. It is understood the new owners will resume operations at the mine as soon as the necessary rehabilitation has been completed. Options are reported to have been taken on the adjoining eighty acres of coal lands by the Bessemer Coal, Iron and Land Company.

Baltimore, Md.—Directors of the Consolidation Coal Co. at their regular meeting on Jan. 11 cut a melon for the stockholders in the shape of an extra dividend of 3 per cent. The regular quarterly dividend of 1½ per cent. was also declared payable Jan. 21, to stockholders of record on the 22d. The extra is payable Feb. 11 to shareholders of record at the close of business Feb. 1.

No statement of earnings was issued at the conclusion of the meeting. It is generally known, however, that earnings for year were highly satisfactory. The company would have shown a big increase in coal production at its mines in West Virginia. Maryland and Kentucky had the car situation to the mines been adequate. The Consolidation, however, like other companies suffered from a car shortage.

Columbus, Ohio—The Coal Shippers' Terminal Pool Association, which is now in operation in most of the large centers of population in the Middle States, has adopted a system of classification of various grades of coal which is set forth in a pamphlet. Only three grades of coal are recognized by the pool managers—namely, lump, mine-run and screenings. Pittsburgh No. 8 vein and the Cambridge district are placed in one classification. Another classification is given to the Middle District in Ohio, Coshocton and Bergholtz. Another is given to Deerfield and Massillon districts and another to the Hocking Valley, both thick and thin vein and Pomeroy Bend. Separate pool numbers are given to Jackson, No. 8 stripping, and wagon mines. West Virginia grades are divided as follows: Pocahontas and New River in one classification; Fairmont steam and domestic in another classification and separate pool numbers are given to Fairmont gas, Kanawha steam and domestic, Kanawha gas, Logan County steam and domestic, Logan County gas and smithing. Classifications are also made for western Pennsylvania and Kentucky grades.

MARKET DEPARTMENT

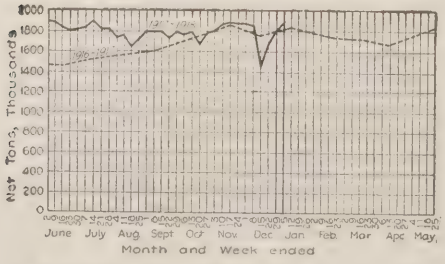
GENERAL REVIEW

Cold wave sweeps country, interfering greatly with transportation, increasing coal consumption and decreasing receipts. Shortage most pronounced in the East, while certain Western localities appear to be fairly well supplied.

A cold wave—the coldest for the season in many years—descended on the country, particularly the region west of the Alleghenies during the week under review. The low temperatures were accompanied with high winds and in some localities heavy snows. This tied up railroad transportation to a considerable degree, and while causing an increased consumption, particularly of domestic fuel, rendered receipts much lighter than normal. The suffering in some localities was intense. Along the Atlantic seaboard in particular the movement of coal was considerably hampered by ice in the rivers and harbors. Baltimore, New York and Boston have been and are still suffering in no small degree from this cause, while Hampton Roads is not without its troubles of a similar nature. Of course, the cold weather exerted an adverse effect on production, and many mines worked only part time, and in many cases only partly manned because of the storm. Conditions in New England, while probably no better, or but slightly so, than a week or two ago, are probably no worse. The priority order granted this territory of 500 cars per day of bituminous coal is certain to have its effect sooner or later, but this effect can not be expected immediately. On the other hand, it is believed in some quarters that the diverting of this coal to New England will adversely affect industries in New York, Pennsylvania and some of the other Eastern states, and considerable protest is heard concerning it. It would appear that domestic shortage has been in many instances considerably relieved. In some localities, however, added inconvenience and no small amount of suffering was caused by the severe weather conditions. The improvement in transportation, which was being shown in some of the coal producing districts was, of course, nullified by the cold wave. It is believed, however, that as soon as the weather moderates for any length of time the transportation tangle can be largely straightened out, and this will doubtless, at least in large measure, relieve the present stringency. The drastic rulings of the Fuel Administration concerning coalless days may also exert a more or less potent influence in this direction.

COAL PRODUCTION

The production of soft coal during New Year's week is estimated as 9,236,000 net tons, an increase over the week of Christmas of 322,415 tons, or 3.6 per cent. The average production per working day was 1,847,000 tons. If allowance be made for the holiday, the rate of production has thus returned almost to the level of early December, before the severe weather began to impede operations. The total production



of beehive coke during the week ended Jan. 5, is estimated as 515,000 tons, an average per working day of 103,000 tons. Preliminary estimates place the production of beehive coke in 1917 at 34,000,000 net tons, a decrease of 1,460,000 tons, or 4.1 per cent., when compared with the production for 1916. Shipments of anthracite reported by the nine carriers amounted to 27,517 cars, as compared with 36,083 cars during the week before Christmas. Losses in output due to observance of the holidays appear to have been larger in the anthracite industry than in either bituminous mining or coke manufacture.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

	Dec. 15	Dec. 22	Dec. 29	Jan. 5
Bituminous shipments, 114 roads..	149,122	177,599	158,596*	164,345†
Anthracite shipments, 9 roads...	31,672	36,083	29,476*	27,517†
Beehive coke shipments, 4 roads...	10,335	11,835	10,211*	10,572†

* Revised from last report. † Subject to revision.

Atlantic Seaboard

BOSTON

"Non-essential" industries shut down in large numbers. Shipments of bituminous diverted to hospitals, pumping stations, and to some extent for household use. Railroads and power companies on narrow margins of supply. Emergency deliveries in sight and probably not sufficient to keep war order plants running, except possibly those rated 100 per cent. No bunker coal in Boston and ship departures delayed. Schools still closed. Expected another week will disclose much additional suffering.

Bituminous — New England people are now fully alive to the coal famine. The fact that the fuel administration has been able to get emergency shipments has encouraged hundreds of steam-users to apply for the relief that on account of the extraordinary situation can be had only in sparing amounts. The prolonged cold spell beginning near the end of December almost completely tied up coastwise shipping and when to this is added the long delays in dumping coal at the piers and the extreme slowness with which all-rail shipments are coming through it can be seen how critical the situation is. There have been periods before when transportation has been delayed, but never has there been a time when in proportion there was so little fuel in reserve. Large mills that are accustomed to carry heavy stocks accumulated during the summer have been facing the winter with coal for only a few weeks, and now in many cases have had to shut down until coal can be had in sufficient volume to permit steady operation. The mill situation in Fall River is partcularly serious. The American Printing Co. plants and other large textiles have had to close, throwing out of employment several thousand hands.

The railroads, in particular, are running on much smaller reserves than in ordinary times would be considered safe, and already there have been several instances of seizure for locomotive supply. The power given state fuel administrators also to commandeer coal in transit adds another uncertainty to the consumer who is dependent upon coal en route to keep him in business. On Jan. 10, 120 cars of bituminous were seized by the New England Fuel Administrator for the relief of Boston and Lynn where retailers were without enough coal to heat the hospitals and pumping stations over Sunday, not to speak of heating apartment houses and public buildings. The schools in most of the cities have not yet reopened, nor are they likely to until coal arrives in far greater volume than at this writing.

Of the emergency cargoes started for New England but two have thus far reached destination, the "Achilles," 12,777 tons, and the "Newton" about 7400 tons. This coal was carefully apportioned by the fuel administration, almost every part of New England being represented in the consignments. Coal was sent from these ships far into Maine, New Hampshire and Vermont, for hospitals and for other imperative needs, as well as to Rhode Island for hospital use there. The "Achilles" was diverted from a Panama R.R. consignment, and the "Newton" brought some of the coal that was diverted from Western consignees at one of the congested railroad points. The latter ship was stuck in the ice in the Chesapeake 10 mi. or so south of Baltimore and delayed two or three days.

Six barges are en route for the fuel administration, but the aggregate tonnage is only 10,000 and movement is so slow their early arrival cannot be relied upon. There are steamers, however, that will be coming along and will help supply the more immediate requirements. The arrival of cargoes for account of the usual wholesale factors will help the most, however, and a week of good enough weather to permit the dispatch of such cargoes is sorely needed. It should be stated that more than 100 bottoms are still waiting at Hampton Roads for coal.

Anthracite—For 10 days practically the only supply of domestic sizes reaching this market have been in trains rushed from the mines to meet the emergency. At least one train-load has been diverted from Camp Devens, and direct from several of the operating companies have come solid trainloads for distribution from points like New Haven, Worcester, Providence, and Boston.

The hard coal famine is certainly acute and cannot possibly be met by such waterborne cargoes as are likely to be shipped. The New England Fuel Administration has at least one steamer, 3500 tons, which is due in Boston during the current week.

Regulations have been put forth limiting the hours during which business establishments, theaters, and other buildings may be open. Saloons are not to open until 9 A.M. and are to close at 10 P.M. and several other drastic rules have been made by the fuel authorities, all in the effort to promote economy in the use of coal.

NEW YORK

Demand for anthracite continues heavy with supplies scarce. Fuel authorities work hard to relieve situation. Appeals made for more coal and local coalmen appear before the Washington authorities. New England gets percentage of local receipts although situation there is not believed to be as desperate as local needs. Harbor crowded with ships.

Anthracite—That the district dependent upon this market for its supply of anthracite has not experienced the worst fuel famine in its history can be attributed entirely to weather conditions. These while not at all mild, were considerably better than they have been and permitted a reasonably good movement of coal. While those in charge have put forth their best efforts to secure sufficient coal for the daily requirements of the market and have partially succeeded, the supplies have been far short of the demand and the outlook is not at all promising notwithstanding the hopes held out.

Even though the reports issued by the various agencies show that there are many thousand tons of coal at the various loading terminals on the New Jersey side of the river and bay, they mean little to those dependent upon getting coal when it is impossible to move it across the water because of the heavy ice floes which have hindered shipping greatly the past week.

In their petition protesting against an order closing the theater and moving picture houses, the theatrical managers state that if the 118 foremost places are closed the saving in coal will amount to less than 163 tons of coal a day while the Government will lose about $11,800 in taxes for each day's closing.

The shortage of fuel has resulted in an almost general closing of schools in Brooklyn. Owing to a decided difference in the prices submitted by the Brooklyn and Manhattan retail dealers for furnishing and delivering coal for the schools in their respective boroughs, the Board of Education did not close contracts for the full requirements for the Brooklyn schools with the result that there are comparatively few of the schools in that borough now open.

Considerable coal has been lost as a result of the heavy ice breaking the barges and causing them to sink.

Existing conditions are driving the gas companies to their maximum capacity, the daily output showing an average daily increase in consumption of about 30,000,000 cu.ft. over normal conditions. The Astoria Coal and Coke Co., a subsidiary of the Consolidated Gas Co. has disposed of many thousand bushels of coke at its plants, each customer being limited to one bushel.

In the wholesale district there are no immediate prospects held out. Most of the

dealers are without supplies and some say they do not know when they will have any. Their offices are continually visited by retail dealers who want coal. All of the domestic sizes are scarce, pea being as hard to get as any other. The steam coals are tightening and the down town office buildings are saving heat wherever possible.

The retail situation is serious. Few if any of the dealers have coal in their yards, invariably delivering direct from the barges to the customers' bins or else taking a load to the yard and selling it direct to customers who carry it home in every sort of receptacle.

Current quotations, per gross tons, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buck	4.30@5.00	5.50@6.00
Rice	3.75@3.95	4.50@5.00
Barley	3.25@3.50	3.50@4.00
Boiler	3.50@3.75	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—A delegation from the Wholesale Coal Trade Association of New York journeyed to Washington the latter part of the week in an effort to obtain certain concessions for the trade. W. A. Marshall and C. C. Marshall, members of the delegation and directors of the association were witnesses before the Senate Committee investigating the coal situation after which the delegation were granted an audience by Fuel Administrator Garfield. On Tuesday of this week many members of the association with others who are not members went to Philadelphia to attend a meeting of the operators association at which vital matters affecting the trade, such as the installation of a zoning system and the distribution of central Pennsylvania coals were discussed.

The local situation continues serious. Supplies are short and while large quantities of coal are reported as arriving at this Tidewater much of it is used in supplying vessels with bunkering fuel. Frequently inability to secure fuel at this harbor has caused ships to go to the Southern ports, secure their fuel supply and then return here for their freight cargo. This has been the case within the past week. While reports show the arrival of large tonnages of bituminous coal at the loading terminals, the diversion of about one-fourth of the receipts to New England and the tonnage required for bunkers leaves comparatively little for local consumption.

Late Wednesday night the national fuel administration made public drastic regulations calling for five coalless days, Jan. 18-22, inclusive, and every Monday thereafter until Mar. 25. This regulatory measure, applies to all the country west of the Mississippi, and promptly met with a storm of protest. If this ruling is enforced, it may tend to clean up congestion on the railroads, but will cause the loss of immense sums in wages, etc.

Demand for bituminous has increased with the decreased anthracite supply and while the city ordinances forbid the use of bituminous except under restrictive conditions, the ordinances are being practically ignored during the present emergency the city using bituminous coal whenever anthracite is not available.

The local fuel administrators have let it be known that New York shall not be discriminated against in the placing of orders curtailing consumption of coal and that because New York supplies about 15,000 tons of coal a day to ships it is no reason why its industries shall be shut down while other Atlantic cities are excepted. It was the belief here that the New England situation was less desperate than New York's and that more coal should be diverted to this port to relieve local conditions.

PHILADELPHIA

Anthracite extremely short. Cold weather returns. Bituminous production critically short. Car supply again poor. Interesting contract situation.

Anthracite — After experiencing a comparatively mild spell of weather, zero conditions have once more returned and the wild scramble for coal is being repeated. As a consequence the city experienced another exciting coal week, but one would find it difficult, though, to judge actual conditions from the daily press. Early in the week the newspapers said there was so much coal en route to the city that all danger had passed. When the coal did not arrive there was another great scare, and reports of all kinds of altercations with the coal administration appeared.

There has been much discontent recently among the local operators because coal has been moved in immense quantities to New England, while Pennsylvania, with its extensive munition plants and other essential industries is in such dire need. They feel it is a rank injustice on the part of the national authorities directing that 500 cars a day be sent into the above territory. In addition it was reported that 750 cars had been seized in a single day west of Harrisburg and diverted to New England.

Probably the most striking incident of the week was the advance of 75c. a ton in the prices of the M. A. Hanna Co., successors to the Susquehanna Coal Co. Prior to Jan. 9 this company had been marketing its product at the company prices. This company is now classed as an individual shipper, and the officers claim it was an oversight that they had ever been listed otherwise by the Government. Customers were asked to signify their desire as to continuance of shipments under the new schedule. Of course, everybody asked that their orders should be kept intact regardless of price.

The steam coal trade has tightened up noticeably and among the individual shippers the prevailing price for buckwheat is $4.15, while $3.50 can be had for rice and barley, even. Culm has assumed greater activity than ever and while heretofore it has been necessary for the shippers of this material to conduct a campaign of education to induce manufacturers to use it, orders now frequently come unsolicited, with most sales still made around $1.25@1.50.

The prices per gross ton f.o.b. cars at mines for line shipments and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buck	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—The outlook for increased bituminous production is far from encouraging. It is true that early in the week the car supply was greatly improved and it began to look as though Government control was about to develop the promised relief, but the supply immediately fell off and is now almost as bad as ever. The central Pennsylvania mines report being closed in numerous instances 50 per cent. of the working time, while from the Fairmont district the report on one particular day, which is said to be a fair average for the week, was that 68 mines out of a total of 139 were shut down from the same cause. With the few cars that are being received the miners are loading them to their capacity and beyond.

The contract situation is an interesting one, since all agreements must now be approved by the Government and executed at the fixed price of $2.45 per net ton. There is a lack of willingness on the part of the operators to enter into new agreements, while consumers hesitate to have their contract scrutinized in this way for fear of losing their entire supply on account of being in a non-essential line. In the meanwhile most shippers have notified their customers they will use their best efforts to take care of them at the fixed price.

BALTIMORE

Fuel situation here continues desperate, with industries at times down to a few hours' supply. Hard coal practically out of the market in many sections.

Bituminous—When a big city sees its important industries and public service corporations at times with but a few hours' supply of fuel on hand, when it sees even its high pressure fire service several times without enough coal to keep running 12 hours, when apartment houses, homes and even big hospitals went without fuel for hours, the desperation of the fuel situation is forced home. With cold weather here in earnest the demand for fuel became the more insistent. Only the efforts of the local fuel administrator, who the week before had diverted 200 cars of soft coal from the pier accumulation to domestic needs here, saved the situation for a time, and again the past week 100 cars were diverted at Brunswick and distributed to urgent cases. One of the largest hospitals that had been without heat or light was taken care of therefrom, as was the fire service.

Anthracite — Hard coal shipments here are absolutely inadequate to meet even the urgent demands. The fuel administrator has advised domestic consumers to turn to soft coal for relief, but even that is hard to get. The administrator admits that there is little hope of hard coal relief in the near future.

The small supplies reaching here are being distributed grudgingly in half ton, or even bushel lots, to the most urgent cases. After the failure of hard coal supplies in many sections, soft coal depots were opened in a number of school yards where coal was sold at 18c. a bushel to prevent many poor families from actually freezing in their homes.

Lake Markets

PITTSBURGH

Improvement in transportation set back by blizzard. Mill supplies fair.

Coal operators continue to insist that the whole matter of coal supply resolves itself into a question of transportation. Conditions in this respect improved somewhat towards the close of last week, but the blizzard in the central West Saturday froze up the railroads badly, interrupting even passenger service, and while the weather has been moderating recently the net result is no improvement in the week. Such improvement as occurred last week was due to the railroads declaring general embargoes against the receipt of freight, a few commodities being excepted, including coal.

Local supplies are only fair, but the city is handicapped by the fact that normally it receives considerable coal by water, and the Monongahela River has been frozen over for about a fortnight. The Pennsylvania and Continental pipe works, which use river coal, are closed entirely, and some other mills have run short. In the Mahoning and Shenango valleys the mills have been getting slightly better coal supplies, and the bessemer department of the Republic Iron and Steel Co., which was idle for three weeks from lack of coal, has been in operation since Jan. 2.

Arrests continue of coal operators and dealers on charge of violating the rules under the Lever act, and there is no intimation as to how much farther the authorities intend to proceed. Most of those arrested are held for the March term of the United States Court at Erie.

Only occasional lots of free coal can be picked up in the market but it is believed that offerings will be decidedly heavier as soon as production increases, as a moderate volume of contract business ran out with the old year. The market remains quotable at $2.20 for slack, $2.45 for mine-run and $2.70 for screened, per net ton at mine. Pittsburgh district, with 15c. permitted to be added in the case of sales by jobbers.

BUFFALO

Situation steadily growing worse. Must come to a climax before the effects of the late storm are worked off. Bituminous scarcer than anthracite. Coal moves in preference to passenger trains.

Bituminous—The worst seems to be close at hand now. Nobody expects to be able to escape the consequences of the storm of the 13th, which hit Buffalo especially hard from the fact that this section was visited by an 84-mile gale, added to temperature below zero. It was the gale that did the mischief, tying up trains and other business as even deep snow would not. If the heavy snow fall promised had taken place the city would have collapsed. As it was the weather held back even the anthracite trains, so that about two days were lost, with every consumer burning all the coal he could get.

Coal shippers and large consumers are up in arms on account of the order from the fuel administration, diverting coal from such roads as the Buffalo, Rochester & Pittsburgh and the Buffalo & Susquehanna, naturally tributary to Buffalo and sending it to New England. A large delegation went to Washington to protest, but no great amount of satisfaction appears to have been obtained. Some of the complainants refused to say anything on their return.

There is intimation now that the fuel authorities will advance the bituminous prices soon, but till then the regulation prices remain as follows, per net ton f.o.b. Buffalo:

	Slack	Lump
Pittsburgh	$3.75	$4.25
Bessemer	3.80	4.20
Allegheny Valley	3.70	4.10

Anthracite—The great storm, though mostly snowless, has tied up the train and city service so that deliveries are again slow. But it is promised that the trains stalled on the way will be rushed in and the lead on consumption held. This city is so near the mines that delivery is a matter of but a day or two at the worst, unless unforeseen and unavoidable delays are suffered.

The complaint of no coal is now aggravated by the running short of natural gas, which always deserts the consumer when it is most wanted. This is now a matter of so small supply that all sorts of shifts have to be made to get on till moderate weather returns. And all this when we had every reason to expect a mild winter, since we had had two hard ones in succession. Candian retailers throng the city, but it is small comfort that can be afforded them.

TORONTO

Coal situation much improved by arrival of large shipments. Railway embargo raised. Dealers resume taking orders. City fuel depots discontinue business.

The coal famine which was severely felt during the bitterly cold weather of the first week of January was relieved by the arrival of large shipments of coal on the 5th and subsequent days followed by considerably milder weather. The raising of the embargo placed by the N. Y. Central on shipments of coal via the Michigan Central has resulted in partially overcoming the congestion at Black Rock. Dealers have resumed taking orders and are making deliveries in ton and half-ton lots. The city fuel depots are filling the orders booked but now that the emergency is over will take no more.

Quotations for best grades per short ton are as follows: Retail, anthracite egg, stove, nut and grate, $9.85; pea, $8.85; bituminous steam, $9; slack, $8 to $8.50; domestic lump, $10; cannel, $11. Wholesale f.o.b. cars at destination. Three-quarter lump, $7 to $7.50; slack, $6.85 to $7.

DETROIT

Temperature 16 deg. below zero early in the week increases hardship of domestic consumers without coal. Citizens urge state and local fuel administrators to take more decisive action.

Bituminous—Further serious complications have been injected into the local coal situation by a blizzard with a 60-mile gale and temperatures dropping as low as 16 deg. below zero. Heavy snowfall, heaped into heavy drifts Saturday and Sunday, completely disorganized transportation schedules, causing serious curtailment of receipts of coal from all districts. With a large proportion of the domestic consumers being carried along on temporary and small allotments and no reserves at hand from which to draw, while the severity of the weather necessitated increased consumption, the effect of the storm was to aggravate severely the troubles of those without coal supply.

Owing to the extremely cold weather drivers for retail coal yards practically discontinued deliveries Saturday and Sunday. More than 600 applications for fuel were received Saturday by the police department which is handling distribution for the local coal administrator. With some 1600 applications previously booked and several hundred added Sunday, the storm left the department a stupendous volume of applications and but little coal, with which to supply them.

For several days preceding the storm, inbound shipments of bituminous coal maintained a volume of about 700 cars a day, but the absence of the usual reserves transformed these shipments into merely a day-to-day supply.

Anthracite—Very limited quantities of anthracite were finding their way into the city before the blizzard, but the supply, which was then inadequate, has been largely interrupted as the result of subsequent transportation troubles. Many domestic consumers, whose heating plants are constructed for use of anthracite have been unable to obtain hard coal and have been attempting to substitute bituminous, with only partial success.

Hopes are still centered on action by the Federal fuel administrator and the director general of railroads, which it is believed is the only thing that will alleviate present suffering and prevent even greater hardships in the near future. Many industrial plants are facing the probable necessity of having to suspend work within the next few days.

COLUMBUS

The continued cold weather has caused a rush of orders for both domestic and steam grades. The situation in Ohio is improving slowly, contingent upon milder weather soon. Little actual suffering reported.

Zero temperatures, coupled with strong winds, have been playing an important part in the coal trade in Ohio during the past week. Demand from domestic users is strong and urgent calls are received by the Ohio Fuel Administration from every part of the state. Available supplies are apparently sufficient for the present but with cold weather continuing with accompanying bad effect on railroad transportation, it is doubtful if the situation can be maintained as at present.

Retail stocks are small, but valiant work by county committees and railroad traffic managers has kept the supply equal to the necessary demand. Dealers are still following the policy of only delivering a small load to each consumer. The icy condition of the streets has hampered deliveries and many consumers are hauling their own supply, which can be secured at almost all yards. Schools and hospitals are now pretty well supplied with a small stock, but none have been able to accumulate fuel. Few cases of actual suffering have been reported, but that condition is not far off if the present low temperatures continue. One of the best features is the fact that the natural gas pressure has been fairly good in all places where it is generally used as domestic fuel.

The steam business is as strenuous as the domestic trade. Many steam plants have been compelled to curtail operations because of lack of fuel. This is especially true of factories engaged in manufacturing what is styled non-essentials. Few steam plants have been able to accumulate a surplus of fuel.

The transportation on certain roads has been improved. This is especially true of the Hocking Valley, which has been giving a good car supply. Other roads such as the T. & O. C. and the K. & M. are not well equipped with cars and mines on those lines are curtailed in their production. In eastern Ohio the output has been estimated at 65 per cent. Massillon and Cambridge produced about the same amount. In other districts the output is estimated at 75 to 80 per cent. of normal.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.70	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

The coldest weather of the winter, with a heavy snowfall, has increased distress and emphasized the continued coal shortage and the transportation tangle. Relief is sporadic and inadequate.

The vigorous but relatively unsuccessful efforts of state, Federal and local authorities, coal operators and distributors and the railroads, all working together, to relieve the dangerous coal shortage existing here and all through Ohio, were virtually brought to naught by a blizzard on Friday night and Saturday, accompanied by a sudden drop of 40 deg. or more in temperature, from around 30 deg. above to 10 below zero. Some points in this vicinity reported unofficially that temperatures as low as 24 deg. below had been experienced.

The weather was much the most severe of the winter, although the storm was in general a striking parallel to that of a month ago. The same general results followed in the shape of increasing difficulty of moving trains carrying coal, as well as other commodities, in the face of an enormous increase in demand for fuel, as the case always is when sudden severe cold occurs. This time, however, the bad weather of the entire month of December and of early January had exhausted all available supplies of coal, and there had in the interim been no opportunity to accumulate reserves, served to make the situation even more distressing than formerly.

Every effort is being made to take care of the public so as to prevent suffering, but the simple fact is that there is not enough coal to go around, even with many factories and other large consumers shut down.

BIRMINGHAM

Low temperatures intensify shortage and at same time cripple production. Field representative appointed by fuel administration to handle district distribution.

On account of the lowest temperatures for many years, prevailing throughout the South for several days the past week, zero weather being recorded in Birmingham and vicinity, the domestic coal situation again became grave and resulted in much suffering. Locally, practically every dealer received increased shipments over previous weeks, but on account of the frozen and slippery condition of thoroughfares deliveries were greatly handicapped and in many cases it was impossible for householders to secure drays or any other conveyance by which they could get the coal from the yards to their homes.

Cities and towns throughout the state reported empty yards, but through the efforts of the state fuel administrator and Governor Henderson temporary supplies were arranged for all sections where suffering was reported, and while the shortage was more keenly felt than at any previous time this winter, less difficulty was experienced in diverting coal to points where the shortage was critical, than heretofore. Coal was reported seized in the railroad yards at Huntsville, and this method of relief was doubtless adopted in other localities.

Industrial plants and public utilities continue to operate on low margins of supply of steam coal. Public schools in a number of cities and towns have temporarily suspended in order to conserve the fuel supply. The steam situation is just as bad or worse than the domestic, but of course the human element in the latter causes it to take precedence when weather conditions are severe.

The appointment of E. A. Holmes, a local coal salesman, to direct the distribution of the district fuel supply has met with the hearty approbation of coal men and is considered the most-important and far-reaching step yet taken by the fuel administration in systematizing the distribution of coal and the allotment of priority orders, which will be in the hands of one thoroughly familiar with conditions at the mines throughout the district, who can place such business with producers who can handle it with the least delay and confusion.

Operations were handicapped probably 50 per cent. by the cold weather Saturday and not more than half crews reported at the mines which attempted to operate. Some were idle throughout the day. Various interruptions were caused by weather conditions, power lines being down, pipe lines frozen up and cars difficult to move under chutes for loading. The output, for the above reasons, was seriously curtailed.

Coke

CONNELLSVILLE

Traffic conditions worse on account of blizzard. Executive committee appointed. Transportation the desideratum.

Car supplies to coke works improved somewhat towards the close of last week, but thus far this week have been very poor, reflecting the influence of the blizzard Saturday. Production is expected to be light all week.

Blast furnaces have had slightly heavier receipts of coke in the past few days, evidently a result of the drastic action taken by practically all the railroads involved in the coke trade, in placing embargoes on the receipt of nearly all freight, coke being one of the exceptions. The object is to clear up the congestion on the theory that if a good start can be made a more regular movement is assured.

The committee of seven appointed at the meeting at Uniontown Jan. 3 between Warren S. Blauvelt, national coke administrator, and the Connellsville coke producers, has appointed three members as an executive committee, to act directly with the Fuel Administration, this committee being: Charles Lenhart, vice president of the Producers' Coke Co.; John Jamison, of the Jamison Coal and Coke Co., and R. M. Fry of the Orient Coke Co. This committee is now trying to formulate a plan of action.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 5 at 216,098 tons, a decrease of 35,300 tons, and shipments at 215,665 tons, a decrease of 39,414 tons.

Buffalo—The local coke consumers have found it hard to get a full supply, but they had good contracts and have depended on them. How long the supply will keep up is unknown, but shippers say that the end of February ought to see the situation easier. The severe winter has tied up railroads everywhere and so far Government management and the taking off of passenger trains has not had any visible effect, especially as any improvement would be counteracted by the weather and the congestion of all trains.

Middle Western

GENERAL REVIEW

Mines and railroad traffic, passenger as well as freight tied up, because of severe storm.

The most severe storm that has been known for years, struck the Middle West-

ern section Friday morning, and raged in all furiousness for 48 hours. Railroad traffic is at this writing at a standstill, and coal mines idle. Hundreds of trains are tied up, unable to move because of the need of motive power. Passenger-train schedules were abandoned, with little prospect of regular resumption for several hours. No attempt was made by coal operators to run their mines Saturday, and they were content to keep their steam pipes in a condition so as not to freeze.

The storm coming from a southwestern direction—which is unusual—caused the thermometer to drop from 25 above to 10 and 15 below in less than 24 hours. The extent and severity of the suffering will not be known for some time. With snow and zero weather all over the Mid-Western section accompanied by a wind that has the velocity of a gale, with telephone and telegraph service paralyzed, it is difficult, in fact impossible, to get the details, such as are needed to make a correct and intelligent report of the exact situation throughout the territory. However enough data have been gathered to warrant the conclusion that the present storm has not had its equal for years. The railroads had just about resumed normal traffic conditions—after several days' battling with the heaviest snow for 15 years—and the present snowfall will tie up coal mines, no doubt for several days.

Dealers that are fortunate enough to have coal on hand cannot make deliveries, because no men are reporting for work, and coal in terminal yards will be worthless to the trade until the railroads can recover to the extent of making deliveries. The first four days of the past week found the railroads with a better car supply than for several weeks past and production was increasing nicely. Had the climatic conditions remained favorable, the past week production would have exceeded any previous week for several months, but with Friday and Saturdy production considered, the total for the week will be limited.

CHICAGO

Blockaded railroad yards and heavy snow wipe out storage stocks. Weather conditions prevent deliveries.

Chicago was visited early in the week with a snow that drifted in many places to a depth of 5 ft. This blockaded terminal yards, and prevented deliveries to dealers until late in the week. With little coal available to the dealers the stock that he had accumulated during the previous week was used. The action of the fuel administration, in taking from several steam plants their storage stock for use by the dealers in emergencies, was unquestionably a wise move, and had the effect of preventing wide suffering. There is now in the various yards of the railroads several hundred cars of coal that is availble for the relief of Chicago, and needs only to be moved to dealers.' yards.

Saturday Chicago was in the grip of the severest blizzard that had struck this section for several years. Railroads were paralyzed, and wagon and auto traffic was an impossibility.

Very few cars of Eastern coal have reached this market during the past week, although City Fuel Administrator Durham has been promised a share from this date forward. So far this promise has not been cashed with results, but dealers hope that by the end of the coming week they will be getting more Eastern bituminous as well as hard coal.

Quotations in the Chicago market are as below, per net ton f.o.b. cars at mines:

MILWAUKEE

Coal and coke advanced 10c. to meet back war taxes on freight. Deliveries confined to 1-ton orders. Wisconsin coal must be released to the Northwest.

Milwaukee coal dealers have received directions to advance anthracite coal and coke 10c. to meet the war tax on freight covering all coal shipped since Nov. 1. Anthracite egg is now $9.20; stove, $9.45; nut, $9.55; and buckwheat $7.65. Coke is now $10 for range and $8 for egg and nut. A carrying-in charge of 50c. per ton is added by dealers.

Deliveries are now restricted to 1-ton lots and are then only made after satisfactory answers to a questionnaire as to amount on hand. Retail trade is practically at a standstill owing to inability to deliver because of blockaded streets following extreme blizzards. Only urgent cases are supplied.

Contrary to previous announcements, coal on Wisconsin docks may be shipped into other states. Fuel Administrator Garfield insists upon the enforcement of his order pooling the coal supplies of Wisconsin, Minnesota and the two Dakotas for distribution under the direction of District Distributor W. A. Grovermann of Minneapolis. The coal is to be distributed in 90 days at the rate of one-ninetieth per day. Gov. E. L. Philipp and State Fuel Administrator Fitzgerald made strong efforts to have the edict overruled, but without success.

ST. LOUIS

The coldest weather in 30 years prevailing, St. Louis came through with coal enough to take care of normal requirements. No outside coal coming in, railroads all tied up and mines idle. Steam plants somewhat short, but no actual suffering.

The past week was a disappointment in many ways, due almost entirely to the transportation problem. Some mines on the Illinois Central worked one day out of six. The L. & N. was almost as bad, and the other roads fell below their previous records.

The latter part of the week, on account of the storm, the situation in the Carterville field became critical and on Thursday a few mines worked, but on Friday and Saturday everything was idle. The snow not only kept the railroads from moving equipment but prevented miners from going to the mines, as electric lines were blocked and trains running five to ten hours late.

The greater part of the tonnage from the Standard field is going for railroad coal. There have been some minor troubles in the field during the past week and this has retarded tonnage, but not seriously.

The last two days of the week the entire field was practically tied up on account of the storm and it is doubtful whether the present week will see the improvement that it should.

The situation, however, as far as St. Louis is concerned, will be all right if all the mines get to working during the present week and the railroads take care of the coal offered. St. Louis weathered the storm all last week in fine shape, with a fairly good supply on hand and with a distribution proposition that was satisfactory to everybody.

There is no coal coming in from the East of any kind and nothing from Arkansas. If the river stays frozen, transportation will become congested over the bridges. The city is laying tracks for connecting the different roads on the east side and the west side so as to utilize the St. Louis free municipal bridge and thus eliminate the bridge arbitrary of 20c. a ton. Mayor Kiel and party returned from Washington with the assurance that the Government would put this into effect just as soon as connections were made. The Terminal Association backed by its supporters in E. St. Louis, are objecting to the use of the St. Louis free bridge for the haulage of coal into St. Louis. This in no way affects the City of E. St. Louis, only that it puts both cities on the same rates, whereas E. St. Louis now enjoys a 20c. cheaper rate.

Householders in St. Louis are in fairly good shape, excepting in the poorer sections, and municipal coal yards are doing reasonably good work and have a fairly good supply on hand.

Steam plants are not so well fixed, but will likely be able to manage to get through.

The Laclede Gas Co. found itself short of fuel and advised conservation of its supply. The St. Louis Fuel Committee ordered the Anheauser-Busch Brewing Co. to sell the gas company about 4000 tons of the Pittsburgh coal it has had in storage for 14 years. More will likely be taken if needed.

The prevailing market price per net ton f.o.b. mines is:

	Williamson and Franklin Co.	Mt. Olive and Staunton	Standard
Prepared sizes, lump egg, Nos. 1, 2, 3 and 4 nut washed and unwashed.	$2.65@2.80	$2.65@2.80	$2.65@2.80
Mine-run....	2.40@2.55	2.40@2.55	2.40@2.55
Screenings and No. 5 nut washed and unwashed....	2.15@2.30	2.15@2.30	2.15@2.30

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

KANSAS CITY

On Jan. 7 the visible supply of coal on hand with the Kansas City dealers was 15,222 tons, and the orders on hand were 10,728 tons, a better condition than has existed during any cold wave this winter. The supply of bituminous coal, however, is very light and users of the cheaper grades of fuel are having a hard time to keep supplied. Numerous Kansas towns are calling for coal from the operators' committee, which is notified daily by the state fuel administrator and which takes care of the shipping to these towns.

MISSOULA, MONT.

Coal prices under Government control show final reduction of from 25 to 30 cents a ton over prices of 1916.

The final setting of retail prices throughout the state shows that a reduction of from 25 to 30 cents a ton over coal prices of 1916 has been made by the fuel commission. The highest reduction has been made at Missoula, where the following schedule obtains: Owl Creek, $9.20; Bear Creek, $8.68; Diamondville, $9.87; Roundup, $8.47; Carney, $9.09; Kooi, $8.64; Acme, $9.19. These prices are for lump, mine run prices for Montana coal are 90 cents a ton less while slack prices are $2.10 less. Dealers are allowed a margin of $1.90 over the mine price of Wyoming coal plus freight and tax. As delivery charges are figured at about 90 cents a ton, the gross profit to the dealer is about $1.00.

LEWISTON, IDAHO

Idaho consumers fear shortage if embargo is declared against Wyoming and Utah coals. Washington mines do not nearly supply demand. Retail prices are set.

The threatened embargo of coal shipments to this state from Utah and Wyoming is causing no little concern in the Northwest consumers, dealers and operators uniting in the opinion that a shortage will result as Washington and Montana mines cannot nearly supply the needs. If Washington could supply the needs of the state consumers would welcome the embargo, as the prices set by the fuel administrator for Washington coal is considerably lower than the prices for Utah and Wyoming coal.

A new scale of retail prices has become effective in this city, which is a fair example of the prevailing retail prices throughout the state. These are as follows: Rock Springs, lump, $9.97; mine run, $8.97; slack, $7.21; Utah lump and egg, $9.73; mine run, $9.48; slack, $8.72; Owl Creek lump and egg, $10.07; Bear Creek lump and egg, $9.81; slack, $7.71; Chestnut lump and egg, $9.71; Acme, Carney, Monarch lump and egg, $8.72; mine run, $8.72; Black Diamond, Renton, lump and egg, $10.46; pea, $8.95. Roslyn and Cle Elum grade, lump and egg, $8.03; mine run, $7.77; Newcastle nut, $10.19; Roundup lump and egg, $9.71; Big Horn lump and nut, $9.82.

SAN FRANCISCO, CAL.

Reduction of 50 cents a ton on Utah coal has been ordered by Albert E. Schwabacher, fuel administrator for California in San Francisco. Maximum prices have been fixed as follows: Bituminous-Utah, $14; Wyoming, $14.50; Wellington, $15; Colorado, $16.20. Anthracite-Colorado, $19; New Mexico, $22; Pennsylvania, $24. Screening, all grades, $10.

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam and domestic lump, egg, nut, stove, chestnut and pea.....	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Washed egg, stove and nut.....	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00
Washed slack.....	2.15@2.30	.....	.....	.....	2.15@2.30	2.85@3.00

	Smokeless					
	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West. Va. Splint
Dom. and steam lump, egg and nut	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Mine-run...	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings..	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

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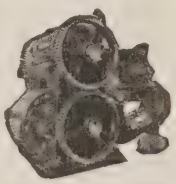
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COAL AGE

Volume 13 NEW YORK, JANUARY 26, 1918 No. 4

An Interview with the Fuel Administrator

By Floyd W. Parsons

"I have a boy in France and another here in the army. Thousands of other parents are in the same situation. If we, as a people, are not big enough to do this most necessary thing, then indeed we are a sorry lot," said Dr. Garfield, in referring to his now famous closing-down order.

I SPENT more than an hour with the Fuel Administrator Monday, discussing the necessity of closing down the Nation's industries in order to relieve the present critical fuel situation. I went to Washington in the full belief that other remedies might have been applied. I had plenty of what I thought was constructive criticism. I must confess that I left Doctor Garfield believing that he took the only wise course possible. Here are a few high spots of his conversation.

"I do not believe in the idea of shutting down non-essential industries. You cannot shut down many so-called unessential businesses without drawing the life-blood of some most essential industry. The exemptions that followed my original order were not an afterthought; they were planned days ahead, and each and every company exempted was listed at the suggestion of the Secretary of War and the Secretary of the Navy.

"The idea that the order issued was designed solely for fuel conservation is incorrect. Directly and indirectly we will conserve coal, but the main purpose of the ruling is to break up the congestion of freight and permit transportation to again assume a normal condition. Approximately 50 per cent. of the cars blocking the railways are loaded with coal. It is absolutely necessary to get this traffic out of the way before even such vital things as food can be moved to the markets.

"Why did we shut down mills and factories operated by water power? Because we do not want more manufactured products to pile up and create an even worse congestion of freight immediately after this five-day suspension ends. Our munition plants in many cases have already produced more war material than our transportation facilities can handle.

"I had no thought of the psychological effect of the order, although I agree it carries such possibilities. Nor did I consider the dollar-and-cents effect of the industrial shutdown on the Nation. It simply had to be—there was no other way. The necessity for such an order has accumulated since Nov. 26, when I failed to get through a priority ruling for the shipment of coal. I told the President: 'Your automobile has the right of way in Washington streets, but if a couple of 'Fords' block the way, you can't get past. Coal is blocking the way. It must be moved.'

"You ask why couldn't industry continue at its normal pace and double energy be put into our transportation effort? The reason is that there is an insufficient number of locomotives to greatly increase the tonnage now moving. If all the loaded cars at every terminal could be unloaded today, it would take time for our available motive power to get these cars back to the mines and the mills.

"In 1913 American railroads ordered 3467 locomotives; in 1916 they ordered 2910, and in 1917, 2704. At least 5000 new locomotives are needed each year by the railroads of the United States. In 1916 foreign orders for locomotives totaled 2983; in 1917 our Allies ordered 4938 railroad engines, of which 2057 were for the United States operations in France. Deliveries of locomotives have been in about the same proportion. United States railroads received 5332 locomotives in 1913; 1251 in 1915; 2708 in 1916; and 2585 in 1917. Deliveries to foreign countries in 1917 were 2861. Locomotives built for Russia and France cannot be used generally in the United States, due to the different gage and height of the Russian locomotives, and to the increased height of the French locomotives. These facts give a fairly clear idea of where the trouble lies.

"It wasn't possible to give the country previous notice of the closing-down order, for the reason that the railroads would have been flooded with freight, and the remedial effect of the order thereby nullified. If the industries had been allowed to go on manufacturing and piling up supplies, the railroads would have been swamped with freight immediately on the resumption of normal railroad operations."

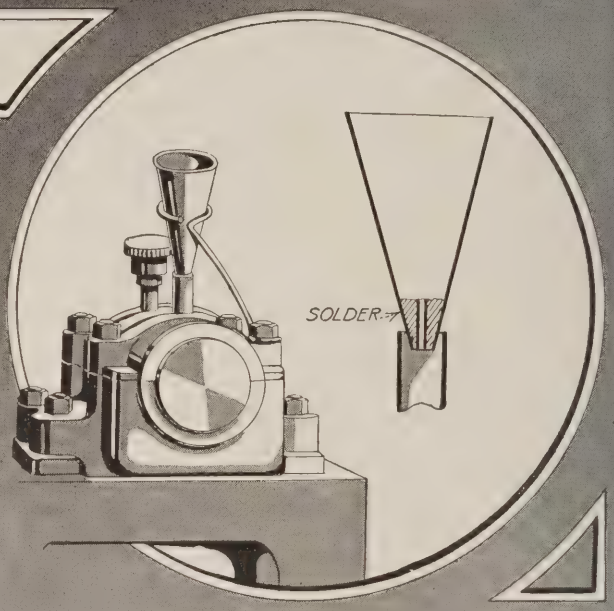
The foregoing statements explain the principal reasons responsible for Doctor Garfield's order. But I gathered many other thoughts that were evidently running through his mind. Among them are municipal storage yards, Government control of important coal-loading piers, the more effective use of our water-ways; which is in line with the action just taken by Railroad Director McAdoo on an appropriation for river transportation. I expect Doctor Garfield to put into effect very soon the long-talked-of zone system for coal shipments and other plans that will largely eliminate cross-hauling.

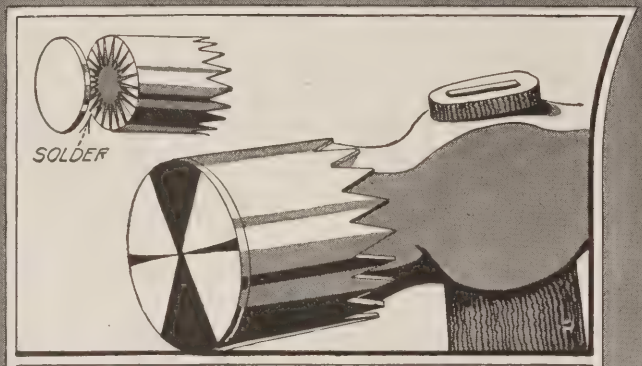
We may expect that the present closing-down order is but the first of perhaps several such rulings. It would surprise me if the next order of this kind did not include the entire discontinuance of all passenger trains for a specified period of time. The Germans shut down all general passenger traffic for days when immense troop movements are under way.

IDEAS AND SUGGESTIONS

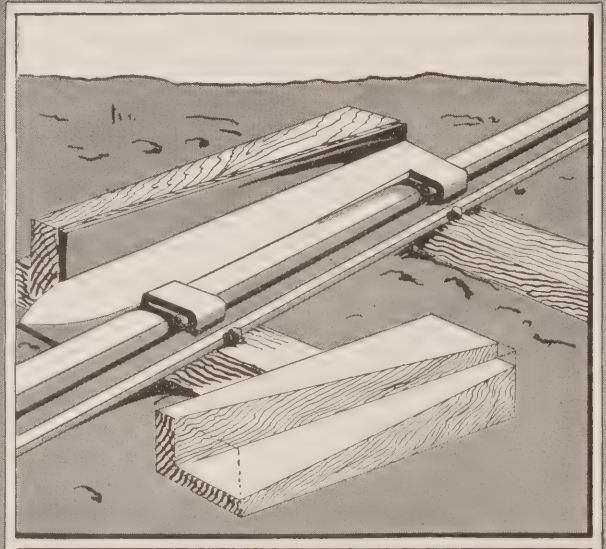


A HOT BEARING QUICKLY CURED

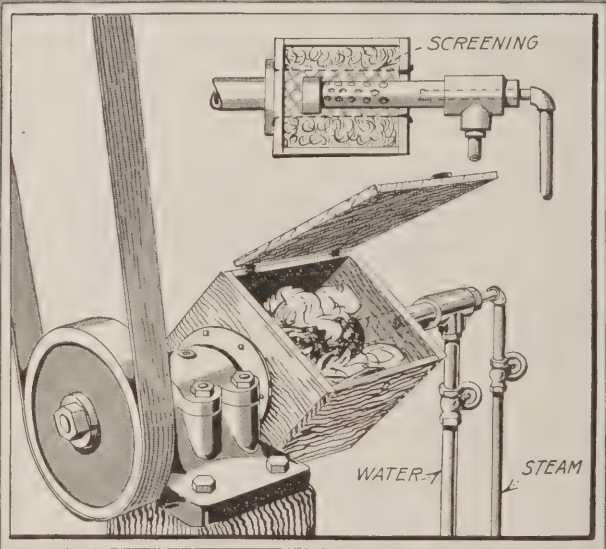




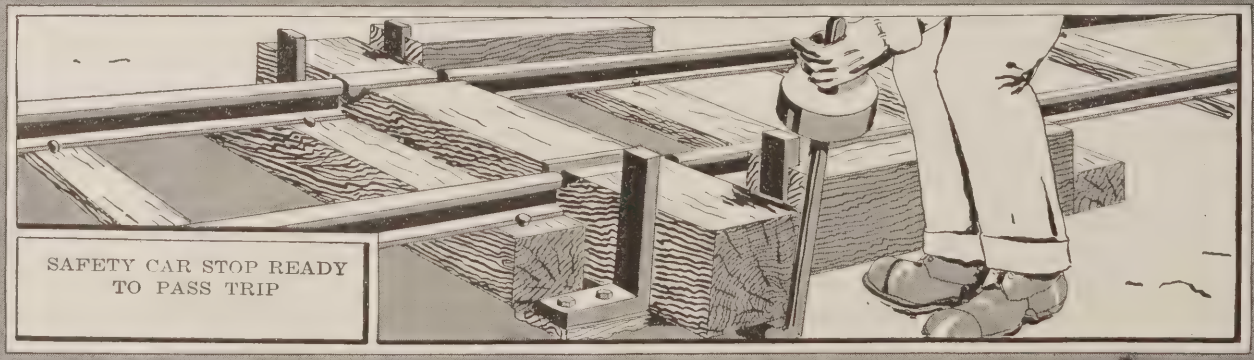
IMPROVISE A SOFT-HEAD HAMMER BY SLIPPING ON COPPER TUBE



WOODEN BLOCK AND A BOILER PLATE FORM A CHEAP RERAILER

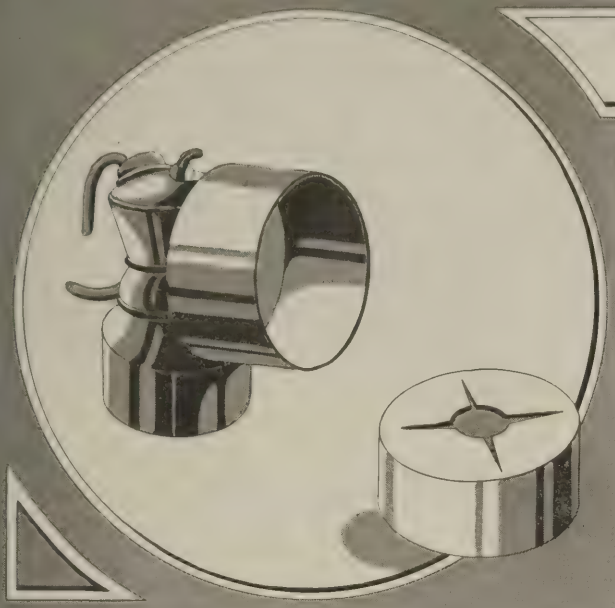


ODDS AND ENDS WERE UTILIZED TO BUILD THIS WASTE CLEANER



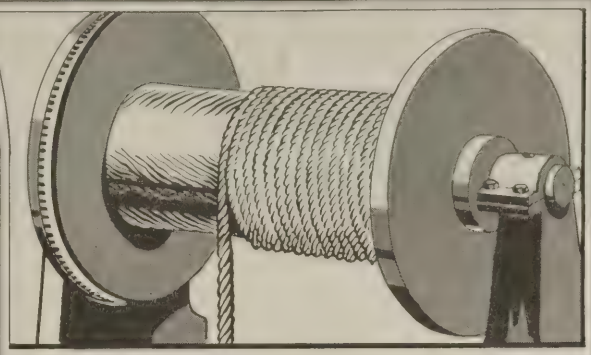
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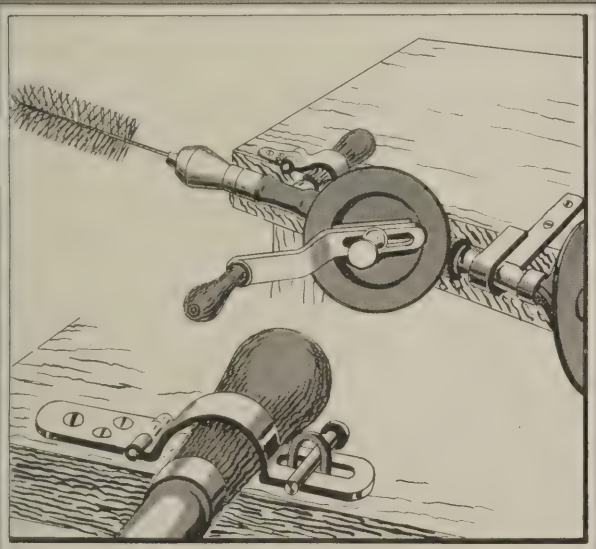


THIS CAN MAKES A PRACTICAL WIND-SHIELD





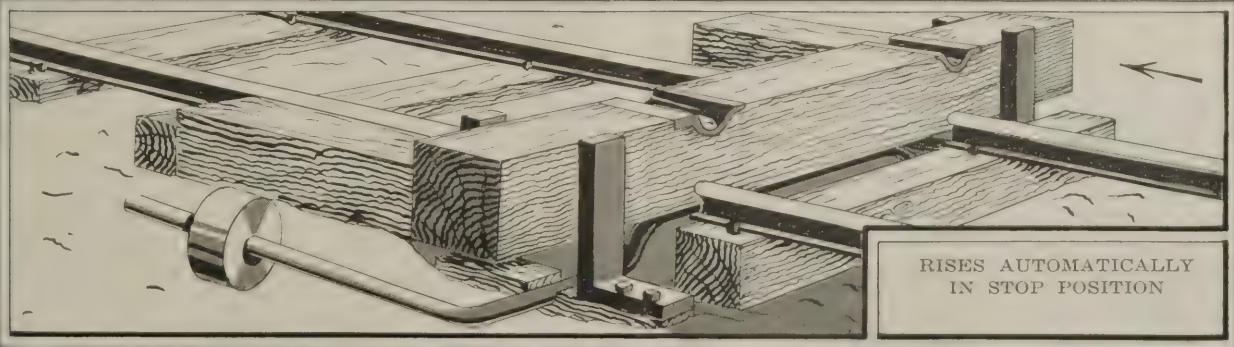
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TWO-ROOM TEN-APARTMENT TERRACES FOR SINGLE MEN IN PROCESS OF CONSTRUCTION AT SUNNYSIDE FOR THE UTAH FUEL COMPANY

Coal Mining in Utah During 1917

By A. C. WATTS
Chief Engineer, Utah Fuel Co., Salt Lake City, Utah

THE year 1917 has been in some respects, due to causes which must be ascribed almost as much to natural as to human agencies, the most eventful year in the history of coal mining in Utah.

This industry in Utah had been showing the effect of the European War before the advent of 1917. It was mainly affected by the ever-increasing difficulty in obtaining a sufficient supply of railroad cars to keep the mines working, but the demand for Utah coal was increasing all the time. The California production of oil was not increasing, and the demand for oil for war uses, together with the raise in its price, had made it necessary to curtail its use for domestic as well as manufacturing, mining, metallurgical and railroad purposes. In addition to this, the coal imports from Japan and China as ballast, and from Australia, British Columbia and the Atlantic seaboard had entirely stopped. The coal output of Washington was entirely inadequate to meet the demands of the Pacific Coast and the country to the east. The Union Pacific Coal Co. in Wyoming withdrew from domestic trade entirely, and the shipments from southern Colorado and New Mexico could not be increased to an extent that would be noticeable.



EIGHT-ROOM MINER'S HOUSE AT CASTLE GATE

Naturally the vast area to the west of us looked to Utah for help. Starting in November of 1916, and lasting until well along in March of 1917, Utah and Wyoming experienced one of the most severe winters in their histories. Not only was the cold unusual, but the low temperatures were sustained without noticeable interruption for comparatively long periods of time. What, however, proved to be the most trying conditions to combat were the most unusual snow falls and the high and sustained wind storms. Utah received most of the snow and Wyoming most of the wind. In Salt Lake City the seasonal snow fall amounted to about 100 in., whereas in Wyoming the terrific winds so drifted the snow and sand as to practically tie up the Union Pacific system for three or more weeks, and it was only by unceasing efforts that the Denver & Rio Grande kept its lines open. In the spring the flood waters in some streams to the north and west were so high that some branch railroads were tied up for considerable periods. At one time there were 600 or more cars of coke tied up en route to smelters to the north, while hundreds of cars of coal were delayed for the same reasons.

With the return of warm weather, the transportation facilities of the Denver & Rio Grande, the main outlet for Utah coal fields, were becoming gradually better, when the road suffered one of the worst calamities in the history of Western railroads. This was caused by the breaking of a storage reservoir in the mountains some 20 miles off the main line. About 13,000 acre-feet of water were released down the narrow canyon of Price River, washing out miles of double track main line, and almost completely destroying six miles of the branch line, running from Colton to the Utah Fuel Co.'s mines in the Pleasant Valley District. Had it not been that Pleasant Valley acted as a storage reservoir which first caught the flood waters and then gradually (comparatively speaking) discharged them,

practically all the main line from Colton to Helper would have been washed out, together with the mining towns of Cameron, Castle Gate and Carbon, and the railroad division point Helper. As it was, it took tremendous efforts to save property at Castle Gate, where the destruction in towns was greatest.

Rebuilding commenced at once, the railroad summoning all its resources and being generously aided by other companies, the coal mines supplying hundreds of men, and what suitable equipment they had. Traffic on the main line was resumed in ten days, but the period of commercial idleness for the mines on the main line lasted from June 25 to July 11, and normal traffic was not possible for about six weeks. The Pleasant Valley branch through the canyon was almost entirely rebuilt by coal miners under supervision of their foremen, superintendents and railroad officials, and was out of commission until Aug. 29—over two months. It might be said in passing, that some very efficient track gangs were developed from among the miners by this experience.

During the course of the summer, the transportation trouble was aggravated by a strike of blacksmiths on the Denver & Rio Grande, and by the extreme difficulty in obtaining sufficient section men and other classes of workers.

The people of Utah and neighboring states to the west and north, with the remembrance of the cold weather of the past winter and the difficulty in obtaining enough coal to keep warm still fresh in their minds, and with the warnings of coal dealers to "stock up," and their "I-told-you-so" ever ringing in their ears, commenced early in the summer to store, but were interrupted by the flood. Naturally, after the flood, the demand increased and has but just been satisfied. Coal dealers have forgotten what it looks like to have coal piled up in their yards. The agitation by calamity howlers and irresponsible newspapers stirred up much unjustifiable apprehension. A census about two months ago of the supply of coal in private bins of Salt Lake City showed an unusual amount in storage, although there was none in dealers' yards.

To aid the coal situation the fall and winter thus far in the region west of the Main Range has been for the most part unusually mild. With very little snow and with uninterrupted deliveries and mild weather, the panicky condition of the consuming public has entirely disappeared; in fact the fuel administrator for the state is now urging people to buy coal and thus prepare for the bad weather that is sure to come.

New Engineering Developments

One of the most important changes in an engineering operating sense has been the use of hydro-electric power in place of power generated by independent steam plants at the mines.

The Utah Power and Light Co. built a line into Carbon County and is now serving nine companies, operating 13 mines. The power company has 30 hydro-electric plants feeding into its transmission system, which runs from Grace, Idaho, to Santaquin, Utah, with its largest plants in southern Idaho. The line running into Carbon County has a capacity of from 4000 to 5000 kw., and is at present operated at 44,000 volts, although it is constructed so as to be capable of furnishing power at 130,000 volts should the load increase so as to demand it.

The contract demands of the mines served calls for 4210 hp. The installed horsepower at these mines is, of course, greatly in excess of contracted power. The estimated total yearly consumption of power at these properties is 8,928,000 kw.-hr. Assuming the consumption of coal in small steam plants to be 12 lb. per kilowatt-hour, the purchased hydro-electric power re-



FLOOD SCENE AT THE TIPPLE OF THE UTAH FUEL CO., CASTLE GATE



HOW THE LOWER YARDS LOOKED AT CASTLE GATE DURING THE FLOOD

leases approximately 53,500 tons of coal per year for market purposes. The coal formerly used under boilers was mostly dust and slack, and the value of the above-estimated saving at prices fixed by the Government Nov. 1, 1917—namely, $2.80 per ton—is $149,500.

Four of the mines being served are just entering the producer class, but by the end of 1918 they should be contributing materially to the total output of the state. The mines using hydro-electric power have produced during the past year approximately 50 per cent. of the total output of the state, or about 2,000,000 tons.

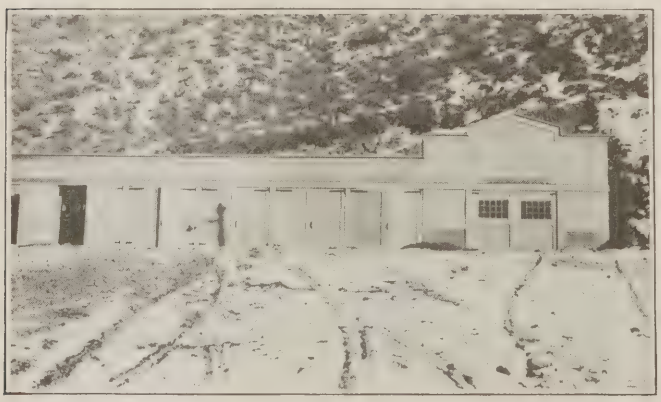
The power company is now furnishing approximately 100,000 hp. for various power purposes, which the company estimates is between two-thirds and three-fourths of all the power used in Utah.

Of equal, if not greater, interest has been the independent operation of the Utah Coal Ry., known as the Utah Coal Route, which began Dec. 1, 1917. This road joins the main line of the Denver & Rio Grande Ry., at Utah Junction, about a mile and a half below Castle Gate, and has terminal yards at Provo, between the Denver & Rio Grande, and the Los Angeles and Salt Lake Road.

It commenced operations with six heavy engines of the Santa Fé type, and four old engines of the old Castle Valley Ry., and 2000 coal cars of 50 tons capacity each. The company expects three Mallet-type engines to arrive shortly.

The mines situated directly on this road are Mohrland, Black Hawk, Hiawatha, Wattis, Panther, Castle Gate and Cameron. The total tonnage hauled by the road during its first month of operation is about 110,000 tons. The operation of this road permitted an increase of about 50 per cent. in shipment from the mines it serves, and naturally helped the mines off its line because of supplying its own cars to the mines on it.

Among other engineering features has been the change of the Spring Canyon Coal Co. from the aërial tramway to the inclined engine plane hoisting method of bringing coal from its mine to the tipple.



GARAGE AND REPAIR SHOP FOR EMPLOYEES; UTAH FUEL CO., SUNNYSIDE

New Mines Have Been Opened

Three new coal mining companies have started operations. The Peerless Coal Co., opening a mine in Spring Canyon, near Storrs; the Liberty Fuel Co., in Spring Canyon, above Standardville, and the Wattis Coal Co., with operations on the new Utah Coal Road near Hiawatha. In addition to these, the Independent Coal and Coke Co. is opening a new mine adjacent to its main operations. The output from these mines is at present small, but by fall of 1918 should be about 3000 tons per day.

In Summit County the Weber Coal Co. has reopened the Wasatch mine and is hauling about 140 tons per day by wagon to the railroad. It is rebuilding 2½ miles of railroad to its mine and will be able to ship about

300 tons per day when it is completed. Hydro-electric power is used for pumping and steam power for other purposes. The Summit Fuel Co. is now shipping about a car a day. The Grass Creek Fuel Co., using hydro-electric power, is shipping about 150 tons a day, which will be increased to about 250 tons in 1918.

The market for Summit County coal is almost entirely local, although some of it is being shipped to a smelter in Nevada. In the southern part of the state the old Wales mine has been reopened, and in addition to supplying some local demands is shipping some coal into Idaho.

In Carbon County the Millburn property has been leased and is operated as a wagon mine. The mine is about nine miles from Price and Helper, and will supply a proportion of the people in these towns, as well as Wellington and adjacent ranches. Wagons are driven into the mine and the coal loaded from the face.

Effect of New Mines

The questions naturally arise, what will be the effect of opening these new mines, and will the state's production be increased thereby? In answering these questions, the first condition that confronts one is the fact that the older mines averaged not more than 65 per cent. full working time during the year, and that the main cause for this was lack of sufficient railroad cars, there being no dearth of orders; rather, the mines were months behind their orders. With the increase of business which is sure to come, or even with the maintenance of present demand, the necessity of transporting soldiers and war supplies, and the slowness or impossibility of getting more equipment, it does not appear probable that there will be a marked improvement in the transportation problem. If such proves to be the case, the opening of new mines would seem to promise ill effects.

The service demanded by new mines will call for more power and more cars, more track to build and keep up. Furthermore, the multiplication of mines increases the chances of accidents, which will tie up railroad equipment and thus reduce the car mileage. In addition these new mines will draw to a large extent upon the older mines for their miners and minor officials, because a certain number of men will always seek new fields. This means the older mines will in cases have to reorganize their forces and go to new fields for more men.

If the labor supply becomes any worse, the opening of these new mines may mean to a certain extent the crippling of established organizations and productions for the benefit of new untried ones.

On the other hand, offsetting the foregoing conditions, we now have Government operation of railroads, which will undoubtedly benefit the distribution of cars and the transportation service to the mines. Again, the high wages now existing at the coal mines will attract many men to them from other fields of endeavor, and although this is the time of year when the labor supply at the coal mines is greatest, it seems certain with steady work that it will not diminish materially in the spring. Though there are many uncertainties, it is probable the new mines will add to rather than diminish the output.

There has naturally been considerable increase in activity among the wagon mines of the state. As a general rule, the operation of these wagon mines has no ill effect on the railroad transportation problem. Wagon mines are usually located off the railroads and their coal is not loaded into railroad cars for shipment. Instead the farmers and other people living near these mines drive to them and take the coal away in their own conveyances. The men working these mines are not as a rule taken from the larger coal



MINERS' WASH- AND CHANGE-HOUSE AT SUNNYSIDE

mines, but are usually farmers and their sons who work in the mines in the fall and winter, while not engaged in farming. Just at this time, it must be said that the wagon mines of the type described are a benefit to the transportation problem and coal situation, because to ship in coal to these out-of-the-way places on branch lines where railroad facilities are not the best, means the tying up of equipment that could be put to better and quicker service on or near main lines. However, it does not serve an economic purpose to load coal from wagon mines into railroad cars and ship it outside the state or local communities, but this is being done.

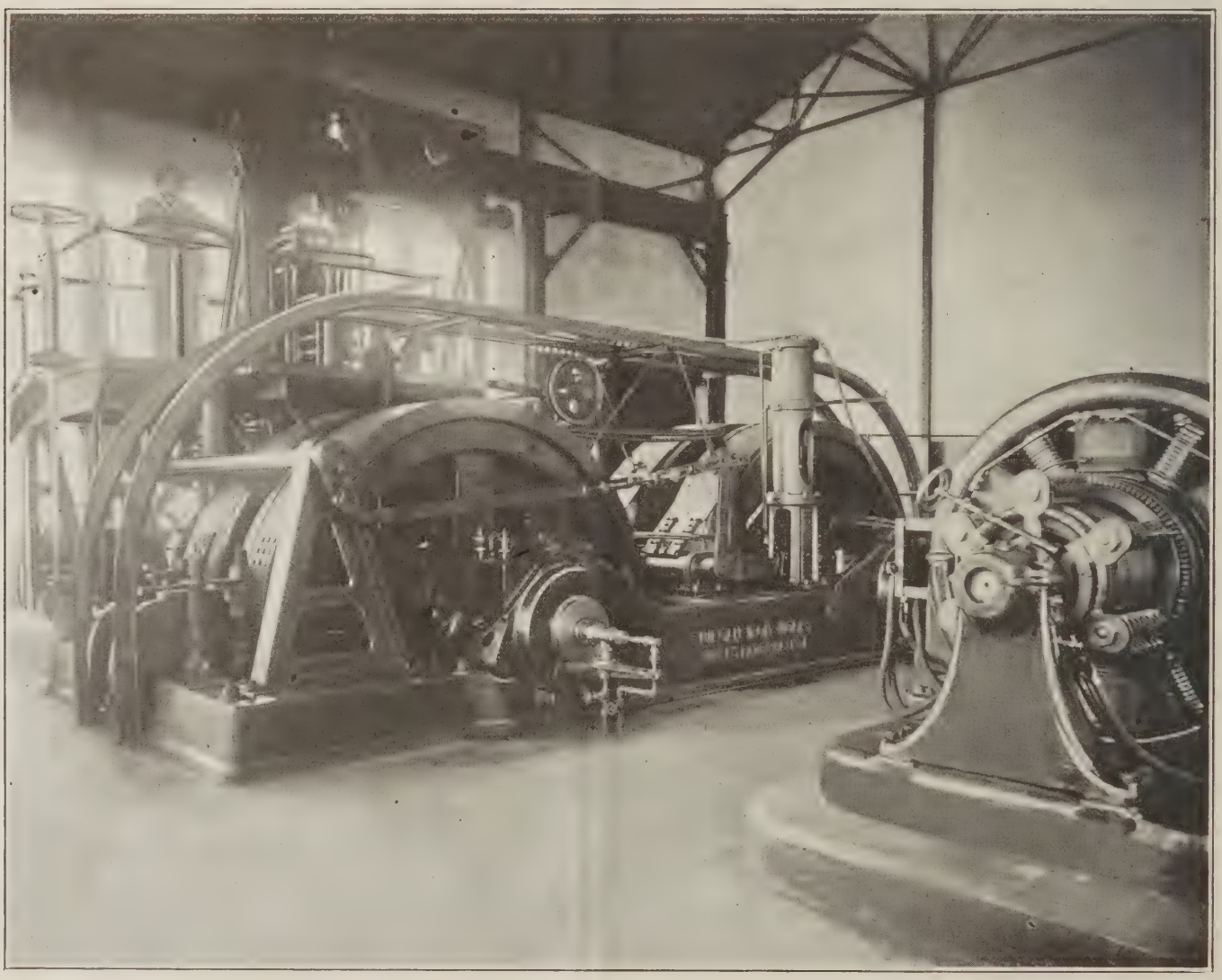
Will Mines Be Able to Increase Production Yearly?

Increase in production during 1918, depends solely on the labor supply and transportation facilities. With an adequate supply of cars the production from now on until about March should increase from 15 to 25 per cent., as many men attracted by the high wages and the desire to have inside work during the winter months are going to the coal mines. Many of these men are old miners who have in times past accumulated enough money to buy farms, both improved and unimproved. Now that the crops are in, they go to the mines to earn enough money with which to improve their farms, or to pay off indebtedness on them. Such men are very desirable, for they are experienced; and the fact that they have heretofore saved enough to invest in farms shows that they have been thrifty and efficient.

The labor supply has shown an increase of about 10 per cent. commencing about the middle of December, and at present writing it exceeds the demands. The older mines have, as a rule, sufficient development to take care of enough men to give an increase of about 25 per cent. in production. In the new mines development work can be increased and thus make new properties capable of materially increasing the production next year. If then, the railroads can supply sufficient cars, there should be an increase of production next year. Industries, especially mining, will demand more coal; the public will commence to store early in the year so that indications do not show any abatement of demand.

The mines of Utah are handicapped to quite an extent in obtaining miners. In the first place many miners prefer to work in metal mines, some because they do not like coal mining, and some perhaps because of the fixed wages which are now high in metal mines, though not so high as in coal mines. Some men prefer to work for a fixed wage. Others, knowing that with present prices they can make much higher wages in coal mines, go to the latter.

Many of Utah's mines are off the main lines of the railroad and without much advertising do not attract



VULCAN HOIST INSTALLED AT THE BLACK HAWK MINE



WOODWORKING MACHINERY AT THE SHOPS OF THE UNITED STATES FUEL COMPANY

the attention of the men. Then, too, Utah is not in or near the centers of densest population and does not have the supply to draw from as do the mines in states farther east. Furthermore, many men prefer to work in places near large towns to which they can easily go for change and amusements. As both labor and transportation are unknown quantities, it is impossible to accurately predict the future; but with a fair chance, the output next year should be around 5,000,000 tons.

New Mining Methods

The method of laying out a mine most in vogue in Utah is the "three system" of room and pillar. The latest efforts are now directed toward adopting panel systems and instead of spreading the workings out over a large territory to get the required tonnage, to practice intensive methods of quick and large production from small sections. This, of course, necessitates the complete extraction of all the coal in a given area. Among the advantages arising from this method are the reduction in amount of tracks, power and pipe lines, a saving in timber and a great saving in haulage and inspection.

Coal-loading machines have been introduced. The Independent Coal and Coke Co. started with a Myers-Whaley machine, and the United States Fuel Co. has two machines coming—a Myers-Whaley and a Halby. The success of these machines depends largely on local conditions, but with the thick flat seams and the hard, tough coal of the mines they will be operated in, there does not appear to be a very large element of chance in their success. With a loading capacity of 150 tons per eight hours, they will do as much work as ten average loaders and will reduce the man requirements to three or four men. They will also tend to centralize production and thus reduce haulage expenses.

There has been a large increase in the use of mining machines due in considerable degree to the difficulty in obtaining a sufficient number of skilled miners. This makes the tonnage per man-day higher.

Outside the mines, the use of gasoline motor trucks at some of the plants has done away with many horses and greatly increased the efficiency of handling material. These trucks have, in one instance at least, saved shutdowns at the mines.

At Sunnyside, the Utah Fuel Co. has installed three magnetic separators in the crushing plants where coal is prepared for the ovens. A miscellaneous assortment of sardine cans, pocket knives, pick points, pieces of rails, splice bars, bolts, nuts, spikes, etc., is collected by these magnets. Practically the entire time of one man is devoted to straightening, cutting and rethreading



TOWN AT BLACK HAWK MINE, UNITED STATES FUEL COMPANY

bolts and sorting nuts and spikes, and the saving of this alone nearly pays for his wages. In addition the saving of wear on the disintegrators and the resultant improvement in the coal sent to the ovens and the better grade coke made therefrom is difficult to estimate, but is very appreciable. Of not the least importance, however, is the reduction of fire risk, due to taking the iron out of the disintegrators, for in the past at least four fires have been directly attributable to this cause. The Utah Fuel Co. has built 93 thirteen-foot beehive coke ovens during the year, and these, in addition to the 726 twelve-foot ovens already in use, makes a total of 819 ovens now operated by this company.

Safety standards in Utah have not been neglected during these strenuous times, although such events as first-aid and mine-rescue contests have been for the time being discontinued. The flood in June put the mines back in the filling of their orders, and since then it has been a question of working whenever possible without certitude of knowing when an idle day could be had during which to hold a meet.

At this time, when there is such urgent need for all coal that can be produced, operators more than ever realize that it would be the height of folly to countenance any practices that might end in disaster. The state coal mine inspectors, together with all company inspectors, thoroughly believe in the safety measures in vogue in this state, and are conscientious in demanding their observance. In the shops modern safety appliances are becoming more numerous each year.

In gaseous mines miners' electric lamps are replacing the gasoline safety lamps, and the result has been an increase in efficiency as well as safety. The Bureau of Mines instruction car visited the mines during the year and gave the customary instructions.

Although not directly a safety measure, and not directly instituted by coal men, the state prohibition law received the hearty support of coal-mine operators. Undoubtedly prohibition promotes the efficiency of mine workers and adds greatly to their safety and general welfare. Our saloons are now being converted into boarding houses, stores and amusement halls. Contrary to the dire prophesies of the liquor interests, there has been no exodus of men to wetter fields, and those who have gone can well be spared; for a man who depends upon alcoholic beverages to give him his strength and zeal, does not amount to much.

The prices set by the Government raised the average of Utah's selling prices except to some of the markets. By raising the price of slack the large consumers have been made to shoulder their share of an increased cost, made necessary by war conditions. Ultimately the general public shoulders the burden, but it is more generally distributed. For instance, a raise of 1c. a pound for copper, caused by a raise in the price of coal to the copper mines and smelters, will not be felt nearly so much by the ordinary householder as a raise of $1 a ton in the coal he must use to keep him warm and cook his food.

Government regulation has entirely eliminated competition and has put all producers and consumers on an equal basis. There is now no chance for a large consumer to get a better price than his smaller competitor and thereby obtain an advantage over him in the conduct of his business.

Government Regulation Stabilized Industry

Salesmen now are not busy trying to get orders, rather they are worried to distraction trying to keep customers supplied. Price cutting and questionable competitive practices have been stopped. It has undoubtedly stabilized the industry. The raise in the price of slack has caused some consumers to change to nut coal. In view of the high grade and large sizes of slack made in Utah it is not apparent why consumers should wish to change, as there is still a differential of 50c. a ton between slack and nut.

For most points in Utah, the freight charges on slack are 25c. a ton less than on the larger prepared sizes, and there are places in Idaho where there is a 50c. difference.

It costs as much to mine and prepare slack—in fact, a good slack is harder to prepare—and during slow times there was more trouble about slack than over larger sizes. There would be too much fines in it, or too much dust sticking to it, or it looked dirty, and this when it was selling for from 50c. to $1 per ton at the mine.

People became accustomed to regarding slack as a waste product of the mines. This idea is of course erroneous at all times, particularly now, and in regard to Utah coal it is erroneous in a peculiar sense. Utah seams now being mined are thick seams. In many mines the roof is never seen until pillars are drawn, and the coal does not stick to the roof or floor. Moreover, the deposits are practically universally free from impurities. In most mines the mining is done by machines

which cut in the coal so that all slack made by them is pure coal. With a hard bottom, often formed by coal, no impurities are loaded out with the slack. We thus have slack and dust which run practically the same in heat values as the larger sizes. City consumers have in the past raised the objection that slack makes more smoke, and many well-meaning people tried to have ordinances passed prohibiting the use of slack in city plants. A trip around Salt Lake City with one of the smoke inspectors would soon convince them of their error.

The fixing of prices and consequent raising of wages for mine employees have caused a few to become more difficult to handle and less efficient. Miners can now make as much in three days as formerly in four or five, and as the expenses of many have not increased proportionately they do not care to work so long. Constant work also impairs efficiency, as the output per man-day readily shows.

High Wages Attract Labor to Mines

The high wages have undoubtedly attracted many men to the coal mines; to their benefit, but possibly to the detriment of other classes of mining. Unfortunately, the wage increases to the monthly and salaried men have not been proportionate to those granted miners and day men, and this condition ought surely to be remedied. This class of men embraces all those who are looked to for loyalty at all times, and as their expenses have been increased more than day men, they cannot understand why they should not receive proportionate increases in wages.

Employees now demand more in the way of accommodations. The number of steam-heated quarters has had to be increased and the general condition of these quarters improved. After spending thousands of dollars for steam heat, plastered houses, reading rooms, bathhouses, fences, good beds and new bedding, it is certainly discouraging to note how some people abuse them.

The drafting of men for service has caused considerable readjustment at the mines. Quite a large percentage of the mechanics, electricians, machine men, drivers, hoistmen, clerks and mining engineers, etc., are Americans and subject to draft. When these men were called to the colors, or volunteered, it often proved difficult to replace them. The miners being comprised for the most part of nationalities not subject to draft have not been affected to any material extent.

State legislative action of great importance to the coal-mining industry took form in the passage of a Workmen's Compensation Law, which was made to become effective July 1, 1917. The passage of this act met with almost universal approval, the only exceptions, possibly, being that class of lawyers who make it a practice of stirring up damage suits between employer and employees.

The act provides that employers who comply with its provisions shall not be liable to respond in damages for injuries sustained by their employees not resulting in death. If injuries result in death, the dependents of the deceased may elect between suing or the acceptance of the benefits allowed by the act. If they elect to sue, they must prove negligence on the employer's part and then forfeit the rights to compensation under the act, and the employer may plead the common law defenses—negligence on part of employee, negligence of fellow servant and assumption of risk.

Employers may provide for insurance in three ways—with the state, with insurance companies, or they may carry their own insurance if financially responsible in the judgment of the state. The insurance rate for coal mining was placed so high that many of the larger operators carry their own insurance.

During the year there has been a great deal of building in the older camps in addition to the large amount made necessary by the opening of new mines.

Changing conditions have demanded more houses. The call of the younger men to arms has made it necessary to employ many more older men who are married, and that has meant more houses. The large increases in wages have permitted many families to expand and demand larger quarters, and many have given up boarders, not now wishing to endure the extra work and inconvenience entailed in keeping them.

To keep men and their families contented and to increase efficiency and productiveness it has become necessary to further rather than abate the efforts to improve living conditions in the towns. Thus we can now observe some of the older towns laid out in regular streets, lined with trees, and with lawns and gardens fenced in. The Utah Fuel Co. alone has built two large amusement halls, costing $25,000 to $30,000 each. In addition it has built three large miners' wash- and change-houses, each capable of caring for 300 men. The United States Fuel Co. is working along the same lines.

The schooling facilities in Utah have ranked among the best in the country and have not been allowed to suffer in the coal camps. Utah takes pride in being



UNITED STATES FUEL CO.'S STEEL TIPPLE AT BLACK HAWK

among the leaders in caring for the teachers. At the camps they are provided with comfortable quarters and may keep house if they choose.

The method of proportioning the car allotment for coal mines is known as the "Idle Hour Basis," and was devised by the late F. R. Rockwell, former general manager Western Division of the Denver & Rio Grande. By it sufficient cars are to be supplied to each mine to keep the tipples running eight hours per day. Each mine orders sufficient cars from day to day to take care of its output, and is credited with full time and the hours worked marked against it. If the railroad has not supplied sufficient cars one day to keep the tipple in operation the full eight hours, it must make up the difference at some future time, for the mine is credited with the hours it could not work through the inability of the railroad to furnish a sufficient number of cars.

On the other hand, if the mine does not load the cars supplied it, or has delays, they are counted the same as if they had loaded the full allotment or worked the entire eight hours. By this scheme, if operators are honest in reporting delays, there is no discrimination between mines or companies and there is great incentive for operators to load as much coal in their working hours as possible. They must try to keep all their men steadily at work and to maintain their equipment at the top notch of efficiency.

Many Foolish Suggestions Are Made

Of course, there are many suggestions made by people who always know better than anyone else what to do. For instance, there appeared in one paper the recommendation that all the coal be pulverized at a central point, such as Helper, Utah, some 115 miles from Salt Lake City on the Denver & Rio Grande, and then pumped through pipes with the aid of water to Salt Lake, where it could be distributed. This would save the railroad much work.

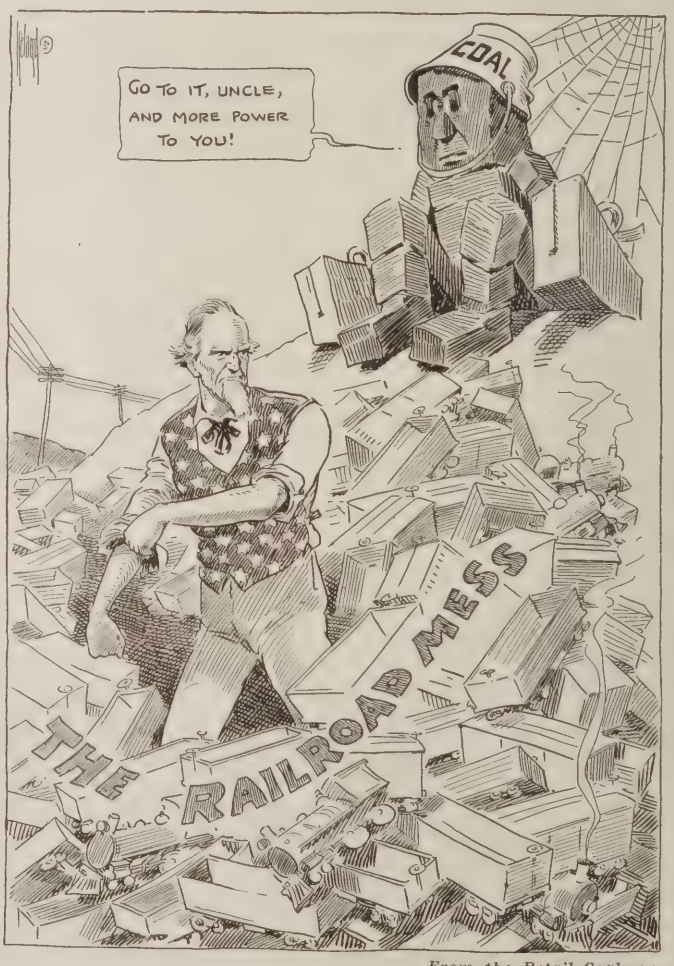
A scheme like this is about on a par with the suggestion made for smoke abatement in Salt Lake City during the winter months. The scheme was to drive a great tunnel through the mountains north of the city to the other side of the Divide and then install large ventilating fans to suck the air from the city and drive it through the tunnels. Americans are noted for their inventive genius, and with such helpful suggestions as the above we may confidently hope that soon all the consumer will have to do is to push a button or turn on a faucet and he will get all the coal he needs.

As yet no direct effort has been made to encourage men to work six days a week regularly. The need of some such incentive may become imperative when it is possible to work six days a week continuously. When car supply permits working but three or four days a week many men go into the mines on idle days and prepare their places, or load all available empty cars. The operators help in this by cutting all places that are ready to be cut, distributing empty cars and gathering loads to the partings ready for immediate transportation to tipples on working days. By these means the men maintain their average earnings and the production per working day is largely increased. Also there is no delay the first thing in the morning due to "No Coal."

Normally, between 10 and 15 per cent. of the miners are continually "laying off." Abnormally high wages and steady work will increase this percentage rather than diminish it. One of the avowed objects sought to be attained by the recent Government increase in wages was to increase production by rendering the returns more attractive to the men. It has meant to a large degree merely an increase of pay for the same amount of work.

It is rather generally accepted as a true principle of scientific management that a bonus system is the best appeal for calling forth increased efforts. There does not now seem to be the opportunity to apply this means, and it is a serious question what is the proper system to adopt should the labor supply become inadequate, as may be the case if the war continues for a long period.

As one able operator puts the matter, "We have tried moral suasion, mental suggestion and verbal coercion, backed up by appeals to their cupidity, patriotism and the debt which they owe to their families," and all prove futile to convert the industrial slacker into an efficient producer. Some have tried the fining system. By this, men are fined a dollar a day when they lay off without good reason, and they are required to present their reason in advance, but what does a dollar mean to a man earning from $8 to $15 per day. The problem is not yet solved and it may eventually mean industrial conscription.



From the Retail Coalman.

IS GOVERNMENT CONTROL OF RAILROADS THE SOLUTION?

St. Louis Coal Trade in 1917

By E. J. WALLACE
St. Louis, Mo.

SYNOPSIS—*The year 1917 has been active, puzzling and exciting. It witnessed prices highly remunerative and almost destructively low. Toward the latter part of the year transportation became an uncertain factor and the one upon which the market hinged more than on any other.*

WHEN 1917 came into being the coal trade in the St. Louis territory looked back with a longing that was pathetic to the wonderful record of 1916. The year opened with the highest prices on record, and a demand that exceeded all expectations. The mid-winter slump of former years failed to materialize. Unusual demands from districts that never before called on St. Louis shippers, a car shortage that was appalling, poor transportation facilities and embargoes of all kinds, in addition to petty strikes at the mines, were a few of the problems that confronted the trade. The market was:

	Carterville District	Mt. Olive District	Standard
6-in. lump	$3.50	$3.50	$3.50
3x6-in. egg	3.50	3.50	3.50
2x3-in. nut	3.50	3.50	3.50
No. 2 nut	3.50	3.50	3.25
No. 3 nut	3.50	3.50	3.25
No. 4 nut	3.50	3.25	....
No. 5 duff	3.25	3.00	....
2-in. screenings	3.25	3.25	3.25
2-in. lump	....	3.50	3.50
Mine-run	3.50	3.25	3.25

Carterville rate, 72½c.; others, 57½c. to St. Louis.

The outside markets paid as much as 50c. over these prices, but there seemed to be an attitude that the St. Louis market would not pay more. The embargoes were the cause of this in a general way.

The steam demand was the hardest to handle. Small storage bins kept many plants on a day-to-day supply and many retail yards in the city were without coal for days at a time. Buyers were here from points in Ohio, Indiana, many of the Southern and all the Northern and Western states, and there was no limit to the price if the coal could be secured.

Anthracite coal, which was almost off of the market at the close of 1916, moved in during the first few weeks of 1917 in a surprising tonnage, but this did not continue. Eastern smokeless was hard to secure and but little came forward. Arkansas was much in the same class.

The year opened with retail prices at: Carterville (coal from Williamson and Franklin County) $4.75 to $5; Mt. Olive, $4.50; Standard, $4 to $4.25; anthracite chestnut, $10; egg and stove, $9.75; grate, $9.50; smokeless egg and lump, $8.25; Arkansas, $8.50 to $8.75, all per net ton gutter delivery.

In January there was a tendency to fear an easy market ahead and considerable coal was sold at prices below the circular on tonnages that would carry to Apr. 1. This caused a local slump the latter part of the month, more pronounced in the Standard and Mt. Olive fields than in the Carterville district.

At this time the railroads placed big orders, taking all the surplus coal available in the three fields. The bulk of the open-market coal moved to Chicago, that market keeping buyers here throughout the season.

The failure of the Terminal at St. Louis to handle coal for shipment west of the river forced the Chicago shipments. Coal was held up at St. Louis for as long as two weeks on account of the Terminal congestion. There was a general feeling that if coal was moved as it should be that a market $1 per ton lower would prevail. The slow movement kept the price up.

In February contracts were made for the period of one year and some up to Apr. 1, 1918, at $1.65 to $1.85 for screenings, and $1.65 to $1.75 for mine-run. This is an indication of what the future looked like to the trade. At the same time the output of several Carterville mines were bought outright at figures close to those quoted above for mine-run.

The general market dropped about 50c. in February on all sizes. Steam coal was in better demand than domestic. In March, the market toned up about 25c. a ton at the beginning and slumped off 50c. about the middle of the month. Steam coal again held up better than domestic. The spurt about the first was purely due to failure of the roads to deliver loads and furnish empties. The congestion was so serious that business organizations in St. Louis held meetings with the representatives of the roads demanding that better service be rendered. These meetings resulted in much good and coal began to move more freely.

Railroad orders at this time paid $1.25 to $1.40 for mine-run in the Standard field, cars to be furnished by the buyer. The January and February price was $1.60 to $1.75. Many mines unable to get cars for commercial loading were glad to accept these prices.

Apr. 1 saw the end of the strenuous season. With warm weather the market went to pieces. It was much like old times, with coal selling at about production cost in the Standard field and not far removed therefrom in other fields.

The second quarter opened with the following market:

	Carterville	Mt. Olive	Standard
6-in. lump	$1.65@2.00	$1.85	$1.15@1.25
3x6-in. egg	1.65@2.00	1.85	1.15@1.25
2x3-in. nut	1.65@2.00	1.85	1.00@1.10
No. 2 nut	1.65@2.00	1.85	1.15@1.25
No. 3 nut	1.65@2.00	1.85	....
No. 4 nut	1.65@2.00	1.85	....
No. 5 duff	1.65@2.00	1.75	....
2-in. screenings	1.65@2.00	1.75	1.00@1.10
2-in. lump	1.65@2.00	1.75	1.00@1.1
Mine-run	1.65@2.00	1.50	1.00

Embargoes against Chicago and the North were largely responsible for low prices here. The car supply became good and movement of coal normal. A tendency prevailed among operators to contract. Several closed in the Carterville field at from $1.85 for No. 5 to $2.35 for No. 3 and $2.40 for No. 2. A few minor steam lump contracts went at less than $2.50. The same price prevailed on egg and No. 1 nut. Screenings went at $2.25 to $2.40.

In the Mt. Olive field somewhat similar prices prevailed. Steam lump contracts were made at $2.25. Standard screenings contracted for $1.75 and a few steam lump contracts were made at $1.50.

The Carterville circular quoted lump, egg and nut at $3; mine-run and screening at $2.75 for April.

No dealer contracts were made from any fields. The retail price at this time was: Carterville, $4.25; Mt. Olive, $3.75; Standard, $3.75; anthracite chestnut, $10; egg and stove, $9.75; grate, $9.50; West Virginia smokeless, $8.25; Arkansas mine-run, $7; grate, $8.

No anthracite arrived during April, but about 500 cars were purchased. West Virginia was booked at $4 to $4.50 for about 500 cars for future shipment.

About the middle of the month the railroads bought up to the limit, and with a car shortage, cool weather, and a demand for storage, the operating interests discovered that they had oversold. The circular was accordingly withdrawn, no more contracts made, and prices began to stiffen. The buyers realizing what had happened began to clamor and the last week of the month saw the price advance $1 per ton on Standard coal. On May. 1 it was impossible to get prices or promises of shipment from almost any of the fields. Eastern coal shipments were cut off altogether and Arkansas was sold up to Aug. 1. Carterville coals had advanced now to the $3 mark for domestic sizes, and Standard to $2 and over.

Because of car supply and labor troubles the tonnage produced decreased in the face of a growing demand. The public began to get uneasy and besieged the retailers with orders. This brought the retail price to $6 for Carterville, while the advance was slight on the other grades. Steam coal was extremely active. The market eased up before June 1 on Standard, and Carterville went off about 25c.

In June easier conditions set in. Embargoes against Chicago sent a good tonnage of Standard into St. Louis. A little Carterville was offered, some anthracite came in, also smokeless, and some Arkansas grades. There was no demand to speak of, and no coal to offer. The month finished well. On July 1 the market was:

	Carterville	Mt. Olive	Standard
6-in. lump	$3.50	$2.35	$2.50@2.75
3x6-in. egg	3.50	2.25	2.50@2.75
2x3-in. nut	3.50	2.25	2.50@2.75
No. 2 nut	3.50	.....	.....
No. 3 nut	3.25	.....	.....
No. 4 nut	3.00	.....	.....
No. 5 duff	2.50	.....	.....
2-in. screenings	2.50	2.00	1.80
2-in. lump	.....	2.25	2.25
Mine-run	3.00	2.25	2.00

The Mt. Olive operators had a fixed price, regardless of supply and demand, but were entirely sold up. At the end of the first week in the month the market came to a standstill on account of persistent reports that the Government would cut the price. Consumers cancelled retail orders, hoping to save from $2 to $3 a ton, and the steam users did likewise.

The domestic demand had switched from Carterville to the other grades on account of prices. There was a feeling that the Peabody prices were too high. This was the cause of the slump.

A 15c. increase in freight rates to St. Louis was secured by the railroads, while increases to all other points were suspended. This annoyed buyers and tied up business.

Prices eased off some, and car supply got down to two days a week, except in the Mt. Olive district where a better supply existed on railroad coal. The month ended with railroads still getting the larger part of all the coal from the Standard field.

Attorney General McAllister of Missouri had been investigating St. Louis coal operators and the evidence was such that the public saw no reason why there should not be a cut in price. The newspapers had for months advised against buying coal, promising lower prices. Strikes in the Mt. Olive and Standard fields kept a light tonnage offered with no demand to speak of. Such mines as worked were getting cars for one day per week. Many commercial mines are being forced to load railroad coal or go without cars.

On the morning of Aug. 22 came the announcement of President Wilson's proclamation and then his selection of Dr. H. A. Garfield, as Fuel Administrator.

Retailers who stored coal suffered most. The operators insisted that the old high prices were good until Sept. 1. The secretary of the St. Louis Coal Club had to wire President Wilson to get information that the new prices were effective Aug. 22. On Aug. 21 the market was:

	Carterville	Mt. Olive	Standard
6-in. lump	$3.25@3.50	.....	$3.25@3.50
3x6-in. egg	3.25@3.50	.....	3.25@3.50
2x3-in. nut	3.25@3.50	On Strike	3.25@3.50
No. 2 nut	3.25@3.50	.....	.....
No. 3 nut	3.00	.....	.....
No. 4 nut	3.00	.....	.....
No. 5 duff	2.50	.....	.....
2-in. screenings	2.50@2.75	.....	2.50@2.75
2-in. lump	.....	.....	3.00@3.25
Mine-run	2.75	.....	2.75

Carterville rate, 87½c.; other fields, 72½c.

Orders at the old prices were promptly cancelled by most buyers. Mine agents turned jobbers, as did some operators. This upset the St. Louis market, and broke up many agencies. It was a week before business got settled and losses could be calculated on coal in transit.

The demand for coal at the new price was so great that it took everyone off their feet and overloaded the mines. Strike troubles in the Mt. Olive and Standard fields were settled. New retail prices caused some confusion, but business was good and all steam sizes offered found a ready market.

The latter part of September the situation took on a serious aspect. No one had stored much coal in July or August and now they wanted it. This applied to both steam and domestic grades.

There were no Eastern or Arkansas coals coming in. The Mt. Olive tonnage was on contract and while the car supply was better, there was little Standard to offer and almost no Carterville. The situation became such a critical one for the jobbers who could get no coal that they sent a committee to Washington to explain the local condition.

The last quarter opened with a strenuous market on everything. The steam demand was a big factor at this time. There was practically no coal coming in from the Carterville field, this tonnage being taken almost in its entirety by railroads.

Anthracite moved in only lightly and spasmodically. There was no West Virginia smokeless and the Arkansas operators got all they could, as there was no Government price on their product. No Pennsylvania anthracite was jobbed.

As the month wore on the situation became critical. There was no open market coal, embargoes were placed, cars were short, and transportation began to figure in the trouble. Cars were delayed for two and three weeks without cause. Railroad coal was given the right-of-way over everything else.

The car supply for the first half of November was exceptionally good, but the tonnage of coal mined was less per man than at any time in the last 15 years. Throughout this month the mildest of weather prevailed, and this was a wonderful help in a trying time.

The railroads began to confiscate high-grade coals, the tonnage of which was small, and failed to notify the consignees. The roads that make up the Terminal Association at St. Louis fell out with each other and there was a lack of coöperation.

The early part of the month brought some Pennsylvania anthracite, but outside coals were scarce after the first week. The retailer could get only Standard as a rule, and the consumer had to take it or go without.

The weather continued mild until about Dec. 10, when came the worst period of winter weather that St. Louis has had for many years previous to Christmas. The mercury went down to 8 or 10 deg. below zero and hovered around the cipher for about a week. The cold was accompanied by a heavy snow that tied up traffic, and completely demoralized transportation.

With no coal in storage on account of the general shortage that had prevailed St. Louis was for the first time since it became a big city confronted by a coal shortage. Factories closed, the Federal buildings were without coal, and the eight municipal coal depots, in the congested sections of the city, proved their utility by having enough fuel to dole out a bushel at a time.

The situation at St. Louis was taken in hand personally by Administrator Crossley on Dec. 15, and W. I. Jones, general freight agent in charge of coal traffic of the Missouri Pacific R.R., was drafted as traffic manager and put in charge of the work of getting the coal congestion loosened up. On Dec. 14 Dr. Garfield extended the Missouri jurisdiction to include the terminals of Kansas City, Kan., and of East St. Louis, Ill., and gave Lieutenant Governor Crossley power to take such action as he might see fit to get results from the Terminal railroads at these points.

A new order was put in effect that only one load of coal would be delivered to any home in St. Louis in a 21-day period. This was equivalent to the card system and enabled everyone to have a cheerful Christmas at least as far as a fire was concerned.

The coal haulers demanded an increase of wages which increased the retail price 25c.

The mine situation was not a satisfactory one. The roads were all embargoed against each other and the Terminal was so tied up that it did not know where it was headed. Cars laid around for two and three weeks and could not be moved. Empties could not be delivered to the coal roads, mines were idle, and such little tonnage as did come in was held up at East St. Louis for an indefinite delay.

The year ended with slightly better conditions existing and in prospect. What the future may hold is of course uncertain, but it is believed that if transportation difficulties can be straightened out there should be little cause for foreboding in St. Louis over the fuel situation.

Market Conditions in New England in 1917

By G. G. WOLKINS
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WAR demands chiefly characterized the twelve months ending Dec. 31, 1917. It was a year of uninterrupted strain in all channels and everyone was obliged to deal with the complicated uncertainties of a market taken under the wing of the Government.

Requirements of the Navy and other national services, imperative needs of the Allies, the enormously increased consumption by railroads and industries, and a public roused into accumulating fuel wherever possible, proved a combination that overburdened railroads while diminished water lines were inadequate to meet the demand. Add to these the momentous expedient of Government control and we have the outstanding difficulties of an unparalleled year.

General Features

In many ways the year can be reviewed as a chapter of innovations. Long-established practices were modified or given up, and new agencies created in a patriotic effort to "help win the war." The new factors, however, whether committees or fuel administrators, were under the disadvantage of a depleted market, practically dependent upon daily mining to keep wheels turning.

It was realized at the end of 1916 that New England was in for a hard season, but few had the courage to buy "futures" at prices then prevailing. Coastwise buyers have always been prone to "wait developments" and the early part of 1917 was no exception. It was apparent they would try every known way to get fuel at less cost than "spot" quotations. In other years when the volume of Hampton Roads coals was temporarily curtailed or prices were considered excessive, interest would naturally be shown in coals from Pennsylvania. But a year ago the Pennsylvania operators were quite as cautious as their Southern competitors and opportunities to cover grew increasingly rare as the situation developed during January.

The price differential was much in favor of the Pennsylvania grades. There was also well-grounded rumor that a heavy tonnage of Pocahontas would be withdrawn from this market for an industry that wanted the output of a group of mines, but even though this failed to materialize the Government appropriated a heavy volume of Hampton Roads coal and deliveries to this territory were materially reduced.

After January steam-users were much more concerned about getting supplies than haggling over prices. "Give us coal," was the cry. With the average cotton mill the cost of fuel, even in a year like 1917, was only about 3 per cent. of the cost of operation, leaving a 20 to 25 per cent. advance in the cost of coal at the boiler relatively a small item. Spectacular advances during March made the price tables the highest in the history of the trade.

From early February until Aug. 21 there were inter-

mittently present the usual makings of a "flurry." Extreme cold weather interfered with mining and with car movement, there was difficulty getting boats out of the Delaware and the Chesapeake, and together with increased consumption there was enough to accelerate an already insistent demand. Some distributors held the better grades for contract business, and for spot demand were willing to release only what inferior coals they were able to pick up. Even for short hauls car supply was much reduced.

Portland felt the shortage more than either Boston or Providence, and ice-embargoed ports like Bangor were heavily handicapped. Unable to get their accustomed quota in the fall consumers in such areas were obliged to draw on Portland earlier than usual. To add to the difficulties, traffic restrictions were rigidly enforced against reconsignments at the various New England gateways all-rail. It was the marvel of the trade that more was not heard about the distress of large industries, but from one source or another coal was always forthcoming to keep fire under the boilers.

Transportation Troubles

The acute railroad situation developed during 1916 was progressively bad during the twelve months following. The Norfolk & Western Ry. alone for the 11 months ending Nov. 30 showed a deficit in loaded coal cars, as compared with the same period in 1916, of 41,633, or 2,081,650 net tons. Such figures are regarded as the result of holding railroads in check as to revenues. They were not equipped with the locomotives, trackage, and terminal facilities that would now be a great boon to the country's needs.

Early in the year the Interstate Commerce Commission set out to secure a relocation of cars, and in an effort to clinch the matter defined a "diversion" in such way as to bring it within the statutory fine of $5000. The inequalities of car distribution usually fall hardest upon New England, partly because open-top cars here have no adequate return freight. In the usual course of trade, however, the roads receiving and not originating coal shipments have on their lines an excess over cars owned, while roads originating coal traffic ordinarily hold less than their ownership. Notwithstanding this, the Commission felt that roads having an excess of coal-car equipment should substantially reduce the excess when so requested. Instead, the percentages in many cases steadily increased. Particularly was this true of railroads in New England, with their additional coal traffic inland from Tidewater terminals.

To meet prevailing conditions the Railroad War Board evolved the priority order. A priority order was asked all-rail for New England but to the end of the year no favorable action was taken. Limited priority orders were served on certain mines in favor of certain utilities and plants, but priority request so accumulated as to defeat their purpose. The railroads themselves have been protected from the excessive use of priorities by their own priority director.

Water transportation has also been affected in discouraging ways. The destruction of shipping overseas has made necessary the taking of bottoms from the coastwise trade and sending them to help solve the freighting problem of France and Italy. Several steam colliers were diverted in this way, besides those commandeered by the Navy Department. Others would doubtless have been withdrawn but for strong protests. The Shipping Board intended to replace the vessels taken with certain foreign tonnage, but so far little has been accomplished.

The Shipping Board requisitioned all steam colliers of 2500 tons and over, D. W. capacity, effective Oct. 15, but allowed them to run under stipulated terms until the Board decided to use them in other service. Formal documents were signed in December. The serious phase of this for New England lies in the diminished tonnage that can come by water. If a single steamer of 8500 tons capacity is removed and not replaced, it means at the normal rate of loading more than 400,000 tons yearly is lost to consumers in this territory. When to this is added the commandeering of eight ocean-going tugs for war purposes it will be realized how hard hit are the industries in this part of the country. The railroads in New England were utterly unable to handle more than they did. Since their coal tonnage in 1916 was 50 per cent. greater than in any other year, there was no room for further increases.

On Dec. 28, Government direction of railroads became effective. If this will mean the pooling of equipment and therefore the better movement of coal to New England it will relieve a critical situation.

Coöperation With the Government

The trend toward Federal control was noticeable early in the year. In the seaboard trade the Federal Trade Commission began in April to exercise its broad powers by seeking to change radically some of the selling methods that had always prevailed. Cumulative commissions and the frequent transfer of shipments en route were frowned upon, and there was also an effort to restrict operators to the consignees for whom they were the usual sources of supply, rather than allow the coal to go to the more attractive markets. Later a system of frequent reports was put into use; and with salutary effect, particularly on anthracite. The object, of course, was to protect the consumer, and that feature of the work was thoroughly done. The coal houses responded with good grace, for the most part their coöperation has been of the best, and the rules laid down as to reports were closely followed. One result has been a better regard for the functions of middle houses, or "jobbers," and it is believed the supervising authorities have learned there is nothing more harmful among reputable coal commission houses than among reputable banks, or other institutions that exist upon trade in commodities which they themselves do not produce.

One of the early efforts on the part of the railroads was to pool all the bituminous at the various Tidewater loading ports. A similar experiment at the Lake ports had met with moderate success. The Committee on Coal Production of the Council of National Defense had quietly done much in smoothing out rough places in the relations of the departments at Washington with the coal interests; it was later enlarged to include labor representatives, and in general it showed grasp of the problem. In brief, the Tidewater Coal Exchange was organized, with Rembrandt Peale as commissioner,

and all the mines accessible to Tidewater were classified according to railroads and quality of output. It was stated at the time that the total Tidewater tonnage during the year 1916 was about 31,000,000. If the detention at Tidewater piers which was then averaging about 5½ days could be reduced by pooling to 3 days another 6,640,000 tons more could have been moved with the same equipment, or it would have made available 133,000 cars for other coal movement.

Instead of all the separately designated coals, more than 1100 in number, sent to the Atlantic loading piers, it was proposed to limit the number to 41. That is, 41 different numbers would designate all the bituminous for dumping at all the piers, classified according to a schedule in which mine origin, proximate analysis, probable use, and merchantable value were taken into account. At all the piers, whether at Hampton Roads, Baltimore, Philadelphia, or New York, "No 1" was coal originating at mines on the Navy Acceptable List, whether Pocahontas, New River, Georges Creek, or fuel administrations. Representatives of the coal trade were invited toward the close of the year to help in the office of the New England Fuel Administrator and they coöperated to such extent as they were permitted.

As the year closed measures were on foot to secure an emergency supply in Baltimore and Philadelphia piers, but by Dec. 31 the full detail of transportation had not been worked out. The twelve months together formed such a continued record of stress and helplessness as the coal trade had never known. And the end is not in sight.

Pocahontas and New River Grades

The Hampton Roads terminals never seemed so remote from New England as in 1917. The vicissitudes of shipping and the war needs of the Government made it particularly trying for all who were concerned in getting coal from that quarter. Operations in the districts accessible to Norfolk and Newport News were at no time embarrassed through lack of labor; it was al-

RECEIPTS OF BITUMINOUS COAL BY SEA AT BOSTON, SHOWING PORT OF SHIPMENT*

	Baltimore†		Norfolk‡		Newport News		Philadelphia		New York		Totals		Foreign§	
	1916	1917	1916	1917	1916	1917	1916	1917	1916	1917	1916	1917	1916	1917
January	43,975	73,854	285,416	240,422	113,052	96,131	29,123	31,544	.....	5,092	471,566	447,043	49,528	24,612
February	65,552	28,393	230,252	206,088	48,997	56,939	16,715	3,459	.....	4,838	361,516	299,717	32,293	27,706
March	50,316	61,522	257,905	305,606	80,707	66,840	22,662	4,198	714	4,198	412,304	442,252	31,247	22,664
April	67,398	58,015	265,840	328,193	83,535	42,397	36,517	.....	2,725	6,326	456,015	434,913	42,936	27,061
May	82,299	68,104	233,586	276,394	100,039	38,780	22,615	.....	.....	8,888	438,539	392,166	10,882	13,930
June	64,756	56,516	260,610	217,961	75,777	44,184	27,079	4,003	1,550	4,341	429,772	327,005	15,375	15,565
July	95,679	51,374	205,107	222,891	79,604	40,652	19,099	11,510	3,879	8,222	403,368	334,643	27,345	21,320
August	81,018	39,504	264,165	272,546	80,471	34,016	23,547	22,254	.....	8,269	449,201	376,589	28,721	35,694
September	82,984	30,419	249,397	221,445	39,115	41,256	18,627	6,067	5,250	5,264	395,373	304,451	26,409	28,362
October	76,897	39,896	213,924	169,587	34,387	35,964	23,382	7,388	2,851	11,124	361,441	263,959	24,865	21,437
November	67,777	45,247	199,364	203,895	48,306	36,310	23,077	7,293	9,582	13,860	354,886‖	306,605	27,655	21,611
December	57,404	34,849	187,619	134,150	89,990	27,484	25,352	27,453	16,341	.....	376,706	223,936	27,536	15,650
Totals, 1917		587,692		2,799,178		560,953		125,169		80,422		4,153,289		275,612
1916		836,055		2,853,185		873,980		287,795		42,892		4,910,687		344,792
1915		1,172,431		2,212,530		680,929		403,927		24,604		4,610,312		440,615
1914		1,158,266		2,637,632		611,369		456,446		3,095		4,866,778		258,647
1913		1,164,514		2,485,679		737,647		553,573		3,274		4,944,687		269,659
1912		1,361,994		1,836,750		945,803		322,334		9,629		4,665,520		309,106
1911		1,576,397		1,218,391		921,220		381,961		3,776		4,101,745		263,861
1910		1,595,554		795,475		1,243,857		292,636		25,515		3,954,251		296,564
1903		481,111		314,505		596,439		.....		.....		2,081,819		1,226,134

* Courtesy of the Boston Chamber of Commerce, Statistics Department. † Includes small shipments from Washington and Georgetown, D. C. ‡ Lamberts Point and Sewalls Point. § Almost exclusively from Louisburg, Cape Breton, except during 1903, when a large tonnage came from Great Britain to relieve shortage because of strike. ‖ Includes one cargo, 6780 tons from Charleston, S. C.

Cambria. Other classifications were of like significance and showed intelligent discrimination.

For four months membership in the pool was voluntary and a large number of shippers withheld support. On Nov. 6, participation in the Exchange was made mandatory by order of the Fuel Administration. Thereafter, certainly, none of the shippers could be blamed for any failure of the remedy offered. The pool was enforced at a time when terminal conditions were extremely bad, and due allowance should be made an expedient for which perhaps on the whole too much was claimed.

A New England Coal Committee was organized as early as April through the coördination of the governors of the six New England States and as a branch of the Massachusetts Committee of Public Safety. From this committee was evolved in the fall the New England Fuel Administration. Cases of actual seizure of coal were few and unimportant, up to the end of 1917. As in other parts of the country local fuel committees were appointed for communities of 2500 or more population. Cases where prices were reduced were rare in New England. Supervision of local retail prices and a service of intercession for various dealers and consumers with their usual sources of supply were, in practice, the chief functions of the various state most exclusively a shortage of equipment and facilities that made the three big arteries appear so inadequate.

Strained conditions at the beginning of the year were without acute developments. Irregular car service was causing 2 to 4 days' detention, and spot coal sold at $7@7.50 f.o.b. vessel. Bottoms were hard to get and for that reason spot demand was intermittent, though firm. In fact, through the whole year the only really pronounced spot demand was from shippers themselves who required part cargoes to clear their ships. Demurrage rates had grown so heavy it was common practice to pay what might otherwise have been considered exorbitant prices purely to free a ship from extra detention. Without boats in hand no buyer was in position to take delivery f.o.b. vessel, and no buyer was so rash as to commit himself on 1917 charter terms unless he had good assurance the coal would be forthcoming.

The attitude of the agencies toward annual contracts was developed early. Many of the supply arrangements that would expire Apr. 1, 1917, were undertaken in October, at prices based on $2.70@2.85 f.o.b. Norfolk. Conditions in January were expected to carry through at least to June, and export and bunker business would furnish the demand needful to keep prices strong at the season basis, $4.75, a full $1.75 up from the 1916 "asking" figure. No rush was expected, but yet New

England was restricted as to sources of supply, and numbers of buyers thought, and wisely, that it would be prudent to cover while the going was good.

Only a modicum of the volume sold in this territory was placed at alongside prices based on direct barge delivery. A few such contracts there were, later on, at prices from $7.65@8, depending upon destination and allowing $2.90 for water freight and insurance. The bulk was given buyers who had taken similar delivery the year previous, and to those only a percentage of their 1916 quota. The available bottoms were in few hands, and as to rates it was not so important whether $2.50 or $2 should be set. Obviously there would not be enough sail or barge tonnage open to season charter to affect materially any rate made on steamers. A sellers' market it was bound to be, although most buyers were slow to sense the prospect. Differentials favored all-rail delivery, and a drive was made to interest large plants in medium grades from Pennsylvania, but the regularity of steamer deliveries had its appeal and a liberal tonnage was soon signed up, at first on a $2 freight basis to Providence and $2.25 to Boston, or respectively $7 and $7.25 f.o.b. cars, but a fortnight later reduced to $7 flat at both points. Prices for spot delivery inland were then $9.25@9.50, as a comparison. Shippers were diffident as to the tonnage placed; it was as if they had simply wanted it said that all their customers had been favored with opportunity to buy; and on the purchasers' part the only delicate feature seemed to lie in the speculation whether some competitor in the same line of manufacture might pay less, by waiting.

Bottoms Commanded Good Rates

Factors equipped with transportation as well as rehandling facilities let it be understood they might prefer letting their boats for the export trade on the extravagant freights that offered, allowing their forwarding plants to lie idle until the coastwise market should get normal again. They yielded, however, to some of their established trade, and on their free coal at spot prices have netted more on their ships than if they had chartered offshore. Contracts for delivery in lighters were closed, ranging from $7.60@8.50. Other regular sources of supply offered to carry customers through the season, so far as conditions would permit, and prices to be adjusted monthly on basis of cost; others would not respond at all to importuning for contracts. There were too many possibilities.

By this time prices at Hampton Roads had eased to nearly a $6 basis, although shippers were just as guarded about commitments. Then came the uncertainty caused by war probabilities and the likelihood that a number of the steamers that New England had now grown so dependent upon would be withdrawn. For buyers who faced the market squarely there was no real encouragement that Pocahontas and New River would soften. Meanwhile, spot inquiry was broadening noticeably, and the volume of free coal was rapidly diminishing. The Government enforced its privilege of prior loading, but few New England consumers were alive to the situation and many felt levels were now so high they could lose little by waiting. All options on a delivered basis were definitely withdrawn, and current figures f.o.b. Boston reached $11. There were also intimations that the $4.75 base might be advanced $1, although for the twelve months the only additions were 10c. advance in tolls, the war tax, and the wage increase that was added by some of the shippers. At the end of February a week's detention was the rule and loading got increasingly difficult to arrange. Frequently eight or nine agencies would be called upon to dump for a single cargo. And all the time the Government was likely to drop on them for heavy tonnages on short notice.

Boston on-car prices touched $15, the same price being paid for lighter loads. The Bangor & Aroostook R.R. cancelled passenger trains and for one period had solid trainloads rushed all-rail from the mines.

The approach of mild weather had its usual effect upon prices, which dropped f.o.b. to a $5.50@6 range, largely on coal in the hands of less prominent agencies. Buyers, however, were only hoping against hope when they postponed purchases. It was now practically impossible to get taken care of on an annual basis. Sales were made at market price at time of shipment and other terms were carefully phrased. Shippers were certainly in position to pass the risk along to consumers. Aside from the endeavors of the railroads and a few large mills there was apparently little effort to get coal forward.

Navy Requests Large Tonnage

Meanwhile, anxiety increased among shippers because of Government requisitions which by May 1 were heavy. The Navy asked operators for 1,000,000 tons. In addition there was extra demand from the West. Nevertheless, until October contract requirements were met with reasonable promptness.

The upward trend was again pronounced in May. New England mills were driven with business and even with a great accession of water power they were just able to keep moving on hand-to-mouth deliveries. Occasionally a spot cargo met with ready sale at high prices, but such transactions were quietly arranged, neither party seeming anxious to spread the fact. Two dollars and ninety-five cents gross tons f.o.b. mines was the "taking" mentioned at that time in connection with Government requirements, this basis figuring $4.45 at Hampton Roads. The upset spot price had now swollen to $8.50. In June the Navy Department made known its wish for the 1916 contract level plus labor and other extra costs being paid in 1917.

Relatively easy freights helped the coastwise consignees to quite an extent during the summer. The demand for coal was so insistent that the agencies only piled up trouble for themselves when they yielded to a natural inclination to sell the utmost possible when spot prices crept above $7. The possibility of Government action was an accelerator for production as long as spot orders lasted.

The $3 mine price "fixed" in June was in effect a scaling down of spot prices to within 30c. of the season contract level of $4.85 f.o.b. Hampton Roads, now that the advance in tolls had been added. The Pocahontas and New River operators faced no particular embarrassment, however, especially when there was conflict of opinion in high circles. Practically all the output they could count upon was affected very little and shipments continued as before. For the rest of the

year, receipts were applied to contracts, after Government requisitions and bunker demands had been met.

Much alarm was caused by intimations in August that certain of the 8500-ton steamers regularly bringing smokeless coal would be taken for overseas. It was figured that the tonnage for the ports of Providence, Boston and Portland approximated 8,000,000 tons. Of this about 2,000,000 is carried in barges, leaving 125,000 tons weekly to be brought in steamers. A few ships were withdrawn from the trade and the tonnage has been impossible to make up.

The Fuel Administration's grant of 45c. increase per net ton to cover wage increase had no material effect upon Hampton Roads coal for New England. The manufacturer who failed to contract for an adequate supply prior to Aug. 21 had a poor outlook for requirements.

Loading dispatch grew slower as the year drew to an end. The Tidewater Coal Exchange as a unit is not quite the equal of a few large shippers all keenly alert to get coal forward and using all their powers to that end. Notice was served on certain mines to ship 100 per cent. on contracts for tonnage destined to New England in an effort to relieve the impending famine, but movement had to be via Tidewater piers and with upward of 100 bottoms waiting to load the prospect was not cheering. Moreover, preferential shipments along the same lines, except in a few cases for railroad fuel, had not been brought about at the end of December.

Export and Bunker Trade

The volume of commercial off-shore business the first half-year was limited only by the number of ships available. Many of the figures covering this trade are not available and if they were it would be difficult to separate cargoes that were purely commercial and those loaded in pursuance of war needs. Ocean freights remained so high that to coal factors who controlled ships the opening was most tempting. There was also a prospect of building up future trade. The maximum price was always to be had and without the risks that accompany delivered prices in the seaboard market.

The diminution of ocean tonnage early in the summer had its effect upon the volume exported, and on June 27 the President issued a proclamation requiring all exports to be licensed. This applied to bunker coal, the Government's object being to force ships into necessary trades and draw out other vessels from neutral and Allied harbors. Effective July 15 another order provided for complete Federal control of exports, including coal and coke, and each shipment was to be specially licensed, the license to be issued only after full details had been given, and subject to renewal after 60 days. Bunkering in the stream at Hampton Roads was put into practice under supervision of the Shipping Board, in order to provide berth room for cargo boats.

Operators in conference with the authorities insisted in the fall that the authorized basis was on too low a level to insure the steady output needed. For bunkering, the prescribed price, war tax and all, figured about $3.80 f.o.b. Norfolk before the wage increase was allowed, while the season's contract cargo price was $4.85. Attention was called to the 30s. (about $7.30) basis f.o.b. Cardiff, authorized by the British government, and the discrepancy declared too great. As a result, the Fuel Administration authorized a $1.35 advance, with charges on a new basis, and plus the 45c. wage increase previously allowed.

Pocahontas and New River operators certainly enjoyed a prosperous year, even though tonnage was somewhat curtailed through failure of car supply. Manifestly, 1918 will see far-reaching changes in distribution. The trend is toward the diversion of most of the "No. 1" coals to Government use, leaving other grades for other consumers. New England will probably have to look to Pennsylvania for its major supply, although it is to be hoped that something will be done for, or to, the railroads first.

RECEIPTS OF ANTHRACITE COAL BY SEA AT BOSTON

	From Philadelphia		From New York Ports		Totals	
	1916	1917	1916	1917	1916	1917
January	55,461	32,019	68,526	.....	123,987	97,061
February	44,734	16,575	44,191	.....	88,925	62,194
March	44,673	69,375	73,110	.....	117,783	161,027
April	64,678	44,689	113,583	.....	178,261	132,200
May	39,187	41,985	106,017	.....	145,204	120,440
June	45,555	51,332	94,749	.....	140,304	138,959
July	45,802	53,299	93,862	.....	139,664	144,066
August	40,033	50,274	96,588	.....	136,621	143,124
September	35,387	57,425	85,599	.....	120,986	142,613
October	45,605	28,696	74,989	.....	120,594	102,429
November	34,713	28,185	58,345	.....	93,058	91,334
December	28,392	.....	47,117	53,213	75,509	.....
Totals, 1917		473,854*		.....		.....
1916		524,220		956,676		1,480,896
1915		548,689		960,331		1,509,960
1914		624,798		1,094,241		1,719,099
1913		582,183		1,094,128		1,676,311
1912		579,778		1,054,378		1,554,156

RECEIPTS OF ANTHRACITE COAL BY RAIL AT BOSTON

	1916	1917.
January	33,536	30,379
February	30,565	13,874
March	23,721	21,425
April	22,898	12,343
May	12,437	23,546
June	11,713	15,527
July	14,151	19,215
August	17,532	17,196
September	18,283	13,504
October	20,303	18,502
November	41,202	16,275
December	46,258	15,622
Totals, 1917	.....	217,408
1916	292,599	
1915	192,442	
1914	192,426	

* Total for 11 months ending Nov. 30, 1917.

Georges Creek Coals

The shippers of Georges Creek made relatively so few deliveries in New England during 1917 that they about ceased to be a factor in the coastwise market. Receipts of this grade were light from the beginning of the year and except for scattered instances were applied to contracts taken mostly in October, 1915, contracts on which the chief distributors were far in arrears on Apr. 1, 1917, the date of expiration. Utilities, mills and dealers who had the coal due them insisted upon deliveries being made, and one way or another during 1917 unfulfilled obligations were adjusted. What tonnage was sold here was confined to individual cargoes, few and far between. In spite of all that was accomplished in other years to build up a coastwise business, Georges Creek had become negligible as a source of supply.

All-rail deliveries were of no moment. Cars dribbled through but insufficient in number to please anybody. No season prices were named and steamers and barges were placed trip by trip, usually at Hampton Roads and other ports where coals other than Georges Creek could be lifted. In March an advance of 17c. and a fraction was added to the 1916-17 contract basis to cover a wage increase. By April it was evident that all idea of naming prices had been abandoned. Except for

Government purposes there was none of this grade for the open market at any of the loading piers, although in June a few cargoes were sold at $11.50@12 alongside.

As high as $7 f.o.b. mines was named for prompt shipment and inasmuch as the President's order of Aug. 21 did not apply to coal for forge use there was no material reduction the balance of the season. For the present there is no reason to suppose shipments to this market will show any increase or any regularity during 1918.

The Pennsylvania Grades

Central Pennsylvania was prominent in the minds of New England buyers throughout 1917, although as a source of free coal it practically disappeared after the price-fixing proclamation of Aug. 21. From Jan. 1 it was plain that the Northeastern market would have to look to Clearfields and Cambrias to piece out the supply of Pocahontas and New River for the region accessible to Tidewater. The volume of business handled by the all-rail agencies the previous twelve months encouraged many large consumers to buy even the inferior grades for the sake of getting fuel forward while it could be had. Although shippers of the more favorably known coals were obliged to restrict their customers to less than 1916 quotas, those in position to ship ordinary varieties, even those high in volatile and ash, did a handsome business in this territory.

A few important Pennsylvania factors took on business early in January for twelve months from that time, but the "contracts" were well hedged as to labor, car supply, and other contingencies. Several comprehensive orders were placed in this way at from $3@3.25 f.o.b. mines. Notwithstanding spot figures at the time ranged from $5.90@7, depending upon grade, a large number of big buyers thought the contract level too high and postponed purchases.

Numerous local labor adjustments were characteristic the whole year. These had a marked bearing on prices, but even with sundry wage increases Pennsylvania coals still had the advantage over water-borne coals from the South. Rail coal was a factor therefore in territory hitherto regarded as exclusively supplied by water and transshipped inland. But in spite of a most discouraging outlook as to labor a creditable year's record was made.

In March the railroads were obliged in several cases to withhold cars except for engine fuel. Embargoes were intermittent and prices for shipments en route continued up to $7. Tidewater deliveries were also difficult to arrange, one cargo selling in Boston at $11 alongside. Quotations all spring were pitched to a high key, although for intervals the spot demand would flatten materially, except for loading at Philadelphia and New York where any surplus was readily absorbed. Mine prices were down to $4 for deliveries through the summer months, and yet New England buyers showed their customary hesitancy.

In April all producers were hard put to it to meet even the most urgent demands. Far-sighted operators were now adding to the "blue ribbons" already attached to sales a clause covering any tax that might be imposed on coal for commercial use. Mills working on Government orders did everything possible to get fuel forward on a preferred basis, but operators on the other hand who normally are heavy shippers to New England found so large a share of output requisitioned by the Government many were obliged under labor and car conditions to cut off practically all their commercial obligations. And again, so little transportation was available outside of anthracite barges that sellers knew the traffic would bear high prices and for several weeks $8.75@9 f.o.b. Philadelphia was a regular price when coal was available for prompt dumping and went through several hands. It is common experience that high prices will draw out coal, and that was true the first half of 1917.

When labor difficulties got ironed out, a better movement followed. Orders had accumulated and there was a rush demand for cars. Most buyers were cautious and bought only for urgent needs. Those under contract were waiting to see if shippers would make good; others were hoping prices would recede enough to make comprehensive purchases. Neither class was wholly justified in its attitude, and those who failed to buy the coals then offering for spot shipment, even the high volatiles that had been attracted by the active demand, were in distress in the fall.

In June the Tidewater Coal Exchange was organized and for the most part it worked favorably at both New York and Philadelphia. Shippers have since been saved considerable items of demurrage at the piers, and there has not been the fault found that was usual at Hampton Roads.

A heavy volume of free coal came to New England from the Cambria, Clearfield, and Indiana districts, as well as from Pittsburgh, during June, July, August, and September. After Aug. 21, however, new sales were for the most part discontinued. By December the accumulation of priorities had set in, and only a small percentage of output was left for deliveries on the season's commercial contracts.

High prices, continual labor adjustments, and Government control of output were three features of trade from central Pennsylvania, so far as it related to the seaboard market in 1917.

Announcement to Hungarian Miners

On page 208 of this issue appears an announcement to Hungarian miners of which the following is a translation, which translation has been duly filed with the New York post office with the affidavit that is required by law:

In any country when war commences, everybody belonging to the country of the enemy is interned.

The United States has not done this. It will not intern Hungarians so long as they continue at work and make no trouble.

No one who does his duty will lose his job. Everyone will be as well treated as if he were a citizen of the United States, so long as he behaves himself.

He will not be deprived of his savings or his property. Hungarian miners have, therefore, reason to be grateful to the United States for its generosity.

Hungarian miners can show their good will by working steadily and quietly. This nation and the mine owner heartily appreciate the services of those Hungarian miners who have labored steadily to get out a large quantity of clean coal.

Résumé of the Anthracite Industry in 1917

By H. M. CRANKSHAW
Manager, Cranberry Creek Coal Co., Hazleton, Penn.

THE year 1917 has probably done more to shake up and modernize the anthracite coal industry than any two previous years in its history. The demand for coal, which has insured steady operation for the mines, has enabled the industry to settle down and devote every energy to output, with a resultant increase in production, in spite of a decrease of about 15 per cent. in the number of men employed.

During the past year every operation has been striving to employ mechanical devices which could be commercially used to advantage wherever possible. This has meant the increased use of electricity in almost every form. Electric shovels, electric hoists, together with electric drives for breakers and other machinery, have been installed without question. It is not now a question as to whether electric or steam power should be used, it is more a question as to where power can be obtained and how soon electrical appliances can be purchased. The electric power companies no longer ask where they can sell their power, but where they can get more power to keep up with the requirements of their customers.

Fig. 1 shows a modern hoist of first-class construction. This hoist handles two cars per trip on a slope, having a maximum pitch of 36 deg. with a rope speed of 1750 ft. per minute. The distance down to the first lift is 1020 ft., and the second lift, which will be 1400 ft. from the dump, will soon be opened up. The hoist is equipped with overhoist control post brake and 650-hp., 2200-volt, three-phase, 60-cycle motor and has a capacity of 80 cars per hour.

Fig. 4 shows a small electric hoist for a small isolated slope, handling one car per trip on a maximum pitch of 45 deg. with a rope speed of 500 ft. per minute. This hoist is equipped with a 150-hp., 440-volt, three-phase, 60-cycle motor and has a capacity of 125 cars per day. When coal is hoisted on slopes by electric power, which is paid for by meter, it naturally does not pay to use cars with antiquated stiff bearing, adding an appreciable amount to the tractive power required to pull the load. The logical thing to do is to use roller-bearing cars or cars with a good modern bearing. In this connection it does not pay to mix roller-bearing cars with other rolling stock, but a smaller mine or opening should be picked out and equipped entirely with roller-bearing cars, then comparative costs should be worked out.

Fig. 3 is an illustration of a modern roller-bearing car with strong wooden underframe, straight steel sides and bottom. This car is easy to repair in case of a wreck and has a wooden door.

Fig. 2 shows a small electric shovel at work handling waste bank. This shovel is a one-man revolving type with a 1-yd. dipper, being very economical and useful where a small shovel is required. It has a capacity of 400 tons per day handling waste bank, and is run entirely with one 20-hp. motor. This means a small cost for power, and as there is nothing to freeze up the shovel can be operated in the worst winter weather

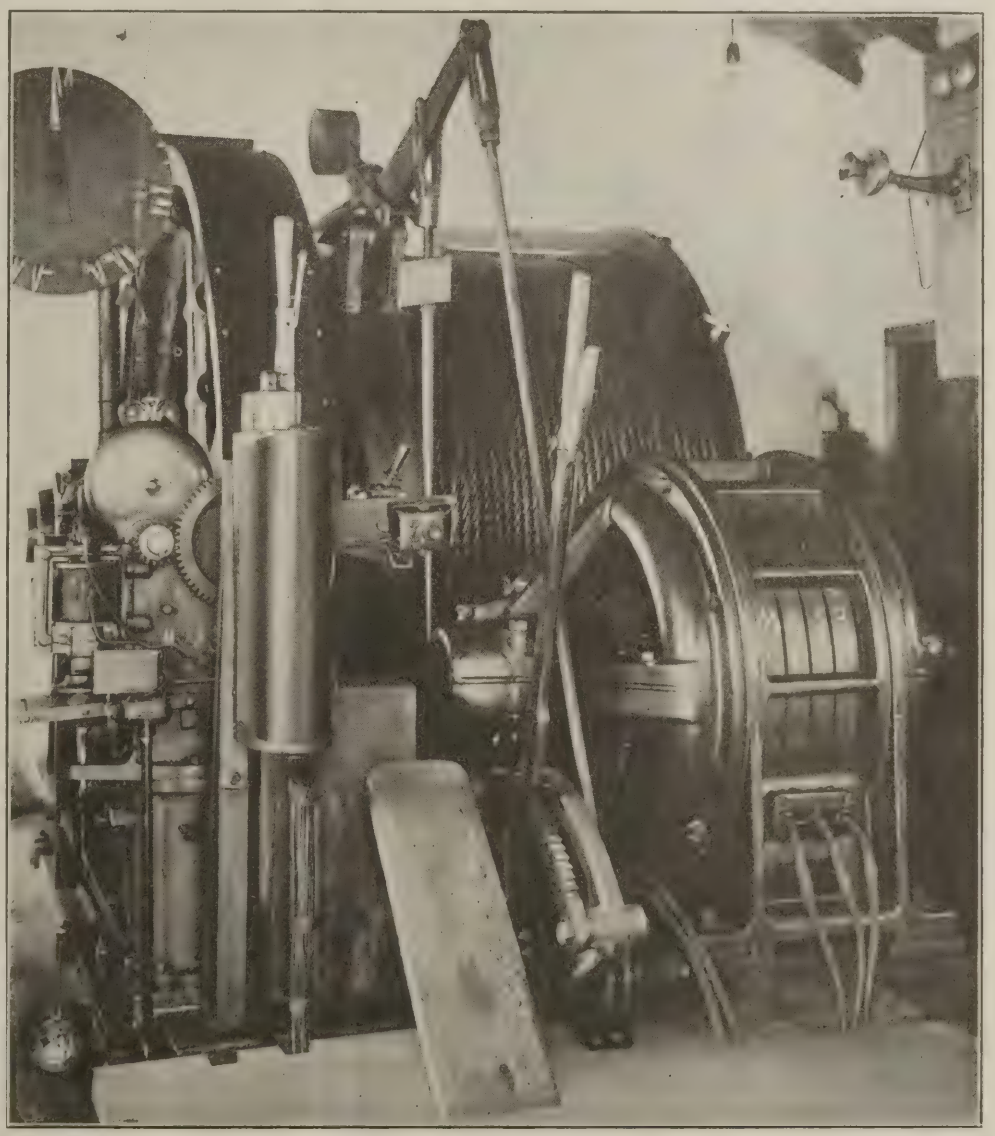


FIG. 1. MODERN HOIST OF UP-TO-DATE CONSTRUCTION
Made by Vulcan Iron Works at Wilkes-Barre; driven by General Electric motor; Cutler-Hammer electric control; mechanical end of control furnished by Vulcan Iron Works



FIG. 2. SMALL ELECTRIC SHOVEL HANDLING WASTE BANK AT HARWOOD, PENN.

without the delays experienced in running a steam shovel.

The illustrations referred to give some idea of the manner in which modern appliances have been and are being applied to the anthracite coal industry in order to speed up production. While there has been a ready market for all sizes of coal during the past year the selling end of the industry has also seen some extensive changes. Early in the year, when it became apparent that there was a shortage of coal, fuel speculators boosted the prices with the result that in May the Federal Trade Commission started an investigation. The results obtained were beneficial in curtailing speculation, until finally, in the latter part of August, the proclamation by President Wilson named Dr. Garfield as Fuel Administrator and fixed the prices of anthracite.

This, in one stroke, removed all doubt, put the industry on a settled basis and entirely eliminated all possibility of speculation in anthracite. The price fixing has been beneficial to the anthracite industry, inasmuch as it has tended to abolish the weaker middlemen, who by speculating in coal get the industry into ill repute.

Labor has had substantial increases during the past year. In 1916 a four-year contract covering the rate of wages to be paid was signed between the mine workers and operators. Early in 1917 it became apparent that as other industries were paying higher wages and as 20,000 men had already left the anthracite industry, something should be done to pay the workers in the anthracite region higher wages. A conference was therefore held, and in May, 1917, a war allowance was given the mine workers, which amounted to 23 per cent. for the lowest-paid labor.

After Dr. Garfield was appointed Fuel Administrator it became apparent that the mine workers were not yet receiving enough wages to equalize the high cost of living and other war conditions. Consequently, another conference was called and a further war allowance of 28 per cent. was given, the additional allowance to be paid from Dec. 1, 1917. The percentages quoted are for the outside laborers, who previously were the lowest paid of all employees in the anthracite industry. The total increases given the contract miners amount to 25 per cent.

The transportation of coal to market has brought out some interesting changes. Throughout the year



FIG. 3. MODERN ROLLER-BEARING CAR
Bearings are Whitney roller bearings made by Sanford-Day, who furnished wheels and axles

almost every conceivable scheme has been tried to facilitate the transportation of coal. The old system of placing embargoes on almost every line connecting with the one on which the shipper is located was finally abandoned as a failure.

Keeping certain cars on certain lines and returning same to point of origin empty was also tried out and abandoned. Finally the car supply got worse, until Government control of the railroads was declared by President Wilson, effective Jan. 1, 1918. A few days before this all car restrictions had been removed so that cars could, as much as possible, travel with a load.

We, therefore, have passed through a year in which old prejudices have been wiped out, all tonnage records beaten by 10 per cent. with a labor shortage of 15 per cent., and a year which in general has been beneficial to the industry inasmuch as it has tended to put it on a more efficient basis, comparable with the bituminous coal industry or the steel trade.

Colliery Notes

IN 1915 THE RAILROADS used 128,000,000 tons of coal. The coke ovens require 62,000,000 tons and manufacturing and power plants 180,000,000 tons. The domestic consumption was 100,000,000 tons. The balance of the 510,000,000 tons produced was used in miscellaneous ways.

RUSSIA'S PRODUCTION OF COAL during 1913 amounted to about 31,000,000 tons and in 1914 to 28,000,000 tons. As the Polish districts, which in 1913 yielded 22 per cent. of the aggregate output, are now occupied by Germany and Austria-Hungary, Russia's production of coal for 1915 cannot be estimated at more than 20,000,000 tons.

THE COAL INDUSTRY is the most important industry next to agriculture. It employs more than 750,000 men, furnishes 65 per cent. of all the traffic for the railroads and has made possible our great industrial development. It should receive attention in proportion to its importance, and though one-half the size of the agricultural industry, the United States spends less than one-eighth as much on the mining industry as for agriculture.

AN INTERESTING COMPARISON in the value of coal compared to fuel oil, natural gas and producer gas can be made when the heating furnace is not considered. Assuming coal to cost $2.50 per ton, cost of drying 50c. per ton and B.t.u. contents 14,000, then fuel oil having 140,000 B.t.u. per gal. would have to sell at 1½c. to make the same cost. Natural gas would have to sell at 11½c. and produce gas at 2c. Therefore, if powdered coal could be burned commercially, it would be the cheapest fuel.

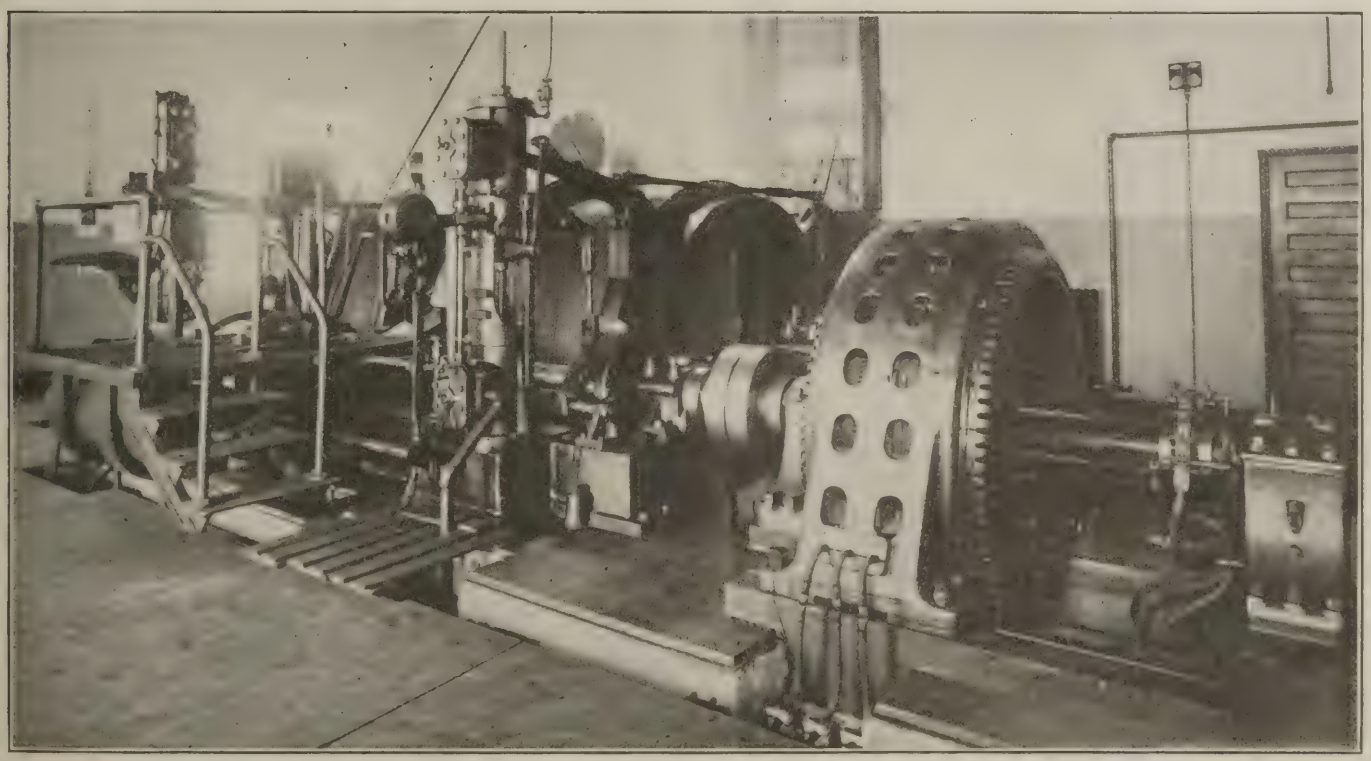


FIG. 4. VULCAN IRON WORKS ELECTRIC HOIST IN USE AT CRANBERRY, PENN.

Coastwise Shipping Conditions in 1917

SYNOPSIS — *Notable lack of tonnage throughout the year. Government requisitioning of ships and shortage of coal made 1917 an unparalleled year for transportation. Rates high, but less chartering than in 1916. Government fixing of steamer rates.*

THE year 1917 saw a considerable withdrawal of coastwise colliers for overseas transport. Several steamers were either requisitioned for immediate use by the Government or were sold with the Government's approval to syndicates representing France and Italy. The "Tidewater," one of the largest, was sold for $2,600,000, a fair indication of the market value of modern ocean carriers. Late in the fall a number of old-type steamers of Norwegian and Danish registry, together with colliers from the Lakes, were put into the coastwise trade to relieve the tense fuel situation caused, among other factors, by the lack of shipping.

Government Carefully Considers Question of Requisitioning Boats

Requisitioning of coal boats was gone into carefully at Washington. Conferences dealt with the subject in April, in an effort to see whether such drastic action could be taken without such an upset of all-rail service as would cause this territory to suffer acutely. Except for the old "hookers" that are still in service to shoal points the sailing vessel has almost entirely disappeared from the trade. In volume greater than ever before New England relied upon modern steamers for bringing fuel from Hampton Roads, and the withdrawal of ships together with the shortage of coal at Hampton Roads gave a serious turn to the steam coal situation. However, fewer ships were taken than at one time seemed likely, and had the coal reached the piers in better supply receipts at this end would not have been so far in arrears. At the end of December more than 100 boats were waiting for cargo at Hampton Roads and demurrage was accruing to sizable amounts.

As in 1916 the trend of coastwise freights was upward, especially the first half-year. A market rate of $2.50 in January on 5000- to 6000-ton steamers rose in April to $4.25, as high as $5.25 being paid on a 1000-ton barge to Boston. The Government accepted a bid in freighting 10,000 tons to coaling station at Melville, R. I., from Hampton Roads at $3.75, 5 days loaded and discharged, demurrage 25c., dispatch 7½c. Small steamers chartered at $6 from Hampton Roads to Gardiner, Maine, 5 days to load and discharge, 8c. per ton per day.

One of the developments of the year was the acquisition by interests allied with the Consolidation Coal Co. of the Coastwise Transportation Co., reorganized under the name of the Consolidation Coastwise Co. The latter now owns the "Plymouth," "Norfolk," "Suffolk," "Bristol," "Hampden," "Middlesex," "Coastwise," "Transportation," and others.

There was probably less chartering in the open market than had ever been the case previously. Steamers were about the only transportation available, and aside from those filling in coastwise trips between trips abroad or to South America, bottoms were extremely scarce. Even in cases where one or two trips coastwise would be arranged the holders considered the ships worth more to themselves than for charters in the open market. On the other hand cargoes were difficult to arrange. War risk at advancing rates was a factor the first half-year, although in December things had come to such a pass that incidental items like insurance or demurrage were hardly considered; they were just paid. The usual rate of demurrage on 5000- to 6000-ton ships figures now about 20c. per ton per day.

Complaints That Barges Were Not Moving Results in Formation of Towing Agency

In June rates receded temporarily and a still hunt for a ship might have produced one at $3 flat. A month later barges were taken at $2.50, the lowest barge rate of the year, from Hampton Roads.

There was a fair supply of barges, partly because some shippers declined to name season rates on their transportation, and also because of the number of barges in the open market that under normal conditions would have carried anthracite. Several bottoms were attracted to Southern ports by rates on lumber and ties.

Growing out of complaints that tows were not moved with dispatch and as a result of a hearing before Commissioner Stevens of the United States Shipping Board the different owners pooled their equipment and organized the New England Barge Owners' and Towers' Association. The difficulties in the way of carrying out the theory of such a pool are many. It was figured that about 2,000,000 tons yearly were carried in barges, leaving only 125,000 tons per week to be brought in steamers to Providence, Boston and Portland.

Shipping Board Takes Over Many Ships

Effective Oct. 15, the operation of all coastwise colliers above 2500 tons D. W. was taken over by the U. S. Shipping Board that commandeering might not be subject to delay, should the situation warrant. A rate of $2.50 was established to Boston, although in December this was advanced to $3. The Government paid the owners on the basis of $6.25 per ton and collected freight on the basis of $2.50 or $3, as the case may have been. The original arrangement was for 90 days but has since been confirmed. On prior charters the holders are entitled to have their ships resume contract obligations when the Government releases them. In December the Boston rate advanced to $3.

Barge rates to Long Island Sound, New York loading, hovered around $1.25@1.35 most of the year. When they advanced to $1.50@1.75 it was usually because coal was immediately available at the piers.

Four dollars was the ruling figure from New York to eastern Maine, but during the summer it was shaded to $3. Few season contracts were taken during 1917. Every owner of transportation is inclined to charter only from trip to trip, so rapidly are conditions undergoing changes.

Mining Chronology of 1917

By R. Dawson Hall

Jan. 1—Central Pennsylvania operators commence paying 10 per cent. bonus.

Jan. 13—Explosion at Fushun colliery, in Manchuria.

Jan. 22—Rocky Mountain Institute meets.

Jan. 30—Allegheny Valley Operators' Association agrees to give the same 10 per cent. bonus granted in other parts of central Pennsylvania.

Feb. 3—Diplomatic relations between the United States and Germany suspended.

Feb. 5—Fowler bill sponsored by United Mine Workers introduced into Pennsylvania House of Representatives. It called for the appointment of 25 assistant mine inspectors in the anthracite region.

Feb. 9—Statewide Prohibition Act signed by Governor Goodrich, of Indiana.

Feb. 10—New wage scale in Connellsville region goes into effect.

Feb. 13—The Illinois Senate passes a measure providing that statewide prohibition be voted on by referendum at 1918 general election.

Feb. 19—John Franklin Fort, of New Jersey, and William B. Colver, of Minnesota, nominated for Federal Trade Commission by President.

Feb. 19-22—American Institute of Mining Engineers meet at New York City.

Feb. 21—Senate measure forbidding shipment of intoxicating liquors into states which prohibit the manufacture and sale of such liquors is passed by the House. As a result 19 states become "bone dry."

Mar. 2—New coal-mining act in State of Washington signed by governor.

Mar. 3—Daniel Willard, the president of the Baltimore & Ohio R.R., becomes chairman of Advisory Committee of the Council of National Defense.

Mar. 6—Two indictments were returned by the Federal Grand Jury against 64 coal operators and 108 coal companies.

Mar. 7-9—Canadian Mining Institute meets at Quebec, Canada.

Mar. 13—Mine explosion at Henderson No. 1 mine, Hendersonville, Penn., in which 14 men were killed.

Mar. 25—The President orders the personnel of the Navy increased 18,000 and begins to call out regiments of the National Guard.

Mar. 26—Special convention of District No. 2 (central Pennsylvania) met at Du Bois, Penn., to discuss proposed wage increase.

Mar. 28-29—New England Coal Dealers' Association meets at Boston, Mass.

Mar. 30—Wage agreement completed in District No. 17, covering Kanawha field.

Apr. 1—A large number of contracts at low prices expire, and the corporations hampered by them begin to make large earnings. The day is hailed as "Emancipation Day."—New wage scale in Connellsville region goes into effect.

Apr. 2—President asks Congress to declare that a state of war exists with Germany. — Tuscarawas district grants an increase to the mine workers.—Indiana "goes dry."

Apr. 4—Senate passes resolution declaring that war exists.

Apr. 6—House of Representatives passes resolution declaring that war exists. President Wilson signs joint resolution.—John P. White, J. C. Kolsem and F. C. Honnold call for a conference of operators and mine workers in Central Competitive region.

Apr. 12—Conference of mine operators and mine workers of Central Competitive field meet in New York City. —The War Department practically makes a call for 500,000 volunteers.

Apr. 17—New wage scale in Central Competitive region is signed. Pick and machine mining is raised 10c. per ton; day labor is raised from $2.98 and $3 per day to $3.60; trappers wages are advanced from $1.57 to $1.90. Deadwork and yardage are unchanged. To be effective as from Apr. 16.

Apr. 18—Explosion at Lynden mine, Mason, W. Va. Lightning ignites powder in powder house and kills 5 persons.

Apr. 19—The Interstate Commerce Commission grants railroads permission to file tentatively 15 per cent. increase in freight rates pending hearings and ultimate decision of commission.

Apr. 21—Anthracite wage conference begins.

Apr. 24—Block-coal operators of Indiana (District No. 8) complete their scale.

Apr. 25—Anthracite mine workers obtain wage raises of from 11 to 35 per cent., the men with lowest pay getting largest increases.

Apr. 27—Mine explosion occurs at Hastings mine, Hastings, Colo., near Trinidad. In this accident 121 men are killed.

May 1—Anthracite operators testify before Federal Trade Commission at Washington, D. C.—A 20 per cent. increase in wage, granted by West Kentucky Coal Operators' Association, becomes effective.—Increase of wage in Missouri, Kansas, Oklahoma and Arkansas equal to that granted in Central Competitive district becomes effective.—New wage scale in Connellsville district goes in effect.

May 2—Anthracite jobbers and retailers testify before Commission.—Illinois operators complete agreement with mine workers.

May 3—Central West Virginia Coal Operators' Association grants an eight-hour day in the Clarksburg-Fairmont region with substantial increase.

May 5—Miners in District No. 18 (Western Canada) vote in favor of new wage-scale agreement, granting 12½ to 20 per cent. increase over previous agreement.—Two operating companies in Flemington district, West Virginia, grant mine workers eight-hour day, short-ton basis and wage increase of approximately 14 per cent. Others sign June 12.

May 7—Interstate Commerce Commission begins its hearings relative to the plea of the railroads for 15 per cent. increase in freight rates.

May 7-9—Illinois Mining Institute meets at La Salle, Ill.

May 9—Committee on Coal Production holds its first meeting in Washington, D. C.

May 10—Wage agreement between Southwestern Coal Operators' Association and United Mine Workers of America, District No. 14, to become effective as of May 1.

May 17—Southern Wyoming region makes a new wage contract increasing machine- and pick-mining rates 6 to 8c. per ton and regulating day wages.—Federal Trade Commission makes a report on bituminous-coal trade, recognizing the scarcity of fuel and the large demand for coal and opposing enlistment and conscription of mine workers.

May 18—Kentucky Mining Institute meets at Lexington, Ky.

May 24—Mine workers in central Pennsylvania, District No. 2, agree to accept a new wage contract.—Operators in Winding Gulf and New River fields of West Virginia grant to the miners a 12c. increase per gross ton and the weighing of all coal and to all their employees recognition of the union and the eight-hour day.

June 1—New agreement between Washington Coal Operators' Association and United Mine Workers comes into force.

June 2—Mine explosion at Rend No. 2, Herrin, Ill., in which nine men were killed.

June 3—Explosion at mine of Canadian (Dunsmuir) collieries, killing five men of a surveying corps, including George W. Bertram, chief surveyor.

June 4—Meeting in Philadelphia of operators and shippers of bituminous coal to North Atlantic ports for the purpose of pooling coal shipments.

June 5—Registration for draft of men for National Army throughout the United States.

June 5-6—West Virginia Coal Mining Institute meets at Charleston.

June 11—Rules of Tidewater Coal Exchange are formulated.

June 12—Eight Preston County mining companies and one Harrison County mining company join the two Taylor County mining companies in West Virginia that on May 5 signed a scale with the United Mine Workers of America.

June 19—Rocky Mountain Institute holds summer meeting at Glenwood Springs, Colo.

June 20—R. F. Green recommends that a commission be appointed to take charge of the mines in District 18 (Western Canada) and the Dominion Government appoints W. H. Armstrong to that position.—Federal Trade Commission reports to the Senate on anthracite and bituminous coal.—Interstate Commerce Commission refuses to approve 15 per cent. increase of rates filed by the railroads to meet the advanced costs in operation. However, the Eastern roads are granted high-class rates, thus adding nearly 10 per cent. to their gross earnings.

June 22—Canadian Government takes over operation of Crow's Nest Pass coal mines, which a strike had closed.

June 26-28—Conference of coal operators at Washington, D. C., meets and fixes prices.

June 29—Supplemental wage agreement between Kanawha coal operators and United Mine Workers of America.—House passes "Priority Act," giving President right to designate priority shipments in interstate commerce.

July 1—Tidewater Coal Exchange rules go into effect.

July 3—Strike commences in western Kentucky, embracing Hopkins, Union, Webster, Christian and Henderson Counties.

July 7—Senate passes bill to prohibit manufacture and importation of whiskey during the war.

July 9—By proclamation, President Wilson places exports of certain commodities (coal and fuel oil, iron and steel and ammunition, etc.) under control of the Government.

July 11—"Trading with Enemy" act passes the House.

July 18—M. A. Hanna & Co., of Cleveland, Ohio, purchases the anthracite mines of the Pennsylvania R.R. These are the Susquehanna Coal Co. and the Lytle Coal Co.

July 19—Pennsylvania law requiring motor-driven ambulances instead of horse- or mule-driven conveyances for transportation of those injured in the mines is signed by Governor Brumbaugh.

July 20—Draft is made for the National Army.

July 26—Explosion at No. 12 colliery of Dominion Coal Co., near New Waterford, Nova Scotia, in which 65 mine workers are killed.

Aug. 4—Explosion at West Kentucky No. 7 mine of West Kentucky Coal Co., Clay, Ky., in which 62 men lose their lives.

Aug. 11—Strike occurs in southeastern Kentucky and eastern Tennessee.

Aug. 20—Judge Robert S. Lovett, chairman, Union Pacific R.R., is designated as Federal Agent under Priority Act.—Lovett directs 46 railroads to give preference to such shipments from the coal mines as are consigned for the Northwest via the Great Lakes.

Aug. 21—President sets prices for bituminous coal at the mines. Run-of-mine varies from $1.90 to $3.25; prepared sizes from $2.15 to $3.50; slack or screenings from $1.65 to $3 per short ton.

Aug. 22—National Coal Operators' Association formed at Washington.

Aug. 23—President sets prices for anthracite at mines and regulates jobbing charges. Decision leaves price of coal at mines unaffected.—President names Harry A. Garfield as coal administrator under the "Food Control Bill."

Aug. 25—B. N. Baruch, R. S. Lovett and R. S. Brookins appointed a commission to make purchases for the allied nations.—V. E. Macy appointed public's representative on board to arbitrate shipyards' disputes. President names Macy. The Shipping Board and President Gompers, of American Federation of Labor, will also name a member each.

Aug. 27—Alabama dispute comes to an end after six days' conference.

Aug. 31—New wage agreement between Washington coal operators and United Mine Workers is signed.

Sept. 8—Coal transport order goes into effect in Great Britain. This order prevents cross-hauling.

Sept. 10-14—National Safety Council meets in New York.

Sept. 14—John P. White appointed adviser to the United States Fuel Administrator.

Sept. 22—Fuel Administration orders Canadian shipments reported.

Sept. 24—War Industries Board and steel producers agree to reduce price of pig iron, some steel products and coke, effective for four months. Price is $33 for pig iron and $6 for coke.

Sept. 26—National Coal Association is definitely organized.

Sept. 30—Dr. H. A. Garfield cuts anthracite pea-coal prices 60c. and raises price of coal in several parts of Missouri, Iowa, Arkansas, Oklahoma, Colorado, Alabama and Indiana (block-coal district).

Oct. 1—Temporary order cutting off Canadian coal supply in favor of the sections in the Northwest of the United States, which had apparently not received their share in the preference given to the Northwest by Judge Lovett.

Oct. 4—The Exports Administration Board decides to withhold American coal from such neutral (South American) vessels as were trading with European neutrals in goods which would ultimately benefit the enemy.

Oct. 6—Washington agreement is signed by representatives of operators and mine workers of Central Competitive field, whereby it is agreed that wages should be raised if price increases are conceded and that the operators shall pay a penalty if violations of the agreement by the mine workers are not penalized in full accordance with the terms of the agreements binding on them.—"Trading with Enemy Act" is approved.

Oct. 8-13—American Institute of Mining Engineers meets in St. Louis and other Middle West points.

Oct. 11—Four men killed at a haulage accident at the Flat Top mine, Flat Top, Ala.

Oct. 20—Colorado State Industrial Commission reports in favor of Colorado Fuel and Iron Co. in dispute with United Mine Workers of America, and indorses, in particular, the Rockefeller plan.

Oct. 23—An agreement is signed by the Southwestern Interstate Coal Operators' Association and the United Mine Workers of America, covering Missouri, Arkansas and Oklahoma. This was amended Nov. 17 and came into effect as of Nov. 1.

Oct. 27—Priority Order No. 2, relative to open-top cars, is promulgated.—President grants increase of 45c. a ton in price of bituminous coal, but provides that contracts, already made, which base prices on miners' wages, shall be increased as the contracts provide and not in accord with the increase in price set for coal not under contract. The order shall not apply where mine workers refuse to agree to some sort of penalty clause.—Prices are set for the first time in Michigan and are increased in Montana, Arkansas (Paris field),

Illinois (McLean Coal Co. of Bloomington), Missouri (Putnam County and longwall thin seam in Randolph County). In Montana, Arkansas and Illinois, where prices were raised on prepared sizes, they were concurrently lowered on screenings.

Nov. 1—Central Pennsylvania, South Wyoming and Southwestern wage scales come into force.—New safety standards for coal mines inaugurated by The Associated Companies.

Nov. 2—Priority order No. 3 is issued relative to movement of coal from mines in Utah and Wyoming.

Nov. 3—Announcement made that a special mining regiment, known as 27th Engineers, would be raised by voluntary enlistment.

Nov. 6—National Fuel Administrator declares his intention to requisition 10 per cent. of output of every coal mine in United States.

Nov. 7—Agreement at Thurmond, W. Va., between mine workers and operators. Increases granted are the same as in the Washington agreement. The penalty clause is accepted.—Agreement at Great Falls, Mont., between Montana mine workers and operators.

Nov. 8—Anthracite wage conference assembles.

Nov. 9—The Fuel Administration fixes price for blast-furnace coke, foundry coke and crushed coke to become effective Nov. 10.—Ohio wage-scale agreements made at Cleveland, Ohio.

Nov. 10—Connellsville operators grant an increase.

Nov. 12—Three men killed at Gowen mine, No. 40, Gowen, Okla.

Nov. 15—Federal law relating to the use of explosives comes into force.

Nov. 17—Illinois Mining Institute holds its fall meeting.—Order regulating price of byproducts and gas coke to become effective Nov. 19.—Penalty clause satisfactory to mine workers, operators and Fuel Administration is signed in Illinois.

Nov. 22—The Federal Court at Fort Smith awards Franklin Bache triple damages, amounting to $2,222,000, the defendants being the United Mine Workers of America.

Nov. 23—The Fuel Administrator makes regulation regarding new coal mines.

Nov. 25—John P. White resigns as president of the United Mine Workers of America and becomes assistant to Dr. H. A. Garfield, United States Fuel Administrator.

Nov. 26—Penalty clause for Illinois mine workers approved by the Fuel Administrator.

Nov. 29—Emerson Carey makes special ruling for Osage district mines in Kansas.

Nov. 29—Mine explosion at Old Ben No. 11 mine, Christopher, Ill., in which 17 persons lost their lives.

Nov. 30—Priority order No. 1, giving preference to shipment to Northwest, is rescinded.

Dec. 1—Anthracite prices are increased 35c. per ton.

Dec. 5-6—Coal Mining Institute of America holds its winter meeting in Pittsburgh, Penn.

Dec. 7—United States declares war against Austria-Hungary.

Dec. 10—Supreme Court hands down an important decision in favor of petitioner in case of Hitchman Coal and Coke Co. vs. John Mitchell, T. L. Lewis, W. B. Wilson et al.

Dec. 12—Live stock, perishable freight, food and feed are given a priority over coal except coal for railroad use. Supplies to the United States Government have right ahead of coal, also all supplies designated by the officers of the United States Government as immediately needed. Coal for byproduct plants is given priority over all other coal except coal for railroad use.

Dec. 14—Kentucky Mining Institute holds short session at Louisville, Ky.—Federal Trade Commission meets steel operators to discuss coke and steel costs in presence of representative of War Industries Board.

Dec. 17—Mine explosion at Yukon No. 1 mine, Susanna, near Bluefield, W. Va., in which 17 persons lose their lives.

Dec. 20—Mine explosion at Nemo mine, Harriman, Tenn., in which 11 men lose their lives.

Dec. 22—Differential of 6⅜c. established in Kansas in favor of the miner in the thin vein.

Dec. 28—Government operation of railroads established in United States by Presidential proclamation, William G. McAdoo, Secretary of the Treasury, being placed in charge.—President directs that the maximum prices already set on iron ore, coke, pig iron, steel and steel products be continued in effect until Mar. 31, 1918.

Research Fellowships at University of Illinois Experiment Station

To extend and strengthen the field of its graduate work in engineering, the University of Illinois maintains fourteen engineering experiment station research fellowships. One other such fellowship has been established under the patronage of the Illinois Gas Association. These fellowships, for each of which there is an annual stipend of $500, are open to graduates of approved American and foreign universities and technical schools. Appointments to these fellowships are made and must be accepted for two consecutive collegiate years, at the expiration of which period, if all requirements have been met, the degree of Master of Science will be conferred. Not more than half of the time of the Research Fellows is required in connection with the work of the department to which they are assigned, the remainder being available for graduate study.

Nominations to these fellowships, accompanied by assignments to special departments of the Engineering Experiment station, are made from applications received by the Director of the Station each year not later than the first day of February. The nominations are made by the station staff, subject to the approval of the executive faculty of the graduate school and the president of the university. Nominations are based upon the character, scholastic attainments, and promise of success in the principal line of study or research to which the candidate proposes to devote himelf. Preference is given those applicants who have had some practical engineering experience.

The Engineering Experiment Station, an organization within the College of Engineering, was established in 1903 for the purpose of carrying on investigations in the various branches of engineering, and for the study of problems of importance to engineers and to the manufacturing and industrial interests of the state. Research work may be undertaken in architecture, architectural engineering, ceramic engineering, chemistry, civil engineering, electrical engineering, mechanical engineering, mining engineering, municipal and sanitary engineering, physics, railway engineering, and in theoretical and applied mechanics.

The work of the station is closely related to that of the College of Engineering, and the heads of departments in the college constitute the administrative station staff. Investigations are carried on by members of the station staff and other members of the instructional staff of the College of Engineering, by special investigators employed by the station, and by the Research Fellows. Additional information may be obtained by addressing The Director, Engineering Experiment Station, University of Illinois, Urbana, Illinois.

Mining Anthracite in the Pennsylvania Wyoming Region in 1917

By J. H. HAERTTER
Division Superintendent, Lehigh Valley Coal Co., Wilkes-Barre, Penn.

THE year 1917 in the Wyoming region of Pennsylvania was one of unusual activity as compared with previous years when dullness in the trade, particularly during the summer months, necessarily reduced the number of days worked. Conditions which never previously existed in the history of the industry, due to the war, perplexed the minds of the operators and their official organizations, among whom were men of long and wide experience. A greater production was demanded in face of a 20 per cent. labor shortage, a shorter working day, a scarcity of railroad cars and the difficulty and delay experienced in procuring material and machinery.

The production of the region for the year—about 55 per cent. of total anthracite production—will be approximately 49,500,000 tons, the rail shipments, estimated at 43,000,000 tons, being greater than the total production in former years, which included local retail trade and coal consumed in colliery operations. A further increase was prevented by a number of petty strikes, lack of railroad cars and the usual observance of a number of holy days.

Many Banks Reclaimed During Year

The tonnage figures for the year, when available, will show unusual activity in the reclaiming of banks; a great number of steam shovels were used for the loading of the material from these banks and washeries were erected for preparing the product for market. Where the banks were not of sufficient size to warrant the erection of a washery, the material was loaded into mine and railroad cars and transported to the breakers for preparation along with the run-of-mine coal. In some localities dump wagons were used for haulage. By these latter methods numerous small banks in isolated locations, and heretofore considered unprofitable from a transportation standpoint, were reclaimed to meet the heavy demand for steam sizes. In fact so heavy was the demand at times for these sizes that the consumer asked for immediate shipment of the material as it was loaded from the bank. River dredging for the smaller sizes during favorable weather was also conducted on a larger scale than ever before, and the output, though small and not included in the production, relieved the situation to the extent that fuel used locally permitted shipments from the mines to out-of-town points.

Important as affecting the results for 1917 was the extent to which the use of coal-cutting machinery has developed during the past several years. This was notably true in the Scranton district, where the exhaustion of the thick and profitable beds made the installation of machinery for profitable mining and the maintenance of output compulsory. The mining of these low beds by machines, undertaken several years ago, during which time the best efficiency in their operation and the various methods of mining could be worked out, is a condition now to be appreciated by those operators who, confronted by a scarcity of miners and laborers, are able with these machines to maintain their production.

Of greater importance to the increased production was the increased number of air drills of the Jackhamer type which were put into use during 1917. Like the coal-cutting machines, and fortunately too, their practicability and efficiency had been fully demonstrated, due, as stated before, to a shortage of men as a result of the exodus to other industries and the large virgin territory of low coal from which the tonnage must be obtained. These drills, which were first introduced for drilling the rock for height in the low beds, are now used extensively for drilling the coal.

Several of the large coal companies now carry the drills in stock for the convenience of the miners, who are allowed to purchase them on the installment plan at a small amount per month. Another method in vogue in the low beds where the mine car follows, is to employ competent company men, experienced in rock work, to drill, fire and gob or load the rock on the night shift. In this way the miner is kept constantly on coal during the entire time he is in his chamber. Gangways, too, are driven ahead more rapidly, and territory for chambers is therefore also developed more rapidly. That a greater production will come from the same number of working places is readily appreciated. This method, owing to labor shortage and manifested discontent among miners because of the shortage, was introduced during the year and materially benefited production.

Many Electric Locomotives Installed

Electrification of haulage roads was continued during the year on a large scale. Perhaps the demand for no other class of material was so great as that for electrical equipment. Only the inability of the manufacturers of electric locomotives to make deliveries in the usual time prevented what would have probably been the banner year in motor installation, in spite of the fact that the price over former years had almost trebled. A great number of electric locomotives, however, were installed and they, together with the number of storage-battery locomotives which came into extensive use during the year because of the scarcity of material for the usual line extensions, played an important part in the production, particularly where a scarcity of mules and drivers would have had a serious effect.

During the year, haulage at several operations in the Scranton district was almost entirely converted from mule to electric. At these same operations, mining also was almost entirely done by machines, either coal-cutters or air drills, the air for which was furnished by small electrically driven air compressors, mounted on

narrow-gage mine trucks for transportation to and from the working places. The gigantic electrification of these operations undertaken primarily several years ago for the profitable mining of low beds has played no small part in the production of anthracite in 1917.

Perhaps one of the most prominent features in anthracite operations for the year was the stage which all the companies had reached in concentration, pumping, transportation, preparation and, in many localities, power. At no time has the wisdom of this movement, begun several years ago, been so forcibly appreciated. In fact should the war continue for any great length of time, and should there be an additional drain on the labor forces, further and hurried concentration will undoubtedly result.

Summed up, therefore, the increase in annual production was due to the steady time worked as compared with former years, the reclaiming of banks and, to a large extent, the increased use of machinery.

A large amount of credit must be given, nevertheless, to company and union officials, miners, company men and boys, who, immediately upon the declaration of war, roused to patriotism, have labored perhaps as never before to give to their country and fellowmen the coal needed to help win the conflict. Surely the year 1917 will go down in anthracite history. We can make the year 1918 bigger and better. Let us begin at once to do it. Many miners have worked extra time in spite of the fact they had to load the coal formerly loaded by the laborer after the miner had drilled his holes and fired them. The majority of officials, foremen and clerks sacrificed the usual summer vacations in order to produce a larger tonnage.

Safety Banquet at Gary, W. Va.

The eighth safety-boosting banquet of the United States Coal and Coke Co. was held in Gary, W. Va., Saturday evening, Jan. 12, 1918. Ever since 1909 it has been the custom of this company to give a banquet each year to the superintendents, assistant superintendents, foremen, subforemen, bosses, etc., upon whom devolves the work of keeping the mines safe. Guests, friends and former employees of the company are also invited to these affairs.

In the present instance the various speakers laid about as much emphasis upon the need of maximum production as upon maximum safety. All were made to realize that the country is at war and that a high rate of production per man is necessary in order to insure the successful prosecution and prompt winning of the struggle.

The room where the banquet was held was tastily decorated for the occasion, chiefly with the flags of this country and its Allies. An orchestra behind a screen of evergreens furnished music during the evening, opening the program with the "Star Spangled Banner."

General Edward O'Toole presided as toastmaster. Wall charts showing the progress the company had made in accident prevention were explained by H. N. Eavenson, chief engineer. Although these diagrams indicated that a steady advance had been made, the management is not satisfied with the results so far attained; and it is believed that a still better showing can be made.

Among the speakers were H. I. Shott, editor of the *Bluefield Daily Telegraph;* L. C. Anderson, of Welch, W. Va.; H. C. Ogden, editor of the *Wheeling Intelligencer;* the Rev. Father Madert; the Rev. Mr. Benton and General O'Toole.

At the close of the evening the audience rose and was dismissed with a fervent prayer for the Nation, its armies and its people.

Illinois Mining Commission Visits Pittsburgh District

A commission appointed by Governor Frank O. Lowden, of Illinois, has been investigating the mines in the Pittsburgh field with the purpose of collecting data on the safety provisions being taken therein. The members of this commission are: Evan John, director, Illinois Department of Mines, Springfield, Ill.; William Hutton, miners' representative, State Mining Board, Springfield, Ill.; Robert M. Medill, general superintendent, O'Gara Coal Co., Harrisburg, Ill.; M. S. Coleman, general superintendent, Saline County Coal Co., Harrisburg, Illinois.

During its trip this commission visited Banning No. 2 mine, of the Pittsburgh Coal Co.; Marianna mine, of the Union Coal and Coke Co.; the Experimental Mine, at Bruceton, of the United States Bureau of Mines, and Vesta No. 4 mine, of the Vesta Coal Co. The commission will continue its investigations at other operations throughout the Pittsburgh field as well as in adjoining districts. James E. Anderson, chief field inspector of the Associated Companies, through the courtesy of H. M. Wilson, the director of its operations, piloted the visitors through the mines. Director Evan John expressed himself in an interview much interested in what he had seen and complimented the Pittsburgh district on what it had done to bring its safety provisions up to date.

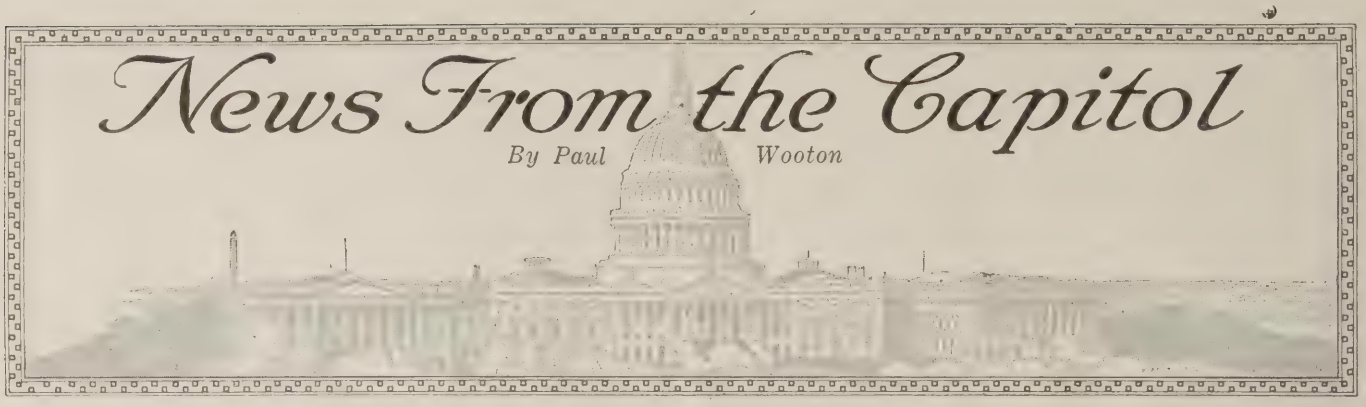
For Use in Estimating Concrete

For the following figures we are indebted to "The Ransome Book" on "How To Make and How To Use Concrete." Roughly speaking, a sack of cement occupies a cubic foot, so the mixture and material columns are the same.

Mixtures		Materials			Aggregate		
Cement	Sand	Pebbles or Stone	Cement, Sacks	Sand, Cu.Ft.	Pebbles or Stone, Cu.Ft.	Mortar, Cu.Ft.	Concrete, Cu.Ft.
1	1½	..	1	1½	..	1 75	....
1	2	..	1	2	..	2 10	....
1	3	..	1	3		2 80	....
1	1½	3	1	1½	3	....	3 50
1	2	3	1	2	3		3 90
1	2	4	1	2	4		4 50
1	2½	4	1	2½	4		4 80
1	2½	5	1	2½	5		5 40
1	3	5	1	3	5		5 80

The table following gives the quantities per cubic yard of compacted concrete of the mixtures specified:

Mixtures		Materials			
Cement	Sand	Pebbles or Stone	Cement, Sacks	Sand, Cu.Ft.	Pebbles or Stone, Cu.Ft.
1	1½	..	15.5	23.2	....
1	2	..	12.8	25.6	....
1	3	..	9.6	28.8	....
1	1½	3	7.6	11.4	22.8
1	2	3	7.0	14.0	21.0
1	2	4	6.0	12.0	24.0
1	2½	4	5.6	14.0	22.4
1	2½	5	5.0	12.5	25.0
1	3	5	4.6	13.8	23.0
1	3	6	4.2	12.6	25.2



[Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Metropolitan Bank Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 703, Metropolitan Bank Building, Washington, D. C., while at the capital.—Editor.]

Garfield Defends Order That Shut Down Industries

Washington had no advance notice of the order prescribing coalless days. In fact every effort apparently was made to keep the real nature of the order a secret. Many members of the Fuel Administration's staff were taken completely by surprise when the formal announcement was made. On the day the order was issued, a rumor reached the correspondent of *Coal Age* that curtailment of certain nonessential industries was in contemplation. Inquiry at the Fuel Administration, however, brought forth a statement that the report doubtless came from an effort that was being made to determine a temporary curtailment in New York City until deliveries could be made more rapidly from Jersey terminals. The announcement that the coalless days were to be put into effect was issued at 10 p.m., Jan. 16.

The plan is thought by many to have originated outside of the Fuel Administration. Owing to the fact that the order is so apparently a railroad relief measure, some think that it was conceived by friends of the Administration who saw in it an opportunity to allow the criticism to fall on Dr. Garfield while the one to benefit most would be the Director General of Railroads. Any such version is denied vigorously at the Fuel Administration, where it is said that Dr. Garfield has had the plan in mind for many weeks but was hoping against hope that the situation would better itself without such drastic action. P. B. Noyes, the head of the conservation division of the Fuel Administration, is recognized as having been an important factor in securing the issuance of the order at this time. He had been investigating fuel conditions in New York and in Boston and became convinced that a general shutdown would be necessary before the situation could be brought well into hand. The actual drafting of the order was done by H. D. Nims.

Following the publication of the order, the Senate of the United States allowed itself to reach a degree of excitement that has few precedents. The political side of the situation received a thorough airing on the floor of the Senate and only 19 votes were cast against a resolution introduced by Senator Hitchcock requesting a five-day suspension of the order to allow those opposing it to be heard. The passage of a day or two, however, brought into plainer view the practical side of the order.

At first there were few who would admit that the order has a practical side, but it was not long before the voices of the friends of the Fuel Administration could be heard. They declared that there is nothing quixotic about the order, but that it is a business proposition to which many far-seeing business men had subscribed prior to its promulgation. They pointed out that mines are in no way interfered with and that there is no interference in the normal course of coal traffic until the cars reach destination, when distribution is superintended so as to allow the building up of slight reserves on the part of the consumers in whose hands it is most necessary to have an adequate supply of coal.

It was also pointed out that care was taken to protect coke ovens, food industries and others which naturally were entitled to exemption. Just as in the case of the selective service act, every effort was made to make it apply equally to all similarly situated. One prominent manufacturer was quoted by the friends of the Fuel Administration as declaring the five-day shutdown as the best possible step that could be taken to benefit the manufacturer, even if no consideration is taken of the good to be derived from clearing up the transportation situation. This manufacturer is said to hold the opinion that there is not a plant in the United States that will not profit as a result of the shutdown. It will give them a chance, he says, to oil up, overhaul and get into shape to continue operation under high pressure.

Most of the coal operators, judging from the opinions expressed in their communications to Washington and from the verbal expression of those in the capital, regard the order as primarily a railroad relief measure. Many of them think that Dr. Garfield unwittingly is pulling Mr. McAdoo's chestnuts out of the fire. They admit that manufacturing plants were speeded too high for the railroads, but they believe the situation should have been remedied by a direct order from Mr. McAdoo, who, they declare, could have met the situation simply by keeping new traffic off the rails and by requiring more prompt unloading of equipment and more efficiency in the return of empty cars. The opinion is expressed

that Mr. McAdoo will be beset by criticism if he does not succeed in eliminating congestion after the Fuel Administrator has shut up the country for five days. After this, many think there will be no excuse for a condition which permitted 45 miles of anthracite trains to be stalled and which caused great coal-producing districts, such as the Kanawha field, to be impotent in relieving the coal shortage by receiving 7400 cars when 59,000 were urgently needed.

It is admitted that, had Dr. Garfield's arguments for his order been presented a day or two before its issuance, the storm of disapproval would have been less severe. As it was, Dr. Garfield's defense of the order was not issued until Jan. 18. This defense is regarded very generally here as being a very able one. It reads as follows in its entirety:

The most urgent thing to be done is to send to the American forces abroad and to the Allies the food and war supplies which they vitally need. War munitions, food, manufactured articles of every description, lie at our Atlantic ports in tens of thousands of tons, while literally hundreds of ships, waiting loaded with war goods for our men and the Allies, cannot take the seas because their bunkers are empty of coal. The coal to send them on their way is waiting behind the congested freight that has jammed all terminals.

It is worse than useless to bend our energies to more manufacturing when what we have already manufactured lies at tidewater congesting terminal facilities, jamming the railroad yards and sidetracks for long distances back into the country. No power on earth can move this freight into the war zone where it is needed until we supply the ships with fuel.

Once the docks are cleared of the valuable freight for which our men and associates in the war now wait in vain, then again our energies and power may be turned to manufacturing, more efficient than ever, so that a steady and uninterrupted stream of vital supplies may be this Nation's answer to the Allies' cry for help.

It has been excess of production, in our war-time speeding up, that has done so much to cause congestion on our railroads; that has filled the freight yards to overflowing; that has cluttered the docks of our Atlantic ports with goods waiting to go abroad. At tidewater the flood of freight has stopped. The ships were unable to complete the journey from our factories to the war depots behind the firing line.

Added to this has been the difficulty of transporting coal for our own domestic needs. On top of these difficulties has come one of the most terribly severe winters we have known in years.

The wheels were choked and stopped; zero weather and snowbound trains; terminals congested; harbors with shipping frozen in; rivers and canals impassable—it was useless to continue manufacture and pile confusion on top of confusion. A clear line from the manufacturing establishments to the seaboard and beyond; that was the imperative need. It was like soldiers marching to the front. The men in the foremost ranks must have room to move.

More than a shock was needed to make a way through that congestion at the terminals and on the docks so that the aid so vitally needed by the Allies could get through.

The incidental effect of this transportation situation on coal production has been disastrous. There is and always has been plenty of fuel, but it cannot be moved to those places where it is so badly needed while railroad lines and terminals are choked. Throughout the coal fields scores, even hundreds, of mines are lying idle because of railroad inability to supply the cars to carry away their product. Coal mines cannot operate without cars. Cars cannot be supplied while the railroads are crippled by the present freight congestion; which keeps idle cars lying useless in the freight yards.

In the past week the production of coal has been disastrously reduced. Reports in some cases have shown 90 per cent. of the mines in certain fields closed completely.

This is war! Whatever the cost we must pay it so that in the face of the enemy there can never be the reproach that we held back from doing our full share. Those ships laden with our supplies of food for men and food for guns must have coal and put to sea.

Baltimore & Ohio Does Not Have To Furnish Cars to Wagon Mines

Refusal, under certain conditions, of the Baltimore & Ohio R.R. to supply coal cars for the use of wagon mines is upheld in a tentative report made public Monday, Jan. 21, by the Interstate Commerce Commission. Since July 24, 1917, the Baltimore & Ohio has refused to supply wagon mines with open-top cars for loading and shipping of coal from its public team tracks. The railroad continues to supply such equipment to mines equipped with tipples, and to wagon mines where the loading is accomplished on private or industrial tracks. Box cars only are furnished for team-track loading. The commission holds that: "Although in its nature a discrimination as between shippers as a class, this practice is shown to operate in the interests of the public as a whole; and in the light of such results it is neither an unjust discrimination nor is it unduly prejudicial within the meaning of Sec. 3 of the regulating statute."

Peabody Suggests Price Changes

Testifying before the Senate Investigating Committee, Jan. 17, Francis S. Peabody made the following suggestions with regard to price:

All coal from seams 36 in. and under, $4; from seams 36 to 48 in., $3.50; from seams 48 in. to 5 ft., $3; from seams, 5 ft. to 6 ft., $2.50. All the prices mentioned are for mine-run.

Mr. Peabody specified that the Bureau of Mines is to establish the practical commercial ash content in all fields, this finding to be used as a standard. Coal, with ash exceeding the standard, is to be penalized $1 a ton. A premium of 10c. a ton is to be allowed on prepared sizes. An addition of 20c. per ton is to be allowed for coal that is picked over the picking table. Coal handled through washers or spiralizers would be allowed a premium of 30c. a ton.

The zoning plan proposed by Mr. Peabody and an analysis of the law governing the sale of coal in England were embodied in the record of the committee in connection with Mr. Peabody's testimony.

Weekly Production Statistics

Weather conditions are blamed largely for a decided decrease in the average daily production of bituminous coal for the week ended Jan. 12. The average daily production was 1,735,023 tons, making the week's production 10,410,140 tons. Beehive coke, to the amount of 586,628 tons, was produced for the week ended Jan. 12, which shows a decided improvement over the preceding week. Anthracite shipments for the week under review were 35,720 cars, which still is considerably under the average. These figures are compiled from the returns to the United States Geological Survey.

An analysis of production during the week ended Jan. 5 shows that the percentage of full-time output was 74.

This compares with 75.4 per cent. for the week preceding. C. E. Lesher, the geologist in charge of coal statistics at the Geological Survey, makes the following comment on conditions during the week of Jan. 5:

Throughout the United States the ratio of tonnage produced to full-time capacity amounted to 74 per cent. during the week ended Jan. 5. Although approximately the same proportion of the potential capacity was lost during the week of New Year's as during Christmas week, there was a change in the relative importance of the causes of loss. Losses due to labor declined from 10.1 per cent. during Christmas week to 3.1 per cent. during the week of New Year, while at the same time losses attributed to shortage of cars increased from 9.4 to 17 per cent.

Improved working conditions were reported from Illinois, Indiana, central Pennsylvania, the Winding Gulf and Panhandle districts of West Virginia; from the Cumberland-Piedmont field, western Kentucky, and the entire region of the South and West, from Virginia and Alabama to Kansas and Missouri, and the Rocky Mountain States. Unfavorable conditions were reported from Ohio, western Pennsylvania, Somerset County, Pennsylvania, northeastern Kentucky, and in the high-volatile, Junior Philippi, and Fairmont districts of West Virginia. In each of these fields the decline in production was attributed to a lack of cars more acute than that experienced during the week before.

The total capacity of the country's byproduct coke plants is approximately 500,000 tons per week. During the week ended Jan. 5, operation was at 81.1 per cent. of full-time capacity. The chief limiting factor was the inability of operators to secure coal.

State Fuel Administrators Given Power To Divert Coal or Coke

Formal authority to divert coal or coke to meet the emergency demands of domestic consumers was conferred on State Administrators in a regulation promulgated on Jan. 14 by the United States Fuel Administrator, Harry A. Garfield. State Administrators were authorized to make diversions to relieve distress in a telegram sent by the U. S. Fuel Administrator on Dec. 31. The order promulgated on Jan. 14 confirms that authority. It provides:

Whenever the state fuel administrator in any state is of opinion that, in the present exigency occasioned by the war in which the United States is now engaged, the consumers in any city, town or other locality in such state are in pressing need of coal or coke for domestic use, whether by reason of a general shortage of coal or coke therein or of an unequal distribution among the residents thereof, and that there is actual or threatened inconvenience and suffering of the population therein, or that any public utility in such state conducting a service essential to the health, convenience or industrial activity of any of the people of such state, is in danger of discontinuance for lack of coal or coke, so that in either case the efficiency and ability of the people of such state, or any part thereof, for performing their part in the conduct of the war may be lessened or impaired, such state fuel administrator may take the action hereinafter indicated.

He may divert to or for the use of such domestic consumers, or to or for the use of any such public utility, any coal or coke in transit by railroad or other conveyance within such state and consigned or intended for delivery to any consumer, dealer or other party therein for consumption, sale or use in such state. Such diversions shall be made in accordance with the lawfully published tariffs and reasonable regulations of the railroads now under control of the United States Director General of Railroads. As soon as practical after diversion the state fuel administrator shall cause notice to be sent both to the shipper and to the consignee of the coal or coke so diverted; and the shipper thereof will be expected, so far and as soon as practical, to replace for such consignee an equal amount of coal or coke of the same grade and quality as that diverted.

As a supplement to this regulation, the Fuel Administrator on Jan. 15 directed that all shipments diverted under the authority conferred in the regulation should be made at the Government prices for the coal or coke. Under the regulation, all coal, whether it has been sold and shipped or not, shall be subject to diversion at the Government prices. The shipper of diverted coal will, however, be allowed to collect a charge of 15c. per ton to cover handling, provided no jobbers' commission is added to the price.

The regulation of Jan. 15 on this point reads:

All shipments of coal, whether f.o.b. mines or otherwise, and all shipments of coke f.o.b. ovens or at place of storage or otherwise, shall be made subject to the diversion of such coal or coke by the United States Fuel Administrator or any persons acting under his authority, to any persons or consumers, and for any of the purposes heretofore or hereafter authorized by him. The title of the purchaser, consignee or consumer, in the case of any such shipments of coal or coke, which by custom or law might become vested at the time and place of such shipment, shall from and after the effective date hereof be subject to the condition that the coal or coke so shipped may be diverted as aforesaid, and that in case of any such diversion, the title and interest of such purchaser, consignee or consumer with respect to any coal or coke so diverted shall be completely divested and terminated and his liability to pay therefor shall cease. The person or consumer to whom any such coal or coke is diverted shall become liable as of the time of such diversion to pay to the shipper thereof the price in force at the date of shipment as fixed therefor by or under authority of the President of the United States, plus transportation charges thereon and plus a handling charge of 15c. a net ton to cover costs of rebuilding, collection and replacement. If such handling charge is made no jobber's commission shall be added to the mine's price. If the coal or coke so diverted was shipped under a valid and enforcible contract the quantity thereof so diverted shall not be charged against the amount to which the contract applied.

Effective at 7 a.m., on Jan. 15, 1918.

(Signed) H. A. GARFIELD,
United States Fuel Administrator.

Brief Washington Notes

At the request of the Fuel Administrator, the Director General of the Railroads placed an embargo on open-top cars suitable for coal loading, so as to reserve this class of equipment exclusively for the handling of coal.

Both the Shipping Board and the Fuel Administration have sent representatives to New York to assist A. H. Smith, the Director General of Railroads, in making arangements looking to the pooling of facilities for bunkering ships in New York harbor.

East St. Louis has the reputation of being able to make itself heard. This was fully borne out by the manner in which the Illinois city protested against the Fuel Administrator's order, which closed its industries and allowed those of St. Louis to continue operation uninterruptedly. East St. Louis interests were anxious to have themselves included with St. Louis in being exempt from the order. The protest nearly resulted, it is said, in the inclusion of St. Louis in the territory.

THE LABOR SITUATION

General Labor Review

A splendid spirit animates the mine workers at their biennial convention. In the face of great national needs almost every mine leader has become a patriot. The one or two who have not risen to the occasion have been a thorn in the flesh of the union for years and are a festering sore today. It is just to say they are few and unpopular.

Central Illinois and the Southwestern coal field seem full of disturbing elements. The union cannot overlook these men. It would be best to appoint a body of spellbinders to bring these men to a better mind. No work could do more to redound to the credit of the union.

Leaving Everything Up to the Mine Operator

The mine workers near Shamokin want to use the strike as a club to bring the street-car companies to time. The operator is being made "the goat" for all the mine workers' troubles. After a while the men at the "Millennium Colliery" will quit work to make Maria put pumpkin pie in her husband's pail and make Billy carry in a pail of coal. An editorial in the present issue gives further consideration to this question. The central Illinois miners are asking to ride free to work, the operator to pay the bill. Is it not a fact that the miners have a contract, twice revised, already? Does the Ways and Means Committee believe that a new contract should be written every month?

Mine Workers Supporting Chicago Lawbreakers

One of the mine workers' locals, near Harrisburg, Ill., is alleged to have levied an improper assessment which was to be used in defense of some Industrial Workers of the World, who are under arrest in Chicago. Most of the members in the local refused to pay the assessment and an investigation is now being made.

A strike of 250 miners in the employ of the Durham Coal and Iron Co., at Pittsburg, Ga., recently took place and lasted a week, when a compromise was effected. The men demanded an increase of 20 per cent. on the present price, which is 85c. per ton. Details of the settlement are not available.

Miners Decide That Penalty Clause Is Reasonable

Strange to say, the penalty clause created no trouble at the meeting of the international convention and no oratory was needed to stay the discontent, for help came from a totally unexpected source. Peter McKesky, classed as a radical of radicals, formerly an anthracite miner but now in the bituminous fields of western Pennsylvania, rose and said: "The penalty clause is all right and I am going to stand for the agreement." Peter, during his short stay in the Pittsburgh region, has made himself quite objectionable to the Fuel Administration. He was arrested for staging an illegal strike and for his offense was lodged in jail. But it is all over now. He made his confession of error and took the convention by storm.

Anthracite Men Keep Hands Off Soft Coal

The anthracite mine workers do not want their bituminous fellows to interfere in their business and showed their restraint by not discussing the penalty clause, which has no application to the anthracite region. District officials from Ohio, Illinois, western Kentucky and Tennessee and fully 20 delegates indorsed the agreement. The opposition completely faded away. The officials declared that if the penalty clause was deleted the whole contract would be erased with it. One part was as binding as the other. The clauses stand and fall together. It is finally decided that the foreign language section in the United Mine Workers' Journal is to be maintained.

United Mine Workers' Convention

The convention of the United Mine Workers is justifying the good will of those who have always hoped for the best from the union. Those who have declared that the United Mine Workers were United States citizens and bound in the long run to act as patriots and hard-headed sensible men, who could be trusted with a degree of confidence, have reason not to be ashamed.

In fact, the men of whom we have most to be afraid are those who are outside the industry and who interfere without knowledge. We have the best of men at Washington, but as they are out of touch with things as they are, their judgments fill us with apprehension. Eventually, perhaps, when they come from the Land of Dreams to the Country of Things That Are, we may get better Government and important results.

Have No Time for Blackguarding Operators

But when the miners talk of coal, they speak of something of which they are sure, and that their fingers have handled. They don't waste time blackguarding the operators, for they know that whatever their faults may be—and like everyone else they are not perfect—they are trying to do their best to produce coal as fast as the railroads will let them.

There is no class in coal mining except the coal-industry class. Given a chance, the coal men, from operator to miner, will produce coal to their utmost ability at least so long as the war lasts. Witness the comment of Frank J. Hayes, president of the United Mine Workers: "It is too bad that the American people are suffering the hardships of a coal famine when they have an inexhaustible supply of coal almost at their doors. Had the miners been provided with an adequate car supply during the past year the coal market would have been glutted and not an industry nor a domestic consumer could have suffered from the deplorable condition that now exists.

"Make Every Sacrifice To Boost Production"

"As president of the United Mine Workers of America I have repeatedly urged our membership of 450,000 to make every possible sacrifice to boost production, realizing that congested railroad transportation would eventually result in the shortage with which we are confronted today. In no branch of industry do employees brave greater dangers or make larger sacrifices than in coal mining.

"It is my hope that something can be done to eliminate the widespread suffering threatened and, to that end, I again ask the coöperation of every mine worker, requesting you, one and all, to do your best to produce a maximum output day by day. In many localities miners are practically working only half time. They have been discouraged somewhat by car shortages, but I am sure they will bend every effort when cars are available 'to do their bit big.'"

Miners Not To Blame for Recent Shutdown

Ex-president J. P. White said: "It is to be regretted that the car shortage makes necessary the Federal Fuel Administrator's orders restricting manufacturing and business. Our sympathy goes out to the wage earners who will keenly feel the effects of this step.

"The miners are fortunate that this action can in no way be attributed to them, for they have responded loyally and coöperated to their utmost in attempts to supply the needs of the Government and the people. The situation is to be attributed to inadequate car supply. The miners now, as in the past, will be found ready and willing to do their part loyally and to produce the coal needed by the nation.

"The stern realities of the situation are brought home to every citizen. The hour of sacrifice is here and will and must be met. With the most abundant facilities for producing fuel, we find the activities of the miners reduced and the mines idle only because our transportation facilities are wholly inadequate to meet national necessities."

When the resolution urging the Federal investigators be given complete power to interpret contracts existing between mine workers and operators was introduced, it found much opposition. The mine workers, as also the operators, do not feel great confidence in fuel administrators. These disinterested but untrained officials do not understand mining conditions and would be likely to make unfortunate decisions and to be somewhat slow in making them.

Do Not Want Federal Arbitration of Disputes

Several of the speakers declared at the convention that appointing such arbitrators would be a serious blunder. It would only complicate mine labor troubles. However, we are not disposed to believe that there are labor troubles in prospect. The mine workers ar showing an excellent spirit, and the disposition to do right and take a generous view of matters is growing steadily. The operators are similarly being drawn in sympathy and interest to the side of their men. Many occasions for bitterness in the past are now entirely unlikely to make trouble.

The proposal to give such powers to Federal investigators was contained in a resolution which sought to provide a means by which the operators' accusations that the mine workers were deliberate slackers might be refuted. The resolution brought the first real fight of the convention. The creation of a Federal commission was suggested, composed of an equal number of employers and employees, whose duty it would be to investigate charges made by both parties to the wage contract.

Afraid It Might End in Labor Conscription

White, Hayes, Green, Walker and the committee men before whom the resolution was considered declared that such a step would possibly invite the conscription of labor. White and Hayes denied that the charges occasionally made by a few operators were given credence at Washington. He assured the author of the resolution that the Government knew of the truth or falsity of the reports charging miners in various localities with slacking.

Of course there are slackers among the mine workers. There is no need for a commission, for it could only determine what we well know, that you can't expect to find 450,000 men with a single purpose. It is not to be expected that all the locals will be found free of pro-Germanism and Bolshevikism. But as a body the union needs no defender. It is the duty of the union, as it will be its pleasure, to bring these wilful men to a better mind.

Let the union cease to try to defend itself. It can only fall into public disesteem by so doing. It will be obliged to admit, after an investigation has been made, that some men have been unpatriotic. That is an unfortunate admission for anybody to have to make.

To Answer Union Critics by Deeds, Not Words

Instead of arriving at such a result, how much better to obtain by enthusiastic work a good reputation such as will come from activity in ridding the union of such slackers and from coercion used against men who are seeking excuses rather than opportunities for service. What we want to know is not how few slackers there are in the union, but how numerous are the boosters and patriots; not how many commandments have been broken, but how much good has been done.

That the present shortage of labor is a "bugaboo," and that women should not be permitted to take the place of men in laborious tasks, was decided by the convention in a resolution asking that the Department of Labor investigate the alleged labor shortage and the replacing of men with women in positions requiring heavy toil.

Thomas Kennedy declared the lengthening of the working day in the anthracite region would not increase production, but on the contrary would disorganize the present efficient force, as mine material was hard to obtain. International officials were instructed to conduct an educational campaign for coöperative stores throughout the jurisdiction of the United Mine Workers.

Food Administrator Hoover will be asked to require the operators to notify miners every day whether the mine will operate on the day following. The miners waste the lunches which they bring to work whenever the mine does not operate, so the prior notice, if procurable from the Government operated railroad, will act as a food-conservation measure. Canadian delegates assert that hundreds of Chinese are being brought to Canada on their way to France and are being detained there. A campaign is to be started at once to secure for the new district in West Virginia—No. 29—10,000 new members.

Mother Jones, who was one of the orators, advised against political fights within the organization, and supported Wilson and Hayes. She also advocated the organization of the Pocahontas field.

Union Statistician's Report Is Extremely Interesting

The report of John L. Lewis, vice president and, till recently, statistician of the organization and business manager of the *United Mine Workers' Journal*, contains many items of interest. Among Mr. Lewis' interesting statements stood out prominently the following: "Since and beginning with the year 1912 the United Mine Workers have secured wage advances from 30 to 104 per cent., varying according to the kind of labor performed."

Mr. Lewis went on to speak of these increases as if they were actual advances. He did not actually declare the increase in wages outran the increases in the cost of living or outran the advances in other crafts, but he suggested as much when he said: "Our union has been successful in securing wages that rightfully place the earning power of the mine workers on a par with the [workers belonging to] other stable unions comprising the American labor movement." Clearly then in the mind of Mr. Lewis the wage increases granted represent a revision of the social status of the mine workers and not merely, as has been claimed, a revision of wage rates to accord with rising costs of living.

Lewis Defends Appeal for Increased Wages

He then considers the action of the union in asking for new wage scales during the life of a contract. "It is argued by some [from the context it appears he means members of other international trade unions—Editor] that the opening of a wage agreement and the increasing of wages during the life of a contract is a policy fraught with great danger. They reason that if an agreement can be opened to secure an increase that the precedent thereby established is in reality an invitation to the coal operators to demand a lowering of the wage schedules in periods of depression in the coal industry. I am firmly convinced that such opinions are mistaken. If we maintain our strong union in the future as in the past (and I am convinced we will) and continue to prosecute strong organizing campaigns in the unorganized coal fields, I feel sure there is no power strong enough to dislodge our institution from the achievements we have won or to compel our members to labor under conditions which are worse than those of the present time."

Union Wage Pawl Works Only in One Direction

In short, trade unionism is like a pawl on the wage-rate ratchet. It will permit the wage rate to work only one way, so long as it is not thrown out of gear altogether. On the whole, Mr. Lewis does not miss the truth very much. No one expects, and few even wish, to deprive the mine worker of his increased wage and improved social status, some of which is unfortunately negatived by the uncertainty of his working opportunity.

It may be noted also that here, as also later, in his speech Mr. Lewis shows himself in accord with his chief Frank J. Hayes, and his former chief, John P. White, in regard to the advantage and moral rectitude of trying to extend the domain of the union during the war. His words clearly show that when he says, "If we . . . con-

tinue to prosecute strong organizing campaigns in the unorganized coal fields, I feel there is no power strong enough to dislodge our institution."

Does Mr. Lewis' statistical statement open with a wage report, a membership report or with a report of idle time? Not at all, but with a map showing the number of men who have volunteered and been drafted. The United Mine Workers are solidly behind the war for democracy and solidly behind the draft. Says the report with due reason: "The United Mine Workers has just cause to feel proud of the unbounded patriotism proved by the enlistment of 19,135 members in the nation's service and 60,604 subject to draft." Then follows a statement which we quote, but without indorsement: "The largest number of men in the service of any organization or industry is our proud boast." It is hard to believe that the mine workers can outstrip the farmers of America in an aggregate count of conscripts and volunteers.

Mine Transportation Forces Are Inadequate

However, the statistician goes on to say: "From the reports received from 544 locals, the transportation system seems to have been the only branch of mine service in which a shortage of men could be claimed, and such claims were limited to a comparatively few localities. In many localities reports indicated crowded conditions in the mines, notwithstanding a liberal response to the Government's call for men."

The table shows the number of members, the number who have probably volunteered and been drafted and the number probably subject to draft:

State	Number of Members	Volunteers and Draftees	Subject to Draft
Pennsylvania	145,423	8,302	23,537
Illinois	87,189	3,269	13,863
Ohio	40,553	1,561	7,129
Indiana	24,649	788	3,471
West Virginia	18,510	1,036	3,527
Arkansas, Oklahoma and Texas	14,632	576	2,086
Iowa	13,288	460	671
Tennessee and Eastern Kentucky	12,322	702	1,910
Kansas	9,231	392	1,707
Missouri	7,945	373	636
Wyoming	6,949	360	1,431
Alabama	5,885	253	1,083
Washington	5,591	269	985
Colorado and New Mexico	5,213	328	608
Western Kentucky	4,446	104	742
Montana	3,971	176	664
Maryland	2,512	152	232
Michigan	2,005	34	322
	410,314	19,135	64,604

As stated, the table is based on reports from 544 locals, the percentages obtained in any one state from the locals reporting being used to determine the number of men volunteering and drafted or subject to draft in the other unions of the same state. About 4.82 men out of every 100, in the unions reporting, volunteered or were drafted. About 17.62 men out of every hundred, in the unions reporting, are subject to draft.

Miners Have About 33,000 Drafted Men Already

As a footnote Mr. Lewis says: "If the draft has operated throughout the coal industry in union and nonunion fields in the same degree, the number of the volunteered and the drafted men will reach 33,525. The number subject to draft will be 112,831. These figures are based on the total number of men employed in the industry being 720,971 as reported by the Geological Survey" (for the fiscal year ending June 30, 1917).

The figures Mr. Lewis gives for coal production lost by car shortage are quite inadequate. One hesitates therefore to quote them. The tonnage lost in 11 months by the unions reporting was 8,577,883 tons. What Mr. Lewis thinks of these figures is shown by the statement: "It is estimated that with the same force of miners and mine laborers employed in and about the mines, without the addition of new machinery, more than 920,000,000 tons of coal can be produced annually in the United States, an excess production of 3,000,000 tons over America's maximum demand." However, much that Mr. Lewis says about the labor shortage is only partially truth.

Miners are veritably scarce in the anthracite region. In the bituminous region they are only scarce in proportion to mine capacity. In many of the bituminous regions of the East it is certain that more men are little needed. They might load the cars supplied a little faster if they were there, they might clean the coal a little better if they were competing with one another, but they would be idle much of the time. Many of the idle men in other industries, concerning whom Mr. Lewis speaks, should be idle as long as they persist in continuing at unwarworthy tasks. Warworthy industry would soon absorb them if they would transfer their much-needed services, but like the miners they take to a new job as unwillingly as they would to a new nationality.

Tremendous Drain Placed on the Coal Industry

Take from the coal industry the 112,831 men subject to draft, and take as many more into munitions work, and you will get a most acute shortage in the anthracite industry and a real stringency in the bituminous mines. Five men in 100 are gone to the army and 18 men in that 100 are yet to go and then doubtless some more. Who will not say that the strain will be tremendous.

When we get a drain equivalent to that which has been made on the smaller English-speaking man power of the British empire—in which nation 7,500,000 have already been enlisted or drafted—we shall find that there is a real shortage of men. No one can but sympathize, however, with those who look askance at yellow labor as a means of meeting the question and who wait to solve the problem till the moment when it becomes more painfully apparent and who feel that when all labor is converted to war work will be time enough to talk about inviting, like France, the coöperation of the patient but unassimilable workers beyond the seas. It is well, however, to let them know that it is in the farming district that men are most needed and not in the mines. It is doubtful whether even idle miners would be willing to go back to the farms. Those who talk yellow labor most earnestly are seeking to introduce it in the raising of foodstuffs so that our mining and manufacturing men will have food to eat.

Miners Make Complaints in Illinois

The mine workers of the Illinois subdistrict No. 5 in central Illinois have a new Ways and Means Council, composed of representatives of the various locals. It meets every 60 days and undertakes to better such conditions in and around the mines as are not sufficiently general to be taken care of in joint conferences. Disputes growing out of conditions peculiar to a single mine have been a prolific cause of local strikes and have retarded production to no inconsiderable extent. Officers of the union say that this Ways and Means Council is intended to afford a means of settling these disputes and of averting local strikes. It seems, however, to have an entirely different purpose and to be disposed to break contracts and make trouble.

Miners Don't Want To Pay Carfare

The council met the other day at Springfield and discussed compensation for the removal of impurities from the coal, free transportation to the mines, abolition of overtime and increased compensation for miners who work in "bad places." It seems that in the Springfield district a considerable amount of fireclay mixes with the coal when it is shot and as a fine is imposed upon the miners if any of the fireclay is found in the cars, the miners expend time and labor in keeping the coal clear. For this work, according to the resolutions adopted by the council, they believe that they should receive reasonable compensation.

It was further resolved that where the mines are opened so far from the dwellings of the miners that train service is necessary, it should be furnished free by the operators. It was resolved that overtime be abolished except in case of extreme emergency involving danger to life, limb or property, and should then be paid for at the rate of time and a half, Sundays to be considered overtime. A demand was made that $5 a day should be paid for men compelled to work in "bad places."

EDITORIALS

The Heart of the Trouble

THE interview with Dr. Garfield printed on the foreword page of this issue will leave in the mind of the careful reader one big outstanding fact, and that is that this country is suffering more from a shortage of motive power for transportation than from any other cause.

It is all very well to talk of car shortage, and no one doubts that we have too few cars; but even if we had an abundance of cars, there are not enough locomotives to pull them from the mines and mills to the markets. Locomotives cannot be built in a day or in a month. During recent years, the railroads of this country have ordered less than one-half as many engines as are required to maintain transportation lines on an adequate basis of operation.

The pity of it all is that while American industries have been developing at an unprecedented pace the one vital link in the chain has grown weaker until the final break has come. In an emergency that threatens the life of the Nation we find ourselves helpless through our inability to transport the things we manufacture. No quick remedy can be provided. There is only one way, and that is to promptly increase the efficiency of locomotive service and of car service.

We can no longer dally with the situation. Stern measures must be adopted. The Fuel Administrator is right in saying that we must abolish all cross-hauling, that we must put into operation an intelligent zone system, and above all else that we must make it prohibitive for any individual or any company to hold goods in a railroad car longer than 24 hours. If the situation is as critical as we are told it is, then a demurrage penalty measured in dollars is not enough. It would be well to establish a ruling that will carry with it the penalty of imprisonment for anyone who does not unload freight within 24 hours. The Government being the worst offender, of course, there would be a small army of quartermasters in jail; but it is likely that before long freight and coal cars would be unloaded promptly. Let us all prayerfully hope that Director McAdoo will act promptly and effectively.

Need for Anthracite Inspection

THE frequency with which one hears complaints of the impurity of anthracite leads one to feel that an anthracite inspection service should be established. There is no question but all the reputable elements in the anthracite region, probably over 95 per cent. of the shippers of anthracite, would be glad to submit their shipments to an impartial force of inspection. In that manner they would be able to maintain the reputation of the region for honest methods. They are beginning to fear that the public, finding slate in the coal in large quantities, will blame companies indiscriminately or rather will select the largest companies, who are invariably held to be at fault whenever anything goes wrong.

At the meeting of the Engineers Society of Northeastern Pennsylvania, held in Scranton, Jan. 17, one of the Canadian representatives, Major M. S. Boehm, 169th Battalion Canadian Infantry, said that "Coming up on the car to Scranton from Wilkes-Barre . . . I heard it said that the operators were adulterating the coal sent out. If that is true, and I only quote it as I heard it, and I do not wish you to think that I indorse the statement, it is the most damnable piece of traitorism possible in a free country. It is a dastardly act, if true. Remember, gentlemen, we are standing on the brink of hell. It is all over if Great Britain and America lose the war and just at present we are not winning it."

On the authority of one of the leading anthracite coal men, there was a little too much truth in that statement for the anthracite mining men to feel quite easy. Probably there is no coal actually adulterated, but coal is being put out from culm banks or from some other sources where not the slightest pretense of cleaning is made.

A record of the impurity found by one large company showed the slate to run from 25 to 50 per cent. in eight different cars. This coal was not shipped by the company making the investigation, but by one of the so-called independent companies. It is not to be assumed, of course, that the independent operations are usually irresponsible and ship slate and bone coal in excessive quantities.

In fact this is probably by no means true of the older independent operators; but there are some fly-by-night concerns which have purchased rocky coal dumps and lack both conscience and the facilities for making an adequate separation of impurities. One would-be coal producer recently sought to buy a coal dump and had the effrontery to tell the representative of the coal company owning it that he would pay more for it than it was worth to the company because he could ship all the impurities with the coal, whereas the corporation having a well-established clientele and an unbending conscience, would stand by its standards of preparation and ship nothing but clean coal.

It is remarkable with what persistence in the face of the urgent demand and the shortage of cars and labor the coal companies are standing by the old-time purity standards. One company, by no means the largest, is trying to maintain its former scale of purity, and in doing this is condemning 40 cars of coal a day and sending them back to the breaker to be recleaned. With all the anxiety for coal, and in view of the car demurrage thus caused, the action seems too finical rather than not finical enough.

Another company does not condemn cars which have a single per cent. excess of slate. To do so would put a car out of action for 24 hours. The men have instructions to make a careful cleaning of the upper two feet of coal, and as more than one per cent. of slate is removed the coal in the car is brought well below the per-

mitted figure. However, while thus keeping the slate content below the limit it does allow a little excess undersize coal to pass muster.

At the present time the breakers are usually crowded to capacity or beyond their rating. Their efficiency is a trifle reduced by that fact. Those breakers which still depend on men and boys are apt to be undermanned. For this reason, there is a tendency to keep a little nearer the upper limit of slate content than is desirable.

There is no disposition observable to depart from the strict rulings of past years. The larger anthracite operators would be pleased apparently to see everyone made to toe the mark which they have always been willing to line themselves by. The large concerns especially, which have railroad connections, are not a little chagrined to know that inferior coal is being sent to market and to see it sold under the cachet of the Fuel Administration at a price 75c. per ton higher than they are allowed to charge for far superior coal.

Poor coal is not shipped in large quantities, but the man who gets it is as painfully present as a sore thumb. The man who gets a large percentage of slate can say as much as the fifty men who may have bought clean coal. Thus the word is spread that all anthracite operators are rogues, and the public egged on by the newspapers is only too ready to believe it. Inspection would not be difficult. The present inspectors with a little transference might do the work under the authority of the Fuel Administration, the Committee on Coal Production or the Bureau of Mines.

Rock Dumping

THE work of rock dumping varies greatly with the depth of spoil to be deposited and with the secondary purposes kept in view in doing that dumping. The most economical dump is a high one. Fortunate, indeed, is the concern which has a dump from 150 to 300 ft. high, so that the cost of building out to extend the dump occurs only infrequently and the cost of widening the approach to the dump is not too expensive. Where the dump is shallow, it daily goes forward and side dumping must be kept up continuously. Where the dump is high, it is best to have two dumps and advance them alternately. When this is done the idle dump has time to complete its inevitable sliding before the dumping trestle is built out over the uncertain foundation, and somewhat greater boldness in extension is therefore possible when that work is done. The extension, also, when completed, has to be jacked up less often.

A freezing spell, or may be a flood of water in the run below—there is usually a run or else a discharge of water from the mine—will carry away some of the rock and perhaps make it both profitable and desirable to go on dumping for a while without extending the trestle. However, whether extension is necessary or not, the dump is solidified during the month's rest and the extension work over the top of the dump brow is fraught with less risk of an undesirable subsidence. It is not well, if it can be avoided, to have water passing under a dump. At any time it may dam up and carry away a huge slice of the fill, breaking the continuity of an important part of the mine work—dumping rock—and filling up a valley for which the mine manager may have other and better uses.

Miners' Time Should Be Saved

A STRIKE is threatened of between 4000 and 5000 mine workers at Shamokin, Mount Carmel and Kulpmont, Penn. The men want the Shamokin and Mount Carmel Trolley Co. to restore the 5c. fare and the Pennsylvania R.R. to reëstablish a miners' train between Shamokin and Mount Carmel. The trolley company has just raised its zone rate to 6c.

The company is to be congratulated that it has been able to make such an increase in rate in view of increased operating costs. It is a pity that it cannot be done everywhere. The trolley companies are near the end of their string. In a very short while they will collapse like the railroad companies, and then the miners will walk to their work or stay at home.

The miners are suffering a great deal now from slow and inadequate transportation to their work. In Scranton the trolley cars are altogether too few, and it is the same everywhere. If 1c. or 5c. more per mile will assure service, the mine worker will be able to make up the difference a dozen times at his work. It is a trying matter to wait hours in the snow and then while riding to make slow time in cold cars.

We must pay for what we get. Starve the street-car companies, and they will leave you freezing at the street corners. Cheap service is poor service. One cannot blame a man for being a little niggardly who works by the day, but the man whose wage is determined by how much he performs can easily afford a few cents to an agency that helps him to do more and do it in relative comfort.

If it were unreasonable to pay it, this advice would not be given; but it is not an unreasonable demand. If the miners were running the cars and not riding in them, they would soon change their point of view. The condition is nation-wide. Coal is lost daily by inefficient street-car transportation, and the street-car companies should be helped by higher fares and required to give good service.

In conclusion, let us analyze the time value of two cents. After all, "time is money" to the poor man as also to the rich. If the rich man will give $8 to be speeded a couple of hours from New York to Chicago, perhaps the workingman would be justified in risking a penny to be speeded on his way from his home to his colliery. If a workingman makes $5 in an eight-hour day, he is getting 500 cents for 480 minutes of work. That is, he is receiving a penny a minute. So if he can save a minute a day by a satisfactory and adequate service, it is well worth a cent to him.

Too lightly, indeed, we regard today the infrequent schedule and the overcrowded and unheated car service. These features might be overlooked in a metropolis, for they save coal; but in a mining community, where coal need not be saved, because it does not arrive by railroad, there is no reason for making the schedule less frequent, the space in the car more crowded or the comforts less grateful, unless it be because of the growing cost of the service. Surely this should be a small objection with increasing wages. Must the miner be the only one to be accorded an increase to offset the cost of living? He is always regretting the rising costs, but secretly he believes that he alone should be allowed an advance proportionate to his increased expenditures.



Felhivás a Magyar Bányászokhoz!

(True translation filed with the postmaster at New York City on Jan. 16, 1918 as required by the act of Oct. 15, 1917)

Ha bármely országban háboru üt ki, mindazok, akik az ellenség országához tartoznak, fogolytáborba lesznek küldve.

Az Egyesült Államok nem tette ezt. És nem is fogja öket fogolytáborba küldeni mindaddig, mig nyugodtan folytatják munkájukat es nem okoznak zavart.

Senkisem fogja munkáját elveszteni, mig kötelességét teljesiti. Mindaddig, mig a magyarok rendesen viselkednek, az Egyesült Államok épen úgy fog velük bánni, mint saját polgáraival.

Megtakaritott pénzükhöz, vagy birtokukhoz nem fog hozzányúlni. A magyar bányászok csak hálásak lehetnek az Egyesült Államok e nemeslelküségéért.

Jóakaratukat csakis úgy mutathatják ki, ha nyugodtan es állandóan fognak dolgozni. Ezen nemzet és a bányatulajdonosok szivből elismerik mindazon magyar bányászok szolgálatait, kik állandóan dolgoztak es képesek voltak nagymennyiségü es tiszta szenet bányászni.

DISCUSSION BY READERS

Seasonal Freight Rates

Letter No. 1—In an article entitled "The Principles of Coal's New Program," which appeared in a recent issue of a prominent coal-trade publication, it is stated, "If perfection is to be even approximated, certain methods of forceful persuasion must be allowed those who produce and distribute coal."

The writer of the article carefully refrains from mentioning any of the methods he may have in mind, but I presume they are such as will tend to stabilize the industry by securing as nearly as possible a uniform monthly production and distribution of coal to consuming territories. One of the most important of these methods, I remember, was strongly advocated, in several communications some time ago, by a correspondent of the same paper, but it seemingly attracted little attention.

The correspondent urged the adoption of "seasonal freight rates." If it is true, as was stated in an address made before the Railway Coal Purchasers' Association some years ago, that operating costs for moving freight are 30 per cent. less in the summer than in the winter season, then it would seem that the railroads could profitably make a summer rate of from 20 to 30 per cent. less than winter rates, and still keep up their equipment and service during the months when traffic fell off and so relieve the pressure during the winter months. It seems reasonable to expect that this proceeding would, at the same time, provide that "forceful persuasion" that acts automatically.

In normal times, no retail dealer or power producer can safely take the chance of storing large quantities of coal, in view of the fact that January prices have often been nearly as low as those current the previous July. On the basis of 600,000 tons production of hard and soft coal there was enough open-car equipment, a year ago, to allow a time allowance of 26 days for each car, per round trip. With the elimination of long distance movements where the quality needed can be secured at nearer points, the present coal-car equipment, not considering box-car shipments, should be ample for distributing 750,000 tons per annum, if moved in approximately equal monthly installments, providing, of course, something is done to increase and conserve motive power.

Chicago, Ill. R. T. McKEEN.

The Mine Gatehouse

Letter No. 1—The suggestion of establishing a gatehouse at the entrance of a mine, for the purpose of checking all persons going in and coming out, which was made the subject of a Foreword in *Coal Age*, Dec. 8, is timely and important to the economical and safe operation of every mine employing from 50 to 100 or more men.

Even allowing that there is already in use in a mine a good checking-in-and-out system, the idea of a gatehouse at the entrance presents many advantages. When properly located and equipped, and with an active, intelligent man in charge, it would be possible to keep a complete record of all men and material passing in and out of the mine. This record would frequently prove of great value in the checking up of accounts, proving timesheets and giving other valuable information in respect to the operation of the mine.

My experience during the past twenty odd years convinces me that a large mine is incomplete without the establishment of a well built and thoroughly equipped gatehouse where the daily input and output of the mine would be fully recorded. Here should be stationed the mine clerk, whose duties would be to check all persons and material passing in and out of the mine. The record should be made on a properly prepared timesheet. There should be a reliable clock for the purpose of noting the time of every transaction.

The advantages of such a system can hardly be overestimated. It would wholly eliminate all chances of defrauding the company, by men slipping in and out of the mine at times suited to their own convenience. It would settle all disputes that so frequently arise on payday, by men claiming time for which they have not been credited and cars of coal that, perchance, were never loaded.

The gatehouse, moreover, would act as a stimulus for men to be on hand on time in the morning. It would systematize the entire work of the mine and, in doing this, would more than pay for itself in the reduction effected in the cost-sheets. These are not rambling thoughts but clear facts that warrant careful consideration by all coal operators. R. W. LIGHTBURN.

West Leisenring, Penn.

Climbing

Letter No. 1—The Foreword in the issue of *Coal Age*, Sept. 22, opens the way to a most interesting and instructive discussion. It presents the case of a mine clerk, who, as office boy, let it leak out that it was his ambition to some day be president of the company.

The writer of the Foreword admits that the hero of his story was an "exceptional man." He had the ability to search into the causes of things—in other words, to analyze a situation—which proved the key to his rapid advancement, from office boy to clerk, timekeeper, assistant to superintendent, and special investigator for all the company's mines.

Personally, I will confess to having sat up many nights in an endeavor to unravel the mystery of the phenomenal success of men. I have read articles and devoured books on "How I Became General Manager," and kindred subjects. My trouble seems to be, however, an inability to reduce these elements of success to a principle that would apply to my own case.

The success of other men appears so frequently to have resulted from some particular circumstance that

served to unlock the door of fortune to the individual in question. Either the man inherited a large sum of money that enabled him to make a start in business, or he had an uncle or other relation that brought him to the notice of the president of a large company, and so on down the scale.

The secret of success seemed to lie generally in some outward power or influence rather than in the individual himself, and this gave me little satisfaction. I was soon convinced that the reading of one or another man's rise in the world was of no avail, except in the way of stimulating one's ambition. The means of following the same road to success he must divine for himself. The account of another's struggles against obstacles and difficulties is stimulating to the man who has the desire to rise; but, further than this, he must build his own fortune.

It has been my good fortune to meet, in my travels, men who are making history today and to learn from them some of their experiences. Among these, I might mention Bonar Law when yet a business man, Captain Scott when on his last voyage to the South Pole, General Botha immediately after the Boer War, and others.

A Glance Backward and What It Teaches

Looking back at these interviews, each of which impressed me as having some superlative quality, I cannot say that had these men been present in a crowd before me I would have picked them out as possessing qualities that would enable them to stand before the world as leaders of thought and action. Among mankind there are many endowed with equal brains and possessing equal capital and social standing with these men and who, yet, fall far short of their attainments. I have asked myself, Wherein lies the difference?

I have no great confidence in my ability to formulate correctly the attributes of success in life. Briefly expressed, my creed is:

1. Work, not merely from a sense of duty but from a soulful interest. When a worker is interested in his task, his labor is made easier. For this reason a man should choose a business to his liking. Successful labor often means the setting aside of the pleasures of today for the opportunities of tomorrow, which appeals to me as the first step in the ladder by which the climber mounts the pinnacle of fame.

2. Analyze the situation or the work to be accomplished so as to have a clear conception of what is required and the best means to attain the desired end. In this manner waste of time and effort will be avoided and greater results will follow and the worker become daily more efficient. This ability to analyze promptly and correctly gives a man a firmer grasp of a proposition and appeals to me as one of the underlying basic characteristics of all successful men.

3. Get your sailing orders before starting. In other words, know the object to be attained and plan beforehand for its accomplishment. Look forward, each day, each month and each year to doing larger and better work than in the preceding day, month or year.

Of these three essentials, let me say that work—pure work—the ability to plow steadily on through alternating success and failure is the real test of a man and presages his ultimate success. Opportunities come and go in the lives of men, very much as good and bad times alternate in the industrial world. To win success, the man must have a fixed determination to outweather gales of disappointment and ill-luck, doing faithfully and persistently the work before him while awaiting his opportunity to rise. KAPPA.

Ottawa, Canada.

Conservation of Mine Gas

Letter No. 2—In response to the requests of friends, I had promised to arouse the question of the conservation of the large quantities of natural gas generated in our mines. While I have been considering the matter, however, my old true and tried friend, Eugene B. Wilson, of Scranton, Penn., has started the ball rolling, by his letter, which appeared in *Coal Age*, Dec. 15, p. 1029, and in which he refers to the attention drawn to this subject by Governor Martin G. Brumbaugh, who conferred recently with men summoned from different sections of the coal field, in order to ascertain their opinions as to the feasibility of such a project.

To discuss this question intelligently, and give the subject the prominence it deserves, it will be well to review the remarks, verbatim, with which the governor addressed the 18 men, heads of the various Boards of Trade and Chambers of Commerce in the anthracite region, who assembled at his request, in the executive chamber of the capital, at Harrisburg, Nov. 23, 1917.

Governor Brumbaugh's Address

I wish to thank you, gentlemen, personally, and the important business organizations you represent, for coming here at my request today. The call was indefinite, in terms, because I did not think it wise to have any preconceived ideas in your minds as to the purpose of the conference.

As you know, this administration has in the past three years endeavored to impress upon our people the great need of conserving our rapidly disappearing natural resources. Pennsylvania was at one time the reservoir of greater natural and potential wealth than any other state or country. This wealth has been steadily disappearing with no adequate return to the people now in the state, and no provision for those yet to come.

The great anthracite region which you represent is a good illustration of this situation. Some of your most thoughtful citizens are questioning the future of your cities and your industries. The time has come to take note of the resources now remaining and to use them for the good of this great region.

While I have in mind a special and specific problem, I wish at the same time to name a few other matters of moment to the good people of your great counties; and all of these are, in a way, related to the great problem that I desire to lay before you.

First. The firedamp explosions that occur so frequently are a menace to life and a loss to the community. Life is sacred and its safeguarding is our solemn duty. I ask you to keep in mind the need of reducing the hazard from gas to a minimum, and if possible avoid it entirely.

During this great war we are speeding up all forms of industry. Pennsylvania is so commandingly essential to the nation and to the welfare of civilization that we must give, and give liberally, all the supplies our skill and our endeavor can produce. Thousands of our skilled miners have gone into the service of our country at the front. Their places must be taken by others doubtless less experienced in the work of the mines. This creates a double menace to the region you represent. I call upon you and, through you, on your great bodies of thoughtful business men to see to it that peace and tranquillity prevail during this stressful period. Let no excitement, no unusual ac-

tivity be encouraged; for the result may be disastrous in the extreme. Let labor be encouraged to keep quietly content and steadily busy in productive service to the country.

Allow no strikes. Frown upon the first move to cause a cessation of output. The man who today foments strife and encourages strikes is a traitor and will, so far as I am concerned, be so regarded. There are other and better ways to adjust the problems of labor and capital, and I appeal to your bodies to support me in my fixed resolve to keep Pennsylvania free from disorder and industrially loyal to the Government in this supreme hour.

The Mine-Cave Problem Serious

The mine-cave problem is an acute one. It is on my mind daily. It has developed a situation for which our constitution makes no provision. By the decrees of our highest courts the rights of property have been held sacred. By the judgment of the community the safety of human life is menaced by the removal of coal under your homes. The constitution holds that life and property are alike sacred and inviolable. This conflict, therefore, is unique and I had by counsel and conference hoped to have some legislative relief for you during the past session. For reasons known to you, no such enactment has reached me. The Legislature having failed you, I ask you if possible to get together and amicably and peacefully solve this serious situation.

And now the real purpose of this conference, a purpose of great moment to the anthracite region, is the outgrowth of numerous conferences based upon an idea first conveyed to me by William S. Tompkins, of Wilkes-Barre. There is escaping daily into the air about 72 000 000 cu.ft. of gas from our mines. This is estimated to be the equivalent of about 14,400,000 hp.—a volume of power unequalled. It would belt the German empire with a sheet of fire. It would, if used, release for home consumption many thousands of tons of coal that could go over the mountains to those that need it and there would return a stream of wealth to our people. Moreover, it would open the way for a new and greater anthracite region, whose whole economic outlook would be speedily changed from an unstable to a stable situation. The more complex and varied your industrial activities the more stable your economic life. If this gas were harnessed to industry in your region you would become the most progressive and dependable industrial center in the world.

"Watch Some Fellow Do"—the Impossible

I know you will think this cannot be done. Everything we now prize was once impossible. The history of civilization is the story of the accomplishing of the impossible. When you go home and the pessimists and the inert and the short-visioned, sour-visaged man says it cannot be done, please give him a copy of my motto—"When it is finally settled that a thing is impossible—watch some fellow do it."

My practical suggestion is that your great bodies, so well represented here, join in a movement to pay five or ten or even fifty thousand dollars to the genius that will harness this enormous waste and make it the servant of industry in communities. It will be money well invested and it holds the destiny of the great coal region we love. I shall help in any way I can. What is for your good is for the good of Pennsylvania. Our interests are identical. For the welfare of the state and the great good of our people, let us take up this problem now. I lay it before the solid, substantial business men of the region, through you, confident that you will solve it and solve it in a commanding way.

At the conclusion of the governor's address there was some discussion of the subject by those present. H. C. Hubler, president of the Scranton Board of Trade, asked the governor if this matter had been taken up with the coal companies, and received the reply that "it had not," whereupon Mr. Hubler intimated that it might develop that the coal companies owned the gas. The governor admitted that that was possible, but stated that it was a matter for the organizations represented by those present to work out the question of ownership, the main point being the conservation of the gas that is now being wasted and doing no one any good.

Replying to the statement of William S. Tompkins, of Wilkes-Barre, to the effect that "all that was necessary to get plenty of gas in Wilkes-Barre was to put down a borehole on the court house lot," I stated that, "such a plan had been tried out on the Kingston flats, in Nanticoke, and in Hanover township, by the Delaware, Lackawanna & Western Railroad Co., but their efforts had proved a failure."

At this juncture, Mr. Warwork, of Mt. Carmel, flashed the governor's card, "when it is finally settled that the thing is impossible—watch some fellow do it." The adoption of this motto leaves nothing to be done save to "watch," and I must admit that, in common with my friend, Mr. Wilson, of Scranton, former editor of *Mines and Minerals*, I have been watching and listening since, but the other fellow, who is to do the trick, has not yet appeared.

Watching and Waiting Never Accomplishes Anything

Evidently, if anything is to be accomplished along this line, it will not be by watching and waiting. I take it that the meaning of the governor's remark was that what seems to be impossible will eventually be done by the man who thinks and acts. I trust that this will only prove the beginning of a broad and liberal discussion of a subject, the realization of which would be an untold boon to communities throughout the coal regions.

Mr. Wilson has already given the chart showing the flow of gas from different collieries as tabulated by Mine Inspector Joseph J. Walsh. It was on the information conveyed to him by these charts that the governor based his remarks, and I will take the liberty of drawing special attention to the data relating to the Auchincloss colliery, operated by the Delaware, Lackawanna & Western Railroad Co., and located at Nanticoke.

The Auchincloss colliery is working one of the most gaseous seams of the Wyoming coal fields and the two shafts, known as No. 1 and No. 2, are producing, according to the chart, a total of 6,743,000 cu.ft. of gas each 24 hours, or 280,958 cu.ft. per hour. Now, assuming this gas is burned in gas engines consuming, say 25 cu.ft. per b.hp.-hr., and allowing for some waste by leakage, there appears to be a loss in the gas wasted from these two collieries of over 10,000 hp., which is almost beyond conception.

The Estimated Loss of Power

My friend, Mr. Wilson, has estimated a total loss of 400,000 hp. as resulting from the reported flow of 72,000,000 cu.ft. of gas in 24 hours throughout the anthracite field. These figures are certainly impressive, and Mr. Wilson has asked the question that naturally presents itself to all of us, "How can the escaping gas be collected?"

While there is no question that gas can be got from the coal-bearing strata of the Wyoming coal field reaching from Pittston to Nanticoke, there is considerable question whether it is possible to collect the gas diffused

in the air currents discharged from the several mines in this region, so as to make the undertaking a commercial proposition.

It is well known that there is a wealth of gold lying at the bottom of the ocean, but the cost of reclaiming this treasure would more than equal its market value, and it is therefore worthless in its present state. Perhaps the same is true of the gas-charged air discharged from our mines.

However, it has since been explained that the idea was not to separate the gas from the mine air; but, by adding artificial gas to the mixture, make it available for industrial purposes. This may be a suggestion worthy of consideration, and it is to be hoped that *Coal Age* readers will be able to make further suggestions that will ultimately bring this proposition to a successful issue. I am permitted, through the courtesy of R. V. Norris, consulting engineer, Wilkes-Barre, Penn., to present the following interview published in the Wilkes-Barre *Record*, giving his views on the waste-gas question.

CONSULTING ENGINEER R. V. NORRIS INTERVIEWED

Ques. 1—Is gas present in all coal mines?

Ans.—Yes.

Ques. 2—In what quantities is gas generated in mines in the anthracite coal fields?

Ans.—Mines in this field use from 8 to 20, say 12 tons of air per ton of coal produced. This air is always kept below the explosive point and generally contains less than one-half of 1 per cent., or, say an average of ¼ per cent. of gas, which would be high. On this basis, the production of 1000 tons of coal would correspond to a ventilating current of 12,000 tons of air carrying 30 tons of gas.

Ques. 3—How does this gas occur in mines?

Ans.—The gas is confined in the coal and oozes out from the surface, the largest quantity coming from the freshly mined coal. Quite rarely the gas is found in pockets, causing occasional outbursts in the mine. At times, gas issues as "blowers" from fissures in the coal, frequently in large quantities under considerable pressure.

Ques. 4—Can you estimate the extent of surface and the quantity of gas produced in these mines?

Ans.—A fairly representative colliery will have from 500 to 1000 miles of openings, including entries and rooms. Assuming the average height of the coal to be 6 ft., the exposed coal surface can be taken as, say 1½ acres per lineal mile, making 750 to 1500 acres of exposed surface in a single colliery. Assuming an average of, say 1000 acres of coal surface in a 2500-ton mine [generating 30 tons of gas per 1000 tons of coal mined] would allow an estimate of about 150 lb. of gas per day per acre of exposed coal surface [$(30 \times 2\frac{1}{2} \times 2000) \div 1000 = 150$ lb.].

Ques. 5—Can this gas be collected from the air current discharged from the mine?

Ans.—No. Practically speaking, no apparatus could be designed for this purpose.

Ques. 6—Is it possible to collect mine gas under any conditions?

Ans.—Yes, gas can be collected from blowers when these are of sufficient volume, by piping it out of the mine. The volume of the gas is not generally sufficient and the life of the blower is too uncertain to warrant doing this, however.

Ques. 7—Could not the gas be obtained from boreholes?

Ans.—Yes, there are several holes giving out gas, which have existed for years, but the quantity of gas produced has been small and not enough to warrant their general use.

Ques. 8—Could sections of a mine be walled off and the gas allowed to accumulate therein?

Ans.—This might be done in rare cases, in very gaseous workings, but it would result in a stoppage of mining in that vicinity, and the output of gas would probably be too small to warrant the undertaking. Such a proceeding would convert a coal mine into a gas mine and the output of gas would be small in comparison with that of coal. The danger of such an undertaking would be an effective obstacle, however, and inspectors would probably close the mine at once.

Ques. 9—Do you consider it a mechanically practical proposition to attempt to redeem the gas discharge from anthracite mines, for fuel purposes?

Ans.—In my opinion the scheme is not practical, with our present knowledge, except possibly in the case of certain blowers. The output from these, however, would be so small as not to warrant the installation of the necessary gasometers and distribution sytem that would be required for the commercial use of the gas.

The waste gases from furnaces, in rolling mills, and from blast furnaces, are extensively used for fuel and lighting. The process is limited, however, to the places where such furnaces are located; and, in order to protect the furnaces from the danger of backfiring, it is necessary to install water seals and blowout doors.

I hope this question will be thoroughly discussed in *Coal Age*, to the end that some practicable scheme, if possible, may be devised to utilize the estimated waste of power in the gas escaping in such great quantities from our mines.

H. G. DAVIS.

Wilkes-Barre, Penn.

Blacklisting To Prevent Accident

Letter No. 6—I was greatly interested in the Foreword that appeared in *Coal Age*, Dec. 1, in which James T. Reynolds emphasizes the importance of mine discipline.

Mr. Reynolds cites an instance where he saw men leaving the mine by way of the hoisting slope. On drawing the foreman's attention to this dangerous practice, he received the reply that it was "hard to control men." The foreman stated that he had warned them that they were violating the mine law, but feared to insist further on their stopping the practice, as the company were badly in need of miners. The suggestion of Mr. Reynolds that the foreman place a danger board at the top and bottom of the hoisting slope and make an example of the first man to go out that way was not carried out. A few days later, however, two men were killed while traveling the slope in disobedience to orders.

It would seem, from this citation, that there was a great lack of discipline in the mine here mentioned, and one is led to ask why the inspector did not compel compliance, on the part of the mine foreman, with his orders in reference to placing danger signals at the top and bottom of the slope. In my opinion, a mine inspector should have the authority to arrest persons violating the mine law. Without this authority, how can it be expected that he will be feared or respected and his orders obeyed.

Following this Foreword, Mr. Reynolds, in his letter in *Coal Age*, Dec. 15, p. 1028, makes the suggestion of "blacklisting men who are guilty of carelessness, indifference to orders, or insubordination in the mine." Such persons he styles "unsafe miners." While it is true that there are careless and indifferent miners who are prone to disobey orders and disregard safety rules and regulations and do not hesitate to violate the mine law, the fault for these offenses is largely that of the

mine foreman and other company officials in not exacting a more strict discipline in the mine.

Men are often made careless by the examples of disregard for safety set by the mine officials themselves. As instances of this, I could cite a case where the mine foreman marked the roof in many working places where posts were needed and told the miners working in those places that they would have to quit if the roof became dangerous, until such time as he could send them posts to make it safe.

At another time, I saw an electric wire crossing an entry, at a height of 5 ft. above the floor, where men and animals must pass and the wire was unprotected. The law requires a height of not less than 6½ ft. above the rail. Again, whole sections of mines are worked with half the air current required by law and the inspector reports the mine as "O. K."

Instead of blacklisting men, under such conditions as these, let me suggest that mine officials should set a better example and enforce discipline among the men, suspending them for violations of rules or disobedience to orders. In this way I believe it will be possible to make greater progress toward safety than by blacklisting men.

DANIEL F. SMITH.

Wellsburg, W. Va.

Favoritism in Mine Management

Letter No. 2—In his article, "Favoritism in Mine Management," *Coal Age*, Nov. 17, p. 862, Thomas Hogarth appears to consider but one side of the question. In fairness to both sides kindly allow me to take exception to a few of Mr. Hogarth's remarks.

Speaking of the changes made by a new superintendent when taking office, the writer seems to regard it as a general rule that changes made in the working force of a mine are apt to cost the company "thousands of dollars." While that may be true in some instances, it is not always the case.

For example, take a mine where the same men have been employed for so long a time that they have fallen into ruts and are using out-of-date methods that are wasteful and expensive and that should have been abandoned long ago. A new man brings with him new ideas and experiences, the application of which, instead of proving a loss, is the means of saving thousands of dollars for the company. It is often cheaper to make changes among the men than to attempt to alter their views or overcome their prejudices, which are often deep-rooted.

In regard to the statement, "Many men do not take kindly to working under a new boss," let me say that my observation is that the men who object to a new boss the most are those who have been favored by the old boss. When a new boss takes charge it is common for the men to look for changes, new methods, rules and regulations. They are very apt to make up their minds beforehand that these will not be to their liking.

Workers are prone to look with suspicion upon anything that differs from the old established way of doing things. They are not slow to pronounce a new scheme a failure, before it has been tested or given a fair trial. As we all know, there are men who get old on the job, so to speak, and are practically worthless in the positions they occupy. This class of workers is not always composed of men old in years but, rather, old in their ideas and slow of action. They do not care to be rushed but want to take their own time and way.

It cannot be doubted that many superintendents who have been in charge of a mine for a number of years have friends and favorites who are holding easy positions under their management. It is very likely that a new superintendent may find that these men are better fitted for other work. His observations may even convince him that they are incompetent or that long association with their particular duties has rendered them inefficient for the best service. Under such circumstances, it is not strange that a new superintendent, in justice to himself, would desire to change the order of things, even to the extent of getting rid of men that he considered in the nature of parasites.

Regarding the employment of old miners who have been disabled in the mines and are fit only for the performance of some light work, it is my opinion that a company might as well pension such a one and let him stay at home. To place him in a position or allow him to retain a position where the work he has to perform is not thoroughly done, or where his slow movements delay other work, would not be doing right by the company. An efficient superintendent quickly realizes these hindrances to the work, which it becomes his duty to remove. A disabled and faithful employee is often retained as night watchman or given other work that he can do without proving a hindrance to the operation of the mine.

CHANGES NECESSITATED BY FIXED PURPOSE OF MANAGEMENT

Hardly any two superintendents are alike, and, the fact that a new man introduces new schemes affords no reason for the claim that the required changes will increase the costs to the company. On the other hand, they may prove a means of saving much expense. Since it is results that the company and its management desire, no one can blame a new superintendent for changes he may see fit to make, providing these do not show special favoritism. In the filling of a position for which there are a number of aspirants, the superintendent must select the man he considers best fitted for the place, and the charge of "favoritism" so frequently heard is usually unjust, as all cannot hope to be chosen for one place.

Let us look at the question broadly and realize that behind every change in management and service the company has a fixed purpose involving improvements in ways and methods. The new undertaking will often necessitate employing a man of different capabilities from the one at present in charge. Likewise, the new superintendent has plans that he must work out to his satisfaction.

It is my belief that changes so often criticised as marks of favoritism are made on the ground of true merit and increased efficiency. The ascendency of the chosen one has often been gained by years of study and preparation. A superintendent that fails to recognize merit and fitness in such employees is not doing his whole duty by the company who employs him.

JOHN ROSE,

Dayton, Tenn. Former District Mine Inspector.

INQUIRIES OF GENERAL INTEREST

Corrosive Action of Mine Water

For some time past, we have sought to obtain some reliable information regarding the extent to which different metals are subject to the corrosive effects of acid mine water, but without success. If it is possible to give any definite answers to the following questions, in the columns of *Coal Age*, the information will undoubtedly interest a large number of readers who are troubled, as we have been, with corroding pipes, pumps and other metal equipment in a wet shaft. The questions are as follows:

1. What may be said to be the maximum allowable percentage of sulphuric acid in mine water, for the economic use of each of the metals, ordinary brass, wrought iron and cast iron?

2. Do the metallic salts of the acid, as copper sulphate or sulphate of iron, have any corrosive effect on the metals mentioned?

3. Will sulphur, in the form of a sulphate, in the coal burned under a boiler, form sulphuric acid in the presence of moisture?

Des Moines, Iowa. MINE FOREMAN.

These questions were submitted to a prominent electrical engineer who has experimented to a considerable extent to ascertain the causes of and relative effects of the corrosive action of acid mine water on different metals, and he writes, in effect, as follows:

Responding to your request for what information I can give in regard to the relative resisting powers of ordinary brass, wrought iron and cast iron when subjected to the corrosive action of acid mine water, and the maximum percentage of sulphuric acid permissible in mine water for economic use of these metals, allow me to say that it is doubtful if anyone can give the information requested with any degree of accuracy, and I do not care to be quoted.

However, for such as desire suggestions in line with our practice, it can be stated that, while we have never used brass in such service, I do not believe it would prove satisfactory in the presence of acid in the water.

In regard to wrought iron, we would not care to use it in contact with water containing any free acid, unless it was, of course, in a case of emergency.

Cast iron would probably give fairly good results with a very small amount of acid, but I cannot say what percentage of acid could be in the water and still permit of a fair life for cast-iron pipe.

Allow me to suggest, here, that there is one feature regarding the use of metal equipment in handling acid mine water, which I think is quite generally overlooked; namely, the electrolytic action that is always set up when two dissimilar metals are immersed in an acid solution and electrically connected.

We have made some experiments along this line to determine to what extent this action destroys the metal. We find, for example, that when a piece of acid-resisting bronze is electrically connected with a piece of cast iron and the two immersed in an acid solution, a disintegrating action begins that eats away the metal.

Our experiments showed that the iron was eaten away more rapidly and the bronze less rapidly than when each of these metals was immersed alone in the same solution. We conclude from this that if a bronze pump is used to pump water containing sulphuric acid, and is connected to a cast-iron discharge or suction pipe, the electrolytic action that takes place between the two metals through the medium of the acid water tends to prolong the life of the bronze pump, while it shortens the life of the cast-iron pipe.

In answer to the second question it should be stated that, while a truly neutral salt can exert no corrosive action on the metals mentioned, it is seldom that these salts are present without some free acid.

The answer to the third question is that sulphur existing as sulphate in the coal burned in presence of moisture would not form sulphuric acid.

Electrically Driven Mine Pump

We have a great deal of trouble with a pump that is located at the foot of a slope 800 ft. long and having a 25 per cent. grade. This pump has a 6-in. suction and a 5-in. discharge. The 5-in. discharge pipe is carried but a short distance from the pump to a point where it connects with an 8-in. pipe line that was originally laid in the slope for an air line. Being no longer required for that purpose, it was found convenient to make use of this 8-in. pipe for a discharge line for the pump.

The pump is electrically driven, the motor being self-starting. For some reason that we have not, as yet, discovered, the pump works badly, at times bending the piston rod and breaking the casting of the belt-wheel journal. At other times, the armature has burned out. We have been wont to attribute the cause to the large 8-in. discharge pipe, and I want to ask if a 5-in. pipe had been used all the way up the slope, would the same trouble have been experienced?

JOHN MARTIN,
Arden Mines, Penn. Mine Foreman.

From the data given, it would appear that the trouble is due to a lack of adjustment in the controller of the electric motor, which starts the pump too suddenly. The controller should be adjusted so that the pump will start slowly and thus be able to overcome the inertia of the water in the discharge pipe by degrees. The use of a 5-in. discharge line would be no improvement, as the pump would still work under the same discharge head. A good air chamber would greatly help to reduce the shock due to the inertia of the water in the pipe when starting the pump.

EXAMINATION QUESTIONS

Indiana Mine-Bosses Examination, Vincennes, Jan. 17, 1918

(Selected Questions)

Ques.—If you were mine boss, what orders would you give to timbermen in regard to making themselves safe while timbering an entry where the roof is bad?

Ans.—I would instruct them to sound the roof and examine it carefully to ascertain its condition before starting to set any timbers. It may be found necessary to stand one or two posts temporarily in advance of the timber frames about to be placed. I would tell them, also, to prepare all of their timbers back from the place where they were to be set, so that the work of framing the collars and posts could be done with the greatest degree of safety. Under no conditions should the men be permitted to expose themselves to danger while working under bad top.

Ques.—(a) How, in your opinion, should a mine boss examine a miner's working place to comply with the law? (b) What is the best known method of ascertaining when the roof is loose?

Ans.—(a) The Indiana mining laws require the mine boss to examine every working place in the mine, at least each alternate day when the men are or should be at work, and ascertain that the place is securely timbered and a proper supply of timbers on hand ready for use when needed. He must also see that all loose coal, slate and rock are taken down or made secure. If a place is found to be unsafe for work the mine boss should not permit the man to work there, until the danger is removed and the place made safe.

(b) The usual method of testing roof in mines, for the purpose of discovering any loose top, is to sound the roof with the butt end of a pick, bar or hammer, at the same time holding the other hand lightly against the top to detect any vibration or trembling, which can usually be felt if the piece is loose. It is not sufficient to rely entirely on the sound produced when the roof is struck with a pick or bar.

The roof must, also, be carefully examined to discover any slips or faults that would prove to be lines of weakness. The condition of the timbers standing in a place should also be carefully observed, in order to detect what movement or settlement, if any, is taking place, and enable one to form a more correct judgment of the strength and action of the roof.

Ques.—(a) With motor haulage, how would you protect the trolley wire along the main haulage roads to prevent accidents from same? (b) What system would you establish to govern motor haulage and what kind of markers would you use? (c) How would you arrange motors and wires, to prevent placing trolley wire across room-necks, where trolley motors are used for gathering purposes?

Ans.—(a) As far as practicable, the trolley wire should be hung on one side of the track, throughout the length of the entry, which should be the side opposite to that where clearance is provided to allow men to pass whose duties require them to work on the road. The trolley wire must be well supported by hangers fixed in the rib at regular intervals and not too far apart. Where it is necessary for men or animals to pass under the trolley wire, this should be supported at a height not less than 6 ft. above the top of the rail, and should be otherwise protected by an inverted board trough, which would permit the passage of the trolley, while preventing the accidental contact of tools carried on the shoulders of men. A suitable danger sign should also be arranged to warn men of the presence of a live wire.

(b) Where more than one motor is used in the mine, a careful schedule should be prepared that will make it impossible for a collision to occur in the movement of the trips. The motormen must follow the schedule precisely and run no chances.

A suitable marker must always be placed on the rear end of a trip of cars when starting from the parting on the inside of the mine with a loaded trip or taking an empty trip from the shaft bottom into the mine. Different markers are used, consisting of a gong operated automatically by the movement of the car, a danger board painted white and hung on the last car of the trip, or anything that will show plainly the end of the trip. The gong is generally to be preferred, because of the warning it gives an approaching motorman, by its sound. The danger of using a light is its possible extinction when the trip is running.

(c) The trolley wire must be placed on the side of the entry opposite to that from which the rooms are turned. In order to avoid the trolley wire crossing the entry, and to enable a trolley motor to operate in a room turned off that entry, the motor should be equipped with a reel carrying a cable that could be attached to the trolley on the entry when the motor is being operated in a room.

Ques.—(a) What are the duties of a fireboss as set forth in the mining statute? (b) What should the miner know before entering a mine which generates firedamp?

Ans.—(a) The Indiana mining law provides (Sec. 11) that every place supposed to contain explosive gas shall be carefully examined with a safety lamp, by a competent fireboss, immediately before each shift. The law requires the fireboss to leave evidence of his presence, at the face of every place examined, and makes it unlawful for any person to enter the mine, or any part of a mine generating gas, until it has been examined by the fireboss and reported by him to be safe.

(b) Every miner should know the danger of working in a place containing gas, and whether his place has been reported as unsafe by the fireboss. On entering his place, in the morning, and before proceeding to work, he should examine to see that the mark of the fireboss is there, showing that the place has been examined.

COAL AND COKE NEWS

Harrisburg, Penn.

The most important step ever taken in the affairs of the soft-coal industry was announced on Jan. 16, when acting under the direction of Dr. Garfield, C. E. Lesher, representative of the Federal Fuel Administration, met the bituminous operators of central Pennsylvania and informed them of a plan by which Dr. Garfield proposes to regulate the distribution of the soft-coal production of the country.

The country has been divided into eleven producing districts and twenty consuming districts. Each district is to have an administrator and three assistants, who will have authority to designate which industries are essential and which are nonessential in order that the bituminous production may be distributed where it will best serve the war needs of the country.

Three administrators will work with the state fuel administrators and Dr. Garfield's office. Barring these two superiors, they will be endowed with almost autocratic power.

The first thing to be eliminated by these boards will be the cross-hauling of coal. Each consuming market is to be supplied from mines on the nearest rail haul. No longer will coal from the West be shipped East, involving a double haul, or from the East to the West.

Under the leadership of T. H. Watkins, president, Low Volatile Association; Benjamin M. Clark, president, Central Operators' Association of central Pennsylvania, and Percy Madeira, president, Madeira Hill & Co., a resolution was adopted to appoint a committee of 15 members from both bodies to recommend a representative of the soft-coal operators as administrator for the central Pennsylvania fields. The committee of 15, it was decided, should sit as a permanent body until the end of the war, conforming to the custom of the anthracite operators in having the operators' committee as an official head through whom the Government may act.

The committee of 15 is composed of Benjamin M. Clark, Jefferson; Rembrandt Peale, Cambria; T. H. Watkins, Blair; Senator T. Larry Eyre, Chester; P. C. Madeira, Philadelphia; John Lloyd, jr., Blair; E. B. Chase, Philadelphia; J. F. Macklin, Philadelphia; Chester Langdon, Huntington; James B. Neale, Schuylkill; Senator Wilbur Graff, Indiana; Harry Boulton, Clearfield; John Cassley, Clearfield; Charles Owens, Cambria, and C. H. Jacobs, Philadelphia.

William Potter said this committee of 15 would be called upon to thresh out the details of a system that was originated by the coal men themselves. "There can be no come back," said the state fuel administrator, "on the grounds that they were not consulted or that the plan was theoretical and devised by men that did not understand the coal business."

The central Pennsylvania fields have a total of 60,000 miners and an annual production of about 60,000,000 tons. It was the sense of the conference that the headquarters of the administrator should be at Altoona, with assistants at Punxsutawney, Johnstown and Clearfield.

The conference was by no means a calm recital of a situation and a remedy. Some of the operators contend that the Government has not treated the operators fairly as to the matter of prices. The problem of distinguishing between essential and nonessential industries aroused uneasiness among the operators, the ground being taken that every contract on their books must be considered void until ratified by the coal administration.

Recommendations for the discontinuance indefinitely of all nonessential industries for the conservation of coal as a step to relieve the present shortage were made at a conference of anthracite operators, transportation and distribution committees called by William Potter, state fuel administrator. A resolution requesting the fuel administrator to use his influence in having the Government assign drafted mine workers to their present work was adopted.

A report of the general committee of anthracite operators stated that as the demand for anthracite was so great it was imperative that there be no waste either in its use or for nonessential purposes. The report continued: "The demand for anthracite has so enormously increased within a year that it is impossible to fully meet it with the largely reduced labor supply. It is a matter of utmost public and national importance that the present army of mine workers shall be kept in its highly essential service, that the men be exempted from draft and not drawn from work upon the full progress of which depends the supply of anthracite for millions of people."

Representative Frank C. Reese made public on Jan. 18 his investigation of the anthracite industry, which has occupied several weeks, with the assistance of a corps of clerks. Mr. Reese asserts that big coal companies are selling refuse coal from the culm banks to the public at full price, although, he says, this fuel rarely costs more than 25c. a ton to place on board cars, and with a charge of $1.70 for hauling should be sold in Philadelphia and New York at a cost not greatly exceeding $2.

He quotes Alfred B. Garner, former Congressman, as his authority that the coal from the Bancroft washery at Ashland is being produced at a cost of about 13c. a ton. This washery is typical of hundreds of others, he says.

While producers are demanding the highest price in all history for coal, Reese asserts, in the Schuylkill region, wherein lies the great bulk of unmined anthracite coal, lands worth untold millions are taxed at only nominal valuation. As the result of his investigation, Reese says, he finds that the coal districts in Schuylkill, which are the richest in deposits, place such a small tax on coal lands that many of the districts are verging on bankruptcy, while educational facilities for children are lacking.

Declaring that nine-tenths of the accidents in this state could be avoided, Harry A. Mackey, chairman of the workmen's compensation board, in an address during the week, advocated legislation providing for increased compensation. He spoke at a dinner given by members of thirty different labor organizations.

Notice is to be given by the State Compensation Board that hereafter all claims made for compensation on the part of aliens in enemy countries are to be made in the name of A. Mitchell Palmer, custodian of alien property. This action will bring the matter under the Federal Government, and awards will be taken care of by Mr. Palmer's Bureau at Washington.

PENNSYLVANIA

Anthracite

Coxton—Traffic conditions in the Lehigh Valley coal yards are in much better shape for handling coal than they have been for a long time. The relief from the congested conditions has been afforded as a result of an order permitting the Lehigh Valley R.R. to transport all of its eastbound coal originating in the Wyoming coal field over the Wilkes-Barre Mountains by means of the Jersey Central Co.'s Ashley planes.

Lattimer—The large stripping operation of the Lehigh Valley Coal Co., which has yielded more than 1,800,000 tons of coal since 1904, is good for but three years more at the usual rate of production, according to estimates of coal region observers.

Wilkes-Barre—For the immediate relief of householders who have not been able to obtain coal supplies, managers of four of the leading brewing companies in northeastern Pennsylvania on Jan. 17 announced the closing of their plants for a limited period. All teams, wagons and tractors will be given without cost to A. C. Campbell, fuel administrator of this district, to help in the delivery of coal. Drivers will be paid full salary by the brewers.

Wilkes-Barre — Saloonkeepers who sell to miners on their way to work will be considered unfit persons to have a liquor license, was a statement made by Judge Woodward, of Luzerne County, in considering applications for transfers. The judge also asked the applicants what time they proposed to open their places in the morning and what would be their closing time. This all indicates that the court may make some order regulating the opening and closing of saloons, as advocated by the coal operators.

Nanticoke—That the Susquehanna Coal Co. has been hit hard by the declaration of war is evident from the fact that 187 of its employees from this town and Newport Township are already in the service of the United States, 122 of these volunteering and 65 being drafted. Some of the men are already in French territory, while others are in training at the various camps in this country. Under the new classification of the draft system, 91 employees of the company have already been placed in Class 1 by the local exemption board.

Gilberton—The Harleigh-Brookwood Coal Co., which operates the Harleigh colliery, has leased a tract of coal land from the Philadelphia & Reading Coal and Iron Company.

Luzerne—The breaker of the Raub Coal Co., which was recently destroyed by fire, is being rapidly reconstructed. The colliery will not shut down, as was expected, but will resume operations. Coal will be stored outside until the breaker is completed. It will take about six weeks to rebuild.

Bituminous

Indiana—Another large coal deal was recorded here this week when David W. Simpson and County Commissioner W. Bruce Wagner, of Indiana, purchased the 138-acre tract in West Wheatfield Township from the John Patterson heirs, of Toronto, Canada. The land is underlaid with both the Upper Freeport "E" vein and the Miller "B" vein. The tract is near Heshbon, near the Cambria & Cresson branch of the Pennsylvania R.R. No plans have been announced for the development of the property.

Several mines in Indiana County were idle last Friday and Saturday on account of the several storms and cold weather. Power lines were down, the railroads were snowed up, and the outside labor refused to work in many cases. Work was resumed in full capacity Monday morning.

Chambersville—Fire, of unknown origin, destroyed three houses of the Seneca Coal Mining Co. here and rendered six families homeless. The fire broke out about 10:30 p.m. and the occupants of the house escaped clad only in their night clothes while the thermometer registered 8 deg. below zero. Very little household goods was saved by any of the families.

Tipperary—The Pensylvania Coal and Coke Co. has built several houses of the bungalow type at its No. 55 mine here. It has also erected a modern clubhouse for the use of employees which contains kitchen, dining rooms and rooms for the officials when they visit the plant. All the streets have been covered with crushed stone and ashes and rolled with large steam rollers. When all improvements are completed it will be one of the most modern mining towns in Indiana County.

Uniontown—J. G. Carroll, referee in bankruptcy for Josiah V. Thompson, former Uniontown banker and coal operator, on Jan. 17 issued an order for the sale of 12,000 acres of coal land to the H. C. Frick interests for $500 an acre, or a total of $6,000,000.

Altoona—About 300 business men and their employees, on Jan. 17, mobilized for the purpose of working on highways leading from near-by coal mines, that the daily coal supply of a thousand tons may be brought in by a motor truck fleet. Since recent snows travel to the mines has been reduced and many business houses have suffered for want of fuel.

WEST VIRGINIA

Charleston—All records for idle mines in Kanawha district on account of the shortage in cars have been broken. A total of 126 mines reported to the Kanawha Coal Shippers' Association on Jan. 17 that they were closed down for the day, throwing out of employment 10,068 men. Out of a total of 158 mines only 32 received sufficient cars to start work. The car supply was enough only for the loading of 7400 tons of coal, against an order from all mines of 62,530 tons, or less than 12 per cent. of requirements.

Clarksburg—The Winchester Coal Co., with chief works at Enterprise, has moved its office to this city, locating in the Elk Building. J. Martin Stark is general manager. The company is now arranging to open a new mine at Arden, Barbour County, and will develop a 125-acre tract of Pittsburgh coal. This will give the company two mines and both are expected to be worked to capacity.

Galloway—Announcement is made that the Simpson Creek Coal Co. has opened up two new mines at Galloway, Barbour County, West Virginia, in the Fairmont region. Coal is already being taken from 14 openings. The combined capacity of the new properties will shortly amount to 5000 to 8000 tons daily.

Monongah—The Ben Franklin Coal Co. is installing electrical equipment in its mine here. Power is to be supplied by the Monongahela Valley Traction Company.

Phœnix—The Alpha Portland Cement Co. is equipping the mine it recently purchased here with electrically driven machinery, furnished by the Fairmont Service Company.

Fairmont—The Fairmont & Connellsville Coal Co. is opening a mine on its property on Teverbaugh Creek. The Monongahela Valley Traction Co. is building a transmission line one mile in length to supply the mine with current.

INDIANA

Princeton—Fire destroyed the work clothes of 300 miners and other property to the amount of $5000 when the new warehouse of the Princeton mine was burned on Jan. 15.

ILLINOIS

Danville—With the opening of the Danville-Chicago division of the Chicago, Terre Haute & Southeastern R.R., a few days ago, three roads are rushing coal trains to Chicago from this section as fast as engines can be obtained. The Big Four and the Chicago & Eastern Illinois each accumulated 1500 cars here during the recent bad weather, which are now being moved.

Carlinville—The Standard Oil Co. has bought, in addition to extensive previous purchases, 80 acres of coal land from Mrs. F. W. Burton and 155 acres from C. E. Berry near here. Reports are that the company will spend $2,000,000 in development in the Carlinville district in the next two years.

Christopher—Preparations are being made to reopen the Christopher mine, which has been sealed since the explosion which killed 17 miners a few weeks ago. Two sections of the mine have been opened and inspected and found in good condition. Other sections will be unsealed in a few days. The mine employs between 600 and 700 miners.

Marion—The Powers Consolidated Coal Co., of Chicago, has purchased 1800 acres of coal land six miles southeast of here. The company will begin development operations at once. This has long been considered one of the best fields in Williamson County, but development has been hindered by lack of transportation facilities. The company will build a track to the Illinois Central. The deal involves an investment of $600,000.

Belleville—William Matthews, a miner employed at the Oak Hill mine, near here, pleaded guilty to committing a misdemeanor, and was fined $200 and costs. Matthews found the fuse of an unexploded shell in his room at the mine when he reported for work and set fire to it. The fumes necessitated the closing of the mine for the day. His only excuse was that he wanted to see what would happen. He was given his choice of a fine of $100 and 30 days in jail or $200 fine, and elected to pay the $200 fine.

A fire, believed to be of incendiary origin, last week destroyed the washhouse of the so-called "Nigger Hollow" No. 2 mine, near French village. In February, 1917, the washhouse was destroyed under exactly similar circumstances. The building just burned was modern in every respect and all precautions had been taken against accident or fire. The washhouse will be rebuilt as quickly as practicable.

Foreign News

Halmerend, England—The latest reports from official sources show that many perished in the explosion that occurred in a mine pit here on Jan. 12. Of the 247 workers in the mine at the time of the disaster, 87 have been rescued alive, and 23 bodies have been found. There is only a slender hope that any of those still entombed can survive. Nearly all the victims were young men and boys.

Personals

R. J. Morgan, formerly supervisor of sales for the American Steel Export Co., Woolworth Building, New York City, has been appointed assistant general manager of sales.

Herbert Devy, formerly mine foreman of Aultman No. 4 mine at Aultman, Penn., has been made superintendent of all the Aultman mines of the Jefferson & Clearfield Coal and Iron Company.

James Cummings, formerly superintendent of the Aultman mines of the Jefferson & Clearfield Coal and Iron Co., at Aultman, Penn., has been made superintendent of the Jacksonville No. 5 mine at Kent, Penn., of the same company.

Lyman Fearn, former mine foreman at No. 2 mine, Cumberland, Wyo., has been transferred to the foremanship of the mine at Superior, Wyo. Mr. Brown, who was connected with the Superior mine, is to be the new foreman at Cumberland No. 2.

James T. Reynolds, mine inspector of the Pittsburgh Terminal Railroad and Coal Co., of Pittsburgh, Penn., has resigned his position with that firm to accept a position as mine superintendent for the Houston Coal Co., with mines near Houston, Pennsylvania.

Frank J. Foley, formerly manager of the mining department of the Westinghouse Electric and Manufacturing Co., is now connected with the Edison Storage Battery Co., Orange, N. J., as manager of the mining and traction department, with headquarters at the main office in Orange.

W. D. McKinney, commissioner of the Southern Ohio Coal Exchange, has been appointed district representative for the Federal Fuel Administration in the Jackson, Crooksville, Hocking Valley, Ironton, Pomeroy Bend and Mason County fields. The last field is in West Virginia.

Wade M. Reed, for the past two years assistant to the superintendent of the Locust Mountain Coal Co. of Shenandoah, Penn., has resigned, effective Jan. 19, to accept a position as superintendent of transportation for the Delaware & Hudson Coal Co., with headquarters at Scranton.

John McBride, of Hazleton, Penn., who has been chief coal inspector for the Dodson Coal Co. for many years, has been named as superintendent of all the coal breakers of that concern. James Landers, of Girardville, has been named to succeed Mr. McBride as head of the coal inspectors. Mr. McBride is a practical breaker man and for many years was engaged by the Lehigh Valley Coal Co., in that capacity.

Obituary

E. C. Brown, of Patton, Penn., general manager of real estate for the Pennsylvania Coal and Coke Corporation, and an independent operator, died at his home in Patton recently. He visited one of his operations and caught cold; pneumonia set in and he died five days afterward.

New Patents

Mining Machine. N. D. Levin, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,244,871. Oct. 30, 1917. Filed Sept. 30, 1907. Serial No. 395,061.

Stoker Driving Arm. J. W. Bell, assignor to Murphy Iron Works, Detroit, Mich., 1,244,945. Oct. 30, 1917. Filed July 9, 1914. Serial No. 849,884.

Mine-Car Wheel and Attaching Means Therefor. F. H. Gibbs, assignor to American Car and Foundry Co., New York, N. Y., 1,245,142. Oct. 30, 1917. Filed Oct. 31, 1916. Serial No. 128,718.

Grate Attachment. M. H. Chandler, Lavonia, Ga., 1,245,087. Oct. 30, 1917. Filed Feb. 14, 1917. Serial No. 148,544.

Combined Coal Hod and Ash Sifter. N. D. Henley, Richmond, Va., 1,244,605. Oct. 30, 1917. Filed Apr. 12, 1916. Serial No. 90,751.

Method of Repairing Coke-Oven Walls. A. H. Chalmers, Fairfield, Ala., 1,244,467. Oct. 30, 1917. Filed May 1, 1916. Serial No. 94,647.

Mining System. W. E. Hamilton, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,244,601. Oct. 30, 1917. Filed Aug. 30, 1909. Serial No. 515,341.

Coal-Cutting Machine. G. Rimmer, assignor to Sullivan Machinery Co., Claremont, N. H., 1,245,771. Nov. 6, 1917. Filed Apr. 16, 1917. Serial No. 162,519.

Dump Car. W. L. Burner, assignor to Kilbourne & Jacobs Manufacturing Co., Columbus, Ohio, 1,245,866. Nov. 6, 1917. Filed Dec. 20, 1915. Serial No. 67,850.

Draft Regulator for Furnaces. A. M. Smith, Fort McKinley, Philippine Islands, 1,245,282. Nov. 6, 1917. Filed Nov. 27, 1916. Serial No. 133,645.

Coal Loader. D. B. Stauft, Uniontown, Penn., 1,246,673. Nov. 13, 1917. Filed Jan. 6, 1917. Serial No. 140,910.

Combined Stoker and Grate. H. F. Moore, Chicago, Ill., 1,246,639. Nov. 13, 1917. Filed Feb. 1, 1913. Serial No. 745,638.

Coal-Mine Hoist. A. Appleyard, Beaverdale, Penn., 1,246,517. Nov. 13, 1917. Filed Mar. 7, 1917. Serial No. 153,035.

Draft Regulator. W. J. Moreland, Skaneateles, N. Y., 1,246,673. Nov. 13, 1917. Filed Jan. 6, 1917. Serial No. 140,910.

Mining Apparatus. G. B. Norris, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,247,407. Nov. 20, 1917. Filed Nov. 24, 1914. Serial No. 873,802.

Grate. G. A. Kohout, assignor to Shear Klean Grate Co., Chicago, Ill., 1,246,937. Nov. 20, 1917. Filed Oct. 21, 1914. Serial No. 867,810.

Method of Effecting and Regulating Combustion in Furnaces. F. H. Brown, Philadelphia, Penn., 1,247,215. Nov. 20, 1917. Filed Nov. 28, 1911. Serial No. 662,814.

Electric Locomotive Cable-Reeling Mechanism. N. D. Levin, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,247,421. Nov. 20, 1917. Filed July 22, 1911. Serial No. 639,931.

Coal-Cutting Machine Attachment. J. Jenkins, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,247,407. Nov. 20, 1917. Filed June 20, 1913. Serial No. 744,885.

Mining Machine. N. D. Levin, Columbus, Ohio, 1,247,419. Nov. 20, 1917. Filed Feb. 23, 1910. Serial No. 545,337.

Trade Catalogs

Wyoming Mayari Red Edge Shovels. The Wyoming Shovel Works, Wyoming, Penn. Catalog. Pp. 42; 4½ x 8 in.; illustrated.

Chapman Type Ball Bearings for Power Transmission. Transmission Ball Bearing Co., Inc., Buffalo, N. Y. Catalog No. 3. Pp. 52; 6 x 9 in.; illustrated.

Smooth-On Instruction Book No. 16. Smooth-On Manufacturing Co., Jersey City, N. J. Pp. 16; 3½ x 6 in.; illustrated. This describes various cements for repairing breaks or leaks in iron piping, castings, etc., and also contains standard sizes of Smooth-On coated corrugated gaskets for flanged pipes from 2 in. up to 26 in.

"Hydro" Gas Meters. Bacharach Industrial Instrument Co., Pittsburgh, Penn. Catalog E. Pp. 12; 6 x 9 in.; illustrated. This catalog contains information on the various methods employed for measuring gases and shows the application of these meters to blast furnaces, byproduct coke ovens, etc., as well as measuring air for mine ventilation.

Publications Received

"Approved Electric Lamps for Miners." By H. H. Clark and L. C. Ilsley. Department of the Interior, Bureau of Mines. Illustrated, 53 pp., 5¾ x 9 in.

"Imports Entered for Consumption and Exports of the Dominion of Canada, October, 1917." Department of Customs. Unillustrated, 340 pp., 6½ x 9¾ in.

"Year-Book of the Bureau of Mines, 1916." By Van H. Manning. Department of the Interior, Bureau of Mines. Bulletin 141. Illustrated, 165 pp., 5¾ x 9 in.

"Cost Accounting for Oil Producers." By Clarence G. Smith. Department of the Interior, Bureau of Mines. Bulletin 158, Petroleum Technology 43. Unillustrated, 117 pp., 6 x 9 in.

"Blast-Furnace Breakouts, Explosions and Slips, and Methods of Prevention." By F. H. Willcox. Department of the Interior,

Bureau of Mines. Bulletin 130. Illustrated, 267 pp., 5¾ x 9 in.

"Directions for Sampling Coal for Shipment or Delivery." By George S. Pope. Department of the Interior, Bureau of Mines. Technical paper 133. Illustrated, 13 pp., 6 x 9 in.

"Monthly Statement of Coal-Mine Fatalities in the United States, September, 1917." Compiled by Albert H. Fay, Department of the Interior, Bureau of Mines. Unillustrated, 27 pp., 6 x 9 in.

"Monthly Statement of Coal-Mine Fatalities in the United States, October, 1917." Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, 29 pp., 6 x 9 in.

"Suggestions for the Safe Operation of Gasolnie Engines in Mines." By R. H. Kudlick and Edwin Higgins. Department of the Interior, Bureau of Mines. Technical Paper 174. Illustrated, 16 pp., 6 x 9 in.

"Geologic Structure in the Cushing Oil and Gas Field, Oklahoma, and Its Relation to the Oil, Gas and Water." By Carl H. Beal, Petroleum Technologist, U. S. Bureau of Mines. Bulletin 653. Department of the Interior. Illustrated by charts and maps. 61 pp., 6 x 9 in.

"Compressibility of Natural Gas and Its Constituents with Analyses of Natural Gas from 31 Cities in the United States." By G. A. Burrell and I. W. Robertson. Department of the Interior, Bureau of Mines. Technical Paper 158, Petroleum Technology No. 32. Illustrated, 14 pp., 6 x 9 in.

"Durability of Cement Draintile and Concrete in Alkali Soils (Containing Results of Third Year's Tests)." By R. J. Wig, Engineer Physicist; G. M. Williams, Assistant Engineer Physicist, and A. N. Finn, Associate Chemist, all of the Bureau of Standards. In cooperation with S. H. McCrory, Chief of Drainage Investigations, Department of Agriculture; E. C. Bebb, Engineer, U. S. Reclamation Service, and L. R. Ferguson, Engineer, Portland Cement Association. Department of Commerce, Technologic Papers of the Bureau of Standards, No. 95; 94 pp. of text, 44 pp. of plates, 7 x 10 in.

Industrial News

Gary, W. Va.—The United States Coal and Coke Co. has filed notice of an increase in its capital from $2,000,000 to $12,500,000 for expansion.

Oklahoma City, Okla.—The Golden Rod Smelting Co. has filed an amendment to its charter increasing its capital stock from $1,600,000 to $2,100,000.

Maitland, W. Va.—The Houston Collieries Co. is planning for the immediate reconstruction of its tipple recently destroyed by fire with loss of about $100,000.

Mt. Sterling, Ky.—Estill & Owings, who have been in the retail coal business here for many years, have gone out of business because of inability to obtain coal.

Williamsburg, Ky.—The Caudill Coal Co. has filed notice with the Public Service Commission of an increase in its capitalization from $35,000 to $60,000 to provide for expansion.

Bald Hill, Penn.—The Hetrick Coal Co. has awarded a contract to the Roberts & Schaefer Co., engineers and contractors, Chicago, for the building of its new retarding conveyor and power house.

Bellaire, Ohio—The Wargo Coal Co. has been incorporated with a capital of $1000 to mine and sell coal. The incorporators are John W. Gibbs, R. E. Althar, Nelle Fry, Bessie Evans and Norma Boyce.

Nashville, Tenn.—The Nashville, Chattanooga & St. Louis Ry. is planning for the construction of a new automatic coaling station at its local yards. H. McDonald is chief engineer for the company.

Cleveland, Ohio—The McComb Coal Co. has been incorporated with a capital of $400,000 to mine and sell coal. The incorporators are E. A. Foote, E. S. Cock, F. S. McGowan, S. Chestnutt and J. K. Lee.

Akron, Ohio—The D. L. Wilson Coal Co. has been incorporated with a capital of $1000 to mine and sell coal. The incorporators are D. L. Wilson, D. M. Yarger, D. M. Turner, E. L. Siegel and H. L. Foratbauer.

Lorain, Ohio—The John Stack Coal Co. has been incorporated with a capital of $15,000 to mine and sell coal. The incorporators are George L. Glitsch, J. E. Stack, Gerald T. Stack, S. J. Stack and L. C. Roth.

Cleveland, Ohio—The Lake Erie Coal Co. has been incorporated with a capital of $1000 to mine and sell coal. The incorporators are George D. Rowland, F. G. Danielson, D. A. Elkins, M. Nichols and W. J. Budd.

Monterey, Tenn.—The Briar Hill Collieries are developing a new 1500-ton mine, and have awarded a contract to the Roberts & Schaefer Co., engineers and contractors, Chicago, for the building of a new modern Marcus tipple.

Rose Bud, Penn.—The Irvona Coal & Coke Co. has awarded a contract to the Roberts & Schaefer Co., engineers and contractors, Chicago, for a complete wood tipple, equipped with Marcus screens, car haul and other machinery.

Cincinnati, Ohio—The Hermitage Coal and Supply Co. has been incorporated with a capital of $5000 to deal in coal. The incorporators are C. W. Stricker, Robert Wirth, M. F. Little, L. M. McGlaughlin and George G. McGlaughlin.

Henryetta, Okla.—The Fretwell Coal Co. has been organized here and chartered for business in Oklahoma. The capital stock is $10,000 and the incorporators are R. R. Fretwell, J. E. Whitenton and R. B. F. Hummer, all of Henryetta.

Birmingham, Ala.—The Montevalle Hard Coal Co. filed articles of incorporation in Jefferson County recently. Thomas L. Hendrix is president and Samuel G. Grey secretary-treasurer. The capital of the new company is given at $4000.

Louisville, Ky.—A resolution in the City Council authorizes the Louisville city buyer hereafter to make coal purchases direct from mines in amounts up to $2000 at a time, instead of having to advertise for bids and award to the low bidder.

Nashville, Tenn.—Impassable streets have resulted in a request from the local fuel administrator, John H. DeWitt, that consumers absolutely in need borrow or purchase from their neighbors or go themselves to coal yards for their supplies.

Hamlin, Va.—The Hamlin Coal Co., recently organized, has leased a large tract of local coal lands and is planning for the immediate construction of a new tipple and 15 miners' residences to inaugurate operations. R. R. Williams is president.

Baltimore, Md.—Fire recently destroyed a portion of the coal-thawing plant of the Baltimore & Ohio R.R. on Curtis Bay Pier, with loss estimated at $75,000. It is said the destroyed portion will be immediately rebuilt. H. A. Lane is chief engineer.

Roanoke, Va.—The Russell Fork Coal Mining Co. has been incorporated with a capital of $500,000 to engage in a general coal-mining business. R. C. Forbes, Lynchburg, is president, and W. H. Partain, Jr., Baltimore, Md., is secretary-treasurer.

Spokane, Wash.—The Miller & Colianni Co. of St. Paul, Minn., has been awarded the contract by the Northern Pacific Railway Co. to supply the engines of that company's lines with coal from Paradise, Mont., to the coast. This includes twenty stations.

Birmingham, Ala.—The W. C. Rust Coal Co. has been incorporated with a capital stock of $10,000. W. C. Rust is president, J. F. Berry Baugh, vice president and treasurer, and Anna M. Rust, secretary. The headquarters of the company will be in Birmingham.

Nashville, Tenn.—According to a report of Chief Mine Inspector Shiflett, of Tennessee, there were 184 coal mines in operation in Tennessee in 1917, compared with 126 the year before. The 1916 production was about 6,000,000 tons and the 1917 production 7,500,000 tons.

Columbus, Ohio—Columbus is to have a municipal coal yard after all, unless a referendum is called to defeat the ordinance passed by the city council over the mayor's veto. So far no attempt has been made to have the referendum and the coal yard will be established within 30 days.

St. Louis, Mo.—The St. Louis Chamber of Commerce has appointed the following to represent the coal interests in the members' conference of the organization: Parker H. Woods, chairman; P. E. Conrades, vice chairman; Edward Devoy, E. C. Donk and John C. Muckermann.

Irvington, N. J.—The International Coal Products Corporation has been incorporated, with a capital of $11,000,000, to engage in the development of inventions for the manufacture of smokeless fuel. The incorporators are C. L. Blair, George W. Bacon and John B. Dennis, all of New York.

Auburn, Ill.—The Panther Creek Mines, Inc., near Auburn, Ill., in which the Solomon Brothers, of Springfield, Ill., are interested, are sinking a new shaft for the development of a 4000-ton mine, and have awarded a contract to the Roberts & Schaefer Co., engineers and contractors, Chicago, for the building of a new tipple.

Greenville, Ky.—Suit has been filed by the Central Trust Co., Owensboro, Ky., as trustee for a number of bondholders, against the Continental Fuel Co., seeking to enforce a mortgage of $125,000 on mining property known as the Diamond Block Coal Co. and other properties near Drakesboro, in Muhlenberg County.

Cincinnati, Ohio—John H. Dierkes is president of the Phœnix-Jellico Coal Co., incorporated with a capital stock of $65,000, to succeed the Phœnix-Jellico Coal Co., of Kentucky, which formerly operated a mine near London, Ky. The mine has now been leased by the company to the Horseshoe Coal Co., which is operating it on a royalty basis.

Galloway, Ohio—At a meeting of the stockholders of the Simpson Creek Coal Co., it was announced that two new mines have been opened in the Fairmont region. Coal is now being taken from 14 openings on the property of the company, which consists of 3500 acres. The combined capacity of the mines will amount to about 8000 tons daily.

St. Louis, Mo.—The fourth annual banquet and entertainment of the St. Louis Coal Club was given Monday night at the American Annex. John P. Reese, vice president and general manager of the Superior Coal Co., was the principal speaker. His subject was "The Relation of Government-Controlled Railroads to the Coal Industry."

Indianapolis, Ind.—A large service flag, bearing 19,135 stars, was unfurled at the twenty-sixth consecutive and third biennial convention of the United Mine Workers, held on Jan. 15. The flag measures 48 x 75 ft., and required 400 yd. of material in its manufacture. Each star represents a union coal miner who is now in any branch of the Federal service.

The Federal Fuel Administrator for Texas—Wiley Blair, of Dallas—issued an order directing the Lone Star Gas Co. to cut off all industrial users in Dallas, Fort Worth, Denison, Sherman, McKinney, Denton, Gainesville, Wichita Falls and Abilene so that the gas supply might be conserved for domestic uses. This step was taken as an emergency measure to conserve the fuel.

Columbus, Ohio—Governor Cox has appealed to Railroad Director McAdoo to take off passenger trains in Ohio in order to get motive power for the movement of coal trains. He claims that many passenger trains in the "Buckeye State" can be taken off without great inconvenience. Reports show that upward of 5000 loaded cars of coal on several railroads in Ohio remain to be moved.

Panama, Okla.—The Stewart Coal and Mining Co. has been organized here with a capital of $10,000, and charter has been filed in the office of the Secretary of State at Oklahoma City. The incorporators are Pete Stewart, Jr., Mrs. Lula Stewart, both of Hartford, Ark., and Thomas Murphy, of Panama. The company will develop coal lands in eastern Oklahoma and western Arkansas.

New Philadelphia, Ohio—The Reeves Manufacturing Co., Canal Dover, has had plans prepared for the construction of a new tipple, 40 ft. high, to be equipped with a 5-ton motor, 60 to 75 coal carrying cars, industrial trackage, transformers, and special mining machinery, for the immediate development of its coal properties. George Arnold, Broadway Ave., New Philadelphia, is the architect.

Cambridge, Ohio—The Akron Coal Co. is opening a shaft mine on the Baltimore & Ohio R.R., seven miles east of Cambridge. The shaft, which is 187 ft. deep, is about completed and the work of installing machinery has started. It is planned to have a daily output of from 1200 to 1500 tons. The shaft reaches No. 7 seam, which is about 5 ft. thick. The company controls a large acreage in that section.

New York, N. Y.—The Hoisting Engine Sales Co., formerly operated by William B. Cist as sole proprietor, has been incorporated in the State of New York under the trade name of the Hoisting Engine Sales Co., Inc., and at a meeting of the directors, the following officers were elected: William B. Cist, president; Archer Armstrong, vice president and general manager; H. Haaman, secretary and treasurer.

Wilsall, Mont.—The Bender Coal Co. has been organized by Frank Bender and Samuel Barrett, of Livingstone, and John Fodness, of Chico, to develop the Edgar Potter coal measures in the Potter Basin field, 12 miles north of here. About Jan. 30 a contract will be let to sink a permanent slope. At present a temporary opening has produced 250 tons of coal, which has been used

by local industries with entirely satisfactory results.

Millfield, Ohio—The North Hill Coal Co. is opening a new mine on Bailey Run near Chauncey, Athens County, Ohio. The mine is located on the Kanawha & Michigan R.R. It will be a shaft mine to No. 7 seam which is about 4 ft. thick. The shaft will be about 40 ft. deep. The mine will be equipped with electrical machinery, the power to be secured from the Hocking Power Co., at Floodwood. The company has 200 acres at that point.

Kansas City, Mo.—Fuel administrators of Kansas, Missouri, Arkansas, Oklahoma, Nebraska and Iowa, in conference here on Jan. 21, suggested that no district representatives be appointed this late in the season in this territory or the territory supplying these states with coal. Breweries in Missouri closed Monday and Tuesday, and these are the only manufacturing industries restricted by any of the above administrators.

Cincinnati, Ohio—Warrants are being issued from the United States District Court at Covington, Ky., against coal operators in eastern Kentucky who are charged with violations of the executive order fixing prices for coal at the mines. Cases where prices were higher than those fixed have been carefully recorded, and it is declared to be the intention of the Federal authorities to cause arrests and prosecutions without further delay.

Louisville, Ky.—In recognition of the handicap represented by the two feet or more of snow on the Louisville streets, the local fuel committee has ordered an addition of 50c. a ton to the retail price of coal delivered in Louisville. Snow has practically paralyzed local traffic in Louisville, and off the street car lines transportation has been practically impossible. Four horses are required off the street car lines to pull a ton of coal.

Manchester, Ohio—C. R. Dailey, formerly a fur buyer at Canal Fulton, has embarked in a coal business in Summit County near Manchester. He has secured 35 acres of excellent No. 1 Massillon seam coal and a shaft 96 ft. deep is now being sunk. The output will be hauled to Akron by motor trucks. It will be a pick-mining proposition, and it is expected the daily output will be about 300 tons. The machinery and equipment will cost in the neighborhood of $50,000.

Greentown, Ohio—The Greentown Coal Co., of Massillon, Ohio, is rapidly equipping a mine near Greentown where a shaft 40 ft. deep is being sunk to No. 4 seam. The company has 300 acres under lease. The seam is 5 or 6 ft. in thickness. The company will depend on local trade to take care of the output until such time as the coal-cutting machinery is installed. It is expected to have an output of 300 tons daily. L. P. Schimke is manager of the company.

Pineville, Ky.—The Williams Byproduct Coal Co., recently organized, is planning for the immediate development of about 2000 acres of coal land, consisting of 1300 acres of Harlan and Creech seams and 700 acres of Wallins seam. Machinery is being installed in its plant, which will include electrically operated equipment. J. W. Williams, Gorton, is president; H. H. Asher, vice president, and G. M. Asher, all of Pineville, is secretary-treasurer. The company is planning for a daily capacity of about 2000 tons.

New York, N. Y.—At the annual meeting of the Wholesale Coal Trade Association of New York, held at the Whitehall Club on Jan. 17, the following directors were chosen: W. S. Alden, R. H. Burrows, W. R. Coyle, George M. Dexter, Thomas Dickson, C. C. Harris, James A. Hill, W. A. Marshall and LeBaron S. Willard. The board of directors the following day elected the following officers: President, James A. Hill; vice president, George M. Dexter; treasurer, C. C. Harris. Charles S. Allen is the secretary.

Dallas, Tex.—Severe coal shortage has been experienced in Dallas and other Texas cities during the blizzard just ended. In many of the smaller towns of Texas there was complete exhaustion of the coal supply and dealers were unable to supply even the emergency calls to relieve suffering. In Dallas, however, the situation was better, the dealers at all times retaining sufficient supply for all emergency calls, although they limited deliveries to the needy cases and delivered only such amounts as would relieve the situation.

Scranton, Penn.—At the annual meeting of the Scranton Steam Pump Co., on Jan. 18, Lester Davis was elected president, succeeding S. E. Dolph, who is now in the United States Army. Mr. Davis, who was formerly general manager of the company, will still continue in that capacity. The last year was the most prosperous in the history of the concern, the shipments for the year reaching a total of $800,000 in value. Orders on hand indicate that the Scranton Steam Pump Co. will enjoy continued prosperity for a long time.

Charleston, W. Va.—The Davis Creek & Spring Hill Railway Co. has been incorporated with a capital stock of $50,000, for the purpose of building a three-mile line of railway from a point near Spring Hill to a point near the Middle Fork of Davis Creek, for the purpose of opening up the nearest coal field to the proposed Government armor plate and munition factory to be located at South Charleston. Work will begin at once. R. N. Snyder, Samuel Edwards, H. F. Smith and E. M. Surber, all of Charleston, are interested.

St. Louis, Mo.—Retail coal merchants of Missouri met here a few days ago and organized a state association and elected these officers: President, P. T. Bryan, Kansas City; vice president, I. C. Knotts, St. Joseph; secretary and treasurer, E. J. Wallace, St. Louis. The state was divided into these nine districts: St. Louis, St. Joseph, Kansas City, Springfield, Joplin, Hannibal, Cape Girardeau, Jefferson City and Sedalia. Each district will have three directors. The St. Louis directors are: Walter F. Heinrich, J. J. Connell and Oscar Stephan.

Buffalo, N. Y.—The Corson Byproduct Coal Corporation of this city has elected the following officers: President, George A. Corson; vice president, A. A. Engle; secretary and treasurer, John E. Selkirk, all of Buffalo. The directors chosen were the officers, E. C. Roberts, of Buffalo, G. B. Stephens, of Lancaster; G. J. Brendel, of Hamburg, and H. J. G. Heiser, of Orchard Park, all this county. The company's property is in the Elkhorn district of Kentucky. Development has about reached the shipping point. The coal goes south, or to the Chicago district.

Louisville, Ky.—One of the principal difficulties under which operators have been working since the arrival of the severe weather has been that of the water supply. Ordinarily Kentucky mining operations do not encounter near-zero temperatures and rely on shallow lakes and streams for water for their power plants. Now, however, with near-zero temperatures a fact for weeks, many mining operations have found their sources of supply frozen up. Tank cars have had to be resorted to to keep water enough on hand for steam-making purposes and some operations have had to shut down altogether.

Columbus, Ohio—Because of car shortage and transportation difficulties occasioned by lack of motive power, and the blizzard, the production of coal in various mining districts of Ohio has been down to a low ebb. This is shown by a report for the week issued by W. D. McKinney, commissioner of the Southern Ohio Coal Exchange, and J. B. Zerbe, secretary of the Eastern Ohio Operators' Association. The report shows that out of 65 mines in the southern Ohio field and 85 mines in the eastern Ohio field reporting, the loss in production was 238,809 tons. Taking mines not reporting, the loss is considerably over 500,000 tons.

St. Louis, Mo.—Operators of the Fifth and Ninth Illinois districts, at a meeting here, unanimously indorsed plans submitted by Missouri Fuel Administrator Crossley for the establishment of a fuel district composed of Missouri, Kansas, Nebraska, Oklahoma and Arkansas, to be supplied with the output of the Illinois mines contiguous to St. Louis. The desire is to give the district preferential jurisdiction over the output of the mines from which it naturally draws its supply. The proposition also received the indorsement of the newly organized Retail Coal Merchant's Association of Missouri. Resolutions will be forwarded to Administrator Garfield.

Gallipolis, Ohio—The unprecedented freeze on the Ohio River, which now covers the river from Pittsburgh to Cairo, virtually its entire navigable length, is causing much damage to shipping in the stream, besides closing entirely the movement of coal. Many vessels belonging to coal companies have been carried by the ice from the Great Kanawha into the Ohio, and are threatened with destruction, many loaded barges of coal, including twelve in tow of the Campbell Creek Coal Co.'s towboat "Robert P. Gillian," being in this condition. The Kanawha fleet thus caught in the Ohio ice near Dam 26, with crushing or sinking by the ice imminent, is valued at $500,000.

Cincinnati, Ohio—Roger W. Babson, the famous statistician and business expert, in an address before the Cincinnati Rotary Club at the Hotel Sinton, declared that the coal shortage is due to the low prices fixed by the Government last summer, which made it impossible for hundreds of small mines to operate at a profit, and thus forced them to close, reducing the possible maximum output very heavily. Mr. Babson declared that price-fixing by the Government has always been a failure, and always would be, especially in the coal trade, suggesting that the incentive of profitable prices, produced by a free market under competitive conditions, has proved to be the best means of securing a large production of coal.

Frankfort, Ky.—One of the new measures introduced in the Kentucky Legislature now in session is House Bill No. 83, which would place a production tax of 1 per cent. on coal mined in Kentucky, and also permit counties to levy production taxes of ½ of 1 per cent., both to be figured on the market values at points of production. Another measure, House Bill No. 61, would affect some mining corporations since it seeks to require that concerns issuing script to employees redeem this script for cash on regular paydays. The Kentucky coal operators are represented at the capital. One lobbyist suggested that in view of the likelihood that the Government would take over the coal properties the efforts to assess tonnage taxes would likely be in vain.

Charleston, W. Va.—The supply of cars throughout the Kanawha district during the past month has averaged less than 35 per cent., according to estimates based on reports from various operators. The car shortage has been especially severe on the Chesapeake & Ohio, on account of the inability of the railroad to move loaded cars to clear the tracks for the return of empties. Figures for the past week indicating the situation as to cars are as follows: Jan 10, out of 166 mines, 80 were without cars; Jan. 11, of 168 mines, 93 were idle; Jan. 12, out of 170 mines, 90 were idle; Jan 14, 160 mines reporting, 58 were idle; Jan. 15, 156 mines reporting, 91 were idle. The loss of coal production caused by this extensive idleness forced by lack of cars is obviously enormous.

Cincinnati, Ohio—Through a successful appeal to Director General of Railways W. G. McAdoo, by the Hamilton County fuel administration committee, the movement of several hundred cars of coal from the congested yards of the Chesapeake & Ohio Railway Co. at Silver Grove was obtained early last week, enabling the relief of some of the distress among all classes of consumers. It is stated that more than 1500 cars of coal have been lying at Silver Grove for some time, within a few miles of Cincinnati and Covington, both of which cities are suffering for want of fuel, due to the inability of the railroads to move the cars. The coal received through the intervention of the Director General of Railways was distributed under the direction of the local fuel administration committee.

Cincinnati, Ohio—Small amounts of coal secured by the city from various sources, including donations from manufacturers, were distributed to the public in bushel lots at 24 stations established for the purpose at various points of the city. According to C. R. Hebble, of the Hamilton County fuel administration committee, the coal situation in Cincinnati is the most serious in the city's history, failure of relief by the receipt of an adequate amount of coal to supply domestic consumers being the cause. Seizure of coal for domestic consumers from factories with a supply on hand was threatened, but the suspension of industrial activity will, it is hoped, make this unnecessary. Dealers with a small quantity of coal on hand distributed it in one-bushel lots to hundreds of applicants.

Cincinnati, Ohio—Members of the Hazard Coal Operators' Exchange, of Hazard, Ky., held their annual meeting on Jan. 12 at the Hotel Gibson, holding the election of officers for 1918, with the following results: President, George H. Barker, of the Maynard Coal Co., Columbus; vice president, G. G. Bowain, of the Daniel Boone Coal Co., Hazard, Ky.; secretary and treasurer, R. A. Hord, Hazard, Ky. Executive committee: E. L. Douglas, of the Hazard-Jellico Coal Co.; A. L. Allais, of the Columbus Mining Co.; H. K. English, of the Blue Grass Coal Corporation, and Hugh Buford, of the Ashless Coal Corporation. The business sessions of the meeting were devoted almost entirely to discussions of how to solve transportation difficulties, with special reference to the problems of getting coal to domestic consumers and Government supply factories. The members did not anticipate the suspension of industrial operations for a period, but discussed only the possible methods of improving conditions as they were at the time.

MARKET DEPARTMENT

GENERAL REVIEW

The order of the Fuel Administrator closing down industry on certain days has been carefully observed. The beneficial effects of this order has been largely nullified by adverse weather conditions.

The event of possibly the greatest importance to the fuel industry since the fixing of prices last August occurred last week when Fuel Administrator Garfield notified the country that for five days certain restrictions were placed upon the industrial consumption of fuel and for each succeeding Monday up to and including Mar. 25. This order came so suddenly as to greatly surprise and shock the fuel industry of the country in general. From all sides wild dissension and severe criticisms were heard, while the members of Congress were deluged with communications from their constituents. The order was, however, obeyed with a promptness and exactitude that clearly portrayed the temper of the American people. Unfortunately for the coal industry, the transportation system and the country at large, another cold wave descended upon the Middle West during the latter part of the week. This was in many localities accompanied by snow, more or less heavy, and by high winds. This resulted in conditions embarrasing for the transportation companies. Some mines have been so hampered by weather conditions that they have not worked for 10 days to two weeks; others have been able to limp along, most of the time with small outputs, short labor and inadequate car supplies. The weather probably played the greatest havoc with the mining industry in Illinois, where the snow in some places is said to be drifted four or five feet deep. The cold, however, exerted an adverse effect throughout the entire country, showing adversely in both production and distribution. Throughout the East where the greatest traffic congestion existed, and which therefore should be benefited more by the five-day shutdown than other section of the country, the improvement so far as can be learned has not been marked where railroad yards and sidetracks are concerned. On the other hand, the bunkering of ships has gone on steadily, and many of the steamers lying at New York and other harbors awaiting coal supplies have doubtless been furnished with their necessary fuel requirements. The dispatch of these vessels will do much to relieve freight terminal congestion, which is quite as marked as the congestion in railway yards and on sidetracks. This relief, of course, will not be immediate, but should take effect with the return of these vessels for cargoes. So far as New England is concerned, the conditions are believed to be slightly less stringent than they were a week or so ago. Congestion at various railroad yards outside New England is doing much to impede the supply all-rail to that territory. It is to be hoped that this congestion may be relieved. New England is also receiving greater supplies by water than it was a week or two ago. The conditions in New York so far as distribution is concerned are probably as bad, if not worse, than they have been at any time in the past few months. It is thought by some that no material relief will be felt until mild weather renders the shipment of coal from the Jersey shore more safe and easy. Difficulty is also being experienced at the present time in securing adequate help at the various loading points where cars are discharged into lighters and barges. It seems to be the consensus of opinion throughout the entire country that little general material relief may be expected until warmer weather.

A Year Ago—Anthracite demand less urgent though still very firm. Railroad embargoes create a spotty condition in the bituminous trade. High level on contract prices. Acute shortage at the Lake cities. Conditions much improved in the Middle West.

COAL PRODUCTION

The return of severe weather at the close of the week ended Jan. 12 caused the average production of soft coal per working day to fall to 1,735,023 tons, the lowest mark since the week of Dec. 22. Because of the six working days, the total production was 1,034,000 tons greater than in the five working days of New Year's week. The total production of beehive coke is estimated at 586,628 net tons for the week ended Jan. 12, an average per working day of 97,771 tons. Anthracite shipments, as reported by the nine carriers, amounted to 35,720 cars. This, although an improvement over the production during the holiday season, is still far short of the average maintained in November and the first week of December, before the coming of severe winter weather.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

	Dec. 22	Dec. 29	Jan. 5	Jan. 12
Bituminous shipments, 114 roads	177,599	158,596	168,936*	185,039†
Anthracite shipments, 9 roads	36,083	29,47o	25,604*	35,720†
Beehive coke shipments, 4 roads	11,835	10,211	9,348*	12,043†

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Bradstreets—Willingness to do business on a large scale has been restricted by heavy snowstorms in the West, by intense congestion in railway facilities, which has made it well-nigh impossible to ship fuel or other supplies, and finally the Fuel Administrator's order closing plants for five days and every Monday for ten weeks, has thrown vast numbers out of employment. Under the circumstances it is obvious that the week has been marked by considerable unsettlement, but after the first shock it is quite generally recognized that the Fuel Administrator's order, while drastic, was imperatively necessary, and the general tendency is one of patriotic obedience to the mandates of the order.

The Dry Goods Economist—The order of Fuel Arministrator Garfield, forbidding the use of coal in factories, stores, etc., during five days and on each Monday up to Mar. 25, will have a tremendous effect on the production and movement of merchandise. It is impossible at this writing to figure the effect of such a radical and unprecedented move.

American Wool and Cotton Reporter—Trading in the local wool market continues moderate. The future course of affairs depends naturally upon what the Government intends to do next.

Marshall Field & Co.—Despite adverse weather conditions current shipments of dry-goods for the week have been about equal to the heavy week of a year ago. Road sales for both immediate and future deliveries have been greatly in advance of the same period in 1917. The number of customers in the market has been somewhat reduced by weather conditions. The market on domestic cotton continues strong. Collections are good.

Atlantic Seaboard

BOSTON

Fuel-saving regulations much criticized, but many industrial plants were bound to close within a short time. Sufficient supply reaches New England to tide over the more vital needs, but situation still desperate. Railroads in particularly bad shape. Anthracite short. From present outlook large number of manufacturing plants must run on much reduced time.

The outlook for fuel is now sufficiently realized in New England so that manufacturers and other large consumers who are not classified among the necessary activities are getting reconciled to the inconvenience. Criticism of the "5-day order" is widespread, but each day sees the need of drastic measures better understood, and if no more is accomplished than the clearing-up of traffic in the area about the New Jersey terminals and the despatch of oversea transports that have been held up waiting for bunker coal it will have a large item to its credit. No one in touch with the general state of coal traffic believes there will be much relief while winter weather prevails.

The shut-down order is being faithfully observed, although the number of exemptions throughout this territory is large. The various rulings have been interpreted in a broad-minded way, yet consistent with the saving of fuel, and the hardship is not as great as people feared. Local train service has been further cut down. Many large manufacturing plants have also curtailed their hours during working days, and the order to close was in a sense prepared for because the time was near at hand when they would have had to cease operations anyway through lack of fuel. One group of woolen mills under one management uses 65,000 tons a month, and the Boston and Maine R.R. finds itself with no supply on hand beyond Feb. 1. When such instances are multiplied it can be seen how desperate is the plight of consumers in this part of the country.

Coastwise movement has been resumed, although ice and other adverse conditions still interfere with loading despatch. The number of bottoms waiting at Hampton Roads has been reduced from 110 to something over 90, and the receipts at this end are so relatively small that only the most vital activities such as railroads and other utilities can hope to continue operation for the present. The Maine Central R.R. at this writing has only a few days' fuel, even after coal has been diverted from other railroads.

Industries like the Victory Destroyer Plant at Squantum, Mass., and the Bethlehem Shipbuilding Co. are in most serious need, and the few emergency cargoes coming through the Fuel Administration are able to meet requirements only in a most restricted sense. The "Achilles," a Panama collier of 12,600 tons, is delivering on her second trip to New England, having brought this time West Virginia high volatile for distribution to points in every New England state but Connecticut, and not an industrial plant among the consignees. The coal is going to railroads, hospitals, pumping stations, and to retail dealers for heating purposes. Retail dealers in several of the New England ports have practically confessed their inability to cope with local conditions and are looking to the fuel authorities for help.

The "New England order" of Jan. 3 for 500 cars daily all-rail from certain designated mines has so far been about 50 per cent efficient. Operators complain that 'other priorities" must be looked out for first and the blizzard a week ago seriously affected the railroads in placing cars.

The congestion on some of the lines in the mining region is something tremendous. Divisions that ought not to have to move more than 2000 loaded coal cars per day have 10,000 on their tracks, and the average daily haul is down to 12 and 14 miles. So large a proportion of what is loaded on the "New England order" is for railroad fuel that only the most pressing cases of shortage among power companies, water systems, etc., can be dealt with. Some of the operators take the position that the Garfield order of Jan. 16 is virtually a cancellation of the "New England order," even though the consignments under the terms of the latter are clearly under the classifications entitled to preferential shipment.

So far not much coal has been commandeered by state administrators under the powers granted. Tonnage, however, is being increasingly applied to distribution for apartment house and other dwelling house uses, in the effort to relieve actual suffering. In the cities all the reserves are fast eaten up. Storage piles that were accumulated for the navy and other Government uses have been subject to heavy inroads the past fortnight to take care of emergency needs of various necessary public functions. Schools, for instance, are not considered among these, although there is probably more criticism directed to the failure of public schools to open than to any other one phase of this complex situation.

The congestion at Maybrook, N. Y., one of the chief New England gateways, is unparalleled. It is reported that more than 4000 loaded coal cars are backed up beyond this transfer point, and the outlook for relieving the New England situation is not bright. Harlem River is in somewhat better shape, but cars are again beginning to accumulate at West Albany Transfer and

the Boston & Maine gateways. This situation, in addition to the breakdown on the Pennsylvania, gives real cause for alarm. It is, in fact, a real problem to keep supplied the needs of railroads and other vital activities. A large number of plants working 100 per cent. on Government orders are being passed over because other requirements are more urgent. One operator who complained of the multiplicity of "priorities" was able the other day to show six different classifications ahead of his regular commercial orders.

As a sidelight on the situation at some of the smaller ports along the coast, it is interesting to note that a 3500-ton barge is now discharging at the Boston & Maine dock, Boston, the entire cargo of which is to be railed to Lynn to supply the waterworks, gas and electric-light plants, and for heating purposes among householders who are without fuel of any kind.

NEW YORK

New York City situation acute. Retail dealers' supplies low with ice hampering deliveries. Conservation order supported by the trade and public. Fuel authorities strive to relieve the situation. Bunker coal moving steadily and waiting vessels get supplies. Car supplies slow and many mines are idle.

Anthracite—Dr. Garfield's conservation order was only one of several important developments in the New York market. The Board of Aldermen by adopting an ordinance has given Mayor Hylan the power to confiscate any surplus coal owned by either individual or corporation, the price to be paid the owner by the city to be fixed by the Supreme Court. One of the largest retail dealers in Brooklyn found he was up against labor troubles when he had plenty of coal for at least one day's deliveries. The matter which involved increased wages for the drivers has been submitted to arbitration.

While the conservation order has no doubt benefited other parts of the country it has not offered much encouragement to the New York public. Even with, according to reports, a few hundred thousand tons of coal in cars at the railroad docks across the river and bay New Yorkers found little satisfaction because it was not possible to dump it into barges. Furthermore, the ice continues to hamper navigation. Several thousand tons of coal are resting at the bottom of the rivers owing to the heavy ice smashing in the sides of the barges. Much of this, it is expected, will be salvaged later in the season.

The order issued by Dr. Garfield created a lot of dissatisfaction among the trade but the dealers and public did their best to uphold it. Every public institution and industrial plant not exempted by its provisions obeyed the order and many thousand tons of coal were saved from consumption. However, the householders were as insistent as ever and at the end of the five coalless days there was no more coal left in the dealers' yards than there was before the order went into effect.

There were upwards of 1,200,000 persons thrown out of work in the Metropolitan district during the five days and about 800,000 more in New York State. Of this vast number it was estimated there were 700,000 persons out of work in Manhattan alone and that the loss of wages will run into the millions of dollars. It was estimated that the amount of capital involved was around $2,633,936,052.

The trade as a rule, was not willing to talk about the order. One man when asked what he thought of it replied "I have been talking until I am black in the face. Now, let others do the talking." Some dealers thought the order too drastic and unnecessary but the majority blamed the railroads for not moving the cars. If that had been done they said, there would not be any shortage of fuel.

An offer of the railroads to employ any of the men thrown idle as a result of the conservation order resulted in a very small percentage reporting for work.

Dealers complained of slow deliveries and then to add to their troubles some of the towing companies it was reported notified their customers of increases in towing charges.

Production has not been at its maximum because of severe snow storms in the mining regions. Transportation was delayed until the mine workers assisted the railroad men in removing the ice and snow from the tracks.

The gas companies continue to do a maximum business and their subsidiaries find a ready market for all the coke they offer for sale.

In their efforts to have Dr. Garfield's conservation order fully obeyed the Fuel Administrators were assisted by the police department and by a corps of deputies from the office of the United States Marshal. Many complaints were sent to the Fuel Administrators' offices but most of them were due to ignorance of the law. The administrators were swamped with applications for exemptions the first few days after the issuance of the order but only 135 requests were granted up to Saturday night.

Fuel conditions in the school houses have not improved and it has been decided that the buildings now closed will not be reopened until Feb. 4, the start of the new school term. Many of the churches have closed their main auditoriums while others have been closed entirely, joining with other churches of the same denominations in services until the situation improves.

Many schemes are being presented to prevent a repetition of the present situation. One civic organization suggests the reopening of the old Delaware & Hudson Canal from Honesdale to Rondout on the Hudson.

The wholesale trade is not hopeful and does not look for much improvement until warmer weather is here. Very few have any supplies and all of them are heavily booked ahead.

The anthracite steam sizes continue to move steadily and the dealers had an opportunity to fill many bins in the lower part of the city as a result of the orders of Dr. Garfield. All of the sizes are scarce none of the dealers having any surplus.

Retail dealers, as a rule, see no better conditions ahead. Several yards are empty and might as well be closed entirely so far as deliveries are concerned. The Bronx with its 700,000 inhabitants is in a serious condition. On Saturday last there was no coal in any of the yards.

After a series of conferences between the city officials and the Fuel Administration authorities Mayor Hylan has announced that prices have been fixed for the dealers, the peddlers who operate the small wagons and the hucksters who conduct the cellar coal business.

Current quotations, per gross tons, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buck	4.30@5.00	5.50@6.00
Rice	3.75@3.95	4.50@5.00
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—Not much encouragement is seen in the bituminous situation. While receipts at this Tidewater have increased the greater part of the tonnage made available for local consumption has been devoted to relieving the shipping situation, the seriousness of which is said to be one of the principal reasons for the issuance of Dr. Garfield's order for five coalless days.

The reports of J. W. Searles, of the Tidewater Coal Exchange, and of J. E. Parsons, of the U. S. Shipping Board, show that the number of vessels waiting for bunker coal in this harbor is being gradually reduced. However, there were over 100 vessels anchored here early this week because of the lack of bunker supplies.

Owners of the plants closed as a result of the Fuel Administrator's order have been asked by the local Central Federated Union to pay the wages of their employees during the suspension, and a letter has been sent to Samuel Gompers protesting against the action of the U. S. Steel Corporation in refusing to pay the wages of those employees who did not work during the five days suspension. It is estimated that not more than one-half of the men employed in the plants affected by the order will receive their pay for the idle time.

Operators here see a ray of hope in the announcement contained in one of the local newspapers that a new mine price of $3.50 will probably be fixed shortly. Nothing official has, however, come from the Washington authorities.

The pooling of barges and lighters in this harbor is expected to facilitate deliveries, as will the proposal to increase the demurrage rate for barges.

A slight relief in the situation may be expected now that all English ships arriving carry with them sufficient coal for the return journey.

The problem of providing coal for apartment houses is still serious. Most places are running on a day's supply with no surplus in the bins, and the owners are frequently taken to court by their tenants for failure to provide heat. Real estate brokers say that the present coal shortage has had the effect of increasing inquiry for private houses by occupants of apartment houses who formerly lived in private houses.

Production does not show much increase because of the car shortage.

The observance of Dr. Garfield's heatless day on Monday was carried out splendidly in New York, according to the local fuel administrators. Only 25 violations of the order were reported.

Joseph E. Parsons, who is in charge of the bunkering of the ships in the harbor, has received orders to commandeer all the barges, tugs and lighters necessary for that work.

State Fuel Administrator Wiggin at the conclusion of a conference held late on Monday telegraphed Dr. Garfield urging speed in coal deliveries to New York and recommended the pooling of all anthracite, the same as is now done with bituminous; and the reduction of anthracite sizes to four instead of eight as follows: that grate and egg be considered as one size; stove and nut as one size; pea and buckwheat as one size, and rice and barley as one size. He also recommended that the docks be worked 24 hours steadily.

Mr. Wiggin also recommended the cancellation of the present demurrage order which was ordered for this week.

PHILADELPHIA

Anthracite trade stunned by suspension order. Later criticism calmer. Bad weather in region holds back shipments. Receipts light, with outlook unpromising. Manufactured fuel finds ready market. Companies appeal for more labor. Bituminous shippers shocked by Garfield order. Car supply unimproved. More plants closed account of fuel scarcity. Contracting dead issue.

Anthracite—The main topic of conversation in the trade is Dr. Garfield's drastic order. At first those most interested were inclined to criticize the wisdom of the ruling. This includes not only those whose plants were compelled to shut down, but many of the shippers as well. The dissatisfaction is general. One of the serious objections seems to be that even industries with coal on hand were forbidden to use it during the named periods.

Dr. Garfield is accused of overlooking many important details when framing the order. One of these which was forcibly impressed upon the retail coal dealers was the increased opportunities the enforced holiday made for the unemployed, especially in the mill districts, to obtain fuel for their homes without paying for it. Dealers in the northwestern section of the city claim that practically every car they receive has been tampered with and at least a few tons stolen, while many are delivered empty. Now they find the idle days give many hundreds more men and boys, and women too—for they have done their share—the opportunity to pilfer from the cars before they have been delivered to the yards.

While this is too small a matter to receive any recognition of the Fuel Administration, it is a serious one to the consignees, for they claim they are unable to depend on any coal until it has actually been received. Notices of shipments have ceased to cheer them because they can never be sure the coal will reach its destination.

Notwithstanding all the grumbling, Dr. Garfield's order has been generally obeyed. Many deemed it unpatriotic to raise any objections and closed their places of business without questioning the justice of the ruling. While they could at first see only what appeared to be a frightful cost, many will admit there will be some benefits. Criticism has become much calmer now that all interests have had a few days to adjust themselves to the new conditions. Many are of the opinion that the Government had a stronger motive for the closing order than could be divulged at this time, which accounts for the suddenness of the move.

One day this week it was reported there were between 800 and 1200 cars loaded with anthracite stalled within ten miles of Pottsville, which is but 93 miles from this city. The majority of the cars are destined here via the Philadelphia & Reading Ry. Railroad men attribute the real trouble to a shortage of engines. Recently there were twenty-three trains made up ready to be moved to this city when it was found there were not engines of sufficient tonnage to haul the heavy loads, and the trains were delayed from 24 to 48 hours.

The past week has been a particularly difficult one with the railroads, as they had a snow storm in the coal regions, which officials claimed was the most severe since the record storm of 1888. This was later followed by zero temperatures, and the

results of these conditions are just now beginning to be felt here. With the city's minimum needs fixed at 18,000 tons daily of domestic sizes, the receipts have not been anywhere near that on any one day, dropping to 6000 tons one day and even as low as 3000 tons on another.

The dealers are unable to maintain any stocks at all in their yards, while their offices are filled all day long with people of all conditions of life pleading for coal. In the poorer sections of the city it is not at all unusual to see crowds of people with all sorts of receptacles besieging the office for a small quantity of coal and who will not disperse even after being told that there is no coal in the yard.

No one can be found who has an optimistic view for the balance of the season. All seem resigned to the belief that they must struggle through some way for at least six weeks more, as mild weather is the only relief in sight.

The present occasion has presented an opportunity to the manufacturers of briquettes to make their product known and quite a good tonnage is being marketed. One plant in the city engaged in the manufacture of this grade of fuel is doubling its capacity, in addition to building another plant in the anthracite region. Just now any dealer who can secure briquettes has no difficulty whatever in selling them.

The steam coal trade is even more active than ever, with the independents getting $4.15 for all the buckwheat they can produce and there seems to be a general understanding among them not to ask more than this figure. Barley and rice are sold around $3.50, while culm is being sold in large tonnages at $2.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for Tide are as follows:

	Line	Tide		Line	Tide
Broken	$5 90	$6.05	Buck	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—The order of the Fuel Administration shutting down the industrial plants for five days came as a positive shock to the trade. The shippers were open in their denunciation of the plan. Many of them who heretofore had refrained from openly criticising the administration gave full vent to their feelings. However, after the first shock had partly worn off and exemptions were granted to the thousands of plants on war material to resume work, much of the criticism moderated and it was beginning to be felt that the order might possibly have some effect on straightening out the railroad tangle.

Up to this time the car supply has not improved in the least and of course it was not believed that any improvement would be felt thus early. Central Pennsylvania shippers continue in particularly bad straits for cars. We know of a typical mine in that district with a rating of 26 cars daily which did not have a single car for commercial loading from Dec. 20 to Jan. 28, and since that time has only had 35. On this account the working forces are badly disorganized and it would really take some time to get the number of miners up to the maximum in the event of a car supply being given between 65 and 75 per cent.

In the Fairmont district, which ships heavily to this market, one of the mining associations reported 65 per cent. of the mines idle for the entire week, representing a tonnage loss of about 225,000 tons. This association wires Washington every day giving a statement of conditions as they exist in that particular region.

Contracting continues to be a dead issue, as it is claimed under present conditions it would simply mean nothing at all to enter into a contract; certainly it would have no advantage to the producer, and would in no way insure the consumer a supply of fuel. It begins to look that with the various modifications of the fuel administration's closing order that it will actually develop into a scheme for cutting down coal supplies for the nonessential users, and the chances are that the Monday suspensions of the next ten weeks will find them the sole observers.

The trade continues to await a new price, which it still insists is absolutely necessary if the business is to continue to exist. No one now hopes for this as an event of the immediate future, but there are some stout hearts who are willing to believe that it will come like a bolt from the blue somewhat similar to the recent suspension order. While several weeks ago opinion seemed to be fixed on a $3 price, quite a number claim that the increase to be worth while must be even greater, certainly not less than $3.25.

BALTIMORE

With supplies still far short of even emergency needs the coal trade is working amid the uncertainties caused by the fuel suspension order. Many mines still closed for lack of cars to load.

Bituminous—Following the first feeling of almost paralysis in business that came from the Fuel Administration order for business suspension, the coal trade here started in to pick up broken threads and accomplish the best results. The arrival of several ships for coal cargoes for New England and South America at Curtis Bay prevented any fuel sent through for that purpose from being diverted to the local needs from cars which had hitherto been kept standing for days awaiting bottoms.

The piers at Port Covington and Locust Point began the present week almost swept clean of fuel, and receipts have been insufficient to meet even emergency demands. On the second business suspension day of the fuel order the receipts of bituminous were but 15 cars, of which ten were assigned for use of the local railway system that was threatened with shutdown for lack of fuel, and five were distributed by the local fuel administrator to domestic consumers in dire need. Retail dealers distributed this coal.

Reports from western Maryland and West Virginia were that many mines were still closed down for lack of cars. Many sections have failed to make a 50 per cent. record since the first of the year, the miners many times being given enforced holidays because the railroads could not deliver empties. The local industries here are still leading a hand-to-hand existence, but it is expected that the numerous loaded coal cars that have been on sidings for weeks between this city and the mines will now be released and will bring at least a temporary relief.

Anthracite—The hard-coal dealers here got a better supply following the suspension order than had been the case for some time. This was also largely due to final release of loaded cars from sidings of railroads. Hundreds of consumers have been unable to get any coal for domestic consumption for weeks, and the fuel administrator is still unable to give any positive assurances. The policy of delivery to homes where there are children, old people and invalids is still being adhered to by the coal men.

Lake Markets

PITTSBURGH

Some coal saving in Pittsburgh. Steel industry will not consume less coal in long run. Scarcely any river coal.

The Fuel Administration's drastic fuel saving order was followed almost immediately by a fresh spell of extremely unfavorable weather in the Pittsburgh district and coal movement has, if anything, slowed down. Every effort is being made to maintain production but conditions are altogether unsatisfactory.

A considerable quantity of coal will probably be saved in the Pittsburgh district by the five-day closing, as regards ordinary manufacturers as well as office building consumption, but it can be set down as an absolute fact that the iron and steel industry does not save a ton of coal by the closing order. This is for the reason that the production of steel has for months hinged upon the production of pig iron. There is much more steel-making capacity than there is pig-iron production to keep it employed. The result is that the pig iron accumulated during the five days' closing of steel works (except such departments as have been exempted) will as soon as possible be converted into steel just the same, and much of it will have to be remelted, with either coal or coke, whereas if used as produced much of it would be used molten or direct. The eventual result as regards the steel industry will be just as much steel production as otherwise, but with somewhat more coal used.

The Monongahela River was opened for a short time last week and a few tows and barges got through, but the river promptly froze again and the boats that had broken up the ice are now for the most part laid up for repairs. Thus Pittsburgh although in the heart of a great coal-producing district is particularly short of coal because one source of supply has been almost entirely shut off and the other source, the railroads, cannot come to the rescue with an increased supply.

The market remains nominally quotable at the set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. additional permitted to be charged in the case of sales by dealers.

BUFFALO

Fuel order shuts off all other consideration of coal affairs. Coal shippers and manufacturers in consternation. Fear that it will fall flat. Anthracite demand aggravated by cold weather.

Bituminous—The situation is no doubt the same here as elsewhere. Everybody is thrown into confusion by the fuel order and the shutting down of factories. As a rule there is no effort to evade the order, but it has been anything but easy to draw the line, either on the factories or the other concerns. A good many factories ran in part at least and some, including the big stores and office buildings, went on as usual, all of course shutting down completely on the Monday holiday. The situation might have been worse, is the mildest comment.

The state of the trade would be hard to define, except that it is demoralized, so that price quotations will have to be a merely nominal matter, made in the hope, or perhaps the expectation, that some improvement is not far away. Figures therefore remain as before, per net ton f.o.b. Buffalo:

	Slack	Lump
Pittsburgh	$3.75	$4.25
Bessemer	3.70	4.20
Allegheny Valley	3.60	4.10

Anthracite—The weather seems to be doing its worst to beat off all effort to meet the needs of the city consumers. The amount of coal coming in is enough to make a good showing and it would do so if the weather was not so severe. But following a December of record severity comes a January quite as cold. The temperature has not been above freezing this year and it was only so for a few hours last December. Coal disappears like dew and the natural gas supply has so nearly given out that consumers have made a rush for coal, which greatly adds to the demand.

People, some of them business men, are getting coal in baskets, after giving up the effort to get it by the ton. There will be no relief till the weather becomes much warmer. It is said that the anthracite companies are preparing to increase their shipments materially, but that will mean little to the mass of the people, unless the distribution is regulated. Everybody will take all that can be had.

DETROIT

Fuel Administrator's conservation order is generally observed in Detroit. Coal receipts reduced by weather.

Bituminous—With places of business closed, stores and windows darkened and industrial plants with a few exceptions in the case of those exempted, stilled, Detroit has been experiencing the rigors of the drastic regulation put in effect by the Federal Fuel Administration for relief of coal shortage and railroad freight congestion. For many of the citizens, the regulation meant severe hardship, because of the reduction of weekly wages and to employers the five days of inactivity, in many cases brought heavy financial loss.

There were protests on all sides and some threats of defiance of the regulation, but after the first day the tendency generally was to observe the restrictions imposed. Vexatious complications attended the efforts of managers of some of the office buildings to obey and at the same time make provision for certain classes of tenants, as physicians and surgeons, who were made exempt from the regulations.

Temperatures around and below zero prevailed in the early part of the week greatly increasing consumption of coal by household buyers, while at the same time the supply was seriously curtailed as the result of transportation troubles following the severe weather and snowstorm of Jan. 12 and later snowstorms early last week which interrupted traffic and blocked railroads in Ohio and the Pittsburgh district.

Receipts of bituminous coal for last week, handled through the Toledo gateway are reported as about 957 cars of which 300 were reported Saturday, the other 657 representing receipts from Sunday to Friday night. Almost no anthracite is arriving in Detroit at present and few of the dealers have any supply on hand.

Demand for fuel continues urgent and at the end of last week the police department, in charge of distributing for the city fuel administrator, had more than 3000 unfilled applications booked. Coal shipments headed for Detroit are reported held back at various points in Ohio by conditions created by atmospheric disturbances. From various towns of the state outside Detroit, equally serious conditions of shortage are reported to the state fuel administrator.

COLUMBUS

The sudden order to conserve fuel by ordering certain fuelless days has caused considerable uncertainty. But on the whole coal production was not affected in Ohio.

Insistent demand both from domestic and steam consumers is still the big feature of the coal trade in Ohio. Both are short of fuel and although there is little actual suffering among domestic users in central Ohio, still some instances are reported from the western and northwestern sections. The continued zero weather which has stopped a large part of railroad transportation is making matters still worse.

Retailers in Columbus have been able to supply all urgent cases. Some little surplus is ahead, but dealers generally have short stocks. The local fuel administrators have been busy investigating complaints and ordering relief. Schools and churches are now fairly well supplied for the time being. Hospitals have been looked after and the same is true of certain charitable institutions.

Public utilities are the hardest hit of the steam users. Many of that class of consumers have little surplus stocks ahead and have been compelled to curtail service. This is true of power concerns, interurban and street roads and similar corporations. Manufacturers who are making nonessentials are generally low on fuel. War plants are now being given preference after railroad fuel and domestic users are taken care of.

Production during the past week was at a low point. This was due primarily to the zero weather which tied up railroad traffic. There are many thousands of loaded coal cars in Ohio without sufficient motive power to move them. As a result of the bad traffic conditions, the production in the Hocking Valley has been about 40 per cent., of which only half was for commercial purposes, the remainder being taken for railroad fuel. Pomeroy Bend and Jackson produced a smaller percentage, a greater part of which has been taken for railroad fuel. The same conditions prevail in other producing fields.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Prepared sizes	$2.70	$3.05	$2.70
Mine run	2.45	2.70	2.45
Nut, pea and slack, coarse slack	2.20	2.45	2.20

CINCINNATI

Continued severe weather, with no improvement either in the movement of traffic or in car supply, and with demand at its peak, caused the coal trade to welcome the industrial suspension order Thursday, as the only apparent remedy.

The uninterrupted continuance of the most prolonged period of severe weather that has ever been experienced in this section brought the coal situation to its most serious stage here early last week, causing great suffering among domestic consumers who were unable to obtain fuel, and bringing about the closing of nearly all of the schools and of many factories on account of lack of coal. The Ohio River is now frozen for virtually its entire length, and is therefore no longer a means of transportation for coal. The heavy snows, repeated several times during the week, caused still further difficulties in rail movement, making it a matter of impossibility to clear up the congestion of former weeks, much less to expedite the forwarding of coal.

This combination of circumstances made the order of the Federal Fuel Administration for a five-day factory suspension and for ten Monday holidays thereafter a rather welcome indication that the railroads and the coal trade may have a chance to get things straightened out and to catch up with the situation.

Inasmuch as things were already reaching a point where a general breakdown of industry on account of the fuel shortage was imminent, it is the view of coal men and of many others that the suspension order cannot do much harm, and that, on the other hand, it may save the situation. It is said that the vigorous attacks made upon the Fuel Administration by many manufacturers on account of the order are not justified, in view of the situation, and that the coal trade, out of its experience, believes the move to be fully warranted.

The Fuel Administration is not responsible for and could not avoid the traffic congestion caused both by the extraordinary demands of industry and by the unprecedented weather which has hampered the railroads for more than a month. Estimates at the saving in the Cincinnati district by the order are that about 25,000 tons of coal will be gained by the five-day lay-off, which is really only a three-day suspension on account of the intervening Sunday and Saturday, which is a full half holiday. The ten Monday holidays, it is estimated, will enable a saving of about 5000 tons each, a total of 50,000 tons, or of 75,000 tons in all.

This saving in actual consumption is entirely aside from the great general object of the suspension, which is to permit the railroads to devote their facilities to clearing their tracks without having to handle the constant influx of shipment from factories, and to enable all of the coal produced during the interval to be placed where it is most needed. The coal trade in Cincinnati, as well as the Hamilton County Fuel Administration and business men in all lines, will do everything possible to make the suspension a success in accomplishing the objects for which it is designed.

LOUISVILLE

Kentucky trade, engulfed by flood of frantic appeals for coal, hopefully regarding efforts of Fuel Administration to bring relief. Sees no other chance for relief. Retail situation chaotic.

Drastic as the order was, the Kentucky coal trade is hopefully looking for results from the Fuel Administration's five-day suspension edict and is rather expectant that something in the way of a permanent benefit has been gained. This order enabled production at the mines to go forward with no obstacles other than those presented by unfavorable weather conditions and the handicaps experienced throughout the season. A somewhat better return of coal-carrying equipment to the producing fields was noted early in the week and the hope was widely expressed that relief had been given which would make the Kentucky producers better able hereafter to meet the demands on them.

Meanwhile there has been no diminution of the steady influx of orders to selling organizations which have long been advising even old customers of inability to serve them. Inquirers appear to consider delayed replies as indications that they may get coal and follow them up by wires urging immediate shipments. In many cases it is stated that the matter of price is of no moment and that coal at any cost is desired.

Two feet and more of snow on the level, accompanied by near-zero temperatures, have simply paralyzed local transportation all over Kentucky, where such conditions are unprecedented. Retailers more or less well supplied with coal are unable to make deliveries and householders more than a few squares from coal yards are suffering severely. Independent owners of vehicles and motor trucks are charging anywhere from $2.50 to $5 a ton to go for and deliver coal to retail consumers, who now are asking for coal and not haggling over the price.

The retail trade has resolved its business into a dumping proposition and hopes that the innovation may, after this winter, lead to discontinuance of a practice which they have long objected to. The Fuel Administrator is making plans for confiscation of coal to meet local needs and the city administration is working with the coal trade to evolve a plan by which distribution may be provided for.

Coke

CONNELLSVILLE

Fuel Administration's order does not affect coke. Movement poor on account of bad weather. Some cross movements eliminated.

The production, movement and consumption, of Connellsville coke has gone on throughout the five-day period ordered by the Fuel Administration, as these operations are not covered by the order. The blast furnaces come under the seven-day operation clause, as do the byproduct coke works while the beehive operations cannot be regarded as coal shippers.

The coke movement has been poor in the past few days. Conditions were growing ripe for an improvement when a fresh spell of practically zero weather came last Saturday night, resulting in a further slowing down of railroad operations. While some good results are expected through the breathing spell afforded the railroads by the plant-closing order, there is nothing to date, because of the bad weather.

The Carnegie Steel Co. is now operating 36 of its 59 blast furnaces, the remainder being entirely out of blast or banked awaiting supplies of coke, and this is almost the poorest operation thus far shown, the minimum having been 33 furnaces, a few weeks ago. The other steel interests are operating almost as poorly, while the merchant furnaces are not getting out more than 75 per cent. of their normal product, at the outside.

The cross movement of coke, so much investigated and complained of in the past two months, is now being eliminated to an extent. A considerable tonnage of coke from the upper end of the old basin is now being moved East instead of coming into Pittsburgh over the main line of the Pennsylvania, and the owners are being given coke from the lower region instead, largely coke originating on the Monongahela R.R. Additional exchanges are being negotiated and eventually this is going to result in better coke movement even without any increase in actual railrod facilities.

The coke market shows practically no transactions. Prices are quotable on the set basis, $6 for furnace, $7 for 72-hour foundry, selected, and $7.30 for crushed, over 1-in., per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 12 at 237,707 tons, an increase of 21,609 tons, and shipments at 290,718 tons, an increase of 75,053 tons.

Middle Western

GENERAL REVIEW

Unprecedented weather conditions cripple railroads and stop coal production.

The week just passed has been one of confusion and chaos among the coal operators and railroads. Monday last occurred one of the heaviest snowfalls that has occurred in the Middle West section for years, making it impossible for coal mines to move cars, until the snow was removed. This heavy fall of snow was accompanied by a gale from the southwest, that continued throughout the week, making it almost impossible for outside labor at coal mines to work. The result is that production has been reduced from 60 to 75 per cent. normal.

Regardless of the fact that there was but little coal to move the railroads have made but little headway in moving to destination that which the operators were able to get into cars. Reports reaching us indicate that there are cases where coal is still standing loaded at mines that has been billed for ten days, occasioned by the fact railroads have not the motive power to operate trains.

That everything having to do with coal is in a demoralized condition is apparent all over the Mid-West, except the territory west of the Mississippi River, and in this region coal is moving very slowly. Dealers everywhere have been stripped of all the coal they possessed, and in cases where a dealer was fortunate enough to have a small supply on hand deliveries to customers in most cases was impossible due to the heavy snow and the inability to get labor to handle them. Industrial plants, public utility companies which ordinarily carried an ample supply for protection have depleted their storages until reserve stocks are wiped out.

Mines, in most instances, have been clogged with snow 4 to 5 feet deep, making it impossible to move cars until this snow was removed. This could be accomplished only in part. Mines that have four tracks, one for each standard sizing of coal, in most cases have been compelled to shovel snow to the two center tracks, and discontinue the making anything but two or three sizes—steam lump, mine-run and screenings. In some instances only the loadings of mine-run was attempted. Local state and national fuel administrators have been working overtime trying to satisfy some of the clamorous demands made on them for relief. Their main efforts have been devoted to trying to keep the people warm and supply such plants as furnished lights and gas.

The result of Dr. Garfield's order closing various industries throughout this section was received in a majority of instances as a matter of necessity. Although it had been expected that some such order was necessary no one contemplated that the instructions would be so far reaching. The first day's operation found thousands of plants idle.

Many large manufacturing plants were really glad of the opportunity to suspend actual operation for a few days so that they might have a chance to make needed repairs which they had been unable to do for several months, because of an accumulation of pressing orders on hand.

Generally speaking, little opposition has been made to the putting into force of fuelless days, and violations so far have been but few. Men that are in a position to know the exact situation throughout this section, particularly the operators that have struggled for months to supply the trade, realized the absolute necessity of just such action as that taken by Dr. Garfield, and heartily agree that unless there was a better car supply and a more

rapid movement of both loaded and empty coal car equipment there was no possible escape from untold suffering.

CHICAGO

Supply inadequate. Railroads badly crippled with burdens increasing in the city fuel administrator's office.

During the past week pooling has been in full force, and has resulted in confusion and dissatisfaction. That there was not enough coal arriving in Chicago to go around, caused pooling to be put in force by dealers at the instance of fuel administrators. The result was that some dealers got more than their share of the available supply, while others that had in the yard and in transit sufficient coal to properly care for their clientele, were cut short.

The confusion was no doubt made worse by the placing at one dealer's yard of mine-run or screenings when he had coal of better grade—lump, egg and nut—tied up by the railroads. A dealer who was handling Indiana mine-run, for instance, would get Illinois lump egg or nut. In fact, when a dealer got coal he did not know whether it was coal shipped on contract at a higher or lower price than that allowed to be charged on open market current shipments.

Some dealers with facilities for handling large tonnages took advantage of the smaller fellow, and tried to get all the pool coal that was placed for unloading.

Chicago's first days encounter with the "no coal" order was a demonstration of the city's patriotic acquiescence. Thousands of factories shut down and remained closed until Jan. 25. Late advice from Washington decreeing that certain large factories would be allowed to continue operation was received with considerable satisfaction. This latest order affected only some of the large steel mills and plants engaged in the manufacturing of food stuffs. It will have the effect of allowing thousands of men and women to continue at work.

Very small tonnages of coal has reached this market during the past week except from Illinois and Indiana. Occasional shipments of hard coal have come in, but Eastern and Kentucky bituminous have been of extremely limited quantity.

Quotations in the Chicago market are as below, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, LaSalle, Bureau and Will
Prepared sizes	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings and washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Hocking	West. Va. Splint
Prepared sizes	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Coal and coke temporarily advanced 75c. per ton to meet increased cost of cartage. Supply sufficient, but dealers are weeks behind in deliveries.

Owing to snow blockaded streets, which make the use of wagons and trucks almost impossible, the county fuel administrator has granted Milwaukee coal dealers an advance of 75c. per ton from Jan. 18 to Feb. 20, inclusive. This advance will not apply, however, when a consumer does his own carting. Deliveries at present are confined to emergency cases and are made with sleighs. Rates are now as follows: Anthracite egg, $9.95; stove, $10.20, nut, $10.30; buckwheat, $8.40; Pocahontas, $9.75; screened coke, $10.75; pea coke, $8.75. Added to this is a charge of 50c. per ton for carrying in. At the various ward stations and city engine houses, where coal is sold, the charge has been increased from 45 to 48c. per 90-lb. basket and from ½c. to 6-10c. per pound for lots ranging from 100 to 300 pounds.

There is not much hard coal left in the yards and enough orders are on hand to clean this up. There is plenty of soft coal, however. Some hard coal will be received by rail between now and spring, but this source of supply is uncertain.

W. N. Fitzgerald, state fuel administrator, states that there were 116,000 tons of anthracite and 681,000 tons of soft coal on the docks of Milwaukee on Jan. 1, and 40,000 tons of anthracite and 400,000 tons of soft coal at other Lake Michigan ports. Notwithstanding this apparently ample supply, he urges Wisconsin people to practice the strictest economy in the use of fuel. The question concerning the control of Wisconsin coal has been definitely settled in favor of Administrator Fitzgerald, who made a trip to Washington in regard to the matter. If any coal can be spared from the state it will go to Minnesota and the Dakotas, but Wisconsin officials are to decide.

All coal yards at Kenosha, Wis., have been taken over by the county fuel administrator, who is letting the supply go in half-ton lots only. Teamsters in that city were demanding $20 per day to deliver coal.

ST. LOUIS

Most acute situation prevailing. Mines idle for week to ten days. Railroads utterly collapsed; no service. Fuel Administration causes drastic local measures. Some slight relief in sight for the present week.

The local situation is almost on the verge of a panic and while St. Louis has coal and so has Missouri, the conditions are bordering on the edge of a famine, caused principally by the utter failure of the railroads to get in shape.

Some mines have not worked for over a week on account of the railroads being unable to bring empties or remove loads. The worst offender is the Illinois Central, where an entire system has almost gone to pieces. This system is perhaps the most incompetent of all locally when it comes to assisting the Government and taking care of the public. This line permitted loads to accumulate at East St. Louis so that an embargo could be used against that point, thus forcing all the Illinois Central coal in southern Illinois to Chicago.

Gale, Ill., which is the gateway to southeast Missouri, Arkansas and Louisiana has also been embargoed shutting off the entire Southwest from Illinois coal shipped off the Illinois Central.

Other roads succeeded in getting opened up in the middle of the week and while cars were scarce the mines succeeded in working part of the time. The railroads, however, confiscated nearly all of this coal. It developed that these roads had only one day's supply of coal ahead.

It is claimed that certain railroads with mines in Missouri and Western states and also mines in Illinois are using the coal from their own mines for commercial purposes and demanding railroad coal from the Illinois fields and from mines other than their own.

The Missouri Pacific R.R. confiscated 125 cars of domestic coal, all the coal on that line, almost causing a disaster in several places.

The Wabash also went to pieces and had to confiscate coal from the yards of dealers.

In the Carterville field nearly the entire output is going to railroads on Government order, and the same condition prevails to a great extent in the Mt. Olive, as well as in the Standard field.

The Terminal in St. Louis found itself without coal and had to confiscate even when it had orders not to do so. The Terminal R.R. went to pieces utterly, even under Director McChesney, who was recently appointed by Secretary McAdoo. Hundreds of cars of coal were at East St. Louis that this road could not take. As a matter of fact there has been coal at East St. Louis for two weeks that it could not touch. On Saturday, the 19th, St. Louis was almost entirely without coal for its retail yards.

Missouri is in pretty fair shape as far as steam coal is concerned, and there was no occasion for the five-day order of the fuel administration applying to the State of Missouri.

Administrator Crossley issued instructions to the state, closing up places of business at 7 o'clock, with certain exceptions, and this has become general throughout the state and included the order for breweries, which are closed for two days weekly, and in Kansas City saloons for two days, and moving picture houses in an effort to curtail coal consumption 25 per cent.

In St. Louis there have been some few cases where there was actual suffering for coal, but these were speedily relieved and in a general way St. Louis is perhaps the best-situated city in the country for fuel.

The Union Electric Light and Power Co. has a good supply of coal on hand, but the Laclede Gas Light Co. is extremely low.

With the shutting down of the factories in East St. Louis, this threw a large tonnage to the west side, so that in two days' time the plants in St. Louis proper had fully a week's supply on the road.

Mining conditions throughout the southern Illinois field are not good. Miners refuse to work on account of deep snow and train service being irregular.

At Collinsville they would not work because the wash room was not warm enough and it would appear in several instances that the miners had deliberately without just provocation refused to work. It is to be hoped that the Government will soon put into effect a system of registration for every mine worker and allot him a certain amount of work to do every day, with a punishment for failure to comply. This sentiment is rapidly gaining ground in this section.

The prevailing market per net ton f.o.b. mine is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson and Franklin County rate is 87½c. Other fields, 72½c.

KANSAS CITY

Temperatures of 16 deg. below zero emphasized the coal shortage in Kansas City recently and while a short period of warm weather "saved the situation" temperatures soon fell again. At that time there were 10,000 tons of coal available in the city and orders for more than 15,000 tons. There was some suffering among the domestic users; but there was also a wider-spread tendency to conserve coal among those who had it in their bins. Orders had been issued that moving picture houses and churches be closed and this suggestion was followed except in places where picture shows got heat and light from outside sources.

Conferences are being held in Kansas City between the coal operators and the fuel administrator, the Chamber of Commerce and other agencies seeking to list the industries and large coal users which can and will suspend operations temporarily or at stated times in order to reduce the local demands on the coal supply.

SEATTLE

State fuel administrator recommends reclassifications of states coal and revision of prices at the mines. Output for last year greater than previous year.

Recommendations for a reclassification of all coals produced in Washington and a revision of prices at the mines have been forwarded to Washington, D. C., for the approval of the Federal Fuel Administrator. While the state administrator has refused to give out what the new prices may be he has let it be known that in some instances the prices will be higher and in others lower. The reclassification and the price lists are in much more detail than those of any other order thus far promulgated by the Federal Fuel Administrator.

A report submitted to the state fuel administrator by the Washington Coal Operators Association estimates the production of coal in this state during the past year as 3,979,576 tons as compared with 3,019,600 tons in 1916. The above are for short tons. Final figures which have yet to be compiled are expected to show a decrease of 30,000 to 40,000 short tons in this estimate of the total production for 1917, since mines with a daily capacity of nearly 7000 tons were closed for several days the last of December because of floods. In addition the mines at Carbonado, Wilkeson and Renton were closed most of the latter part of December and these three districts have a combined daily production of about 1900 tons.

Importation figures show total imports into the state during the past year from Wyoming of 95,000 to 100,000 tons; from Utah, 26,890 tons; and from Vancouver Island mines of 208,572 tons.

COAL AGE

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The Honor of the Coal Industry

REPUTATION is what we seem to be; character is what we really are. The test of the character and honor of the coal industry is now taking place.

The Nation needs coal so badly that it does not complain loudly at the present time, even when it is fed with fuel that contains an undue percentage of slate.

Are producers of coal taking advantage of the people's emergency? Most of them are not, but a few unscrupulous individuals and companies have shipped carloads of dirty coal; and their action threatens the good name of the industry.

THERE is always a day of reckoning. When the time comes that coal is not so scarce and therefore not so vital to the Nation's life, will it not be worth something if coal owners and coal miners can stand at the bar of public opinion and hear the words "Well Done"?

In the rush of getting it to market coal is being handled more roughly than ever before; and it must of necessity follow that there will be more fine coal and fewer lumps in what the average consumer gets. The public must be informed of this fact. However, there is no excuse for the miner to load slate, nor for the operator to ship it.

THE weak spot in our national crisis is railroad locomotives. We lack several thousand badly needed engines. We also lack men to repair the locomotives we now have. Every pound of freight must do its part. Every ounce of rock or slate that is hauled on our railroads today will have as its measure of cost just so many drops of the lifeblood of American boys fighting for us in France next summer.

Every other aim must be subordinate to our present business of winning the war. Each one of us must have his war program and a clear-cut sense of personal duty. The miner at the face who knowingly shovels slate into his car, or the operator who permits him to do it, is just as much a traitor as the man who sells Germany the details of a war secret, and is just as much an enemy as the Teuton who sticks a bayonet into one of Uncle Sam's soldiers.

THE *boys at the front have faith in us. If any of them die, let it be by German bullets and not through our carelessness and inefficiency here at home.* Mining coal today carries with it a responsibility greater than that of any other industry.

IDEAS AND SUGGESTIONS

Promotion

By Robert Littlehales
Smithton, Pennsylvania

How often the remark is heard: "Why, he is active enough and means well, but he doesn't seem to know anything." Some men are all "fuss and feathers." Mere fussiness cuts no figure. You can be here and there and still be nowhere. Other men are all "slam bang." If they drive a nail, they must dent the board. They lift a one-pound weight with five-pound effort.

Direct your effort by every ounce of intelligence you possess. Say what you mean, but say it as it ought to be said. "What do they say of me in the departments through which you have passed?" asked Napoleon. "Sire," replied M. de Narbonne, "some say you are a god, others say you are a devil; but all are agreed that you are more than a man." That was diplomatic. Napoleon knew that he was called a god and a devil, but "more than a man" smothered impossibility and drew the sting.

Don't cry about your lack of opportunity. Make it! Don't try to be a martyr! Don't assume the role of suffering innocence! Don't nurse your nerves! Don't coddle your whims! Don't "baby" your sins! *BE A MAN.*

Unless you fill the place you now occupy, you cannot expect to fill a more important one. Life, be it physical or mental or financial, should be a series of moultings. The lobster casts its shell because its soft body has become too large for the house. You can never get a better position than the one you have now unless you grow too large for the latter. Or, if you secure that better position, you can only keep it because you have somehow grown to that size.

Priming Centrifugal Pumps

One of the difficulties met with in the operation of a centrifugal pump is the priming, and for this reason a number of operators are using the plunger rather than the centrifugal type of pump. Various methods of priming have been tried, some of which were successful and others not. The Clearfield Bituminous Coal Corporation at its Rossiter mine, Rossiter, Indiana County, Pennsylvania, has succeeded in devising a priming device that has operated very successfully.

In the pumping room at the foot of the main slope (it is also at the foot of a manshaft) the company has three 600-gal. single-stage Morris centrifugal

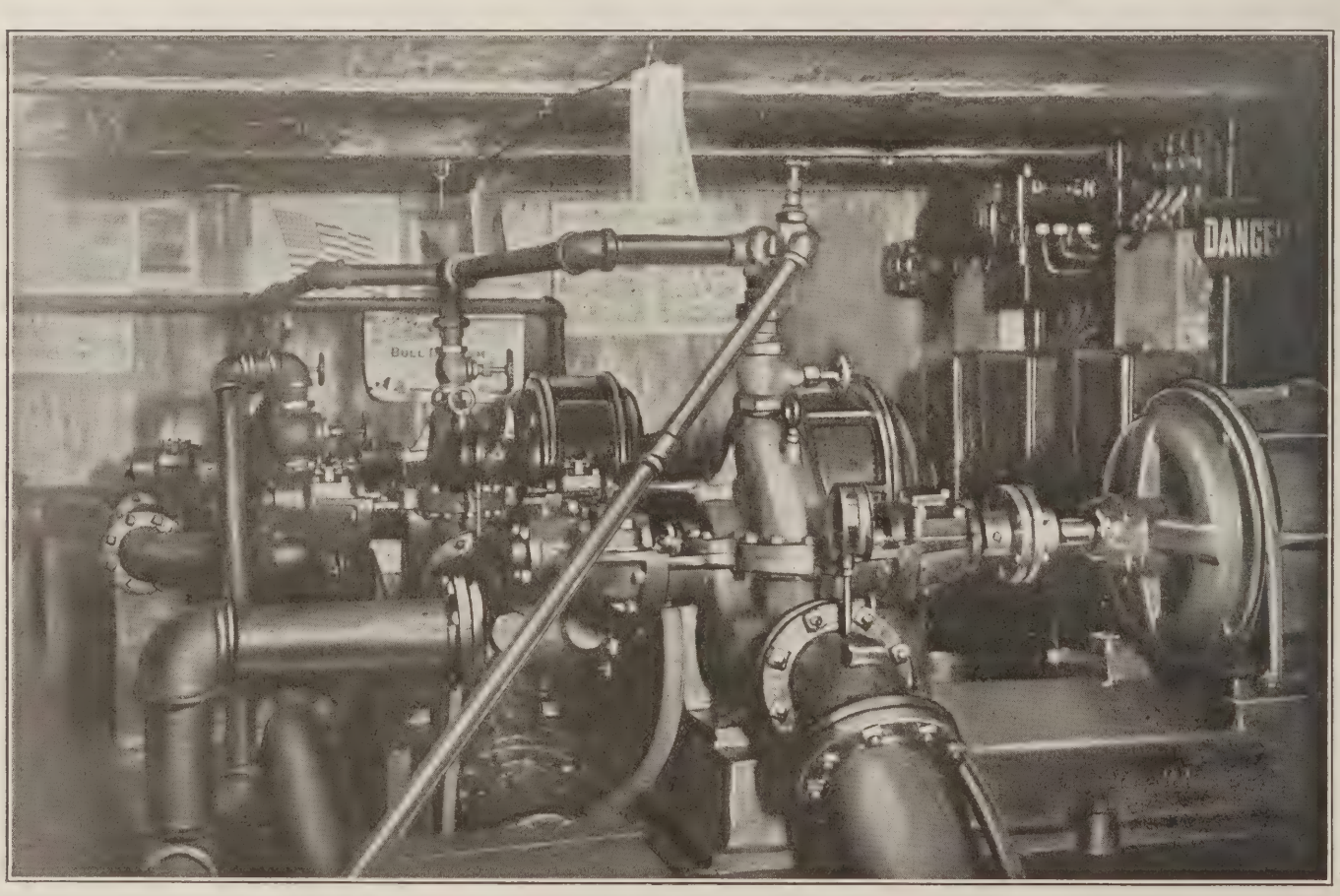


FIG. 1. PUMPROOM OF CLEARFIELD BITUMINOUS COAL CORPORATION, ROSSITER, PENN.

pumps arranged in a battery. These pumps have separate suction lines, but they all discharge into a main discharge line that goes up the manshaft to the surface, making a head of 80 ft. for the pumps to work against. The pumps have a maximum lift of 9.23 ft. on the suction line. The pumproom itself, as can easily be seen in Fig. 1, is built entirely of concrete.

The Clearfield company has had considerable trouble in operating these pumps. It has been difficult to prime them, as they would not start until there was 7 lb. pressure in the discharge line. First the plan was tried of keeping the water in the pumps from running back to the sump by means of foot valves, but these valves would stick and leak, and they caused a great deal of annoyance.

Next priming was tried by means of an auxiliary pump, an electric-driven plunger pump built by Deming.

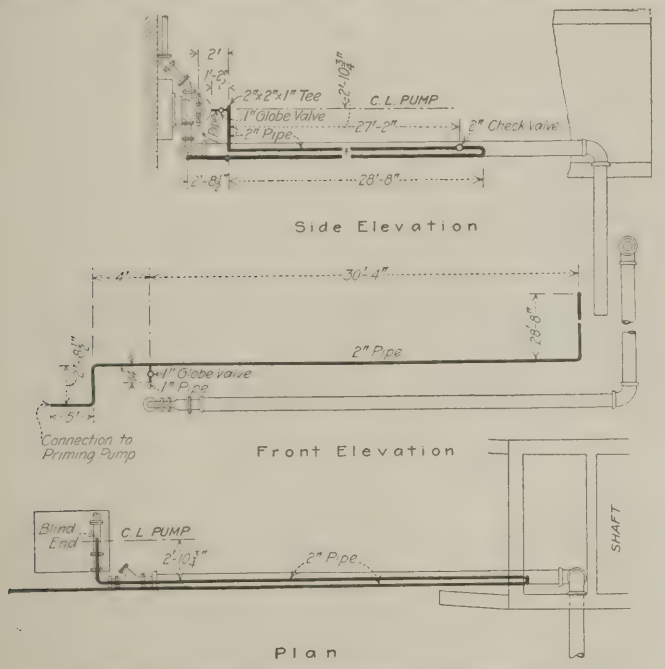


FIG. 2. HOW PIPES WERE CONNECTED

The water was pumped into the centrifugal pump through the priming hole. Foot valves were placed on the suction pipes, and the plunger pump was run until the water filled the suction pipe and the pump, and rose 14 ft. in the discharge pipe. Then the centrifugal pump was started. This method was found to be too slow, particularly if there were bad leaks in the foot valves, though it is still used in case of emergency.

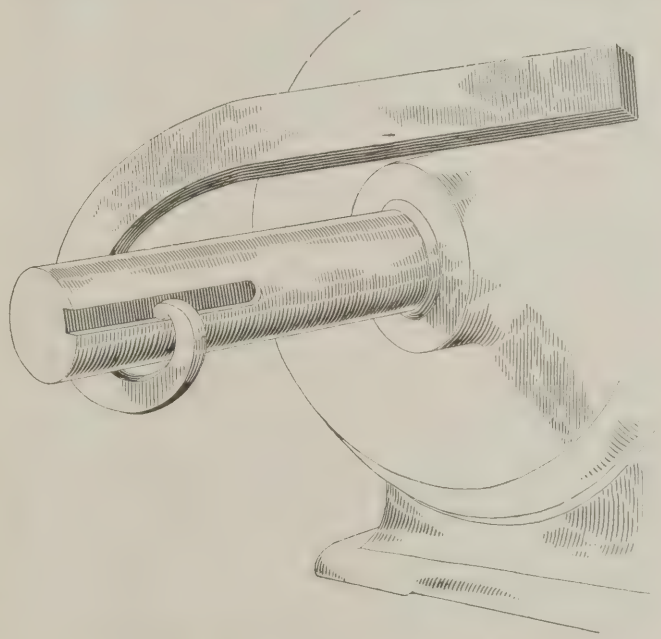
It was then decided that if a vacuum could be produced in the pump the water would rise from the sump into the suction pipe and then into the pump. This method was found to be successful and much quicker than the methods first tried. Further, it eliminates all trouble due to leaking foot valves.

A 2-in. pipe was connected by branch lines to each of the priming inlets of the pumps, as illustrated in Fig. 2. These branch lines each consist of a 1-in. nipple, a 1-in. globe valve and another 1-in. nipple. The main 2-in. pipe was run to the main shaft, 30 ft. away, and then up a distance of 28 ft. 8 in. This, together with the difference in elevation between the center of the pump and the 2-in. pipe line, makes a total distance of 31 ft. 4½ in., or higher than water will rise in a vacuum. A check valve was placed near the top of the line, and at the top of this pipe a 2-in. return elbow was located, then a 2-in. pipe was run down again to the pumproom, to which was connected a blower operated by a 2-hp. motor.

When it is desired to prime the pumps, the main discharge line valve is closed and the blower started. This sucks the air from the 2-in. pipe, the pump and the suction line, causing the water to rise in the suction pipe, the pump and the 2-in. pipe line. As soon as the water reaches a height of 14 ft., as indicated on a pressure gage at the bottom of the discharge line, the large centrifugal pump is started, the large valve in the discharge pipe opened and the water discharged through this to the surface.

Spanner Wrench for Rotating Shafts During Erection or Repair

The illustration below shows a spanner wrench for shafts that has proved so useful that others should know of it. The wrench is made of 1 x ½-in. steel, and can be used on shafts from 1 to 6 in. in diameter without damaging the keyway. The shape of the tool is the result of something like two years' evolution. It is christened the "Twister" and is used for rotating (by



SPANNER WRENCH FOR FINISHED SHAFTS

hand) armatures and the like during the process of erection, repair and inspection, and of course it works equally well on other similar things. The need of something of the kind is shown by the condition in which keyways on shafts are so frequently found, these being damaged by the use of monkey wrenches and pipe wrenches.—*Power.*

IN THE OPENING OF A NEW MINE, the fixing of the daily capacity is of great importance, for on this depend the number of houses to be built and the number of mining machines and locomotives required. The capacity of the power plant and numerous other items depend on the greatest output to be handled in one day and not on the average output.



Precast and Field-Cast Concrete Houses

By J. B. WARRINER
Chief Engineer, Lehigh Coal and Navigation Co., Lansford, Penn.

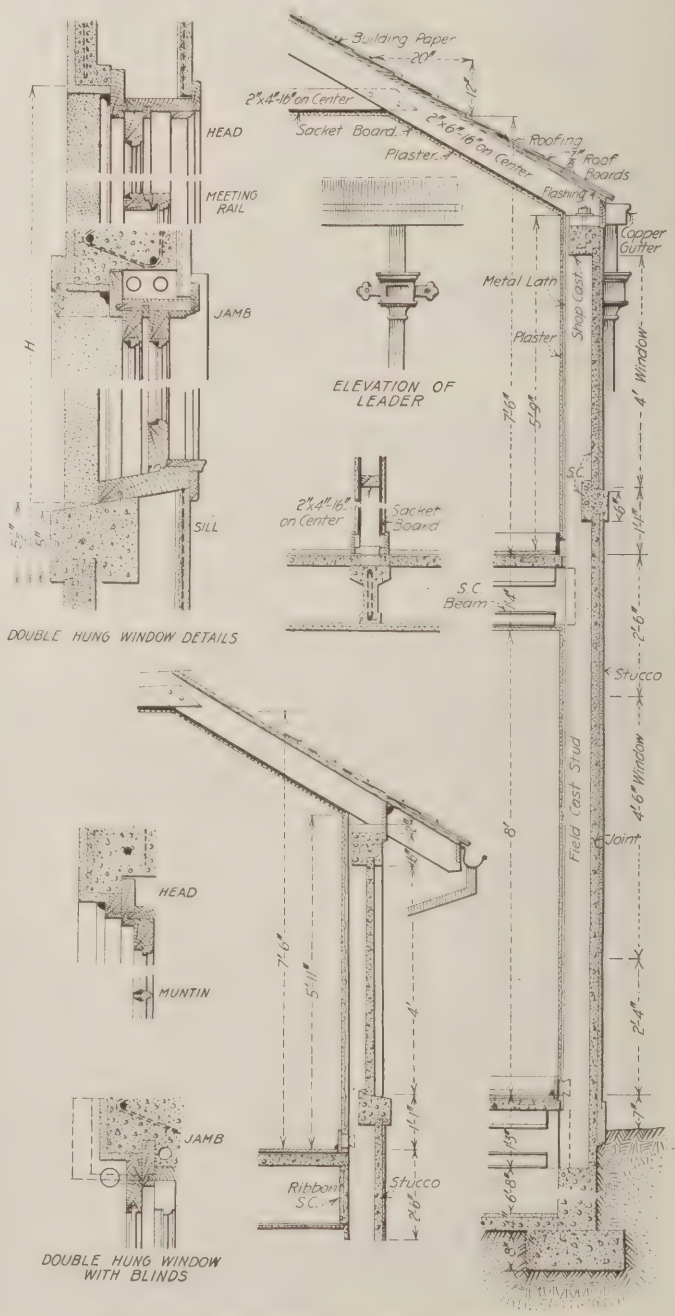
SYNOPSIS — *Concrete is everywhere throughout the coal fields encroaching upon the domain heretofore occupied almost exclusively by wood. This article describes the construction of dwellings built of a combination of precast and field-cast concrete. Wood is employed for roof framing and sheathing.*

IN ACCORDANCE with the welfare work already undertaken by the Lehigh Coal and Navigation Co. at Lansford, Penn., in providing suitable houses for its miners, laborers and mechanics, it is now erecting for the clerks, engineers and superintendents six detached and four semi-detached dwellings, under the direction of Mr. Ludlow, the vice president. These will be situated in the Borough of Lansford, and will be not only artistic and modern but also out of the ordinary in the type of buildings met with in the mining field. The houses are located on ground in the center of the town the site of which was formerly occupied by a culm bank that has been removed and run through one of the company's breakers.

As a departure from the old practice of coal companies building houses all alike, this group will consist of five different types of dwellings. Each house will have a lot from 40 to 45 ft. in width and 150 ft. in depth.

The houses will be of "Simpson Craft" construction, a new method of building fireproof buildings consisting of making 90 per cent. of the structure, such as floor-beams and slabs, window sills and lintels, wall slabs, partition studs, stairs, chimneys and porches, of concrete in standard molds, in a casting shop located at the site. Here the work may be cast quickly and the surfaces may be finished with wood float on convenient benches, during weather when it would be impossible to carry on usual building operations. Later these parts are set up in place and bound together by casting certain field sections.

After the cellars are dug, a footing course of concrete 8 in. in thickness and 20 in. wide is laid for the outer walls of the buildings, and upon this is cast a solid wall 8 in. in thickness up to the underside of the floor-beams. Channel-shaped field forms spaced 3 ft. 4 in. on centers are then set up on the wall and against these are placed the edge of the wall slabs, ends of lintels, sills, floor-beams, window and door frames. A similar channel section, somewhat greater in depth, is then placed inside of the building directly back of the one on the exterior, thus forming a pocket for a small column, or stud, while holding the shop-cast

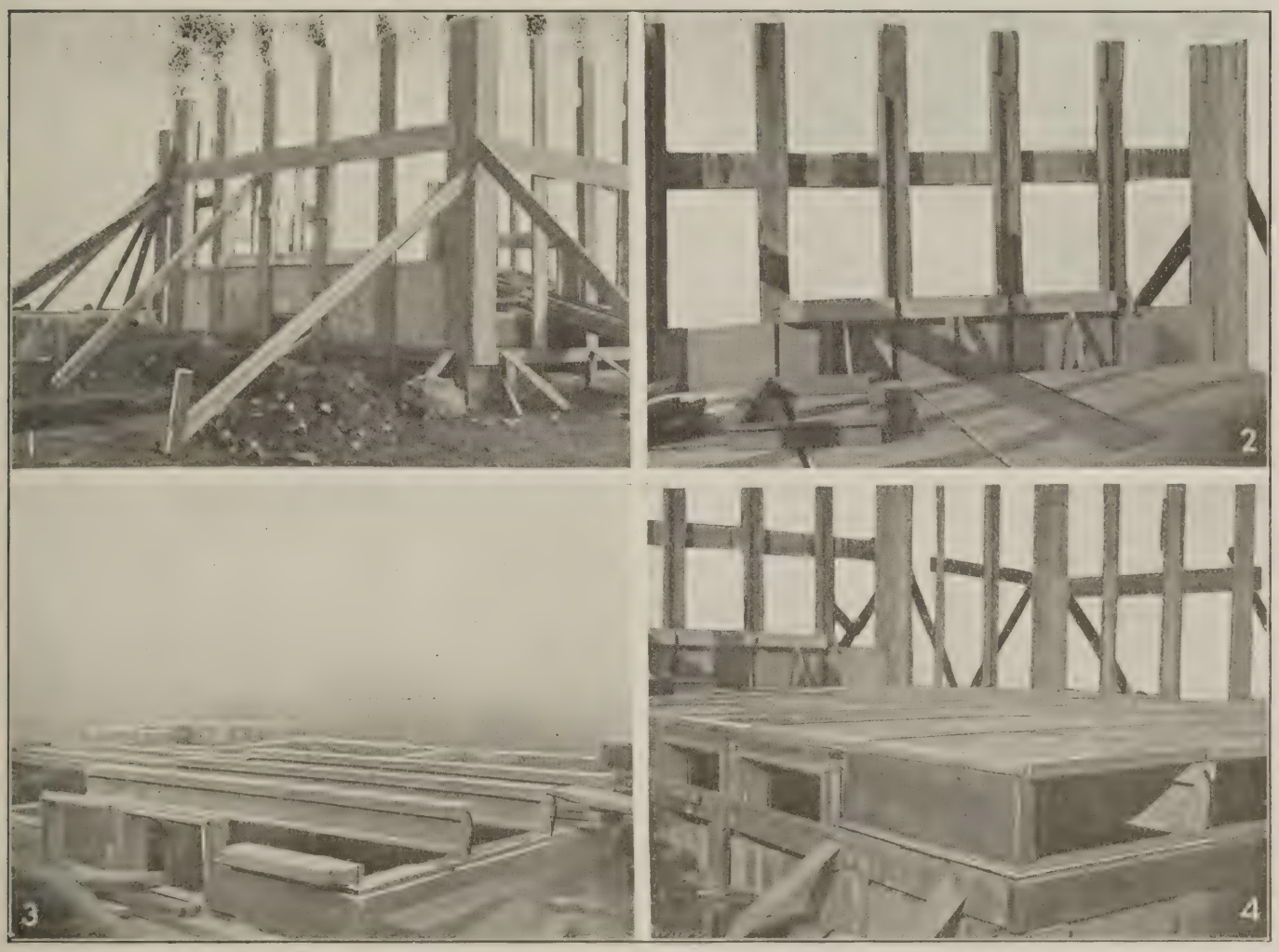


DETAILS OF "SIMPSON CRAFT" CONSTRUCTION

pieces correctly. When all stud forms and sections are in place up to the underside of the roof rafters and the reinforcing steel rods have been placed in the studs, concrete is poured into these pockets, which extend all the way to the roof. As they become filled, the concrete settles around the ends of the sections projecting into the pockets and firmly embeds and secures them.

To overcome the dampness and sweating of concrete walls as usually built, and at the same time to add warmth to dryness, the Simpson Craft method provides on the inside face of the wall studs small wire "hair pins," spaced 6 in. on centers which are built in when the studs are cast. Over the ends of these are forced the outside face of the slabs at these points during casting. Large air spaces are provided between the studs and, as the paper is placed against the inner face of the studs and the rib of the lath is nearly an inch in depth, another air space of that width is provided between the plaster and the paper. This air space extends entirely around the building, cutting off the exterior from the interior face of the wall, effectively damp-proofing, frost-proofing, sound-proofing and insulating the walls.

When the concrete is mixed 5 per cent. of hydrated lime is added to the cement. This not only helps to make the concrete flow more smoothly, but permits a



ILLUSTRATING DIFFERENT STAGES IN THE HOUSING DEVELOPMENT OF THE LEHIGH COAL AND NAVIGATION CO. AT LANSFORD, PENN.

Ninety per cent. of structure is cast in standard molds, in a casting shop located on the site

sheets of heavy waterproof felt, lapped well at all joints and tightly secured to the edges of all door and window frames. When the paper is in place, a metal lath with heavy outstanding ribs is forced over the ends of the hair pins and a small wire threaded through the loop, after which the loops are tightly twisted, securely locking both paper and lath to the studs. The walls are then plastered three coats in the usual manner.

The slabs for the exterior walls are only 1 in. in thickness except when used in those types of houses calling for plain surfaces, in which case ½ in. of stucco is added on the outside, after the work is erected. Provision is made for securing the stucco by roughening finer surface treatment and at the same time waterproofs the concrete. The only finishing required for the exterior walls is the touching up of the projecting studs around the panels, except, of course, the lower portion of some of the buildings where they are stuccoed. The outside of all walls, when dry, is gone over with two coats of Cabot's cement stain in selected color and a pleasing and permanent surface obtained. The stairs, which are also of concrete, are precast with the treads and risers in one piece. A box string of concrete is cast after the treads and railing are set up, and surrounds the ends of the treads and provides a base upon which the plaster of the wall finishes. The



HOUSE OF "SIMPSON CRAFT" CONSTRUCTION

stair railing and newels are also of reinforced concrete, precast and set in place when the stairs are erected.

The chimneys are likewise built of precast sections and have specially designed smoke-proof expansion joints to allow for changes in temperature and to guard against the leakage of gas. The finished floors and base are of cement, with sanitary cove.

The partition studs on the first floor are precast concrete, covered with metal lath, and on the second floor are of wood covered with wire mesh backed with heavy waterproof plaster applied direct thereto. The roof framing is also of wood.

The roofs are covered with asphalt shingles, green and red in color, applied to wood sheathing. All houses are heated by steam and have sanitary open plumbing and electric lights. Simpson Craft construction is the invention of John T. Simpson, C. E., Newark, New Jersey.

Each house provides a reception hall, large living room, dining room, kitchen, pantry, front, side and rear porches on the first floor; three bedrooms, bathroom, three large bedroom closets and a linen closet on the second floor. There is a full cellar under the entire house, subdivided into three separate rooms by 6-in. solid concrete walls.

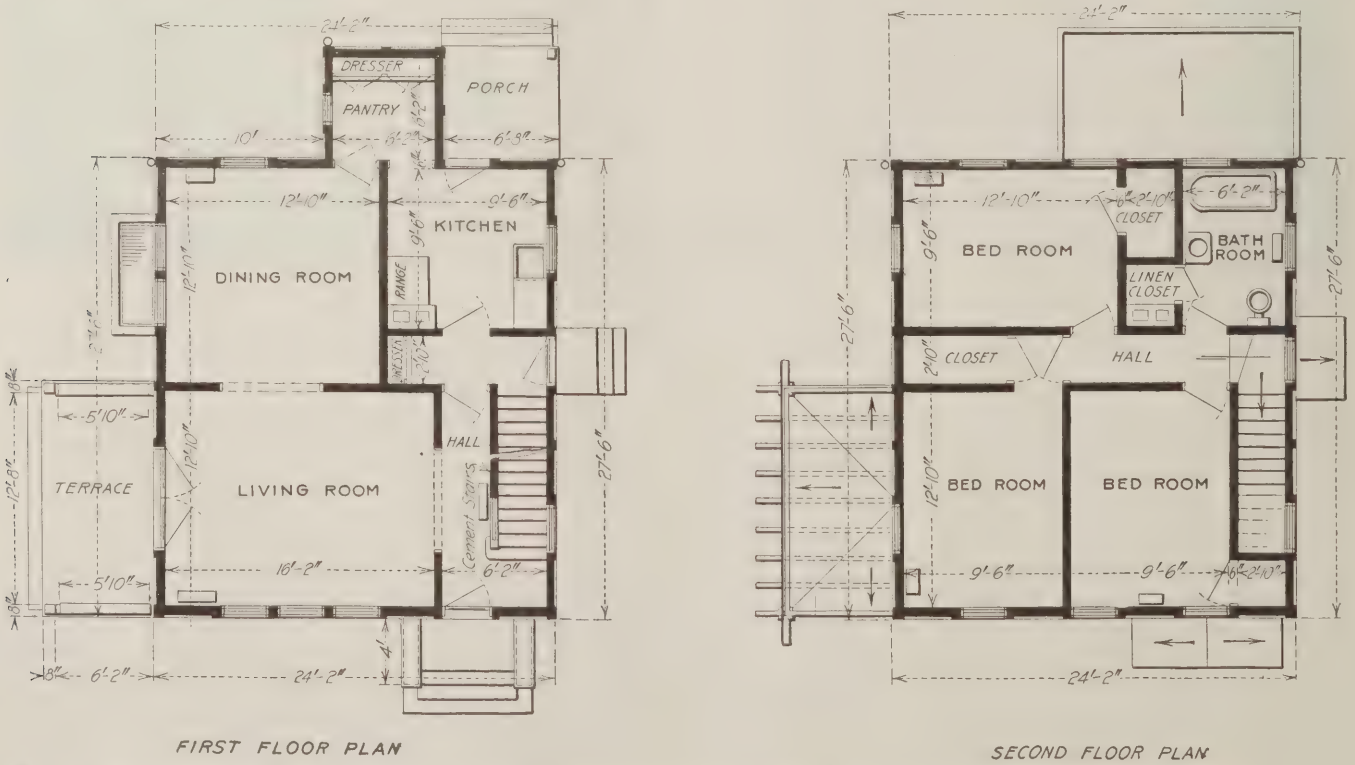
The houses were designed by Simpson & Briscoe, Inc., architects and engineers, of Newark, N. J., and are being built by the Shamokin Lumber and Manufacturing Co., of Shamokin, Penn., under the immediate charge of J. B. Warriner, chief engineer of the Lehigh Coal and Navigation Co. The total cost, for the ten dwellings, complete, exclusive of ground, will be $35,000.

How a Forty-Ton Drum Was Moved Up a Mountain

By Ralph W. Mayer
Roslyn, Wash.

The Northwestern Improvement Co. had two drums weighing 16 and 40 tons each to move about a mile up a mountain side to its newly developed Mine No. 8. A double-track incline extends from the tipple to the mouth of the mine, at the entrance to which the hoisting engines and drums were to be installed. A wagon road also led to the mouth of the mine, but it was not suited to the hauling of heavy machinery.

The two tracks on the incline were spaced equally distant throughout their entire length. Every fifth tie extended under the full width of both tracks and was spiked to all four rails. Where it was not advisable to use ties of this length, short single-track ties were laid under the inner rails of each track, these being spiked fast to the rails. In this manner the two tracks



FIRST FLOOR PLAN

SECOND FLOOR PLAN

FLOOR PLANS OF FIREPROOF DWELLINGS NOW IN COURSE OF ERECTION AT LANSFORD, PENN.

were held a uniform distance apart for their entire length and were prevented from spreading.

The engines and smaller fittings were hoisted up the incline first, a small electric hoist, which had been used on development work at the mine, furnishing the power. The smaller of the two drums was then taken up. It was moved to the foot of the incline on two trucks specially built to transport heavy machinery. The wheels of these trucks were of the same diameter, and extra strong. The two axles of the rear truck were fastened rigidly together in a manner somewhat similar to that employed in trucks used under railroad cars. Pieces of 10 x 10-in. timber were mortised and placed on top of the axles, forming a platform between them. These timbers were fastened to the axles with U-shaped irons, or clevises, bolted around the timbers and axle. The axles were placed just far enough apart so that the wheels would not interfere with each other. A space of 10 in. between the front and rear wheels of each of the trucks is sufficient.

Construction Details of the Truck Platform

A 12 x 12-in. timber is bolted fast to this platform between and parallel with the axles, for a bolster to carry the weight of the load. The wheels being low the load is thus carried above them, and out over them if necessary. Two iron bars connect the front and rear axles. These are placed near the wheels and underneath the axles, being fastened to the latter by iron clamps. Thus no holes are drilled in the axle, and it is not weakened. The front truck also consists of four wheels and two axles rigidly fastened together. The platform on the axles is made by placing two 10 x 10-in. timbers from axle to axle and next to the wheels. These two side timbers are allowed to extend beyond the front axle for about 2 ft., and holes are bored in them near their ends through which a rod is passed to hold the tongue of the truck. The middle timber of the platform is made shorter, so that it only reaches a few inches in front of the axle. The tongue is made of the same-sized timber and placed in line with this middle stick, 6 in. separating their two ends.

Two timbers of the same size are placed alongside this middle stick and the tongue, and securely bolted to the latter. These sticks, or hounds, have holes bored through their free ends, and an iron rod passed through these holes and similar holes in the two side timbers of the platform, allowing the tongue to move up and down. These two side timbers, or hounds, only extend back from the tongue to the front axle.

A small wheel on a swivel or an iron shoe is placed on the end of the tongue to prevent it from digging into the ground. A timber is bolted crosswise to the three platform pieces between the front and rear wheels. Iron braces are used to fasten it securely to the platform timbers.

On top of this cross timber a bolster is placed. This cross timber is mortised into the platform so that the front and rear bolsters are the same height. The timber and bolster are reinforced with flat plates of ½-in. iron, and a ½-in. iron strap passes from the platform up over the bolster, both of its ends being fastened securely to the platform. A kingpin passes through a hole in the iron strap on top of the bolster and down through the bolster and platform. The bolster being thus fastened in the middle, its ends are free to move back and forth. The rear axle of the front truck and the front axle of the rear truck are connected together by means of two chains fastened X-fashion, the one chain being attached to the right side of the front axle and to the left side of the rear axle, and the other chain *vice versa*.

The load is pulled by a chain fastened to the front axle of the front truck. The end of the tongue is attached to the chain so as to guide the truck. The load is moved by a donkey engine on skids, which can be moved along by the engine or by a team of horses with block and tackle.

A 1-in. cable was stretched out for a quarter of a mile or so and its end made fast to a deadman. The block was then made fast to the cable at each shift of the tackle. The piece of machinery was loaded on the trucks by jacking it up with the help of blocking, running the trucks underneath, then lowering it onto them. It was unloaded the same way.

The drum was moved to the foot of the tramway by this means and then placed upon four specially prepared trucks provided with roller-bearing mine-car wheels. The two axles of each truck were set as close together as the wheels would allow and fastened to two pieces of 10 x 10-in. timber placed side by side and parallel with the track. Each end of the timbers extended over the axle about 1 ft. The truck was stiffened by X-braces between the two timbers. A piece of 6 x 12-in. timber placed across each truck in the middle and fastened to the side frame carried the load.

Two of these trucks were used on each track. Pieces of 12 x 12-in. timber were laid from the front to the rear truck on each track, and cross timbers of the same size were placed thereon. The weight laid upon these cross timbers was thus distributed over the two tracks by the four trucks, two on each track, while the drum was carried between the tracks. The small drum was hoisted and set in place before the larger one. The boilers were not in place when the 40-ton drum was ready to be hoisted, but as compressed air was used in the mine and the engine driving the small drum was in position, it was connected to the air line and compressed air used to hoist the drum up the incline.

The drum was moved to the foot of the incline by placing it on 12 x 12-in. timbers chamfered at the ends and used as skids. Timbers of the same size were laid upon the ground and 2-in. iron rollers placed between them and the skids. A donkey engine was used to pull the drum. This engine was also used for dragging forward the timbers upon which the rollers were placed.

When hoisting the drums up the incline, three dogs, or drags, were used to prevent the load from running away should anything break. These were made from 12 x 12-in. timbers 16 ft. long. A piece of timber of this size was securely bolted across the rear end of the drum and directly underneath the drum shaft. A piece of 1-in. cable was passed around this timber and through a hole bored in the end of the drag timber, the two ends of the cable being fastened together by means of clamps, or clips. Several bolts were put through the drag timber on each side of the hole to strengthen it and prevent splitting. One of these dogs dragged on the ground between the two tracks, the other two dragging over the ties.

An Up-to-Date Power Plant — II

By DEVER C. ASHMEAD
Tarrytown, N. Y.

THE dam and the reservoir at the Clymer power plant are of particular interest, as they are good examples of a simple, permanent dam and reservoir, and could be used in a number of cases as a standard. The reservoir has a capacity of 8,000,000 gal. and covers an area of $2\frac{3}{4}$ acres. Its maximum length is about 800 ft. and the width at the widest point, which is at the dam, is about 320 ft. The maximum depth is 24.5 ft. The drainage area of the water shed which supplies the reservoir is 160 acres. Fig. 9 shows the size of the reservoir and Fig. 10 is a view of the dam and reservoir.

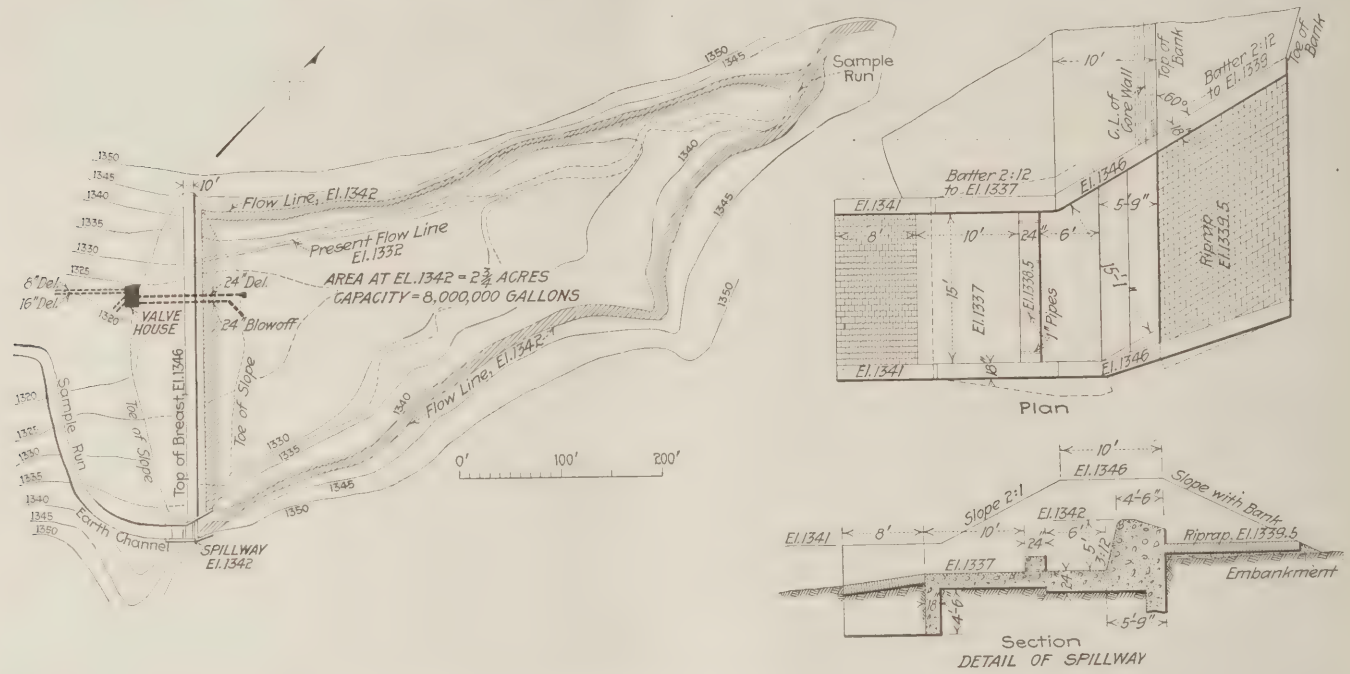


FIG. 9. PLAN OF RESERVOIR AND DETAILS OF SPILLWAY



FIG. 10. VIEW OF DAM AND RESERVOIR, GATEHOUSE IN FOREGROUND

The dam is constructed of earth with a concrete core wall. The depth, through the surface soil to bed rock, is about 10 ft. The rock is shale and the surface soil is clay (see Fig. 11). The surface soil was removed to a depth of 5 ft. for the core wall. The first 10 ft. of the core wall is 2 ft. 6 in. thick. The next 9 ft. is 2 ft. thick and the third and upper part is 10 ft. high and 18 in. thick, making a total height of 29 ft., thus putting the top of the core wall at an elevation of 1344 feet.

The surface soil was excavated to a depth of 2 ft. in order to remove all decaying vegetable matter and foreign substances before construction of the main part of the dam was started. This part of the dam was made of clay carefully rolled and tamped so that it formed a solid earth bank. The top of the earthen part of the dam is at a height of 1346 ft., or 2 ft. higher than the

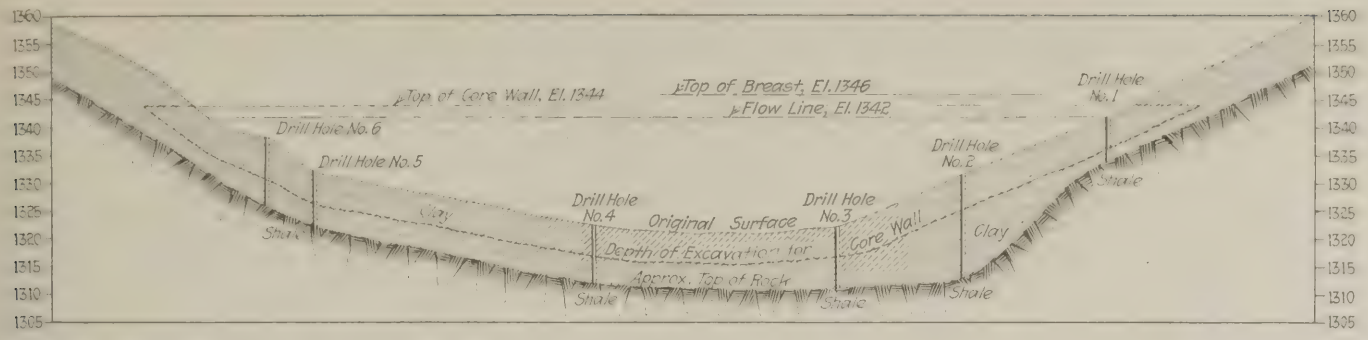


FIG. 11. SHOWING CHARACTER OF SOIL ENCOUNTERED IN SINKING FOUNDATIONS

top of the core wall. The top of the dam is 10 ft. across, and the center line of the core wall is set 4 ft. from the center line of the main dam on the upstream side.

The upper side of the dam has a slope of 2 to 1 and is covered with riprap, 1 ft. in thickness. The downstream side of the dam has a slope of 2 to 1 and is sodded. On the left-hand side of the dam, looking downstream, is the spillway, the top of which is at an elevation of 1342 ft., or 4 ft. below the top of the main dam and 2 ft. below the top of the core wall. The spillway, with the exception of the bottom of the approach and the discharge, is built entirely of concrete (see Fig. 9 for details). The upper approach to the spillway is riprap with concrete sidewalls corresponding to the shape of the main dam. These concrete walls are 18 in. thick. The water flows over the main part of the spillway and falls a distance of 5 ft. The opening through which the water passes over the top of the spillway is 15 ft. wide and 4 ft. high. The lower end of the spillway is made of riprap laid in mortar. The water, after it leaves the spillway, flows through an earthen channel until it joins the original creek.

Two pipe lines pass through the dam to the valvehouse, as is shown in Fig. 12, both these pipes being 24 in. in diameter. One is a delivery pipe and the other a blowoff pipe. Where they pass through the embankment, the pipes are laid in concrete cradles 6 in. thick. Two cutoffs on each pipe prevent leakage through the dam along the outside of the pipes. These cutoffs are made of $\frac{1}{8}$-in. thick reinforced wrought-iron disks, the outside diameter of which is 6 ft. The disks are set in concrete 18 in. thick.

In Fig. 12 the end of the discharge is shown resting in concrete. To this discharge pipe is attached a large metal strainer to protect it from taking in foreign substances. The blowoff pipe rests in riprap and is not protected.

Through a 16-in. cast-iron pipe the circulating water for the condensers is pumped back to the reservoir, to a spray system of cooling, by two 10-in. two-impeller turbo-volute pumps driven by Alberger-Curtis noncon-

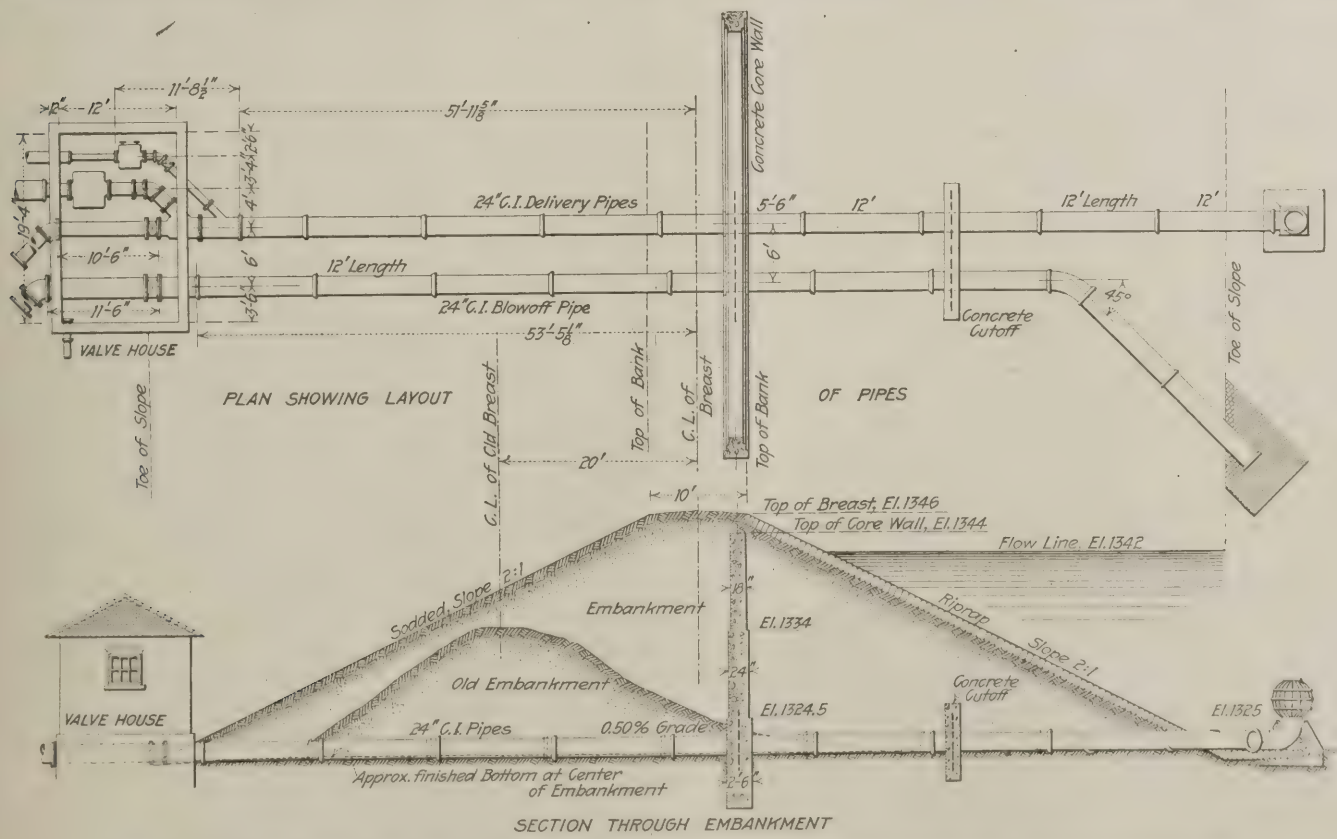


FIG. 12. CROSS-SECTION OF DAM AND ARRANGEMENT OF BLOWOFF AND DISCHARGE PIPES

densing steam turbines. Twenty-two standpipes and four branches to each pipe cool the water for the power house. The spray system was furnished by the Spray Engineering Company.

Outside Equipment of Power House

The transformers are mounted outside of the power house and consist of three General Electric H-60-500-kw., 6600/2300-volt, single-phase, oil-cooled transformers and three General Electric H-60-300-kw., 22,000/2300-volt, single-phase, oil-cooled transformers, together with the necessary choke coils, disconnecting switches and aluminum cell lightning-arrester equipment.

The three 500-kw. transformers will be employed to step up the generated voltage from 2300 to 6600 for use on the transmission line from the main station to the Sample Run slope substation at Onberg and the Barr slope substation at Hastie Run and Dixonville.

The three 300-kw. transformers are employed to step up the generated voltage from 2300 to 22,000 for use on the transmission line running from the power house to the West Branch mine substations near Barnesboro.

Four substations are supplied by the mine—one at Sample Run, one at Hastie Run, one at Dixonville and one at West Branch. The equipment of the Sample Run substation consists of two General Electric TC-60-300-kw., 1200-r.p.m., 550-volt, compound-wound, rotary converters with two banks of HJ-60-125-kv.-a., 6600/340-volt, indoor-type, oil-cooled transformers for use with the above rotary converter, together with the necessary choke coils, disconnecting switches, switchboard and aluminum cell lightning-arrester equipment. All the apparatus is housed in a substantial brick building 37 ft. 8 in. by 22 ft. 5 in. in size.

There is also mounted outside of this substation three General Electric H-60-100-kv.-a., 6600/440-volt, 60-cycle, single-phase, oil-cooled, step-down transformers. This apparatus is for use with the mine ventilating fan and to run the mine pumps in the central pumping station. The Hastie Run and Dixonville substations contain

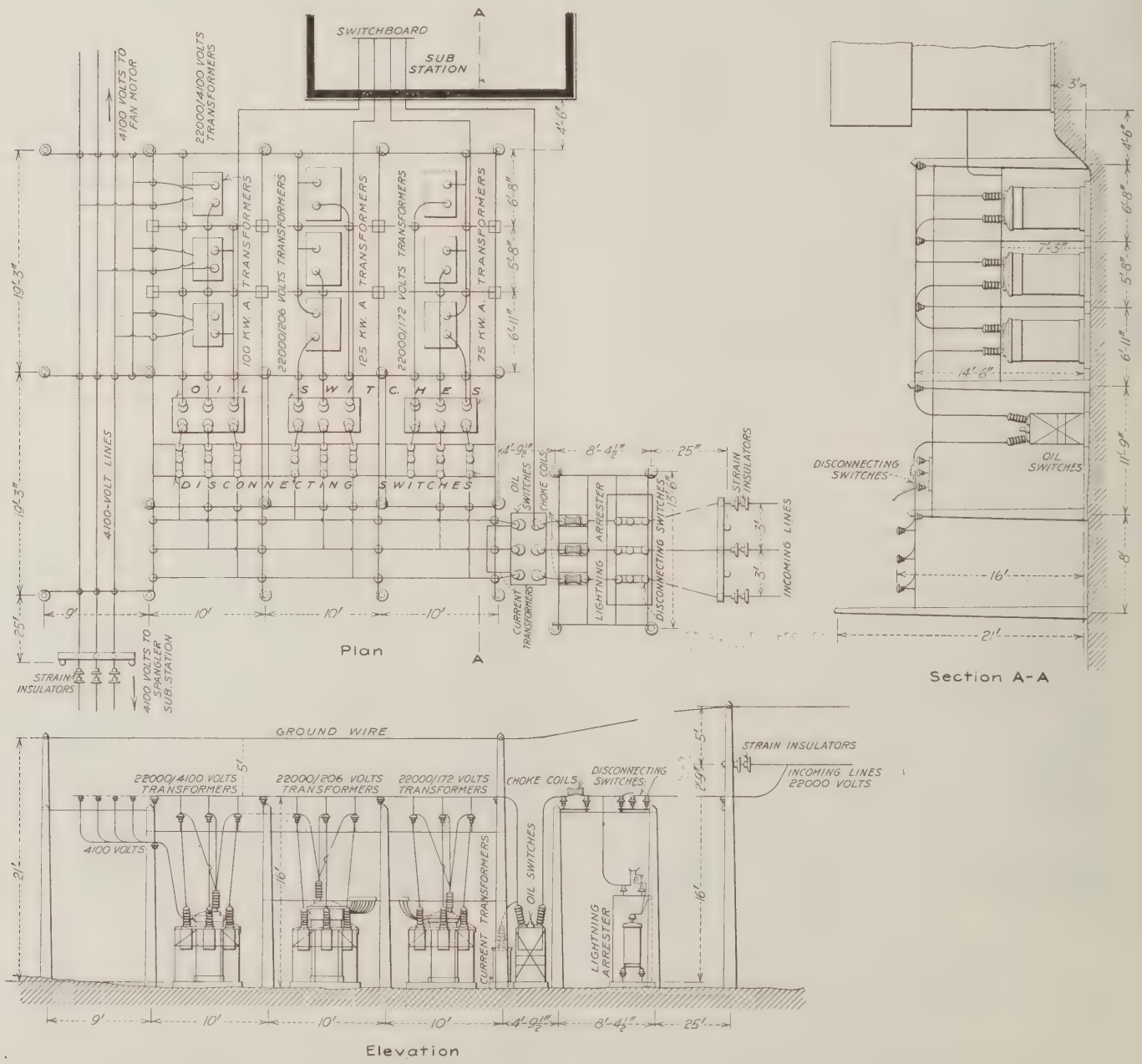


FIG. 13. DETAILS OF TRANSFORMER STATION AT THE WEST BRANCH SUBSTATION

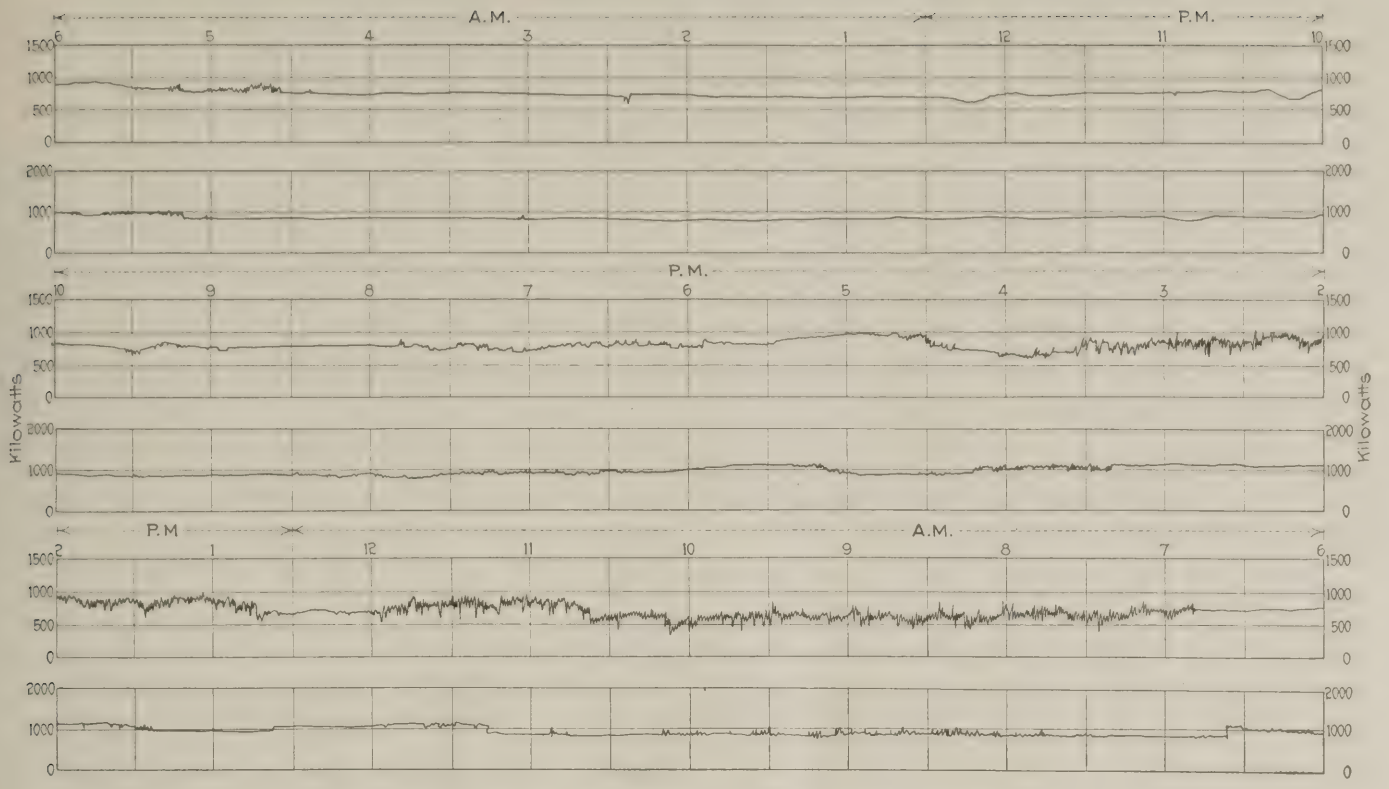


FIG. 14. CHART SHOWING LOAD ON POWER HOUSE

the same equipment, consisting of one General Electric TC-6-300-kw., 1200-r.p.m., 500-volt, compound-wound rotary converter with one bank of HJ-60-125-kv.-a., 6600/340-volt, indoor-type, oil-cooled transformers for use with this rotary converter, together with the necessary choke coils, disconnecting switches, switchboard and aluminum cell lightning-arrester equipment. The apparatus is housed in a brick building 27 ft. 8 in. long by 22 ft. 5 in. wide.

The substation equipment at the West Branch substation is exceedingly interesting, particularly the transformer station outside the building. In the substation proper, which is a concrete building, there is one General Electric TC-6-200-kw., 1200-r.p.m., 275-volt, compound-wound rotary converter, together with a switchboard and one HCC-6-300-kw., 1200-r.p.m., 275-volt, compound-wound rotary converter and its switchboard.

The transformer station is outside the substation, and for convenience, neatness and accessibility there is nothing left to be desired. The 22,000-volt current from the power plant comes in as shown in Fig. 13, and passes through a set of disconnecting switches. Just beyond these is the lightning arrester. The current then passes through the choke coils. From these coils it goes to an oil switch, which is operated by a pipe mechanism from a transformer switchboard in the substation building.

The 22,000-volt lines are carried along for an additional distance of 30 ft. This space is divided into three panels of 10 ft. each. In the first panel the line is tapped in parallel and the 22,000-volt current passes through a set of disconnecting switches and another oil switch operated from the transformer switchboard in the substation. Then the current passes through a bank of three General Electric HJ-60-75-kv.-a., 22,000/172-volt, 60-cycle, oil-cooled transformers to be used in connection with the 200-kw. rotary converter.

In the second section, or panel, the same arrangement of switches exists, but instead of the above transformers there is a bank of three General Electric HJ-60-125-kv.-a., 22,000/206-volt, 60-cycle, oil-cooled transformers used in connection with the 300-kw. rotary converter.

In order to take care of the equipment which was operated on a 4100-volt circuit from the old West Branch power house, and to save changing this equipment, a third set of transformers is placed in the third section, or panel. This panel has the same switch equipment and a bank of three General Electric H-60-100-kv.-a., 22,000/4100-volt, 60-cycle, single-phase, oil-cooled transformers. These transformers step down the incoming line voltage from 22,000 to 4100.

This 4100-volt current is used to operate the mine ventilating fan as well as a small substation at Spangler, which consists of a General Electric TCC-6-100-kw., 1200-r.p.m., 275-volt, compound-wound rotary converter together with the necessary transformers and switching apparatus.

The equipment at the West Branch substation is controlled on the 22,000-volt side by 22,000-volt oil switches of the outdoor type and mounted directly in back of the transformers (see Fig. 13). These oil switches, as well as the transformers, are protected by disconnecting switches, choke coils and aluminum cell lightning-arrester equipment.

The supports for holding the insulators for the transmission lines in the transformer station consist of wooden poles for uprights and 1¼-in. galvanized pipe for the crosspieces. These pipes are shown by the solid lines in Fig. 13. This figure also shows the general layout of the transformer station.

The arrangement of the equipment is such that it is absolutely unnecessary for a man to come near the high-tension current in order to throw a switch. The only time he would be required to approach the high-tension lines would be in the case of a breakdown.

At the present time there is a connected load on the power house through its various substations of 2000 kw., which could easily be handled with the present equipment. But this is not all the load that it has to carry, as it is furnishing from 500 to 1000 kw. to the Pennsylvania Public Service Corporation. In Fig. 14 is found the chart giving the output of the power plant. This is shown in the second, fourth and sixth lines. The first, third and fifth lines show the amount of current furnished the Public Service Corporation. The chart gives one full day's operation of the power plant and was taken on Dec. 6, 1917, commencing at 6 a.m. and running to 6 a.m. Dec. 7, 1917.

A study of these charts shows that the maximum power consumption of the coal company was at noon, when its current was being consumed at the rate of 400 kw.-hr., and for a few periods during the day, when as much as 600 kw.-hr. was consumed; but this did not last over two or three minutes at a time.

The power furnished the service corporation holds steady at about 700-kw.-hr. from 6 a.m. until 9:30 a.m., when it drops gradually to 600 kw.-hr., increasing then to 11 a.m., when it is drawing 900 kw.-hr. During the noon hour, as is to be expected, there is a marked falling off. This is likewise reflected on the chart showing the total output.

The consumption of the service company increases at 12:30 p.m. and holds steady until 3:30 p.m., when the mines on its lines begin to stop work and before the night load begins to come on. At 4:30 p.m. this load comes on, and from then to 5:30 holds at almost 1000 kw.-hr., when it drops to 800 kw.-hr. and keeps at this rate with hardly any breaks until the next morning.

During November, 1917, the power furnished the Pennsylvania Public Service Corporation amounted to 319,500 kw.-hr., whereas the coal company at two of its mines consumed only 86,900 kw.-hr. In November 603 tons of coal was burned to produce the 406,400 kw.-hr., requiring a little less than 3 lb. of coal for each kilowatt-hour produced. This is very good considering the fact that it was the first full month the power house had been operated and that all the firemen were green and unfamiliar with the mechanical stokers.

The average load on the power house is about 900 kw., and it runs as high as 1200 kw.; but it holds very even day and night with no marked peak loads. The power factor seems to vary somewhere between 85 and 90. Only one turbo-generator set is operated at one time.

During November, 1917, the West Branch substation was not operated, it not having been completed until Dec. 4, when it was turned over for the first time.

Carbon Coal Briquettes as a Substitute for Anthracite

The committee on minerals of the Canadian Conservation Commission has issued a report prepared by W. J. Dick, mining engineer to the commission, respecting the proposed production of carbon coal briquettes in the Western provinces. He finds that briquettes made from coal waste, or slack, which could be purchased cheaply at the mines, can be laid down at many points in the Prairie provinces at a lower cost than anthracite. He gives the following estimate of the saving which would result by the use of carbonized briquettes in place of anthracite in certain cities and towns in Manitoba and Saskatchewan, pointing out incidentally that the price of anthracite is likely to increase:

Portage la Prairie, nothing to 45c.; Carberry, 80c. to $1.30; Brandon, 85c. to $1.10; Virden, 95c. to $2.30; Moosomin, 95c. to $2.30; Wolseley, $1.45 to $1.70; Regina, $1.75 to $2.40; Moose Jaw, $1.70 to $2.50.

The report recommends the establishment of a plant at either Estevan or Bienfait with a capacity of 10 tons per hour to be operated up to half its capacity until the success of the undertaking had been established.

Unique Plan To Save Coal

In Albany, N. Y., recently, a conference was held by Governor Whitman and representatives of the State Grange, the Farm Bureau, the State Colleges of Forestry and the Conservation Commissioner, to discuss ways and means of saving more than a million tons of coal by the substitution of wood. In this connection an experiment recently worked out by Professor Mandenburg, forestry specialist of the Michigan Agricultural College, in conjunction with the agricultural agent of the G. R. & I. Railway Co. will prove of interest. It was demonstrated by these gentlemen that there was a large demand for stump wood in the larger cities of Michigan, especially Grand Rapids and Detroit, and that $2.15 per cord was offered for it by the dealers; that about three dollars' worth of dynamite would blast out and break up stumps containing an average of eight cords of wood.

There are many advantages connected with this idea. Merely cutting down trees and using the wood for fuel may take care of a present pressing need, but the practice represents an economic loss in the end; whereas clearing stump land represents an economic gain, because after the wood is burned there still remains the virgin farm land to be used in increasing the Nation's food products.

Using stump wood for fuel not only conserves coal but it relieves freight congestion and releases many cars at present employed in the hauling of coal. True, some of the stump wood would have to be hauled by rail, but such haulage would be purely local and probably most of it would be by team haul, whereas coal shipments frequently have to traverse several states.

The New York conferees estimated that the cutting of one cord of wood from each acre of farm lots in New York State would in itself save 1,125,000 tons of coal. If coal could be saved proportionately in other states, it can readily be seen that the coal conservation would foot up an immense aggregate and that railroad equipment that could be used for other purposes would be released to the extent of thousands of cars and many locomotives.

Library of Congress Wants Back Number of "Coal Age"

Any reader of *Coal Age* who has a complete copy of the Feb. 24, 1917, issue of this paper that he can part with, is urged to send it to Herbert Putnam, Librarian of Congress, Washington, D. C. The National Library desires to complete its files of our publication, and we are now out of print on this particular number.

Anthracite Coal Stripping—III

By THOMAS F. KENNEDY
Scranton, Penn.

SYNOPSIS — *The economic limits of the stripping are or should be systematically staked out in such a way as to facilitate cross-sectioning. Railroads, streams and certain other features on the surface must be amply protected from subsidence.*

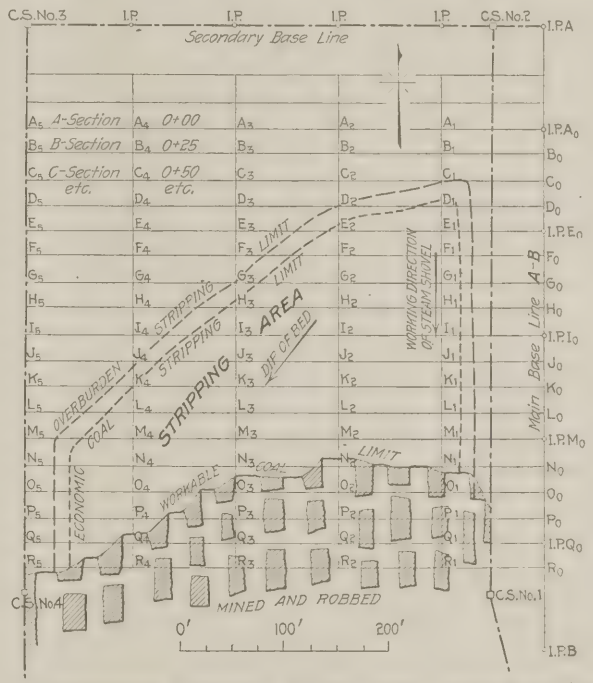
HAVING established the economic stripping limit upon the plan, the next step in the problem is the staking out of the overburden limit upon the surface. Before the stakes can be set, several questions must be considered and definitely decided. The most important one is the method of the removal of the overburden. The nature of the overburden, the strike, pitch, drainage, topographic conditions, etc., must be studied thoroughly from the plan and cross-sections. If a steam shovel is to be used, the approximate path of the shovel should be traced by the engineer from the beginning of the removal of the overburden to the last cut upon the proposed stripping area.

To explain more clearly the establishing of the overburden limit, reference is made to a typical example shown on this page. Studying the plan, the working direction of the steam shovel is seen to be north and south. The primary, or main, base line is run approximately parallel to the path of the steam shovel; and a secondary line, used as a reference line, may be laid out perpendicular to the main base line. Assuming cut-stones of the property are upon the surface, the stripping limit is roughly laid out upon the ground, by a few stakes. The placing of these stakes gives the transitman in charge an idea of how far beyond the stripping limits the elevations should be taken. Referring to the diagram, it can be seen the east property line is practically parallel to the path of the steam shovel. The main base line *AB* is laid out as follows:

Set up the transit on the northeast cut-stone No. 2, backsight on the southeast cut-stone No. 1, turn an angle of 90 deg. east and set the iron pin *A* (1 in. in diameter and 3 ft. long) 50 or 100 ft. from cut-stone No. 2, the distance depending upon the topography of the surface. The transit is then set up on the iron pin *A*, backsighted on northeast cut-stone No. 2 and a 90-deg. angle turned to lay out the main base line *AB*, placing an iron pin every 100 ft., so that the line will be long enough to be used as a working basis for cross-sectioning the proposed stripping area.

The cross-section interval may be 20, 25 or 27 ft. The 20-ft. cross-sections develop comparatively accurate results, but necessitate more field and office work than the 25- or 27-ft. intervals. The 25-ft. sections produce practical results, with speed in the field and a reasonable amount of work in the office, while the 27-ft. cross-sections entail a large amount of computation in the field but facilitate calculations in the office. The 25-ft. cross-sections, which seem to be the most practical method in use, is preferred by the writer. Referring to the plan, stout oak stakes, 1½ in. square by 2½ ft. long, should be driven on the main base line every 25 ft. and lettered as shown. The cross-sectioning of the stripping area perpendicular to the path of the steam shovel furnishes more sections for monthly estimates of overburden removal than sections run parallel to the working direction of the shovel.

In marking the stakes there are several methods which give the required results, but a system should be used so that the work is reduced to a minimum. A method in practical use will be described briefly. The first section is known as the *A* section, or 0+00. Starting with the main base line *AB*, the first point and each succeeding 100-ft. point upon the cross-section is lettered A_0, A_1, A_2, etc. The second section is known as the *B* section, or 0+25. The 100-ft. points upon the section are lettered B_0, B_1, B_2, etc. The same principle



PLAN SHOWING METHOD OF STAKING OUT ECONOMIC COAL-STRIPPING LIMIT

applies to all the succeeding sections, and if the alphabet is exhausted, 1-*A*, 1-*B*, 1-*C*, etc., should be used. Each 100-ft. stake upon each section should be marked properly with blue keel, indicating the letter with its proper subscript.

In this system of marking stakes there are several advantages which will be discussed briefly. A point on any section is located with respect to the main base line and to the *A* or zero section. This being the case, the amount of descriptive matter marked upon the stake should be reduced to a minimum. The letter locates the cross-section from the zero cross-section, and the subscript locates the point upon the cross-section, from the main base line. The simplicity of using one letter with subscript enables the transitman to locate easily any point to the right or left of the stake upon the section. The fact that one letter is common throughout the section lessens the work in keeping notes. It does away

with the numbering of the section and distance from main base line upon the stake.

When all the stakes are placed upon the cross-section lines, the marking of the stakes should be checked and any errors in turning angles should be corrected. A spirit level should be used in taking elevations upon the breaks, which are located from each lettered stake by stretching a 100-ft. tape between the stakes. The nearest tenth in recording elevations upon the surface is close enough for practical purposes, while the thousandth of a foot should be considered in turning points and bench marks. Permanent bench marks should be established around the stripping so as to save time in field work when stripping operations and estimates are under way. The elevations should be plotted to a scale of 1 in. = 10 ft., vertical and horizontal, on a roll of cross-section paper, which will be described later.

The main base line and cross-section lines are plotted upon the stripping plan and the actual work of locating, or staking out the economic stripping limit upon the surface begins. The location of the overburden stripping limit depends upon the thickness of the overburden and the nature of the material which fixes the slope of the overburden excavation. By studying the map, the intersection, point *Z*, of section line *G* with the coal stripping limit line is determined by scaling the distance along the section line from a certain known lettered point *G*, upon the plan, and is located upon the surface by applying the scaled distance along the same section *G*, from the stake marked G_2. Other points upon the coal stripping limit are located in a similar manner.

Only Overburden Limit Is Staked

Knowing the thickness of the overburden and the desired slope of the overburden excavation, the overburden stripping limit is located upon the surface by computing the horizontal distance from the coal stripping limit. The overburden stripping limit is the only limit necessary to stake out upon the surface. Oak stakes 2 in. square and 3½ ft. long driven parallel to the direction of the slope of excavation should be placed about 50 ft. apart upon the overburden stripping limit line. The stakes should be painted red to distinguish them from other stakes and should project about 1½ ft. above the surface.

When the economic stripping limit is to be staked out upon the surface, property lines, railroad tracks and other surface not to be disturbed should be taken into consideration in keeping the excavation line a safe distance away from the foregoing features, so that slides, pulling in adjoining properties, railroads, etc., cannot occur.

The nature of the overburden generally fixes the distance. In case of clay overburden, the safe distance, in most instances, is the thickness of the overburden in the locality of the feature not to be disturbed, while with a rock overburden, about one-half of the overburden thickness is the limiting distance. Each problem has its own peculiar characteristics in arriving at the above solution.

Photographs are herewith presented showing the many features on the surface that must be protected. Fig. 1 shows a portion of a stripping adjacent to a cemetery, which is protected by an embankment about 20 ft. in width, with a slope toward the stripping proper. The overburden consists of about 15 ft. of clay with about 15 ft. of solid rock. This embankment left in place prevents any sliding of the cemetery surface into the stripping.

In Fig. 2, the high clay bank left in place in the distance protects an adjoining railroad from undergoing any disturbance. The overburden consists of 35 ft. of tough gumbo clay, while the railroad is located about 30 ft. from the edge of the overburden excavation.

Referring to Fig. 3, the bed of a creek and its protective embankment are seen in the foreground, with the stripping about 40 ft. away in the distance. The bottom of the creek is about 14 ft. from the surface, but the barrier in this case was increased in width, to prevent any leakage of water into the stripping. The overburden consists of 30 ft. of clay.



FIGS. 1 TO 3. KIND OF SURFACE THAT MUST BE PROTECTED

Fig. 1—Portion of stripping adjacent to cemetery, protected by an embankment to prevent cemetery surface from sliding into the stripping. Fig. 2—High clay bank in background protects adjoining railroad. Fig. 3—Bed of creek and its protective embankment in foreground; stripping about 40 ft. distant.

This phase of the stripping problem is very important, and if disturbances to adjoining properties occur, the operators of the strippings are liable to damages.

(To be continued)

Electric Lamps in Nongaseous Mines*

By GEORGE H. DEIKE
Pittsburgh, Penn.

SYNOPSIS — *With water tunnels, copper and salt mines developing explosive qualities, who is going to define any mines as unquestionably nongaseous? Mine-safety and sanitary reasons for installing electric lamps in all mines, gaseous and nongaseous, and two additional reasons to clinch the argument in case of gaseous mines. According to the author, fussing with oil and carbide lamps consumes 30 to 55 min. per shift and reduces the loader's output 35 per cent. Insurance earnings on electric lamps will pay about 18 per cent. on the money invested in them. Electric lamps cost roughly a half less to maintain than oil or carbide lamps.*

THE attribute "nongaseous" as applied to a mine is a time-honored and battle-scarred expression. As a safety engineer with several years of experience I have been led to the conclusion that no underground operation should be designated "nongaseous." To do so would be to forecast the future of the operation and to base it upon the past record of those particular workings.

By several gas explosions occurring in mining operations that supposedly were quite unlikely to encounter gas accumulations, we have, during the past 12 months, been forcibly reminded of our inability to classify mines as gaseous and nongaseous. Among these might be mentioned the gas explosion in the water tunnel being built under Lake Erie for the city of Cleveland, the gas explosion in a copper mine in Michigan and the more recent gas explosion in a shaft near Ithaca, N. Y., which was being sunk to a bed of rock salt. If operations of this character are to come under gaseous operations, previous classifications must be revised.

The accident in the Cleveland water tunnel occurred when a blower of gas was encountered at the face of the workings about 120 ft. below the water surface and 60 ft. below the bed of the lake, at a point about five miles from shore, 23 men losing their lives as a result. After this explosion a safety engineer and three certificated firebosses were placed in charge of the work, permissible electric cap lamps were installed, and the remaining 1400 ft. to connect the two tunnels was completed without further difficulty.

The Michigan explosion occurred early this year in an old copper mine which was being pumped out and reopened. The workmen were using carbide lamps when explosive gas (methane) was encountered, resulting in a severe explosion and the loss of two lives. The work of reopening this mine was subsequently completed by the light of electric cap lamps, Koehler safety lamps being used for gas in testing. This is a forceful example of the unexpected occurrence of explosive gas in a metal mine.

The explosion in the shaft near Ithaca, N. Y., resulted from gas accumulations encountered at a depth of about 830 ft. The bed of rock salt, to which they are sinking, lies at a depth of about 1600 ft. This shaft was within 200 ft. of Lake Cayuga, and yet the intervening rock was so impervious that there was absolutely no seepage and in order to operate the rock drills it was necessary to pipe water down from the surface to the foot of the shaft. After the explosion firebosses were employed and a complete equipment of permissible electric cap lamps was installed so that the work of sinking could be carried on in safety.

In all three cases no one expected to encounter gas, and at the time the accidents occurred there was no one in charge who had the knowledge necessary to take care of it. These operations belong to such a category that the public and managers do not give the subject of the presence of gas even a passing thought. No mines or tunnels of the character named are anywhere labelled "gaseous," yet outbursts of like character have occurred in such workings before.

In a communication from Frank Haas, consulting engineer, Consolidation Coal Co., Fairmont, W. Va., he says: "The finding of gas in salt developments is not, however, an unusual occurrence, as they have invariably had considerable trouble from this source in the salt mines of Germany. We also find similar conditions in the clay mines of Ohio, also in limestone quarries, and in such shallow operations as cisterns in northern Ohio."

Must Revise Definition of Gaseous Mine

The possibilities of gas emanation having been brought to our attention by the unfortunate accidents already referred to, it becomes necessary for us to revise somewhat the definition of a gaseous mine. That definition is indicated by the fact that in all the accidents enumerated the gas found was pure methane. Chemical analysis proved that no other hydrocarbons were present. Gas will be found in pervious strata wherever there has been decomposition of carbonaceous material in the vicinity. To make such a pervious bed a reservoir for gas accumulations only requires the presence of overlying impervious strata. A condition such as this may exist in strata far removed from any coal measures.

In coal-mining operations coal seams usually act as reservoirs for gas. When the coal seam is below water level the gas is retained in the crevices of the coal. An impervious rock stratum will prevent the escape of the gases even when the coal seam is above water level. Gaseous conditions may likewise be found in metal mines or in any underground operation if a carbonaceous stratum or any carbonaceous material is present, and if a porous or open container and some nonporous overlying strata are conveniently located. The fact that gas is encountered more often in coal mines than in metal mines or other operations does not indicate that the gas always comes from the coal itself. The coal, owing to its open character, can readily become a reservoir for the gases that originate in the carbonaceous

*Abstract of article read at the New York meeting of the National Safety Council, Sept. 10-14. As delivered the title was "Advantages in Use of Permissible Electric Lamps in Nongaseous Mines."

shales usually found in close proximity to the coal seams. The Bureau of Mines has approved six electric lamps for use in mine workings. Among these is the Edison electric cap lamp. During the 2½ years since this approval was granted over 90,000 of these Edison cap lamps have been put in operation. These lamps replace about equally flame safety lamps and open lights.

The main advantages of the electric cap lamp as regards safety and sanitation may be enumerated as follows: (1) Reduction of gas-explosion hazard; (2) reduction of hazard of gas burns; (3) reduction of mine-fire hazard; (4) reduction of the number of accidents from falls of roof, rock, ore, etc., owing to the illumination being more uniform and adequate than with some illuminants; (5) reduction of the number of haulage accidents owing to the illumination being more dependable; (6) reduction in the number of accidents in the handling of explosives; (7) reduction in the fire risk in breakers, tipples and headframes; (8) increase of opportunity to escape following explosions or heavy falls; (9) elimination of the burns caused by open lights; (10) elimination of nystagmus or eye strain; (11) reduction in miners' asthma and tuberculosis.

It will be noted that this list of advantages except the first two items applies to *all* underground operations. The first two are applicable only to mining operations in which explosive gas occurs, though we must all acknowledge our inability to determine in advance the possibility that explosive gas will occur in any underground operation.

Open Lights Responsible for Many Accidents

In reference to the advantages outlined the following brief remarks may be made. Statistics show that about 85 per cent. of all gas explosions are started by open lights. Thousands of miners burned by gas every year are object lessons of the danger of the open light.

The great loss of life and destruction of property at the Cherry mine fire, at Cherry, Ill., in November, 1908, resulting from an open-flame torch coming in contact with inflammable material, well exhibits the importance of using lamps which will not ignite inflammable material. The fire in a metal mine near Butte, Mont., also proclaims the same lesson. At this mine 168 men were suffocated in the fire which resulted when an open lamp came in contact with the insulating material of a torn electric cable.

In regard to the reduction of accidents by falls of roof and coal it may be said that one large coal-mining company furnishes data that indicate a reduction in accidents of 41 per cent. from the above causes during the first year electric cap lamps were in service.

With reference to the hazard of haulage accidents it may be said that many hazards of haulage are really hazards of inefficient illumination. A man loses his light from one of several causes and as a result he is run down by a trip, is caught between cars and crushed or is crowded between the cars and the ribs or the roof. Again, high-velocity air currents, windy shots, bumps and concussions often leave not only the driver, motorman and triprider in the dark, but the miner likewise. The light from an electric cap lamp which is not extinguished by any of these causes will protect the mine worker from the hazards resulting from an extinguished lamp.

After many of the great mine explosions in this country, many lives have been lost owing to the fact that all lights were extinguished or blown away by the force of the explosion, and the surviving miners had no light by which to direct their escape from the deadly afterdamp. When equipped with permissible electric lamps the entombed men have a chance of escape as long as they have their lights with them. This fact was practically demonstrated in an Alabama mine in 1914, when men wearing electric cap lamps were able to escape following an explosion. Other men wearing open lights in the same section of the mine were lost, owing to their lights being extinguished.

The open-flame lamp, either of the oil-burning or the carbide type, requires frequent attention and adjustment throughout each shift in order to keep anything like a regular length of flame and to provide the lamp founts with oil or carbide and water. From tests made in practical experience it is found that from 35 to 55 min. is required by each employee in each eight-hour shift to keep his open-flame lamp adjusted, and even with such time-consuming attention the variation in candle power was so large as to greatly reduce the efficiency of the workmen.

Use of Electric Lamps Increases Output

Where permissible electric lamps have been in continuous daily service for a period of 30 months a greatly increased tonnage per miner is obtained which is rightfully attributed to the better illumination. The increased tonnage from this cause has been estimated at 35 per cent. In these days, when the shortage of labor is reducing the mine output materially, any change of equipment which will permit the daymen to save 30 to 55 min. per shift and which will increase the loader's output 35 per cent. should be adopted as quickly as possible.

To measure the time saved with electric lamps we have but to follow through the operation of a working shift. The mine worker calls at the lamphouse and is handed his complete lamp, locked, fully charged and burning. He places the battery on his belt and the lamp on his cap, and enters the mine to his place of working. The light is sufficient for all working purposes, properly and equally distributed, and does not change in intensity, so that his work proceeds without any interruption from that score, and he completes his shift without the necessity of giving any thought or attention to his lamp. After the day's work is completed he returns his outfit to the lamphouse to be recharged overnight. He had handled his lamp only twice during the day, to put it on and to take it off at the lamp shanty. From the standpoint of efficiency such a procedure cannot be surpassed.

The maintenance of oil and carbide lamps costs from 6 to 7c. per shift. Where sperm candles are used the cost per shift is approximately 7 to 8c. Locally these figures may be exceeded owing to unfavorable conditions. From detailed reports of two years of operation it is shown that the average cost of operating electric cap lamps does not exceed 3½ to 5c. per shift. In these figures is included the original cost of the installation, all repairs, the interest on the investment and other charges. This shows a saving of from 1 to 3c. a lamp per shift to the party who pays the bill, and the savings

accumulated will quickly mount to a convincing sum. Where the standards of the Associated Companies have been adopted the installation of safety devices of all kinds put into effect preferential rate discounts on premiums paid for workmen's compensation insurance. The insurance saving obtained by introducing permissible electric cap lamps into a mine represents a saving of about 18 per cent. on the original investment. The reduction in the premium per $100 of payroll for permissible electric cap lamps in cents is as follows:

Coal Field	Nongaseous Mines	Gaseous Mines	Coal Field	Nongaseous Mines	Gaseous Mines
Anthracite:			Bituminous:		
Pennsylvania...	11	17.5	Indiana.....	11	15
Bituminous:			Colorado.....	13	22
Pennsylvania...	11	14	Kansas.....	10	12
Illinois.....	13	17	Iowa.....	13	15

This schedule applies only to coal-mine operations.

Northeastern Pennsylvania Engineers Have Big Banquet

SPECIAL CORRESPONDENCE

The Engineers Society of Northeastern Pennsylvania met at the Hotel Jermyn, Scranton, Penn., under the shadow of the recent order of the Fuel Administration for restricting national industry. The talk in the foyer was all about the national holiday of five consecutive days and of the nine blue Mondays to follow. None seemed to be impressed with the necessity for the Garfield sabbaths. Certainly it seemed that it was ill advised to apply such an order to Scranton, where the coal comes in by wagon or motor truck, and where the railroads do not handle the coal that is consumed locally.

There is no lack of coal, so why restrain, argued the guests, the production of manufactured articles? If the railroads can't handle that product, then let it remain on the premises; if the manufacturer can't run unless he receives raw materials by railroad, or is unable to store his product, then and then only let the plant shut down; but it is unnecessary to close the plant to save the railroads from a glut of transportation when the plants can be run without using that transportation in any way whatever. Nor is it necessary for anybody in offices to go cold when there are men to mine and clean coal, and inadequate facilities for the shipment of the coal by railroad, and where there is ample opportunity to "motor-truck" coal to the office buildings.

The Delaware & Hudson Co.'s mines were complaining of an entirely inadequate car supply. The management is piling coal on the ground in the hope that the railroads would some day be able to furnish the mines with adequate transportation, though the date seemed far off and the prospect doubtful. This reloading will cause mechanical, labor and degradation losses, but the Delaware & Hudson was prepared to risk these for the public advantage, and in order to prevent their men from leaving for other mines and industries. The manufacturers should be allowed to make and store up manufactured articles in the same way in which the D. & H. is allowed to store up coal.

It seemed to many that companies with stocks of coal might just as well work full force till their coal was depleted or their storage rooms glutted. It might be well, they argued, to refuse to replenish the stocks of fuel of the manufacturer till the greater needs of others were filled. But to make them hold the coal needlessly was held to be unjustifiable. If they have more than they should have, then perhaps it could be reasonably taken from them by wagon or motor—not of course by railroad. To forbid them and everybody else the use of that coal for five or more days did not commend itself to the public as a politic course.

There was our friend Hamilton from Carbondale, Penn., with orders for colliery stacks and colliery screens. He rightly said that the mines must get that material from somewhere, or the coal production would not be forthcoming when it was needed. Much of his manufactured material can go out by motor truck or by wagon; all his coal is brought in from a culm dump in like manner. Why, then, close his plant down when it has no relation in much of its product or its fuel to the plight of the railroads? Why not let him work while he can?

Rufus J. Foster said the International Correspondence School was printing courses for men in the army, using for power mainly exhaust steam from a public service corporation. Surely it is better to work than to waste the low-pressure steam, which the corporation is not equipped to use, and as senseless to make restrictions of this kind as it is to require a lightless night in a town with an excess of electric power derived from a head of water.

Of course, the coal men lacked no word of loyalty. In fact loyalty was the keynote of the objection. When they felt their ability to help, it hurt to have their opportunity thwarted by an order which did not give due consideration to all the elements in the problem.

In view of the intense interest manifested in the conversation of the foyer, it seemed a pity that a clearing of the decks could not be made for a heart-to-heart discussion of the whole subject. Of course, there were side lines into which the discussion drifted. Most of the coal offices around the country, it was said, would have to be closed during the enforced Monday vacations, but as most of the executives in the anthracite region are quartered in railroad buildings the restrictions do not promise to keep the rooms of the coal companies in a state of frigid discomfort.

The menu at the banquet consisted of the following:

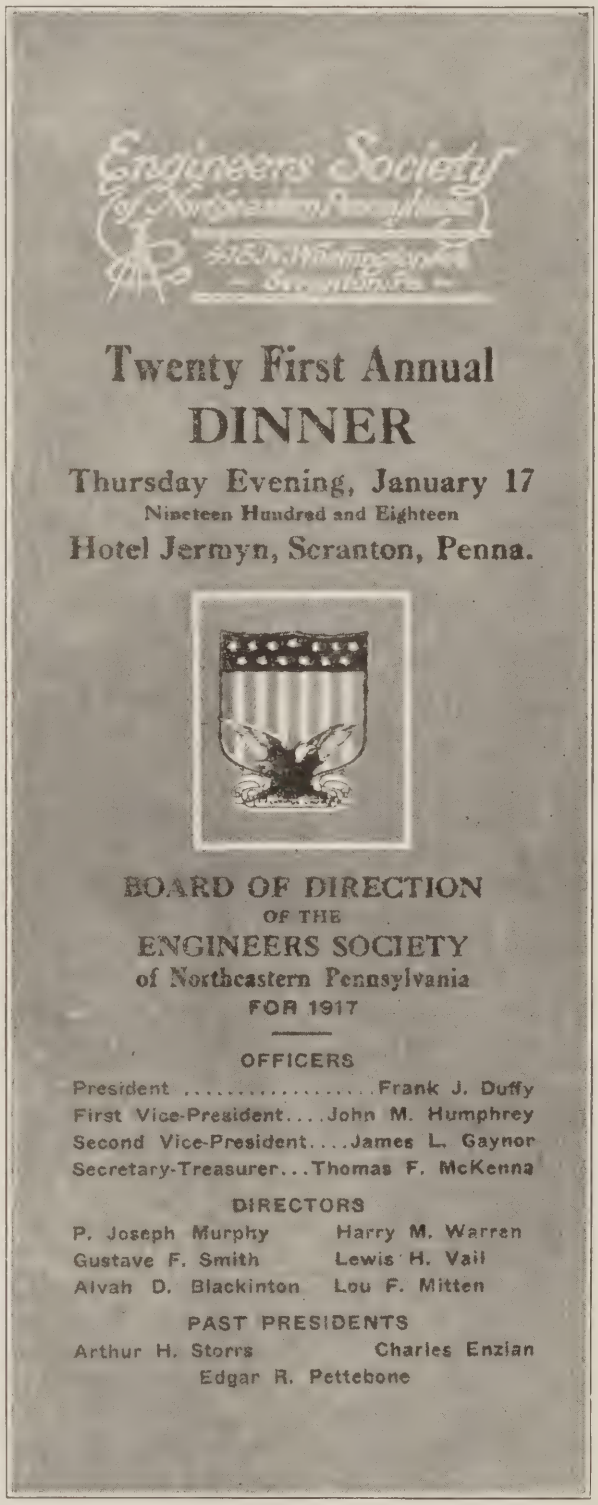
	Calories		Calories
Blue Point cocktail.....	50	Individual tenderloin	350
Celery	10	Mashed potatoes	100
Olives	10	French peas	75
Radishes	10	Neapolitan ice cream.....	200
Vegetable soup	75	Fancy cakes	150
Dinner rolls	150	Coffee	25
Butter	100		
Boiled halibut	125	Total	1530
Lemon butter	100		

E. S. N. P. General Orders No. 1—Penalty for exceeding the above-mentioned calorie equivalent, one year in the guardhouse. E. S. N. P. No. 2—Penalty for not fully utilizing the above-mentioned calorie equivalent, malnutrition and slow starvation.

Peter Rimmer, genial master of ceremonies, had registered a vow to make it an "eatless" banquet as far as he himself was concerned, and he nearly succeeded in separating the other guests from their meal by his energetic and megaphonic encouragement to them to "Sing, sing, sing." And sing they did, though the Canadian anthem troubled them not a little. Lieutenant Colonel Powers laughingly said it was "damnably sung," but then he added: "It was your enthusiasm ran away with you. You were just two bars ahead of the music." It was a lively "jazz band" from Wilkes-Barre that fur-

nished the music. They kept up the spirits of the banqueters and made so much noise that you couldn't hear yourself eat.

The following officers were named for the coming year: Malcom E. Walthall, president; H. A. Smith and Hugh A. Dawson, vice presidents; T. F. McKenna, secretary and treasurer. After toasts to the President and the Allies, Lieut. Col. T. E. Powers, with apologies for speaking on a military subject, discussed the work of the Royal Canadian Engineers. He said that the British army did not favor deep dugouts, the entrances to which could readily be bombed and the occupants smothered. Instead they cut slit trenches off the communication trenches long enough to hold a dozen men. When it was necessary to retire from the main trench of the front line, as was often the case, the slit trench was the place chosen for refuge. As soon as the bombardment ceased the men could resume their positions in the main trench and repel invaders. The speaker said the Germans today were using immense entanglements of barbed wire, three lines of wire each 33 ft. wide being placed in front of the trenches. The British lines are not so liberally protected, as an army's entanglements prevent its own advance as well as the advance of the enemy, and the British are always anticipating a forward movement of the troops. Dr. W. P. Mason, professor of chemistry, Rensselaer Institute, Troy, N. Y., described an explosion of a septic tank having 4 compartments 90 ft. square. The roof lifted was 12 in. thick and was composed of reinforced concrete. Dr. Mason said the methane given off by the sewage was undoubtedly the cause of the explosion, but he questioned how it was ignited. The caretaker had been over the tanks just before the explosion, but he was telephoning at a distant point when the tank let go. So he could not have been the cause of the ignition.



Dr. Mason said that bubbles of phosphine (PH_3) often escaped from sewage, and on reaching the surface they would automatically burst into flame. It is true that phosphine is not spontaneously inflammable, but P_2H_4 is. This liquid hydride is always formed and is thrown into the air with the phosphine. The processes which form ammonia (NH_3) are quite apt to forms its analogue, PH_3, not much, it is true, but enough to start an explosion of methane and air. The solution given is one little comforting to mining engineers as it is just possible that phosphine might be formed in the mines; if not from coal, at least from sewage. Maj. M. S. Boehm, of the 169th Battalion, Canadian Infantry, was the principal speaker in the evening. His forbears came from Lancaster County, Pennsylvania. Major Boehm exhibited some marvelous pictures taken by the Canadian Government of the fighting at the front, showing barrages, and men going over the top, and distressing pictures of "No Man's Land," ruined towns and desecrated cemeteries. Major Boehm said that the Canadian troops did not believe they had in any way excelled their British fellow soldiers. He declared the stories that it was Canada that was doing the fighting and that Great Britain was hanging back were German propaganda and deserved vigorous denial. His remarks on the coal being shipped from the anthracite region received lengthy editorial comment last week. As Major Boehm's address was important and well received, a few of his statements may be repeated. He said:

One of the questions I am frequently asked is when will the war be over? I would not be foolish enough to give the question an official answer. Personally I think the end is not in sight. As far as I have gathered from observation and reading, there is no evidence that the war is approaching an end.

Another question also that is directed at me is as to whether the Germans realize that they cannot win. They do not realize it. They are out to win and they hope to win, and we must make sacrifices such as the German people are making if we hope to win the war. The Germans now possess twice as much territory as they had when the war began. Figuratively speaking, not a shot has been fired on German soil during the war. There will come a day when Germany will begin to realize that she cannot win the war, but even then she will go on fighting.

Germany looks back at 1917 and sees Russia out of the war and Italy not yet recovered from the staggering blow

delivered by the invaders. She recalls that Belgium, Rumania, Poland and Serbia have fallen into her hands. So she has every reason to believe that she can win. The only reason we say Germany can't win is because *we* do not dare to lose.

This great nation is getting into the war in the proper spirit. It is spending thousands of millions of dollars for training purposes, for armies and strengthening the navy. But the war is in Flanders and your men are here. How are you going to get your men to Flanders? Do you know that it would take three years to carry across the ocean an army of 1,500,000 men if a boatload of soldiers was sent across every day?

It seems to me that the one thing essential right now is the building of ships. Work the shipyards 24 hours a day, with the maximum amount of men, and then triple your shipyards. There is a crucial situation here. I have never seen a better bunch of men than the soldiers you now have in training. But the place to fight the burglar is on the lawn before he breaks into the house, and the war is being fought in Flanders. You must arrange to get them there."

Major Boehm read a letter from Charles F. Winter, Minister of Militia and Defense in Canada, in which the writer said that up to Sept. 30, 1917, out of a population of about 6¾ million, 333,313 men had been sent overseas to take part in the war.

The casualties to the same date were: Killed in action or died of wounds received in action with the enemy or "presumed dead," 31,394 of all ranks; in addition, died of disease, 1514; wounded, 87,657; missing, 1298; prisoners of war (Major Boehm said most of these were men gassed at Ypres), 2580. The total casualties up to Sept. 30, were 124,443. The total number of recruits in the Canadian Expeditionary forces who gave their birthplace as the United States or claimed to be American citizens living in Canada was, to the same date, 7793.

The total contributions in Canada to the Canadian Patriotic Fund up to Oct. 30, was $30,863,338.58. This shows how Canada is dedicating herself to the war. Only 250,000 of the 333,313 men reached the front, as many under trial were found unfit. Almost half of the acceptable men have since appeared on the casualty lists. It is interesting to add that 430,000 men volunteered, or one man in every fifteen. It will be noted how small is the record percentage of non-Canadian soldiers enlisted in the forces of the Expeditionary Force.

It may be added that 37 members of the Engineers' Society of Northeastern Pennsylvania are now in the United States service, the outgoing president, Frank J. Duffy, being now at Fort Hancock, Georgia.

Rocky Mountain Coal Mining Institute To Resume Activities

At the last meeting of the Institute, which was held June 18, 19 and 20, 1917, at Glenwood Springs, Colo., it was decided to postpone any future meetings indefinitely during the continuance of the war, unless the Board of Directors should decide that it is to the best interest of the association and its members to call a meeting at an earlier date.

It now appears that practically all the large scientific and engineering societies are continuing to hold their meetings, as many subjects are coming up that require discussion, and the Rocky Mountain Coal Mining Institute has placed the matter of resuming its activities before the Executive Committee. That body will submit a report in a short time, and the Institute membership will receive due and timely notice thereof.

"Coal Age" Indexes Now Ready

Indexes to *Coal Age* are furnished free to all who ask for them. The index for the last half of 1917 can now be obtained by addressing a request for one to the subscription department of *Coal Age*, New York City.

American Coal Trade Shows Increase

Out of a total of 1,024,487 tons of coal imported into Brazil during 1916, the United States supplied 814,212 tons, the remainder being furnished by Great Britian. Since the outbreak of the European war and the British trade restrictions on Welsh coal, which formerly monopolized this market, American coal has gradually been finding a foothold in Brazil. This remarkable increase in the coal trade with the United States, however, must be attributed almost entirely to the abnormal war conditions. American coal interests have failed to follow their British competitors in establishing local coal deposits, or yards, and have sold their coal in lots of almost any size for ready money whenever the occasion arose. With such methods as these the business will probably not have a very permanent foothold when the British restrictions are relieved.

Some Do and Some Don't

By H. S. Salmon
Chief Mine Inspector, Tennessee Coal, Iron and Railroad Co., Bessemer, Ala.

"There's miners an' miners," sez Foreman Bill,
As he tamped tobacco in his old corn cob.
"There's them that won't an' them that will,
An' ye'll find both kinds on this here job.
Ye'll wanta know, if ye're a thinkin' man,
Jest what I means by the "will and won't."—
An American miner helps all he can,
An' a lazy, shackin' slacker don't.

"A dog-gone slacker—dern his hide,
'U'd look like a German if ye saw inside,
Fer he won't work reg'lar fer anyone,
An' our boys can't fight ef the mines don't run.
Whenever he lays out of his place fer a day,
The Kaiser rests easy when he hits the hay.
They're careless, too, when they do make a shift,
An' if one gets hurt that's a heap of a lift
Toward helpin' the Germans hold their line;
But a miner that's up in the hospital won't
Help us much toward crossin' the Rhine.
Do you see what I mean by "Some do an' some don't"?

"An American miner ye'll find true blue,
Ef ye cut him open an' look him through.
He'll work every day to get out the stuff
To help our boys call the Kaiser's bluff.
He knows when he shacks without any cause,
That the Huns take a drink to him in applause.
He watches close that a rock don't drop
An' send him up with the slackers on top;
Fer he's down there with his shovel an' drill,
Doing what a slacker could be doing but won't.
He is the man who can help win and will.
Now you see what I mean by "Some do and some don't."

Nineteen thousand acres of land in the Nenana coal field of Alaska have been divided into blocks and will be offered for lease by the Interior Department in the near future. That portion of the field which is the more accessible has been surveyed and divided into leasing units. These units which range from 160 to 1664 acres have been arranged, it is believed, to permit of the most economical mining.



Reclaiming the Culm Pile

By G. D. EVANS
Pottsville, Penn.

SYNOPSIS — *Considered an eyesore and of no value whatever as marketable fuel, the many culm banks in the anthracite fields are now being sent to market. A brief description is given of one of the many plants that are now shipping this product.*

NO LESS than 15 per cent. of the anthracite coal going to market today is being recovered from culm banks. In years gone by the visitor to the anthracite coal fields, on noticing these huge, unsightly black heaps, would question whether they ever would be used. Usually, the answer was, "Probably some time." This time has now come, and these culm piles, great and small, which for years have been eyesores to the communities resting within their shadows, are the source of much of the power and energy of the country. Were it not for the coal being recovered from these banks, the present coal shortage would be even more serious than it is.

Until a few years ago, the prices for the steam sizes of anthracite were so low that these sizes were regarded by the coal companies merely as a byproduct. They were shipped to market only because the coal had to be handled in the breaker with the prepared sizes, and it paid better to ship them at almost any price than to store them. At times, there was positively no market for No. 2 and No. 3 buckwheat, and therefore hauling away from the breaker and storing became necessary.

Some years ago, the companies began to turn their attention to the banks which had been dumped in the early days of mining at points handy for loading and transporting to an operating breaker. By means of this extra coal handled at a low cost per ton, breakers at mines which had fallen off in production of fresh-mined coal were kept running at full capacity.

When, a couple of years ago, the demand for steam sizes began to grow in leaps and bounds and to set a price for these sizes which made it possible to prepare them at a fair profit, corporations and individuals began to turn their attention to the banks. Washeries began to spring up wherever there was a bank large enough to warrant the erection of an operation. Now some washeries are shipping 50 tons a day, and others are producing as much as 2000 tons in a day. Many banks are being loaded into railroad cars and shipped without any preparation, though most of this coal is mixed with run-of-mine bituminous for steaming purposes.

There is an idea prevailing that this bank coal, having been released from its natural bed underground and deposited for years on the surface, has deteriorated in heat value; but analyses show practically no loss in fixed carbon or B.t.u.'s. If prepared with the same care as fresh-mined coal, its heat value is essentially the same.

One of the largest shippers in the anthracite field, producing bank coal only, is the Ashton Washery of the Lehigh Coal and Navigation Co., near Lansford, Penn. This plant was built for a daily production of 1200 tons and has shipped as much as 58 cars, or 2300 tons,

a day. It is equipped with the most up-to-date machinery for moving the bank and cleaning the coal, and is sending to market a carefully prepared product.

The bank is loaded into steel dump-cars by two steam shovels, a Marion model 70 and a Bucyrus 70 C with 2¾- and 2-yd. dippers respectively. The dump-cars are Clark Car Co. latest type patent automatic dumps, built by the Cambria Steel Co. They are of standard gage, with a capacity of 810 cu.ft. The leading illustration shows the Bucyrus shovel.

The cars are hauled by two 60-ton locomotives to a point directly back of the center of the breaker, or washery, and the contents dumped into a chute leading to a gunboat pit, as shown in Fig. 2. The material is hoisted by the gunboats up a double-track plane to the tower and dumped into a hopper chute from which it is regularly fed to a bull shaker by means of a drop gate operated by a steam-driven piston.

Operating the gunboats are a pair of 36 x 60-in. Vulcan engines equipped with steam brake, steam reverse and Roybel safety overwind devices. There is also installed a Strong, Carlyle & Hammond emergency throttle closer. The breaker machinery is driven by a pair of 22 x 42-in. engines, connected to the main shaft by a 36-in. belt.

An electric motor is now being installed to take the place of the breaker engines, and an idea of the economy of the proposed change can be obtained from the photograph of the washery partly hidden by the exhaust steam from the breaker engines (see Fig. 3). The methods used in the preparation of the coal are about the same as those adopted at most modern breakers. The washery is equipped with the usual shakers and rolls and 16 jigs of the Elmore and German types. One of the unusual features is the jigging of No. 2 buckwheat or rice coal.



FIG. 3. ASHTON WASHERY, LEHIGH COAL AND NAVIGATION CO., LANSFORD, PENNSYLVANIA

This washery does not handle any fresh-mined product in the material passing over the bull, or lump, shaker; there is therefore only a very small proportion of coal, the little there is being picked from the rock and slate by two men and sent to the main rolls. The



FIG. 2. CLARK CAR CO. AUTOMATIC DUMP CAR, HAULED BY A 60-TON LOCOMOTIVE

rock and slate is allowed to pass on to a rock conveyor line. The broken coal is also picked from the refuse of that size and goes to the rolls, while the rock and slate passes on to the rock line, which empties into a hopper. From the hopper, the rock is loaded into the same make dump-cars used to transfer the material to the breaker and taken by another locomotive to the rock bank.

From the main shaker and rolls, the coal goes through the usual methods of preparation until it reaches the pockets, which, contrary to the customary plan of breaker construction are set parallel with the depth of the breaker, or at right angles to the loading tracks. The coal is carried from each pocket to the railroad car by a single belt conveyor. Thus one car must be completely loaded before another is started. The cars are run to and from the loading point by an endless rope system instead of by the usual gravity method. An idea of the efficiency of this plan can be gained by the fact that 58 cars have been loaded in eight hours.

Minecdotes

Educating a Layman

Jack Richards and Bill Jones were a pair of unregenerate shotfirers in Northwestern Colliery No. 8, at Bevier, Mo. Over at Macon they had a newspaper friend whose lack of knowledge about the underground world was pitiably plain in every mine story he wrote. So they decided to "educate" him. Telephoning him to come over one day to get a big story, they encased him in pit clothes and gave him a lamp that looked like a baby teapot. Two other shotfirers—John Ramsey and Ben Evans—joined them, and the scary-looking cage lowered the five to "somewhere in the bowels of Mother Earth." Along the double-tracked entry the walking was good. The tenderfoot brightened up.

"It ain't so bad," he bragged.

"Huh!" from Jack. By the pit lamp's glow you could see his right eye close and open.

There came a place where Jack turned and went through the solid wall. It looked that way. They said it was a cross-entry. It was a little larger than a cracker box, and had two narrow strands of rail on the bottom of it. The ground began to get moist. The tenderfoot remembered bitterly ten cents invested in a shine that day. Soon he had bigger troubles than that. The timbers across the low roof played a rat-a-tat on his skull, no matter how he ducked. There was a black object ahead. Some miner had pushed a carload of coal out in the entry.

"Let's turn around and go back," suggested the tenderfoot.

Jack's face wrinkled with delight. Bill shot himself over the car and bawled to Jack: "Hist him up!"

Jack threw the head end of the visitor on the heaped-up coal car and Bill grabbed his hands. The two of them slid their unhappy friend across the coal. He felt like a mogul engine bumping across a cobble-stone street. There wasn't a spot about him his best friend would have recognized, nor that didn't hurt.

Jack went off into the blackness to one side. Then he came out and the little party continued its course. There was a mighty detonation to the rear, a broad red flash and a crash. With it came a fearful rush of wind that blew out the layman's lamp and sent his hat somewhere.

Meanwhile Bill was darting in and out of the darkness, and in his wake came the boom of the big cartridges and the sudden impact of tornadoes and cyclones.

"Come!" commanded Jack, grasping the tenderfoot's hand. "It's your turn."

They squeezed through between a loaded coal car and the neck of the room, a space so narrow that it would have taxed the skill of a cat, and holding up his pit lamp, Jack pointed to two sinister looking objects that resembled the mustache of a Mongolian pirate. Then he said abruptly:

"Touch your lamp against one of them!"

"Not on your life!" cried the tenderfoot, backing off.

"If you don't, I'll—I'll lose you!"

The threat was effective. The sufferer approached his doom with the same confidence that a woman picks up a garter snake. There was a fizz of tiny stars that follow the ignition of a skyrocket. The tenderfoot made a wild break for liberty and got wedged in between the coal car and the room neck. A free panorama of all the wicked things he'd ever done swept along the black avenue.

"Well, why don't you go through?"

It was Jack sauntering leisurely along behind, careless of the two sputtering fuses in the room. He extricated his companion, who indignantly complained:

"That's the way with you fellows; you stand in front of a cannon till it blows your head off and then you lay it on the company!"

Soon all the shots were fired, and the squad sat down on some timbers to rest until the men who had been on a similar mission to the west joined them. And while waiting they told how Tom Francis, a Welshman, superintendent of the Loomis mine, had stood all night down in the mine with water up to his neck, laying brick across a cave-in, so as to stop an inundation from destroying the mine, and had been given a gold watch and the thanks of the company; how Dave Williams, day engineer, had stayed by his machine with the room burning above and below until every man had been hoisted from the mine; and how in the days of the big strike young Dannie Hughes, night operator, had fingered his instrument and aided the movement of trains all night long despite the crash of glass from rifle balls and the singing of deadly missiles overhead. It was a wonderful story, the story of the mine, as full of courage and of sacrifice as anything that comes from the battle-field.

At last two flickering lights were seen down the dark entry and the shotfirers of the west section came up like shadows and the group meandered to the "bottom," where the cage waited. Jack pulled a cord to one side of the shaft, and presently from somewhere above came two cheery blasts from the whistle and the cage glided upward.

Night had come on and the stars were shining. The layman looked at the dome above with a feeling of relief. Jack waved his hand upward and chuckled:

"No danger of that roof falling."

THE LABOR SITUATION

General Labor Review

The big meeting of mine workers is ended. Its big job was to ratify the Washington agreement, which it did most satisfactorily. There should now be peace in labor circles till after the war, or till 1920, whichever comes first. The opportunity to develop patriotism and exhibit it was, however, the most evident element in the meeting. Perhaps the spirit of nationalism and sacrifice will endure long in the minds and hearts of the participants after the questions regarding the Washington agreement are forgotten. We pass over Howat; surely no one can forget him too soon. He does not in any way represent unionism.

The decision about the Central Competitive Region, apparently reached when the leaders were napping, may be quite important. The mine workers are divided in their opinion about it. That is evident, or they would not have reversed themselves as they did. Perhaps the operators, outside the anthracite region, will be found almost equally divided. The matter does not seem one for bitterness. Only regions with low wage scales, which does not necessarily mean with low wages, need to fear the new arrangement. Really we do not anticipate that in any sections of the country, the operators or the mine workers will try to work an injustice on the operators or the mine workers of any other section. Still every section knows or thinks it knows its own needs and its own woes best. When a vote is cast for unification, the unificators as well as those who are urged into union are apt to suffer from the change.

Labor Hyphenates of Laflin Make Trouble

Strange to say, there has been a strike in the anthracite region at the Keystone colliery of the Traders Coal Co., near Laflin, Luzerne County. Yet it is not so very strange after all. Laflin has been a center of the dual membership, so severely scored at the International meeting. Many men belong not only to the United Mine Workers but also to the International Workers of the World. They are a bad brand of hyphenates.

The trouble started on Jan. 21, and 350 men have been idle for a week. One day an engineer reported late for work, so the men could not be lowered into the mine in the cage in time to start work. The superintendent told the men to go down by the slope. One man is alleged to have become abusive, and he was discharged by the superintendent.

This enraged the employees, who are mostly Italians, and placards were placed at various places by the men, declaring a strike. A grievance committee was sent to the company's office, but the company refused to heed the request for the superintendent's dismissal.

A Talk With the Boss and the Strike Ends

At the Bellevue mine of the Delaware, Lackawanna & Western R.R., coal department, the miners went on strike because they were not paid at the time desired and expected. A vote to return to work was taken at a meeting attended by an official of the company, who made it plain that the employees would be paid in a satisfactory manner. The practice of meeting the men face to face in conclave is a good one and to be commended. When there is as little to complain of, as in this case, it will always cure the difficulty.

The miners in many parts of the country are being induced by the National Railroad Administration to clear the railroad tracks. Just as the miners helped valiantly in the rebuilding of the tracks up Cabin Creek in West Virginia after the great flood so now in the West Virginia coal fields hundreds of miners are helping to remove the snow fall which prevents them from doing their work. They may be asked to do more than this, for there have been washouts along the main line of the Norfolk & Western Ry. and at several other points.

With Howat's promise of a strike, to include many of the mines in the Southwest, troubling us, it is pleasant to turn to the fact that just now almost the only trouble in that region is at the Smith, Scott & White strip-pits, near Cambria, Kan., where the workmen quit on Dec. 29 because of a controversy over the assigning of derrick men to other work because they were regarded as incompetent to fill their jobs.

As usual, Alex Howat says the men are not striking and the matter cannot therefore be settled. There is, from his point of view, nothing to settle. The local union, however, seems to scent that there really is a strike, for it has passed an order that any man who takes the place of the derrick workers pending an adjustment will be fined $35. In all, there are 105 men in the three strip mines, and the production exceeds 900 tons a day when the pits are working.

Kansas is now in the midst of a controversy over the examination and licensing of night firemen, who in practice and under the agreement signed a few months ago may operate the engines at night, and may hoist and lower shotfirers and other workmen when called upon to do so. One of the state inspectors is said to be insisting that these men shall be engineers, though the custom here as elsewhere is to put firemen on the night shift and later advance them to engineers when they receive a license. It is not thought necessary that they shall receive a license for the night turn where the work is not hurried and difficulties are not likely to occur.

The Convention at Indianapolis

The attitude of the mine workers at the Indianapolis Convention is well illustrated by a resolution from Klein, Mont., urging that 25c. a month be collected from the membership in aid of the Red Cross. The resolution did not carry, it is true. The United Mine Workers of America feel that the obligation on them is one which comes to them rather as citizens than as a union, but none the less the 25c. a month, and more than 25c., will doubtless be forthcoming.

Let us not forget to say that though the miners are defending themselves fiercely against being called slackers, they are publishing in their "Daily Convention Reporter" the long list of strikes in Kansas, which show a slack and disloyal spirit. When an organization like the Mine Workers confesses the sins of certain of its members, though few in numbers, it goes a long way toward shriving itself of what sins have been committed. It is a mark of patriotism that it is so ready to point out and make public the errors that are being, and have been, committed by a little band of willful men who are not worthy of membership in this union of patriotic and devoted citizens.

A terrible indictment against Alex. Howat is this long list of strikes permitted during a national crisis. It hardly seems possible, however, that the penalty clause will wipe them out in the future. Patriotic propaganda and patient work on the part of union men is the only thing that will end the disgraceful insurgency of the Southwestern States.

Another answer to those who would say that the union as a whole is unpatriotic was furnished by the vote to pay John P. White his salary of $5000 a year as adviser to Dr. Garfield in the Fuel Administration. It was a clear indorsement of his patriotic support of a policy of conciliation and coal production.

The mine workers voted to condemn House Bill 195, now in Congress, which grants a preferential right to the State of Oklahoma to purchase a coal acreage underlaid with 3,000,000 tons of coal. The mine workers do not object to state ownership, but to the prospect, or rather certainty, that the coal will be mined by convict labor.

On Jan. 21 the most important decision of the convention was made by the assembled delegates. They approved the Washington agreement and so adopted all the wage scales, district and subdistrict, for the period of the war, provided it does not last beyond Apr. 1, 1920. The vote was overwhelming. There never was any real opposition to the Washington agreement, though Howat and a few of his political aides by their activity gave the impression that there was.

Howat's Policies Meet With Disapprobation

During the few weeks preceding the convention Howat wrote acquaintances in various states and told them that his delegation was lined up solidly in opposition to ratification. He guaranteed that he had mustered strength enough to prevent the convention from registering its approval. He held out hopes of benefits to those who would line up with him. He forecasted that by reason of his leadership in defeating the penalty provision he would be able to name the presidential candidate.

But it was not to be. Howat is a broken man. The United Mine Workers are citizens of the United States. Some day Howat will learn that fact. At present he thinks they do not realize there is a war and do not know that they have a duty to perform.

So, from now on, the mine workers and the operators can devote themselves steadily to the mining of coal and not waste time over organization and discussion like a lot of Bolsheviki. Unfortunately the country is so short of locomotives and cars, especially the former, that the mine workers and operators have too many idle days.

Who Shall Make Central Competitive Contracts?

Jan. 22 appeared only less important than the day preceding. However, appearances were deceiving, for by a later vote, on Jan. 26, the work of the day was finally made of no effect. By a vote of 654 in favor and 605 against, the older and cooler heads of the United Mine Workers failed to recommit to a special committee a resolution granting outlying districts representation in the wage conferences of the Central Field. The vote came after two days of debate. The International officials and older heads in the union contended that the amendment was impracticable, for the operators would never consent to meet the men from other districts and have Kansas, for instance, help to decide what Ohio should pay its men.

The resolution was capable of many diverse constructions, but it plainly stated that in no case could the International officials call a wage conference or negotiate a wage scale without having first called into conference the officials of all outlying districts, including the anthracite region. Moreover, provision was made to give the representatives of all the districts voice and vote in the formulation of a policy and in the writing of the wage demands presented to the operators. These representatives would also have a right to a voice and a vote in the conference negotiations, even though the conference would only deal with wage questions directly affecting the Central Competitive Field.

Hayes, Savage and Kennedy Oppose Resolution

President Hayes contended that the present "policy committee" (composed of the district presidents of all the districts), which is called together immediately after a scale is drafted to consider that scale, is sufficient protection for the interests of the outlying districts. Secretary Savage, of the Ohio district of the United Mine Workers, declared that the resolution was dangerous, as the mine operators of Ohio and western Pennsylvania are even now considering a withdrawal from the Central Competitive District. Any attempt to ring in or consult operators or mine workers from other districts, in short in a degree to enlarge the Central Competitive District, would fail in the judgment of Secretary Savage.

All the anti-administrationists—the outs—were lined up solidly behind the measure which was introduced jointly by 14 local unions located in Missouri, Kansas and Illinois. Thomas Kennedy, President of No. 7, a district centering around Hazelton, also protested against the resolution. The anthracite district leaders, as was said last week, are not at all disposed to try to control, or even take a part in controlling, the bituminous wage contracts. They desire to go along in their own way. Tom Kennedy said that if the arrangement suggested was made it would do the union much harm in the anthracite region. The anthracite operators, he believed, would have granted the mine workers complete recognition had the union consisted solely of the mine workers of the hard-coal region. The anthracite operators do not care to meet a general conference of all the mining interests because they realize that the anthracite men would be outvoted. They have always refused to meet with the bituminous mine workers.

The debate was bitter, and the delegates indulged in personalities, charges and countercharges. Half the afternoon session was devoted to maintaining order. The problem is a difficult one. The representatives of the mine workers and the operators of the Central Competitive District meet with the International officials, and a contract is written which the officials of the district and the International officials assent to, subject to the will of the union.

To Date Outliers Have Only Ratified Contract

The policy committee of the whole union considers whether the contract is satisfactory enough for submission to a referendum. Then if it is, the referendum follows and everybody votes whether in the Central Competitive District or not. It is clear that the Central Competitive District has a great deal of power. It virtually determines the scale for the other districts, for they ultimately line up with the scale accepted in the district first signing, not only because it signs first, but because its size gives it predominance. However, while in a way it controls the settlement, in another way it is itself controlled. Ohio might complain that Washington votes on the Ohio scale, and Washington can retort that Ohio writes a scale which Washington is more or less compelled to follow.

On Jan. 23, Samuel Gompers, president of the Federation of Labor, made a speech in which he said that organized labor must uphold the hands of the Government, even though labor might be called upon to make some sacrifices. He said that these sacrifices were imposed on mankind by the progress of evolution. They are but the penalties which democracy must pay if it would enjoy freedom and justice. Mr. Gompers then declared that no one who had been suggested to conduct the war affairs of the Nation in place of the civilians who were now charged with that responsibility had ever performed a public service. He urged the retention of the present government and civilian heads as executives and advisers in the prosecution of the war.

More Money To Be Spent for Tom Mooney's Defense

The convention voted unanimously to aid Thomas Mooney, Rena Mooney and Edward Nolan, charged with being plotters of the San Francisco bomb explosion, which took place during a preparedness parade. Direct appeal will be made to President Wilson, asking him to prevent the execution of Mooney. A special committee will determine how much money shall be expended in the defense. Several thousand dollars have already been contributed by the International Executive Board and other thousands by local and district organizations.

John P. White, on Thursday, Jan. 24, made a ringing speech, and as a result the convention overwhelmingly defeated a resolution to take the power of appointing organizers out of the hands of the International President. The proposal to do this was championed by John Lawson, of Colorado, the rules of order being suspended in order to permit him to speak.

James Moran, acting president of the Colorado district, charged that Lawson was employed by the Victor-American Fuel Co., of Colorado, as a labor agent, and by every

reason of right should be ousted from membership; and Lawson did not deny the charge. The whole morning session was unruly. The conservative delegates finally forced consideration of a motion to close debate. The chair endeavored to forestall this action so that International President Hayes might be heard, but the chair could not succeed in getting its will accomplished. Mr. Hayes' speech was not needed, as the majority was already with him.

On Jan. 26 Alex. Howat, the irrepressible Kansas President, threatened to call a strike in Kansas at all the mines where fines had been collected under the Washington agreement. He declared he would "pull" the miners out as soon as he got back to Kansas. He managed to get his speech before the delegates in a plea of personal privilege. He declared that he was injured by ex-president White's reference to him as a demagogue. Howat received little applause from the convention, and by a chorus of slurring remarks the convention evidenced its disapproval of the threatened action.

Mother Jones, who has always during her 83 years denounced courts, introduced a resolution commending the Supreme Court of Arizona for deciding the election contest in favor of Governor Hunt and against his rival acting-Governor Campbell. She had, however, to return to form by bitterly denouncing the Supreme Court of the United States and all other state supreme courts which had rendered decisions affecting the mine workers' organizations.

Undoes All the Work of Two Preceding Days

On Jan. 26 J. C. Lewis, of Iowa, managed to secure the passage of the following resolution nullifying the victory of the Friday proceeding. The resolution is reprinted in full, for it is likely to be a matter of some debate later.

Whereas, We believe that the operators and miners of the outlying districts where bituminous coal is mined should be represented in joint conferences when basic wage agreements are being made, so that the representatives of each district may have a voice and vote in determining what wages and conditions shall be agreed upon for their respective districts; therefore be it

Resolved, That the International Executive Board and the representatives of the four states known as the Interstate Movement—namely, Illinois, Indiana, Ohio and western Pennsylvania—be instructed by this convention to take steps and make further and greater effort to enlarge the Interstate Joint Conference by the admittance of such as they are able to agree upon; and be it further resolved that when the Interstate Conferences are to be held it shall be the duty of the international secretary-treasurer to notify the resident officers of each district when and where the conference is to be held so that they may so journey to the city where said conference is being held, if they wish to do so, and the representatives of the outlying districts shall be permitted to sit in conference with the representatives of the miners of the Interstate Conference when they are meeting for the purpose of negotiating wage scales and have a right to voice their sentiments on questions that may affect their districts, and be it further

Resolved, That no agreement be made governing the outlying districts unless the representatives of said districts are given a voice and vote on the same.

Will the Operators Consent To Negotiate?

It now remains to be seen how the operators will view the proposition. The distant date, 1920, makes it less important a consideration that it would otherwise be.

The pension system proposed by the old-age committee, whereby each miner over the age of 60 years would secure a pension of $20 per month, was referred to the rank and file for consideration with a continuation of the committee to bring before the next international convention a report embodying the wishes of the membership.

The meeting came to a close Jan. 26, after making provision to file the $800,000 bond necessary to appeal the judgment of the Coronado Coal Co. against the union. The Pennsylvania Mining Co. with mines in Arkansas and headquarters in Scranton, Penn., is preparing to bring suit against the union for $500,000 before the Federal Court

Union Membership Has Increased Greatly

The membership of the United Mine Workers of America has steadily grown since October, 1910. In October, 1917, the membership had increased 75.93 per cent.

It will be noticed that in the earlier year Districts Nos. 1, 5 and 7 in the anthracite region were quite sparsely organized. This, with their more complete organization at present, accounts for the great growth in membership. However, when we add the membership in the three districts together we find that there are 65,441 union men. In 1916 there were 159,169 men engaged in anthracite region, so it is clear that there are still a few men who have not joined the union. In fact, union strength is roughly only 41 per cent. of the possible figure.

MEMBERSHIP OF UNITED MINE WORKS OF AMERICA

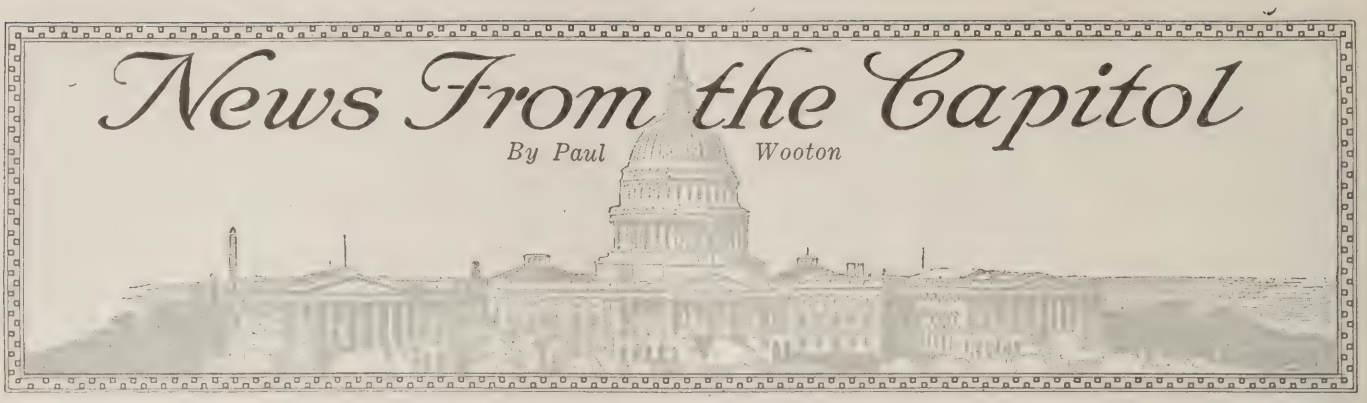
Districts Number	Location	October, 1910	October, 1917	Numerical Increase	Per Cent. Increase
1	Scranton district, Pennsylvania	4,930	27,550	22,620	408.82
2	Central Pennsylvania	31,339	45,082	13,743	43.85
3	Non-existent	.....	.....	.....	.....
4	Non-existent	.....	.....	.....	.....
5	Pittsburgh district Pennsylvania	34,562	34,900	338	0.97
6	Ohio	32,628	40,553	7,925	24.29
7	Hazleton district, Pennsylvania	2,078	13,292	11,214	539.65
8	Block coal district, Indiana	1,355	1,098	—257	—23.40
9	Shamokin district, Pennsylvania	3,078	24,599	21,521	699.18
10	Washington	4,459	5,591	1,132	25.38
11	Bituminous coal district, Indiana	16,449	23,551	7,102	43.18
12	Illinois	51,718	87,189	35,471	68.58
13	Iowa	17,550	13,288	—4,262	—24.28
14	Kansas	4,152	9,231	5,079	122.32
15	Colorado	187	5,213	5,026	2,687.70
16	Maryland	.....	2,512	2,512	.....
17	West Virginia	2,085	13,953	11,868	569.20
18	British Columbia	3,753	4,810	1,057	28.17
19	Eastern Kentucky and Tennessee	726	12,322	11,596	1,597.24
20	Alabama	198	5,885	5,687	2,872.20
21	Arkansas, Oklahoma and Texas	4,604	14,632	10,028	217.80
22	Wyoming	5,958	6,949	991	16.60
23	Western Kentucky	5,512	4,446	—1,066	—19.4
24	Michigan	2,532	2,005	—527	—20.81
25	Missouri	2,445	7,925	5,500	224.90
26	Canada	889	.....	—889	—100.00
27	Montana	2,858	3,971	1,113	38.94
28	Canada	.....	159	159	.....
29	West Virginia	.....	4,557	4,557	.....
Local Union 828	Indianapolis, Ind	14	22	8	50.71
Totals		236,059	415,305	179,246	75.93

Western Pennsylvania, early unionized, shows almost no growth since 1910, despite all the efforts made and the undoubted progress in 1917 along the Allegheny River and its tributaries. The decrease is larger in central Pennsylvania, which was quite generously unionized in 1910; but the membership is still far from 100 per cent.

Kansas, Colorado, eastern Kentucky, Tennessee, Alabama, Arkansas, Oklahoma, Texas and Missouri have all increased their union members immensely. Maryland and West Virginia and District 28 in Canada have come into being, the latter, however, being extremely weak. District 26, also in Canada, has lost all its membership. Iowa, Indiana, western Kentucky and Michigan have lost membership in large measure.

As there were 720,971 men employed in the coal industry of the United States during the fiscal year ending June 30, 1917, according to the United States Geological Survey, the proportion of union men is 57.60 per cent. of that possible.

The extent to which unrest is fomented by pro-German influences is indicated by the fact that more than 150 Illinois miners have been arrested on charges of disloyalty to the United States, according to information given out at Springfield, Ill. Most of them are held on charges of attempting to cripple war industries by checking coal production. A large number of secret service agents have been sent into the mining districts. President Frank Farrington says there has been a great deal of pro-German propaganda among the miners, 60 per cent. of whom are foreigners, representing 29 nationalities.



[*Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Metropolitan Bank Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 703, Metropolitan Bank Building, Washington, D. C., while at the capital.—Editor.*]

Garfield Announces His Coal Distribution Plan

Formal announcement of the long-expected distribution plan was made by the Fuel Administrator Jan. 25. Operation of the plan is expected to result in the consumer's receiving coal from the nearest point of production. It is expected to reduce cross-hauling to a minimum and to speed up deliveries of loaded cars and returns of empties. Each state will be allotted its quota, which will be supplied from certain designated producing districts. Great care was taken by Dr. Garfield and members of his staff in the compilation of a letter to state fuel administrators, which explains the working of the new system. That letter reads as follows:

As soon as district representatives are appointed, all state administrators who may call upon them will be notified. Individual shippers and mines within those districts for which district representatives have been appointed will be notified to refer any orders or requests for shipment of coal made upon them by any member of the United States Fuel Administration to the proper district representative. State administrators accordingly should direct all emergency requests for fuel to the district representative in charge of the particular coal field from which the relief is to be obtained, rather than to an individual operator within that district. This will prevent shippers from receiving conflicting orders from different members of the Fuel Administration, and will insure more prompt attention to such requests because of their being made in the field by a man thoroughly conversant with the local situation and the available supply. No emergency requests should be made directly to Washington by state administrators unless the proper district representative has been unable to supply the necessary coal.

In order that the bituminous coal supply of the country may be apportioned equitably among the different states, and among the various consumers in each state according to the relative importance of their needs, it is necessary that the work of the Fuel Administration in regard to the apportionment and distribution of bituminous coal be not limited to the relieving of emergency shortages. Accordingly, the available coal production of the country is to be apportioned among the various states, based upon previous consumption and the changes resulting from the entrance of the United States into the war. In order that cross-hauling may be reduced to a minimum and that each state may receive coals adopted to its needs, the particular fields from which each state shall draw its supply will be designated (byproduct and gas coal excepted). When this budget is complete, the consumers of each state will be notified through the press that their coal must be obtained from certain specified fields. Producers will then be allowed to ship only to consumers in the states designated, and jobbers will be required to observe the same rules. In other respects the normal distribution of coal will go on without interference.

State administrators, as soon as the tentative apportionment is complete, will be informed as to the particular fields upon which they may call for coal, and the quantities they may secure from each. When a state is currently receiving its full allotment of coal, all further needs must be met by reducing the quantity supplied to other consumers in that state. District representatives will be instructed to comply with any requests for coal made by designated state administrators up to the amount allotted to their respective states. Should any state have a demand for coal in excess of its allotment, this excess will have to be taken care of by a curtailment of consumption, unless a temporary or permanent readjustment of the allotment be made by Washington.

The foregoing is a part of the new plan, details of which are being worked out as rapidly as possible and will be announced to you as soon as they can be perfected. It should be clearly understood that it is not intended that the rights and duties of the state fuel administrators shall be lessened in any respect. On the contrary, the state administrators will retain all of their present responsibilities. The purpose of the plan is to facilitate the handling of emergencies and to define the limitation of supply. The only changes are in the creation of a new office in the field which will aid state administrators in promptly relieving emergency shortages, in reducing the number of such cases which must be referred to Washington, and in making provision for insuring that each state will receive its proper proportion of the available coal supply. In all other respects, state administrators will continue to keep in touch with Washington as heretofore.

Free Time for Detention of Coal Reduced from Ten Days to Six

Reductions in free time for the detention of carload shipments of coal at New York harbor, Wilmington, Philadelphia and Baltimore tidewater terminals, have been allowed by the Interstate Commerce Commission. Free time under the straight demurrage plan is reduced from ten days to six and, under the average agreement plan, from five to three days.

Various of the coal-mining companies, associations and dealers protested against this change. The opinion

was written by Commissioners McChord, Meyer and Aitchison. An extract from the opinion is as follows:

While in many instances the present allowances of free time have been materially exceeded, it appears that the general average detention on all of respondents' lines during the year 1916, under disadvantageous conditions, was less than the free time under the proposed schedules for the straight demurrage plan, and the figures submitted for the first part of the year 1917 indicate that the abnormal conditions have been to some extent relieved and the average detention correspondingly decreased; furthermore, that a number of shippers, under varying circumstances, have been able to conduct their tidewater business within the average free time proposed, even under the abnormal conditions which have existed. While the protestants have shown that considerable demurrage has accrued on cars and on boats from irregularity in the periods of time cars were en route over the lines of certain carriers, it also appears that the irregularity of movement has been caused to a large extent by the congestion of traffic at the ports. In other words, the record does not demonstrate that either condition is the cause or the effect, and the fair conclusion is that each in turn has contributed to the other. While, therefore, the reasonableness of any period of free time for this traffic may well depend in large measure upon a fair and efficient coöperation on respondents' part, the carriers' equipment should not be detained for storage purposes beyond any period reasonably necessary to effect its release, and, subject to such modifications as future practical results may require, our conclusion is that the periods proposed should suffice.

No Coal To Be Diverted Without Consent of Fuel Administration

Confusion caused by the diversion of coal by state fuel administrators and by chairmen of local committees made it necessary for the Fuel Administration last week to issue a number of orders limiting the authority of these officials. The coal consigned to tidewater is not to be diverted without permission from Washington. Coal consigned to byproduct coke ovens is not to be diverted except in emergency to relieve human suffering. Any coal for a destination outside of the state is not to be diverted without permission from Washington. Local committee chairmen are allowed to divert only such coal as is consigned to their community. Among the other orders issued was one making the official ordering the diversion responsible for the payment for the coal.

Weekly Production Statistics

Weather conditions during the week ended Jan. 19 are held mainly responsible for a decided slump in coal production. During that week, 8,602,000 tons was produced. This is an average of 1,434,000 tons per working day, which is among the lowest recorded during the past twelve months. Beehive coke to the amount of 527,000 tons was produced during the week ended Jan. 19. This is somewhat less than production during the week ended Jan. 12, when 562,000 tons of coke was made, but it is an improvement over the week ended Jan. 5, when 455,000 tons was made. Anthracite shipments also reflected weather conditions. Forwardings during the week ended Jan. 19 were 31,861 cars, as compared with 36,178 cars during the week preceding. These figures are compiled from the returns made to the United States Geological Survey.

Factors which limited production are not yet available for the week ended Jan. 19, but for the week ended Jan. 12, when conditions were not at the worst, they show that 25 per cent. of the full-time capacity of the mines was lost due to car shortage. Labor difficulties caused a loss of 2.9 per cent.; mine disability, 4.3 per cent., and all other causes, 2 per cent.

More District Representatives Appointed

E. R. Clayton, of Harlan, Ky., has been appointed district representative for the coal fields located in Georgia, Tennessee and in the Counties of Bell, Harlan, Knox, Whitely, McCreary and Laurel in Kentucky. There are to be 20 district representatives appointed, of which Mr. Clayton is the sixth to be made public.

The Hazard coal field, which is comprised of Perry, Breathitt and Lee Counties in Kentucky, is to be represented on the Fuel Administration staff by R. A. Hord, of Lexington, Kentucky.

The district representative of the Fuel Administration who will look after distribution in the Pennsylvania counties of Armstrong, Butler, Clarion, Mercer and portions of Lawrence and Indiana Counties, will be F. B. Reimann, of Butler, Pennsylvania.

R. W. Gardiner, of Pittsburgh, will be the district representative for the following counties of Pennsylvania: Allegheny, Green, Washington, Westmoreland (west of the Youghiogheny River) and Fayette (in part).

J. B. Zerbe, of Cleveland, has been appointed the representative of the Fuel Administration for the coal-mining district covering the counties of Belmont, Columbiana, Carroll, Coshocton, Guernsey, Harrison, Jefferson, Mahoning, Noble, Portage, Stark, Tuscawaras and Wayne, in Ohio, and the counties of Brooke, Hancock, Marshall and Ohio, in West Virginia.

Brief Washington Notes

A revision downward has been made by the Fuel Administration in prices in the Deerfield, Massillon and Jackson fields in Ohio. The prices fixed are as follows: Run-of-mine, $3.25; prepared sizes, $3.50; screenings $3. Prices prevailing before the order were: Run-of-mine, $3.75; prepared sizes, $4; screenings, $3. Such operators as have complied with the terms of the Washington wage agreement may add 45c. to the prices specified.

Contracts for coal dated before Aug. 21, 1917, which contain no provision for changes in the wage scale, are not now susceptible to the addition of the 45c. increase allowed by the President. The Fuel Administrator issued a statement to that effect when he learned that some consumers had been notified that their contract price would be increased to cover the advance in the wage scale.

In order to make plain how the United States Fuel Administrator approves prices fixed by local officials, instructions with regard to retail prices and margins, which were sent to the local committees, have been made public. In the same order the right of appeal to the United States Fuel Administrator on the part of any individual is granted.

EDITORIALS

Providing a Remedy

IN CASE of sickness, it is always necessary to diagnose the case and determine the nature of the ailment before a remedy can be provided. Only a few weeks ago railroad officials were disclaiming responsibility for a shortage of fuel. The Garfield closing-down order has emphasized more than anything else that the real trouble is a lack of locomotives. It is therefore gratifying to know that Director McAdoo recognizes the situation. He has commandeered all the locomotives that will be built in the United States during January, February and March of this year. As fast as these locomotives (approximately 700 in number) are completed, they will be turned over to Mr. Smith, Director McAdoo's chief assistant, and will be assigned to those eastern roads that are most in need of motive power.

Although it is too late to correct the present trouble, it is good to know that we are at last on the right track, and that before long there will be sufficient engines and enough ships to carry all the products that the essential industries of America can produce when working at full speed. It is better late than not at all, and before we get through with our present job we will strike our real pace and quickly finish the thing we have started to do.

The War Sets Astir a New Spirit

IN THE distribution of credit for helping to win the war, we must not overlook the mine workers' union. Before the war started the union workmen in the anthracite region held that to load four cars a day was a proper stint for the working force of a single breast—namely, one miner and a laborer.

A miner who dared mine more than the customary four carloads would be regarded with disfavor by his fellows, to say the least. Even if he could load the four cars in five hours it made no difference. The men competed to see who could do the daily stint and arrive at the garden gate first. The drivers also held back on the ambitious and so kept the tonnage down to what they considered a proper figure.

But the war and the want have changed all that. The union has put all such considerations behind it. Now the men who do more a day are praised and admired. At some mines the double shift has become quite common. At other mines, like those of the Pennsylvania Coal Co., the men have till lately been working nine hours. So despite a 20 per cent. shortage of labor there is a 10 per cent. increase in production.

The nine-hour day may eventually be a solution of the needs of the hour. The subject has been taken up by the Conciliation Board, the operator members favoring it. The miners and other mine workers are still a little doubtful. Some men have questioned if more hours would mean more coal, but we are sure that when the railroads get their proper stride the mine workers will decide that the longer hours will be justified. No one wants the mine worker to work overtime with frequency if concurrently with that overtime goes several days of idleness.

But better than the prospect of a nine-hour day has been the spirit of patriotism and sacrifice that has made that nine-hour day a possibility. As a result of the new spirit some miners and their laborers are mining eight car loads a day instead of four. The race for the garden gate is ended, and the sense of duty done is bringing to the heart of the mine worker—always a big-hearted fellow—all the joy that goes with performing a big service in a large way.

The average earnings of energetic miners in the anthracite region are now about $200 a month. Many of them are making $10 a day, or $300 a month. The laborers earn about $125 a month. A good day's work is worth good pay, and there is no reason why the mine worker should not get it.

Nova Scotia Gets Unfortunate Publicity

NOVA SCOTIA has some of the best mines on the American continent. We wish that the public knew no more about Nova Scotia than that fact. Unfortunately two bad explosions have recently made the province appear in the public prints. One occurred in the No. 12 colliery of the Dominion Coal Co., near Waterford, July 26 of last year, and the other is so recent, Jan. 23, that the casualty list is probably not yet completely determined.

The latter accident occurred at the Allan shaft, Stellarton in Pictou County, a long way from last year's disaster. There has been a fire in the workings and perhaps it was from this that the accident occurred. Strange to say the explosions, for there were two, were not severe. The first was but slightly felt at the surface. The second, which occurred ten minutes later, was more forcible but it did little damage to the shaft. A few minutes later the engineman was signaled to lower the cage to the 500-ft. landing. Some eight men waiting there entered the cage and came to the surface. These men had not felt the jar but they did notice the smoke, and this manifestation alarmed them and caused them to seek safety. Three or four men working in that same seam apparently did not try to escape and were lost.

The cage was not able to reach the 1200-ft. landing owing to obstructions 20 ft. above the bottom. Not until men with oxygen helmets descended were they able to begin the rescue work. Probably 85 men were lost in this explosion.

There is no intention to single out Nova Scotia for blame. Our record here, in the United States, is this year no cause for congratulation. It does seem that the reasonable and fair price for coal which we promised would reduce accidents has failed to do so. It has

merely made our coal production more feverish and less disciplined. We need to take seriously to heart the unsolved problems of mine management and to adopt with a feverishness equal to that expended in production all the advances in safety which the industry has evolved.

No nation has been more painstaking in its analysis of mine and other accidents than Great Britain. In that noble work her colonies have for many years emulated her. Let us trust that from the investigation of the accident of the Acadia Coal Co.'s mine at Stellarton some message may come that will enable the mines of the United States and Canada to be run more safely than in the past. The mines will certainly have to submit to more stringent regulation, for no one will be satisfied until the present death rate is reduced.

West Virginia Coal Production

EARL A. HENRY, chief of the Department of Mines of West Virginia, has called our attention to several discrepancies in the statistics contained in the Jan. 19 issue. On page 101 of that issue, under "West Virginia," it will be noticed that Mr. Henry gave the production for his state for the year ended June 30, 1917, as 79,806,652 gross tons, which was an increase of 194,354 gross tons over the production last year. On page 117, in the table showing coal production in the United States in 1917, the output of West Virginia is given as 79,806,652 net tons. The correct figures for West Virginia production for the period ended June 30, 1917, reduced to net tons, should be 89,383,450.

It will be obvious to the readers of *Coal Age* that when proper credit is given to West Virginia she will still retain her position of second place in the coal-producing states, as Illinois, to which we allotted that position, produced only 85,700,000 net tons, estimated, while the West Virginia figures are based on actual production. Instead of a decrease, therefore, West Virginia shows an increase of 217,676 net tons.

This is only another instance of the desirability of having all reports of production expressed in net (short) tons, and *Coal Age* again wishes to emphasize that fact. The inspectors of the different coal-mining states should exert their endeavors to bring about such a standardization.

A Proposed Advisory Coal Committee

REPRESENTATIVES of wholesale coal trade associations have presented recommendations to the United States Fuel Administrator, suggesting that he avail himself of the experience and advice of practical coal men at the present time of national stress. The movement is widely indorsed, especially by the trade end of the industry.

The plan as outlined calls for a committee of fifteen members, of which committee five members will be coal operators, five will be coal jobbers, two will be railroad men, two will represent labor, and one member will represent the United States Government. The plan further states that the five coal operators and the five coal jobbers shall each have sub-advisory committees from their respective districts, with a view to keeping them advised of the changing conditions in the various localities.

There is not the least doubt that there is a serious lack of experienced coal men on the staff of the Fuel Administrator. This has been the chief point of attack of those who have criticised Dr. Garfield. However, it is not plain just how such an advisory committee could work in harmony with the present organization of the Fuel Administration. The hand of the Government was shown clearly when it took away the authority of the Peabody committee, which had in its personnel some of the ablest coal-mining men in America. There appears to be a certain Federal distrust of the Nation's most successful business men. At any rate, the general policy has been to give authority for regulating an industry to men not at all versed in the technical or business details of that particular industry. There seems to be a fear that the men who know most about coal mining and railroading would not be able to overcome their personal prejudices and administer in an impartial manner.

Any move that will result in causing Dr. Garfield to call more of our experienced coal men into his service is indeed welcome. We do not anticipate that the present plan for an advisory committee of fifteen will meet with success. However, it is a proposal that aims to correct in some measure the great weakness of the Fuel Administrator's organization, and as such it is not without merit.

Miners' Convention Worth the Cost

THE mine workers' convention at Indianapolis cost the union men a pretty penny. There were 1752 delegates, and the transportation costs will be $40,596.70, about a dime per member. Of course, these costs only represent a small part of what the international organization and 1772 locals will have to pay.

It is sometimes questionable whether these large conventions are profitable. But they certainly are necessary for the education of those attending them. Education is the very keystone of our civilization. Nothing better serves capital than education. The countries where workingmen are intelligent and informed are those in which capital makes the largest ultimate returns. No large and successful industry can ever be built on the work of ignorant employees.

The meetings of the mine workers undoubtedly liberalize their minds. The narrow bitterness of men who never travel is broadened by meeting men of larger viewpoint. They learn the size, the scope, the marvel of the great country in which they live. They learn about other people's difficulties, and they are broadened. The mine work thus gets its proper perspective. The men return prouder and yet at the same time more tolerant.

The education of the masses has too long been feared. Some of the masses today are beginning to denounce education because the men who have it lose their narrowness and see that even if the workman ruled the world he would find himself ruled in turn by economic laws and in harder straits than under the capitalistic *régime*. Why, therefore, should any one fear education? Its ultimate result is to teach the whole truth, and the world will always be best ruled when whole truths and not miserable half truths and prejudices form the basis of its laws.



Conductor Wilson—"Say! You three guys, give the lady your seat. Who let you on here anyway? You fellows belong in the gob."

Slate Must Not Ride on a Coal Ticket

A ton of coal is soon mined, but it is a long time getting to market. It doesn't take as much work to mine a ton of coal as it does to haul it to market and deliver it and stoke it and carry out the ashes.

The Miner Only STARTS *the Coal on its Way*

If he starts some rock, clay, slate or bone with it, that rubbish travels just as far, gives just as much work, but provides no heat. One hundred tons of slate takes just as many railroad cars and just as many locomotives to haul it as 100 tons of coal. It takes the same work to move it and to unload it and to get it into the bunkers, and just as much work or a little more to stoke it; and far more work to load it out as ashes which, in turn, may have to be carted several miles.

With such a shortage of locomotives and railroad cars as we now have, it is everybody's duty to keep slate from riding on a coal ticket. We cannot afford to have it taking up car space, bunker space and grate space.

Don't Load Out Dirt:
Uncle Sam Pays For and Wants Clean Coal

LEGAL DEPARTMENT

INJURY IN HANDLING CARS IN MINES—In affirming judgment in favor of a miner who was injured while temporarily assigned to the work of repairing a track in a mine, work in which he was somewhat experienced, the accident being caused by a collision of cars backed into a derailed car near which he was working, it is held that the operator is liable on the ground of negligence of the employee's foreman in assigning him to the work without placing signals to protect him, or without warning the employees who were operating the cars of the danger of injuring him. Under the circumstances, the injured man cannot be deemed to have assumed the risk of the accident. (Virginia Supreme Court of Appeals, Clinchfield Coal Corporation vs. Ray, 93 Southeastern Reporter, 601.)

PROXIMATE CAUSE OF MINER'S DEATH—Where a coal miner was severely burned by an explosion of mine gas, for which his employer was responsible, the fact that the miner contracted hypostatic pneumonia, resulting in death and caused by the burns and the position in which he was compelled to lie, cannot be said to be so remote from the accident as to exonerate the employer from liability for damages for the death. Where two concurring causes produce an injury, which would not have resulted in the absence of either, a person producing either cause is liable for the consequent injury. (Arkansas Supreme Court, Sterling Anthracite Coal Co. vs. Strope, 197 Southwestern Reporter, 858.)

WHO MAY NOT SUE AS FOR TRESPASS IN REMOVING COAL IN PLACE?—Plaintiff was not entitled to maintain an action for damages for removal of coal from land of which he had neither actual nor constructive possession, the surface being in the possession of third parties who claimed title and under whose lease defendant removed the underlying coal. (Pennsylvania Supreme Court, Griffin vs. Delaware & Hudson Co., 101 Atlantic Reporter, 750.)

WHAT CONSTITUTES "MACHINERY AND APPARATUS" ON COAL DOCK?—RIGHTS TO INTEREST ON CLAIM—A railroad company leased to a coal company a coal dock at Superior, Wis., under agreement that on expiration of the lease the railroad company would buy at a fair valuation all the "machinery and apparatus" installed on the dock and used by the coal company with the lessor's consent. Held that the provision extended to all appliances which the lessee with the consent of the lessor placed on the dock, including trestles and cable system, wooden understructure of the same, the tracks and understructure of hoists, anthracite coal pockets, and other permanent structures. Under the general rule that interest is not recoverable on a litigated claim until the amount of the claim has become ascertained by judgment, the lessee was not entitled to interest on the value of the property left on the dock between the termination of the lease and an adjudication in court as to the amount of such value, the parties having failed to agree on the amount. (United States Circuit Court of Appeals, Eighth Circuit; Great Northern Railway Co. vs. Philadelphia & Reading Coal and Iron Co.; 242 Federal Reporter, 799.)

VIRGINIA MINING ACT APPLIED—The Virginia Mining Act contains the provision: "On all haulways where hauling is done by machinery of any kind, the mine foreman shall provide a proper system of signals and for the carrying of a conspicuous light on the front, and a light or flag on the rear, of every trip or train of cars when in motion, provided that this shall not apply to trips being hauled by gathering motors or mule teams when operating on other than main headings, and when hoisting or lowering men occurs before daylight in the morning or at evenings after darkness." In affirming judgment in favor of a miner who was killed in defendant's coal mine, the United States Circuit Court of Appeals, Fourth Circuit, holds that this statute applies where loaded cars are being pushed by a motor to the foot of an incline to be there connected with a hoist chain for movement to the tipple. (Johnson vs. Pocahontas Consolidated Collieries Co., 244 Federal Reporter, 368.) It is further decided that a mine inspector's erroneous interpretation of the statute as not requiring a light on moving cars at a particular point in a mine where the accident occurred, even though communicated to the operator, cannot relieve the latter from liability for actual damages sustained on account of the accident. It was also held that the jury was warranted in finding that the accident in question was directly due to failure to have a light displayed on the front of the cars which struck decedent while he was waiting on the track for other cars to pass on an adjoining track; and that decedent's act in going into the drift mouth of the mine to a point where it intersected, near the tipple, the entrance from the tipple, there to take a car to ride into the mine, did not constitute a traveling on foot to work on a motor road, in violation of the Virginia Mining Act. Another point held in the case is that decedent was not necessarily guilty of contributory negligence in standing on the track to let the cars on the other track pass, whereas he might have stood in a clear space of 5½ ft. between the tracks, because failure to have the cars which struck him lighted concealed their approach from him. Nor is recovery to be denied because decedent may have failed to listen for approaching cars, it appearing that the noise of the cars on the other track drowned the sound of those that struck him.

WHAT A MINER IMPLIEDLY REPRESENTS TO HIS EMPLOYER—When an adult man applies for employment in a mine, a mine operator is entitled to assume that he is reasonably well qualified by experience for the work he seeks, and, unless he discloses facts to the contrary, the employer is under no legal duty to instruct him against dangers commonly understood by miners engaged in the particular line of work. So where plaintiff had worked in mines for more than two years, observing and taking part in drilling and blasting with powder, the defendant in employing him was entitled to assume that he understood the necessity for careful examination of places where holes had been drilled and charged, before attempting to pick rock down after blasting, in order that any missed hole might be discovered. And since he did not apprise the defendant of any inexperience in such matters the company was not negligent in failing to provide a system of rules or instructions to safeguard him. (Utah Supreme Court, Olsen vs. Triangle Mining Co., 813.)

CARE OF ELECTRIC WIRES IN MINES—It is the duty of a mine operator to cause proper inspections of an electric feed wire strung along one side of an entry on the rib near the roof to be made with reasonable frequency to assure miners against the danger of coming in contact with the wire. Omission of an operator to use ordinary care to make a fallen wire reasonably safe, after it was known, or by the exercise of ordinary care might have been known, that the wire had fallen into a dangerous position, constituted actionable negligence, rendering the operator liable for fatal injuries sustained by a miner through coming in contact with the wire under circumstances which did not charge the man with contributory negligence. The burden to show contributory negligence rested upon the operator when sued, unless the plaintiff's evidence affirmatively established it. (Virginia Supreme Court of Appeals, Virginia Iron, Coal and Coke Co. vs. Prophet's Administrator, 93 Southeastern Reporter, 590.)

DISCUSSION BY READERS

Examination of a Mine

Letter No. 2—It appears from the reading of Letter No. 1, *Coal Age*, Dec. 22, p. 1069, that W. Dickinson claims the answer given by the editor to the question of a fireboss, regarding the manner in which he should examine a mine, is not complete. Mr. Dickinson then proceeds to explain his method of performing the duties of a fireboss in a West Virginia mine.

While I am not familiar with the requirements of the West Virginia mining law in this respect, I want to say that the answer given in *Coal Age* to this question explains exactly the procedure in Colorado when a fireboss is making his morning examination of a mine. Anything to the contrary would not be in compliance with the Colorado mining laws. I am inclined to believe, however, that the editor of *Coal Age* is fully familiar with the requirements in West Virginia and that these do not differ materially from those in Colorado.

Firebossing in Colorado Mines

When a fireboss makes an examination of a mine, in Colorado, his duties as a fireboss end when he has returned to the bottom of the shaft, entered his report in the book kept for that purpose, attached his signature, and reported to the mine foreman that the mine is safe for work, except for any dangers he may have noted in his report.

In doing this, the fireboss turns the mine over to the foreman who has full charge of the underground workings and the men employed therein. He then goes to his breakfast and, upon his return to the mine, seeks out the foreman and receives from him his instructions for the day.

How Practice Differs from That in Other States

Where practice in Colorado appears to differ from that in West Virginia, as explained by Mr. Dickinson, is in the work done by the fireboss when he returns to the mine after breakfast. Mr. Dickinson states that the fireboss then "makes a more careful examination of the air-courses and working places in his district, giving such instructions to the men as may be needed," which will complete his duties for the day.

In Colorado it is the duty of the fireboss, on returning from breakfast, to obey the instructions of the foreman and perform any work that the latter sees fit to give him. It may be the building of a concrete stopping, cleaning up roof falls or other similar work.

In the absence of any assistance, and the mine foreman being too busy to do the work himself, as required by Sec. 76 of the Colorado mining laws, he may order the fireboss to make a second examination of the mine, which must be done during working hours.

I recall an incident where a fireboss refused to perform certain work ordered by the mine foreman, claiming that he was not subject to the orders of the foreman. His refusal led to his prompt discharge from the company. In court the case was decided against the fireboss, and he has not been able to secure a similar position since.

It is not infrequent that firebosses consider their work in the examination of a mine continues for eight hours, and that they are independent of the mine foreman; but this is not the case in Colorado. During my spare hours, I have devoted much time to the study of the mining laws of this state, and I want to say that when an assistant foreman, fireboss, shotfirer or other employee disregards the orders of the mine foreman there is trouble ahead. Should anything go wrong the foreman alone is responsible.

Where the foreman has no particular work for the fireboss to do on his return to the mine, after breakfast, he can employ himself by extending brattices in the working places, not for the purpose of removing gas only, but to provide a better circulation of air and keep the temperature down, so that the men will not be as exhausted at the close of the shift as when they are required to work in hot and close places.

Let all firebosses remember that we are after the Grim Reaper, who so unmercifully takes away many of our good miners. Any suggestion that will sidetrack the Reaper and make his work less effective in the mine is gladly welcome. I believe in a thorough and rigid examination of the mine by a fireboss. He should see to it that all dangers are promptly removed and everything done to make the mine safer and healthier for work.

Where the working places are kept well ventilated, the miners can do more and better work. During working hours, the mine foreman is responsible for the production and output of coal, and it is a good plan to provide safety inspectors to inspect the mine daily.

Farr, Colo. ROBERT A. MARSHALL.

The Mine Gatehouse

Letter No. 2—The suggestion of a gatehouse at the mine entrance, made in the Foreword of Dec. 8, appeals to me chiefly as affording a means of checking the men passing in and out of the mine. Many of the coal-mining states, I believe, have a law requiring the use of a suitable checking system. In my opinion, where there are not too many openings that would afford opportunity for men to enter and leave the mine without it being known, the idea of a gatehouse seems wholly practicable.

It goes without saying that a mine of any size that has no system of checking the men that enter and leave the workings is a back number today. Where no other plan is feasible the mine regulations should insist on each man registering his number on a bulletin board when he enters the mine for work. This may require him to take a little longer route than he would otherwise, but the advantage gained justifies the extra effort.

Every operator should consider it his duty to assume a certain responsibility in regard to the number of

men at work in the mine at any time and be able to tell who they are when the information is desired. In order to do this, however, a perfect checking system must be arranged, and the gatehouse idea seems to offer the surest and most reliable method.

At mines where everyone is supposed to check himself in and out of the mine great uncertainty exists, as there are always those who forget to hang their checks on the board in the morning or take them off at night. This is true even where radical measures are adopted to cure men of their forgetfulness.

A thorough checking system that is reliable in every respect will go far toward driving the truth home to the heart of every mine worker that the country needs him at work in his place every day. The mine worker who lays off, except for sickness or other just cause, is as much a recreant to his patriotic obligations as the soldier who runs from the firing line or deserts the trenches. I believe that the gatehouse is an unfailing means of forcing this truth home. W. H. NOONE.

Thomas, W. Va.

Mutual Capitalizing

Letter No. 1—Allow me to commend the thought expressed in the Foreword entitled "Mutual Capitalizing," which appeared in *Coal Age*, Jan. 5, 1918. It is not without some experience in this particular field of endeavor that I am led to conclude you have struck the keynote to success in securing the highest efficiency in mine labor and a maximum production of coal, both of which are unquestionably supreme factors requisite to placing mining men, employers and employees in the first rank of loyal Americans, taking good care of the boys who must go "over the top."

It has been well said that the best kind of capitalizing, at the present time, is the mutual kind. And certainly one who has given the situation any consideration whatever will admit that profits and earnings are no longer the first in importance, but coal for the country's needs. Although hesitating to discuss this subject personally, the situation seems to demand that natural diffidence be cast aside and we all do our bit to assist the general understanding.

Success in Campaigning Among Miners

Mutual capitalization of coal-mining interests forms the corner stone to national prosperity—the strong shield of the nation's safety. To obtain this in the most effective form there can be no distinction of master and men. Where responsibility is uneven, the burden naturally rests with the so-called masters who have the advantage of their position and education, which gives them a clearer insight into the difficulties now confronting us all.

How may a realization of this truth be best brought home to everyone, in order that results may follow equal to the emergency and develop the highest type of loyalty? To my mind this question is best answered by an explanation of several campaigns which have recently been conducted in this and other mining districts, each embracing different lines of endeavor and all converging to the same end.

The first was a Y. M. C. A. war-fund campaign. Raising money for patriotic purposes is not a novel undertaking for this organization. The proposition, in this instance, was so extensive in its application that it justified an appeal to every class of citizens. As we happen to be located in a mining community there were few workers or employers who were not solicited. The result was gratifying, indeed, but it was felt that even more could have been accomplished.

The first Liberty Loan campaign was next begun. At all mines in this region the work was pushed with commendable zeal and, as the world knows, the desired amount was far oversubscribed. It was significant, however, that in withdrawing the excess subscriptions the Government limited the refunds to purchasers of $20,000 worth of bonds and upward.

When it came to launching the second Liberty Loan subscription it was evident to the mining managers who had taken direct interest in this work (and be it said they were most efficient and commendably active) that something had to be done to break down the barrier that unmistakably existed between them and the so-called foreign class of workers.

The recognition of this fact supplied the first step in advancing mutualization, and it brought actively into the field the assistance of the officials of the United Mine Workers, who were eager to do their bit. In this district a number of meetings were held where the coal company and the union officials sat on the same platform with the mine workers, and results were far more successful than in either of the previous campaigns.

Special Efforts Made To Interest Foreigners

This was followed by another war-fund campaign conducted by the Knights of Columbus, which was similar to that of the Y. M. C. A. campaign. A change of method was again adopted, in that the managers of this campaign took another course to educate the foreign element, whom they knew were just as loyal and equally anxious as their fellows to do their share if properly approached. The pastors of the various churches were first called upon and their active coöperation was secured without difficulty. The success of this last campaign was most astonishing, since it included in the list of subscribers 85 per cent. of the foreign population. Other campaigns followed, such as the Red Cross and kindred funds, each of which found the work greatly facilitated by what had gone before.

I have detailed this somewhat in order to make clear the point that "mutual capitalization" can be done with complete success but only by an active campaign, wherein the mine owners and mine officials who have been most active in formulating plans for patriotic work will forget their titles, divorce themselves from the professor's chair and join in an out-and-out mutualizing campaign.

It is idle to say that the spirit of equality prevails, or that those who know best how to work have been willing to do missionary duty of this sort. They have not; and until they come to a definite decision in this respect, and go out and solicit aid from those who have real influence with their employees, we shall continue to have "Plough Mondays," Little Christmas, Ducking Days, protracted paydays, big heads and a reduced coal production.

The officers of the United Mine Workers have shown their sincerity in endeavoring to increase the produc-

tion of coal. They have exhorted their followers to stay on the job; they have addressed meetings; instructed local leaders to be active and persevering; and in the larger conferences with Conciliation Boards, Government representatives, fuel administrators and operators' committees have given every assurance of their securing a maximum output at the mines.

Let me ask, in closing, Why should this work be left exclusively to these men? Are the mine owners and mine officials willing to admit the intellectual superiority of the union leaders? It would appear so, and yet it is safe to say that a new and improved method can be evolved if those brilliant men who officer the coal companies of the anthracite districts will take an active interest and give a helping hand. It is evident that there are many ways in which this mutualizing can be brought about; but as an individual I would hesitate to offer any suggestion beyond recommending the most serious consideration of the proposition, on the part of all mine officials. They are urged to take this matter up seriously, and open negotiations with the end in view of improving the intimacy of district, local and mine officials, which will eventually bring Yonko, Antonio and Koziusko into the field of educational endeavor for mutual capitalizing. W. E. JOYCE.

Sandy Run, Penn.

Relative Size of Intake and Return Airways

Letter No. 3—Referring to the discussion in regard to the relative sectional areas of intake and return airways, I feel somewhat like F. E. Schroyer, *Coal Age*, Jan. 5, p. 32, who prefers to make the haulage road the larger, regardless of whether it is the intake or the return airway of the mine.

Theory has always answered this question by referring to the increased volume of the return air current, which is due to its generally higher temperature and the presence of gases generated in the mine. The correctness of this assumption cannot be denied, but there are practical reasons that seem to overbalance these conditions and require that the intake airway, when used as a haulage road, should have a larger sectional area than that required for the return current.

This question, to my mind, is a very important one, especially at this time when so many new mines are being opened around the country. These are often in charge of young men of limited experience in mining. I would like to see the matter thoroughly discussed by older and more experienced men than myself, as there is weight of argument on both sides of the question.

In respect to this matter I am inclined to reason about as follows: Assuming that the main haulage road is the main intake airway, in a mine where motor haulage is in use, let it be supposed that a 20-ton motor is employed and hauls trips of, say 25 cars in and out of the mine, or there may be two of these motors in use. There is usually one trip of cars standing on the siding or at the shaft or slope bottom, while another trip is moving on the airways.

We may assume that the clear sectional area of the airway is 70 sq.ft., of which the motor and trip take up about 21 sq.ft., leaving a net area, for the passage of air, of 70 — 21 = 49 sq.ft. I will assume that the original velocity of the air passing into the mine is 900 ft. per min., which would give 900 × 70 = 63,000 cu.ft. of air in circulation.

Now, my idea is that a motor trip standing or moving in an airway blocks the air very much as a box regulator, which increases the velocity of the air passing, while it decreases the sectional area. Then, let me assume that the velocity of the air passing a trip of cars is increased to, say 1000 ft. per min., the effect of which is to reduce the quantity of air in circulation to 1000 × 49 = 49,000 cu.ft. per min. On this basis, the loss in circulation would be 63,000 — 49,000 = 14,000 cu.ft., or over 22 per cent.

In my experience in charge of mines, I have observed a similar decrease in the circulation of air on main haulage roads when a driver was coming against the air. If that is true in the case of a driver, it may be supposed that a fast-moving motor trip will have an even greater effect. The question is, how far do these facts hold in affecting the general circulation of air, in a mine where the haulage is performed on the intake airway? AN INTERESTED FOREMAN.

McIntyre, Penn.

[This is an excellent question for discussion, and there is no doubt that there are many important points to be brought out and remembered, affecting the problem. Indeed, no absolute rule can be given that will fit all cases. The best that can be done is to draw attention to the so-called theory of the increased volume of the return current, demanding an increased sectional area of the return airway; and the practical requirements of all main haulage roads, calling for a safe clearance at the side of the track, when considering the resistance offered by moving trips of cars.

In general it is needless to discriminate between the two cases, whether the haulage is performed on the intake or the return airway of a mine, since the empty and loaded trips pass in different directions going in and out of the mine; and while their movement resists the flow of the air when going in one direction, it assists the air movement when going in the opposite direction. These two conditions would almost balance each other, in respect to the general circulation in a mine, except for the fact that the loaded trips create a possibly greater resistance than that produced by the empty trips, which would be the case when haulage is performed on the intake airway. This difference, however, has a comparatively slight effect on the general circulation.

AN ERRONEOUS ASSUMPTION

The suggestion is offered that a motor trip standing or moving in an airway acts very much as a box regulator, increasing the velocity of the air passing, while decreasing the area of passage. It is a mistake, however, to estimate this increased velocity as being only 1000 ft. per min., in the case assumed by our correspondent, the original velocity being 900 ft. per min. This is pure assumption and not in keeping with the actual facts.

The question of how much the general circulation of air is decreased by a trip of cars moving against the air current can only be correctly estimated in a manner resembling that of a movable piston in a cylinder having

a larger sectional area than the area of the piston. The effect is to set up a local dynamic equilibrium between the energy of the air current, which is opposed and equal to the energy of the rush of the moving cars transmitted to the air about it.

That would be a difficult question to solve satisfactorily; but, as previously stated, the effect on the general circulation of the mine, owing to the movement of the trips in opposite directions, is so slight that it may be practically ignored. In other words the actual effect, as observed by the anemometer readings mentioned, is only temporary and counterbalanced when the conditions are reversed by the trip running in the opposite direction.

This resolves the question into one of increased volume of the return air-current, requiring an increased area of that airway, without regard to whether it is the haulway or not. The question of providing a safe clearance on the haulway is another consideration aside from that of ventilation.—Editor.]

Miners and the War

Letter No. 6—I have been greatly interested in the letters relating to the attitude of miners in respect to the war. In a few instances the miner has been charged with a lack of patriotism. Some writers seem to imply that the miner is getting rich quick, owing to the increase in wages granted him.

Since like increases have been granted working men in all trades and industries, the miner is not alone in this respect. The increase is a recognition of the character of the times and has become a seeming necessity, because of the very large increase in the cost of living. Wage increases are, also, the worker's just share of the largely increased profits that have come through the amazing expenditure of money in the present crisis.

The trend of affairs in the industries of the country causes the thoughtful man to stop and consider what is to be the outcome. The process of increasing prices and then increasing wages to meet them, it is certain, cannot go on forever, and retrenchment will surely come when the difficulty will be to reduce wages without causing a serious disturbance in the labor world. There is such a thing as killing "the goose that lays the golden egg," and we may yet see the application of this old adage.

True Attitude of American Labor

The time has come when labor, in this country, can and should meet all conditions with a thoughtfulness that is unknown in other countries. American labor is possessed of a generally high-average mentality, and this, together with the fact that the true American is animated at the present time by a real spirit of patriotism, will greatly assist in avoiding trouble when affairs take on a different aspect and there is the necessity for curtailment.

In this connection mention has been made of the injustice that is done to that large class of clerks and other salaried men, many of whom are still working for the same salaries that they have been receiving for years past, notwithstanding the fact that they have to stand the same high cost of living as other workers whose wages have been increased.

This is something for all employers to think about. I believe that the average employer does not desire to make a fortune at the expense of a few of his employees. He desires to do the fair thing by all of his men; but these inequalities are largely the result of oversight or thoughtlessness on his part.

I recall reading in *Coal Age* a short time ago an excellent article by an anthracite superintendent [Dec. 15, p. 1008]. The article ought to be read by all superintendents, who should consider carefully the suggestions made. No one who is familiar with the situation here in the anthracite field will imagine for a moment that a man holding a position as superintendent of a large colliery would make these suggestions, unless he felt that they were of the greatest importance to the coal industry. Nor will anyone familiar with conditions existing in and around the anthracite mines fail to understand what that superintendent said about national prohibition bringing a large increase in the production of coal and greatly lessening mine accidents.

Somewhere I have read the statement that 85 per cent. of the men working in and around these mines are given to overdrink on payday and are unfit for work for days afterward. I cannot let this statement go unchallenged, as it is untrue. We all know perfectly well that there are men in every colliery and mining camp who drink too much and are unfitted for work for several days following payday. It is true, also, that the total number of days lost to coal production in a single colliery or field is formidable, but it does not reach the percentage indicated by my former statement.

Problem for Mine Officials

This waste of man-power and production is a matter for superintendents and foremen of mines to consider and take steps to eliminate. It is idle to talk about sacrificing and saving coal and then overlook the weightier matter that causes such a great loss in coal production as the presence of the saloon in mining camps. Think of schools, in the heart of the anthracite coal fields, being closed down to save fuel, depriving the miners' children of the chance of an education, while their fathers are grouped around a hot stove in a barroom, making themselves unfit for work and proving a real loss to the production of coal.

By ridding the mining camps of the saloons, hundreds of thousands of dollars would be saved to the company. The saloon is the last thing the miner sees in the morning when going to work and the first thing he strikes on his return from the mine. There ought to be ways and means of approaching this question through the courts, since it is a matter that should be subject to regulation by the Government in the efforts made for conservation and increased production.

It is my belief that most, if not all, miners are true Americans, in this war. What is needed is leaders, whether in the form of company officials or the officers of their union. In order to enable the miner to do his part all must unite in a war-saving plan, with the details of which every mine worker should be made familiar. Nothing can do this more effectively than for officers and men alike to coöperate in the work, shoulder to shoulder, for the same great end.

The public should cast aside the idea that the miner is thriftless and extravagant. Readers of the daily press should not be misled by the foolish tales that appear, from time to time, in its columns. Only a

few days ago the *New York American* printed an item stating that the head of a large coal firm, owning mines in and around Wilkes-Barre, drifted into his own company store, bought a 5c. cigar and started to smoke, when he was accosted by a miner with the words: "Stranger, throw away that butt and smoke this real cigar. It's a 40-center." Another item stated that a Philadelphia florist, who had filled several out-of-town orders for chrysanthemums, found, on investigation, that they were going to miners' homes. Such talk, as it relates to the average miner, is mere twaddle.

Regarding the patriotism of miners, let me say that, as an American miner, my patriotic feelings have been sorely strained by the conditions at the mines during the past two weeks. My output in that time fell from a possible 250 to only 100 tons of coal. I have been to the mine three days in succession without being able to work a shift; and yet during all that time the mine worked 8 hours each day. A MINER.

Kingston, Penn.

Blacklisting To Prevent Accidents

Letter No. 7—I have been reading with much interest the arguments advanced by different writers for and against the blacklisting of careless miners as a means of preventing accidents, but not a word is said in favor of blacklisting a careless fireboss, assistant mine foreman, foreman or superintendent. Are not some of these men as careless, at times, as the average miner? If so, why not blacklist them as well as the miner? I know we have some mine officials who are equally as careless as the miner they employ.

It does not seem to me a fair proposition, however, to blacklist men for an infringement of the mining law or for being careless and I believe it would be illegal. No one ever talks of blacklisting the man who violates other laws of the state. Why, then, blacklist him for violating the mining laws? If a man commits a crime he is arrested and punished for his misdeeds according to the law.

What right would a mine foreman or other mine official have to discharge a man and blacklist him for carelessness or for breaking the rules of the company or the laws of the state? Are mine officials constituted judge and jury? The man found guilty should be reported to the mine inspector who is the proper authority in this case, and let him punish the offender according to law.

Blacklisting Wrong in Principle

If the blacklisting of men was permitted and put into force it would be a vicious and dangerous practice as it would give one man, and perhaps an unscrupulous one, power to injure another without giving the latter any opportunity to defend himself.

One writer states, *Coal Age*, Jan. 12, p. 74, "Lack of discipline on the part of mine officials is responsible for much carelessness on the part of miners." But, lack of discipline on the part of the man having authority to enforce discipline is nothing less than carelessness, and he is therefore responsible for the act of the miner, and is the one, if any, to be blacklisted. But I say, blacklist no one, it is contrary to all the principles of law and justice. Punish a man for his misdeeds and then send him back to his work and he will seldom give further trouble.

No one would think of blacklisting a soldier for carelessness or for some breach of discipline; he is court-martialed and punished, according to the seriousness of his offence, and is made a better soldier after he has been taught a lesson in discipline. In the same manner, every man should have a chance to defend himself before the legal authorities for any careless act that he has committed in or around the mine.

All men working in and around mines are working under the state mining law and are answerable to the state authorities for any violation of that law and that should be the only way to punish them. I am not, in any manner, trying to defend the careless miner or mine official but am objecting to the method that has been suggested for punishing them by blacklisting.

Uniontown, Penn. JUSTICE.

Letter No. 8—Referring to the suggestion of blacklisting men found guilty of acts of carelessness or disobedience to orders, allow me to say that I hope and trust the day is not far distant when the name or thought of "blacklist" will be forgotten and banished forever. In my opinion it is not worthy of any consideration in the minds of thoughtful men.

No one can deny that there are many careless men employed in and about coal mines and that their acts may be the cause of serious accidents. Observation and experience, however, force one to the conclusion that more accidents occur in mines as the result of the failure of mine officials to install the necessary appliances or perform the work required to make the mine safe than are caused by the neglect or carelessness of miners. From the general manager down to the assistant foreman, the disposition of mine officials in most mines is to make every requirement of safety subordinate to reducing the tonnage-cost for the mine.

The Daily Press on Mine Accidents

A miner may be injured or killed by a fall of slate, and the accident is heralded in the newspapers as the result of the poor miner's ignorance or recklessness. It is even made to appear, to the eyes of the public, as approaching a case of suicide. But, were the real facts known, in many cases the blame for the accident would be laid at the door of the management for its failure to supply the necessary timber to make the working places safe.

Where these facts are true, as they are in many instances, the method of blacklisting men for accidents would generally be unjust; many innocent men would suffer for what was not primarily their fault. Where safety is the first consideration in the mind of a management, there are always fewer accidents recorded against the mine.

It is the tendency of many mine officials to put off for tomorrow what should be done today. This is the cause of many mine accidents that leave children fatherless and deprive wives and mothers of their support. Untold loss and sorrow are the results of these accidents, many of which are avoidable. There is loss to the company by whom the man was employed and sorrow to his family. Let the blame be placed where it belongs.

Nanticoke, Penn. W. A. BARRETT.

INQUIRIES OF GENERAL INTEREST

Treatment of Impure Feed Water

At present much time is being lost in the operation of mines in this district, by reason of the scarcity of water to feed the boilers. Owing to the continued severity of the weather, the reservoirs and other sources of water supply at the mines have failed, many of them being almost frozen solid.

The mines, at the same time, appear to be making about the usual amount of water, which drains into the workings and must be removed by pumping. In its passage through the strata, this water has often absorbed so many impurities that it is unfit for use in the boilers, and must be allowed to run to waste, unless some practicable means can be found for removing the impurities and making the water fit for service.

Any information that *Coal Age* or its readers can give in regard to the character of the impurities that are most harmful in boiler practice and means for their removal, will be of great interest to many readers.

Linton, Ind. W. H. LUXTON.

The scarcity of water supply at the mines is quite general throughout the country, at this time, and more than one mine has faced the alternative of using the impure water discharged from the pumps, or closing down till a supply of water could be obtained suitable for use in the boilers.

The impurities contained in mine water may be mineral salts, as carbonates or sulphates of lime, magnesia, iron, sodium or potassium, dissolved from the rock formations and held in solution by the water as it drains into the mine; or sediment held in suspension, as organic matter, mud, or other foreign substance washed from the strata.

In the boiler, these impurities do not escape with the steam but remain in solid form and incrust the inner surface of the boiler and the tubes with a scale of varying hardness depending on the character of the ingredients. The formation of scale in a boiler not only reduces its capacity for generating steam, but retards the transmission of heat from the furnace to the water and causes the overheating of the boiler plates and endangers the boiler from the bulging of the plates or the forming of blisters.

The treatment of impure boiler feed waters may be classified under three heads: (1) Chemical; (2) thermal; (3) mechanical.

1. The presence of mineral salts or free acid in feed water requires chemical treatment to effect the precipitation of the salt or the neutralization of the free acid. This is accomplished by means of so-called "boiler compounds." No boiler compound, of which there are many on the market, however, is of general application, and the only safe rule is to have a competent chemist analyze the water and recommend the proper treatment. Without such analysis and competent advice, the use of a boiler compound recommended as having proved efficacious in one or more instances, may do more harm than good.

Many boiler compounds are designed to form, by chemical reaction, a new salt that will not make as hard a scale but one that is readily removed, either by blowing off the boiler at intervals, or by the use of scrapers when the boiler is out of use. Other compounds contain substances that coat the crystalline precipitate with a film that prevents their cohering and forming a solid scale. A small quantity of kerosene added to an impure feed water will often have the same effect in preventing the consolidation of the carbonates of lime and magnesia precipitated by the heating of the water, but the use of oil, except in very small quantity, may coat the boiler with a thin film that tends to decrease its steaming capacity slightly.

2. The carbonates of lime and magnesia are held in solution in water containing an excess of carbonic acid. When the water is heated to boiling, the free acid is expelled and these salts are precipitated. This makes it possible to purify such waters, by heating them in large tanks or feed-water heaters, and then allowing time for the precipitated salts to settle before pumping the water into the boiler. This process is known as the "thermal treatment" of feed water.

3. When a feed water contains sediment, as mud, sand or organic matter, this can often be separated by running the water first into large settling tanks and allowing sufficient time for the sediment to settle before using the water. The heavier matter, sand and mud, can generally be separated in this manner, but light organic matter will often require filtering the water through a specially prepared filtering tank or basin.

It has at times been found advantageous to install a purifying plant, which combines any or all of these means and processes, where it is necessary to use large quantities of an impure water. The installation and operation of such a plant will often prove a large saving in expense, which would result in attempting to operate the boilers without first purifying the feed water.

Impure feed waters act in three ways to cause trouble in boiler practice, according to the character of the impurities they contain. (1) Such water may simply incrust the boiler by forming scale of varying hardness and which must be removed from time to time. (2) The water may be corrosive in its action and attack and eat away the metal and thus weaken the boiler. (3) The impurity in the water may be such as to cause priming, by which water would be carried over from the boiler into the cylinder of the engine.

Feed water containing carbonates of lime and magnesia or iron are prone to form scale; and a feed water containing organic matter, chloride or sulphate of magnesia and some free acid, will corrode the boiler; while water containing sodium carbonate or other alkalies and organic matter induce priming.

EXAMINATION QUESTIONS

Indiana Mine-Bosses' Examination, Vincennes, Jan. 17, 1918

(*Selected Questions*)

Ques.—What factors of safety should be kept and maintained at the surface landing where miners are being lowered or hoisted out of mines?

Ans.—The means of safety, or safety appliances, that should be kept at the surface landing of a shaft or slope are the following: (1) Safety blocks to prevent cars running into the shaft or slope. These blocks should be arranged automatically so that when released they will fall back into position to stop cars from running past them. (2) A derailing switch, which should also be automatic and set for the sidetrack, except when in use to take cars into the mine. It is a good plan to have the grade rise slightly toward the shaft, so as to prevent surface drainage finding its way into the mine. (3) The head of a shaft should be protected by automatic safety gates so arranged as to be operated by the cage, rising with the cage as it reaches the surface and falling again as it starts to descend in the shaft. (4) There should be speaking tubes or other means of communication between the head of the shaft and the engine room and the shaft bottom.

Ques.—(a) What effect does a misplaced shot have in the presence of firedamp? (b) In the presence of coal dust?

Ans.—(a) A misplaced shot when fired may produce a considerable quantity of flame, which is projected from the hole as the result of the shot blowing the tamping from the hole or an overcharge of powder crushing the coal into fine fragments. In either case, the projected flame would ignite any accumulation of firedamp in the place and a more or less local explosion of gas would occur.

(b) Where a shot is misplaced or overcharged and a blownout or windy shot occurs, in the presence of an accumulation of coal dust, the latter is thrown into the air and ignited by the flame of the shot, producing a local dust explosion that may or may not be propagated throughout the mine, depending wholly on conditions in the workings.

Ques.—What methods would you adopt to protect surplus powder?

Ans.—No surplus powder should be kept on hand in the mine. Safety requires that the miner should take into the mine only sufficient powder for the day's supply, and this should be kept by itself in a box that is securely locked. Strict regulations should be enforced, in this respect, throughout the mine.

Ques.—What instructions would you give and what precautions would you take, as mine boss, to prevent accidents through shotfiring?

Ans.—Shotfirers should be instructed not to start to fire shots until all persons have left the mine, except themselves. They should begin firing on the end of the air and proceed in regular order, advancing against the air current. Each shotfirer should only fire the shots in his own section of the mine. Two shotfirers should not work together in the same section. Shotfirers should fire no shots that, in their judgment, appear to be unsafe. When firing shots in any place, ample time should be given for the air current to clear away the smoke and gases that may have backed into the place from the shots previously fired in an adjoining place.

For the protection of shotfirers, a mine boss should employ only competent men for that work and should give them authority to refuse to fire any shots that, in their judgment, are unsafe. Greater safety is insured where the shotfirers are required to examine, charge, tamp and fire all holes drilled by the miner and which they consider safe. The mine boss should divide the mine into sections of such size that the firebosses can complete their work in the prescribed time, without being required to do the work too rapidly. As far as practicable, permissible powders should be used in blasting and strict regulations should be made and enforced governing the entire work.

Ques.—(a) What per cent. of air is oxygen? (b) What is the difference between a dangerous atmosphere and a fatal atmosphere?

Ans.—(a) Oxygen forms 20.9 per cent. of air, by volume; and 23 per cent., by weight. Thus, 1000 cu.ft. of pure dry air contains 209 cu.ft. of oxygen; or, 100 lb. of pure air contains 23 lb. of oxygen.

(b) A dangerous atmosphere is one that approaches the danger limit, owing to its being charged with gas or dust, to such an extent that ignition is liable to occur in the ordinary operation of the mine, either from blasting, the sparking of electric wires, blowing out of fuses or the use of open lights, or a defective safety lamp. An atmosphere may become dangerous by the presence of poisonous or irrespirable gases, or an insufficient amount of oxygen.

A fatal atmosphere is one that would cause death if breathed in sufficient quantity for a sufficient length of time. An atmosphere may be considered as fatal when it contains a sufficient percentage of explosive gas to cause a fatal accident.

Ques.—How many tons of coal in a 5-acre block of coal 6 ft. in thickness, assuming there are 27 cu.ft. in 1 ton, and allowing 20 per cent. off for waste?

Ans.—The cubic contents of this seam is $5(6 \times 43{,}560) = 1{,}306{,}800$ cu.ft. Then, allowing 20 per cent. off for waste leaves 1,045,440 cu.ft. Finally, allowing 27 cu.ft. per ton gives a total tonnage in this tract of $1{,}045{,}440 \div 27 = 38{,}720$ tons.

The above calculation gives a result that is rather in excess of the weight of coal usually recovered, under ordinary mining conditions, although with a proper system of mining it may be obtained. A common rule is to allow 100 tons of coal per inch-acre, which would give, in this case, $5(6 \times 12 = 100) \times 36{,}000$ tons.

COAL AND COKE NEWS

Harrisburg, Penn.

Overshadowing the inability of the railroads to move coal quickly from mine to market, a water famine has tied up several big collieries in the Schuylkill region. About a dozen collieries are on the verge of a shutdown for the same reason. The scarcity of water has crippled the production of coal seriously since the severe cold weather began.

Thousands of loaded cars have been held in classification yards and on sidings. The congestion, however, is gradually being cleared by the aid of high officials of the railroad companies, who are taking personal charge of affairs and staying "right on the job." Zero weather has frozen reservoirs and streams from which water is drawn for steam purposes. The water situation in the Wyoming and Lehigh fields is reported to be good. This difficulty was overcome years ago by some of the coal companies who put down wells on their properties.

Labor leaders in the anthracite belt who are keeping in touch with the convention of the miners in session at Indianapolis express themselves as well pleased with the vote on the proposition of permitting other districts to take part in the formation of a basis wage scale. The vote was of vital interest in the hard-coal fields, as the entire system of dealing with the coal operators was at stake.

President Dempsey of District No. 1 presented that side of the situation in a lengthy speech. The carrying of the insurgent proposition would have given the soft coal men a right to be in on the settlement of the rates for the anthracite district. This is the domination that the hard coal operators have always fought against and would have, if carried out, ended the status that has made possible an avoidance of industrial conflict during a long period of years.

After five months' investigation of the anthracite situation in the interest of the consumer, former State Representative Frank C. Reese charged on Jan. 25 that the anthracite operators are perpetrating on the public the most "damnable gouge" in history.

Mr. Reese is a Pottsville business man and knows the practical side of the coal business. He charges that the Federal Fuel Administration is permitting the anthracite combine to sell as coal "everything that's black," at the exorbitant fixed rate of Government regulation.

With the transportation systems clogged and many cities suffering for want of coal, Mr. Reese discloses that the vaunted overproduction of the coal mines is merely the production of refuse and dirt.

"From 30 to 40 per cent. of coal going to the market today," Mr. Reese said, "is but refuse. This slate, bone and dirt, with which coal is being adulterated at the highest prices in history, is clogging the railroads and giving but half the heat which the same amount of real coal would give. It is the most damnable gouge in the history of the coal fields."

Mr. Reese finds that the washery coal which is sold as pea coal costs the operator but 20 to 25c. to place on cars. "And then it is coal that he cannot use," is Mr. Reese's comment. "A washery has a gold mine beaten," Mr. Reese continued; "I know of men who are cleaning up from $150 to $200 a day on an investment of nothing."

At a meeting held during the week by the Board of Trade of Scranton and officials of a number of coal companies mining in Lackawanna County, some of the details of the mine-cave solution plan were threshed out. The plan of settlement of the problem was considered last week at a meeting of the heads of coal companies in New York. It is expected that another conference with the presidents of the leading coal-mining companies will be held in the near future.

The plan submitted is said to provide for the levying of a tax on every ton of coal mined, the proceeds to be used to prevent caves and repair damages to buildings above ground, if such damages occur. A spirit of willingness on the part of the operators to consider the plan of the committee and discuss all questions in dispute in a friendly way was evidenced, when the conferees on both sides organized as a joint committee and elected John H. Brooks chairman.

The board committee does not assume that it can settle the problem of itself, but will endeavor to get the best offer possible from the operators.

The operators were represented at the meeting by W. W. Inglis, vice president of the Delaware, Lackawanna and Western coal department; Charles Dorrance, general manager of the Delaware & Hudson Co.; W. L. Allen, vice president of the Scranton Coal Co.; W. L. Connell, president of the Green Ridge Coal Co.; Joseph P. Jennings, general manager of the Pennsylvania Coal Co.; John G. Hayes, vice president of the People's Coal Co.; David Spruks and Cornelius Comegys, of the Bulls Head Coal Company.

Hundreds of Scranton property owners in that fortunate area comprising more than half the built-up section of the city that is covered by the Supreme Court decision in the Penman vs. Jones "third estate" case, have availed themselves of the opportunity to reattach to their properties the right of surface support, which they waived in the old deeds received from the Lackawanna Coal and Iron Co. The "third estate," under the Supreme Court decision, is vested in the Scranton Trust Co., and that company may sell or convey it. The court ruling also fixed that to get the benefit of the right it must be reattached before the support is removed, and the shrewd property owners are hastening to buy it before the present big demand for coal results in more extensive pillar mining.

During the week several conferences were held between State Fuel Administrator Potter and a number of soft coal operators' representatives, as well as with railroad officials, and it has developed that the kernel of discussion was the advisability of introducing soft coal for householders. It is the intention of the fuel administrators to recommend to the people the using of soft coal, not to take the place of anthracite entirely, but to simply aid in supplying the demand that cannot be filled by anthracite.

How soon soft-coal shipments will begin to flow in no one is ready to say. The reason for turning to bituminous is obviously a matter of supply, bituminous operators hold. Eight times as much soft coal is mined as anthracite every year. More than 60,000 tons of bituminous is mined in central Pennsylvania. Anthracite operators acknowledge they are at the peak of their production. Soft coal men admit the capacity of their mines is going to waste from lack of enough cars and locomotives to haul the coal away.

In the state, during 1917, there were 3748 men killed in the mines, in industries and on public service lines, as against 2814 in 1916. These were divided up as follows: Mines, 1166; industries, 2136; public service lines, 448. In 1916 fatalities were divided up as follows: Mines, 1059; industries, 1225; public service lines, 350.

Luzerne leads the counties of the state in mine fatalities with 222; Schuylkill is second with 161, and Lackawanna third with 151. In industrial fatalities, Allegheny is far in the lead with 336; Philadelphia is second with 268, and Delaware is third with 110. In the anthracite mines 612 men were killed, while in the bituminous field 554 were killed.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Among the changes made recently in the executive department of the Lehigh and Wilkes-Barre Coal Co., the most important was the appointment of William James, of Plymouth, to succeed the late Michael Flaherty as superintendent of preparation. The position carries with it full charge of the preparation of coal in the nine collieries and two washeries of the company in the Wyoming field. Mr. James is 32 years of age. New appointments in the engineering department, all effective from January 1, are: Harry E. Owens, district engineer, Wilkes-Barre district; John B. Tambyln, district engineer, Sugar Notch district; Roland G. Carpenter, district engineer, Plymouth district.

Frank G. Nicholson, a former engineer in the mechanical engineering department, has been appointed as electrical engineer, having supervisor's control of electrical construction and electrical apparatus at all operations of the company. A. H. Partridge, one of the engineers in the department, was promoted to acting mechanical engineer in charge of the mechanical engineering department during the absence of J. H. Doughty, who has entered the military service as captain of engineers' corps.

Pittston—"Somewhere in the Barnum Mine" was written on the envelope addressed to Frank Cicoski, whose questionnaire was sent to him but was returned with above address to the exemption board. This proved to be true, as on Jan. 21 his remains were found under the cave that occurred at the Barnum mine on Jan. 5, the shift about to quit at 11 p.m. having found the body. Decomposition had set in, and early in the afternoon the odor arising therefrom indicated to the state inspectors and company officials that the body must be there. When found it was covered under a quantity of coal. It is supposed that Cicoski had got confused in trying to make his escape and that he ran right under the fall instead of making his way out with the other men who escaped to a place of safety. Deceased was 24 years old.

Dorranceton—Three collieries in Wyoming Valley—the Franklin and Prospect of the Lehigh Valley Coal Co., and the Pettebone of the Delaware, Lackawanna & Western Railroad Co.—operated in whole or in part on Sunday, Jan. 20. This Sunday work in producing coal is almost unprecedented in the history of the anthracite coal region. There was no mining of coal by the Lehigh Valley Coal Co. The breakers of the two collieries mentioned were operated to prepare coal from the William A. breaker, which had accumulated during the week, the William A. breaker having burned down a week or so ago.

Beaver Meadow—The new Evans colliery will be placed in operation about Feb. 3. The contractors have completed the new breaker, and only a few details are necessary to place the colliery in full operation. Starting at a time when the scarcity of coal is sorely felt, the new firm hopes to be able to help relieve the fuel famine by operating the new plant to its greatest capacity.

Scranton—Deeds were filed on Jan. 24 conveying the title of the property of the Coal Lands Securities Co. on Lackawanna Ave. to the Delaware, Lackawanna & Western Coal Department. The new building is to house the coal company offices.

Edwardsville—The Kingston Coal Co. is offering to its employees instruction in mining, mathematics, the common branches, and English to foreigners. Employees should take advantage of this opportunity and attend regularly the evening schools at the company's library on Main Street.

Dunmore—In an effort to increase the coal production as much as possible, several thousand miners employed by the Pennsylvania Coal Co. at its 14 collieries have signified their willingness to work nine hours a day. Frank H. Coughlin, assistant to the president, states that the agreement of the men to increase their working day one hour is a mutual one. "Officials asked the men to work and the employees displayed true patriotism in immediately offering to labor an additional hour." The company expects to greatly increase the tonnage by the men working nine hours instead of eight hours.

Pottsville—A tax of $500 on a deed to property worth $500,000 was paid at the courthouse on Jan. 24 by J. Claude Bedford The tax is for internal revenue on 1500 acres of coal land sold by Fred A. Delano to the New Boston Land Co. The new concern will merge interests which will obviate the necessity of the maintenance of expensive barrier pillars.

Gowen City—The water famine has become so acute that the Roaring Creek Water Co., controlling the supply for domestic and commercial uses, on Jan. 24 notified all coal companies that unless there is rain or a thaw within five days the water supply to the collieries in Northumberland County, already seriously affected, will be reduced 50 per cent. Arrangements are being made by the mining companies to purify mine water for steam and coal-preparation purposes. To do this enormous quantities of lime and soda ash will be required. Officials say the water shortage has never been so acute and fears are expressed that a reduction in the output is inevitable.

Mount Carmel—The entire staff of chemists of the Philadelphia & Reading Coal and Iron Co. is making tests of the mine water at all collieries in this district in a hope that they may devise some chemical process through which to eliminate acids from the water so as to protect metal in machinery in the event that it becomes necessary to use the mine water in the preparation of coal. The water famine is becoming more serious, and it may be necessary to resort to the use of water pumped from the mines.

Throop—A hero medal has been awarded to Mrs. Daniel Thomas, for the heroic act of her husband who gave up his life in attempting to rescue two fellow workmen in the Mount Pleasant mine. The medal was donated by the Carnegie Hero Commission of Pittsburgh, which also awarded a cash consideration to Mrs. Thomas and her three-year old daughter.

Jeddo—The G. B. Markle Co., largest individual coal operator in the state, has started the erection of a steel washery through which a number of culm banks will be prepared for the market.

Drifton—Officials of the Lehigh Valley Coal Co. on Jan. 24, solved the problem of transportation of workmen from Hazleton to its North Side strippings and collieries, by the purchase of two of the trolley cars owned by the Lehigh Traction Co. The workmen who will use these specials are all employed at the Lattimer strippings, No. 9 and Drifton and Wolfe collieries. For some time the Lehigh Valley has been experiencing considerable difficulty with the transportation problem and it was met in this fashion. The cars were sold by the traction company, who will continue their operation for the coal company at special periods.

Stockton—Another tap has been made in the barrier pillar of the old Stockton mine, that will permit a greater flow of water from the flooded and abandoned mines to the sumps in adjoining mines. The successful entrance into the flooded region was made on Jan. 23, by using the same methods that were followed out several years ago. The added hole was obtained by the means of boreholes and gives a huge volume of additional water to the sump in other operations. The hole, as previously driven, while draining the mine, was not sufficient to reduce the levels to any appreciable degree.

Freeland—In order to keep his men employed, General Manager Jessup, of the G. B. Markle Coal Co., is having thousands of tons of prepared coal dumped into empty breasts. The company is swamped with orders, but railroad congestion hampers delivery.

Hazleton — The Lehigh Valley Coal Co. has discovered a way to avoid the delays due to the freezing of fuel brought from mines to the central breakers in the Lehigh region. A steam-heating shed has been erected there and in this cars are kept overnight. Similar plants will be built at other mines in the Wyoming and Schuylkill region.

Through arrangements made with the officials of the above mentioned company, Miss Anna Bock, of the coal company's welfare staff of nurses, has been added to the force of the Hazleton chapter of the Red Cross. During the period of the war the local chapter has received many calls for aid from families of men who have joined the colors. Those will be looked after by Miss Bock and her corps of nurses. Miss Bock is well trained for this class of work. Prior to entering the employ of the Valley coal company in its welfare department, organized when the compensation act went into operation, she was engaged in charity work.

Bituminous

Clearfield—The motor house of the Clearfield Bituminous Coal Co., in Rossiter, was dynamited recently, damaging four large locomotives used to haul cars from the mine, and burning the building. The 1800 men employed in the mine were thrown out of employment.

Connellsville—Two hundred and fifty cars of coal in the yards of the Baltimore & Ohio R.R. here was seized on Jan. 23 by D. W. Kuhn, fuel administrator for the Pittsburgh district. The coal was to be sent to plants of the Jones, Laughlin Steel Co., of Pittsburgh, which is working on war contracts. The coal supply of the steel company from its mines in the upper Monongahela Valley has been tied up since the first of the year by ice in the river, which prevents the movement of barges.

WEST VIRGINIA

Maitland — The tipple of the Houston Colliery Co., at Maitland, in the Pocahontas district, was burned last week by a fire believed to be of incendiary origin. This makes the fourth suspicious fire which has destroyed tipples in that field in the last two months.

Downs—The Rachel Coal Co. is erecting 25 new houses for the use of its employees at Downs, Marion County.

Teter—The Hercules Coal Co. is getting ready to sink a shaft in its coal land near here. The tract has been thoroughly tested, and it is the intention to follow up with the development work in the near future.

Weston—R. Bates Wooters, of Clarksburg, has sold his coal lease to the West Virginia Fuel Co. The purchasers are Fairmont men who contemplate early development.

TENNESSEE

Knoxville—From 10,000 to 15,000 coal miners in the Southeastern Kentucky-Tennessee field worked at digging coal on Sunday, Jan. 20, producing 600 cars of coal. Miners in the Southern Appalachian field have agreed to work ten hours daily instead of eight, when the car supply is available, so as to increase production.

London—Retail coal dealers here have had no coal to sell for a month. Local industrial plants have worked intermittently and wood has been the household fuel.

Nashville—The State Administration has decided to place the entire output of the state's prison coal mines at Brushy Mountain in the hands of W. E. Myer, state fuel administrator. It is proposed that the mines will make at least partial deliveries under existing industrial contracts.

MONTANA

Bozeman—What is believed to be one of the most important fuel discoveries in Montana in a number of years is a new 9-ft. vein of coal of excellent quality recently discovered by J. A. Black, Charles Stanley and W. DeHoog, of Manhattan, on their coal properties in the Trail Creek section. Thirty men are now working on the ground.

Roundup—The Carbon Mine Co., a Minnesota concern, is to sell the Keene coal mine at Horsethief Creek to a new concern, which is to reopen the property.

Lehigh—Lehigh mine No. 2, lying two miles from the present plant of the Cottonwood Coal Co., has begun producing coal. A new railroad line and new tipples have been completed and a temporary screening plant is being erected. A force of 150 miners is now working.

OREGON

Marshfield—The Henryville mine, leased a year ago by R. M. Jennings, has been turned back to its owner, the Coos Bay Lumber Co., with liabilities against it amounting to nearly $30,000. The mine had just commenced to reap the rewards of heavy investments in mining machinery and development work extending over a period of about a year, and an output of from 50 to 70 tons daily was going forward to marketing points. Since Mr. Jennings leased the mine new drifts and tunnels had been opened and the mine was brought to a high state of efficiency. It is said the Coos Bay Lumber Co. will continue the operations.

H. P. Scheol and William McArthur, of Tenino, Wash., have submitted a proposal to the citizens of Marshfield to establish a coal-briquetting and byproducts plant, with an initial capacity of 160 tons daily, to employ at the start from 50 to 75 men and within a year agree to have a $250,000 industry operating. Their proposal is they shall receive a free site and bonus of $15,000. Marshfield capitalists have obtained the site and are within a few thousand dollars of having the bonus ready. The plant would operate entirely on the slack coal which is wasted at the various mines.

Foreign News

Stellarton, N. S.—An explosion occurred shortly after 5 o'clock in the evening of Jan. 23rd, at the Allan shaft of the Acadia Coal Co.'s collieries, resulting in the death of 91 men. A blast of smoke was seen to come from the mouth of the pit, but no noise was heard. Nine men were brought up alive from the upper levels, but all on the lower workings were killed. The Allan shaft was one of the most productive mines in the Nova Scotia coal fields. The company has had, during the past two years, a great deal of difficulty with the shaft on account of fires caused by spontaneous combustion. Galleries that were on fire have been walled off by reinforced concrete to save the mine. A similar explosion took place in the shaft three years ago, fortunately happening on a Sunday, when there were but few men at work. Some 50 years ago there was an explosion in the same seam of coal, known as the Ford Pit explosion, in which more than 100 lives were lost. The recent catastrophe will reduce the output of coal by 500 tons per day.

Ottawa, Ont. — A meeting of the War Committee of the Canadian government was held Jan. 27 to devise measures for the relief of the coal situation. It was decided to take immediate action to secure increased coal production from the mines of Eastern Canada and to speed up the bunkering of ships in the Eastern ports. Fuel Controller Magrath has gone to Washington to confer with Fuel Controller Garfield of the United States.

Victoria, B. C.—Coal mines in the Crow's Nest Pass are putting out the greatest amount of coal in their history. The rate is now 23,000 tons a day.

Ladysmith, B. C.—A crew of fifteen men is at work at the colliery at Coalmont, taking out coal and getting the property in shape for large operations again. Blake Wilson and R. S. Lennie are the owners of the mine.

Personals

Harry J. Meehan has been appointed managing partner of Cosgrove & Co., of Johnstown, Penn., with which he has been associated as a partner for some time. Starting as a trapperboy at the age of 12 years, and working his own way up through the various stages of the coal mining business, Harry J. Meehan has worked at all phases of coal mining, being a trapper boy, triprider, spragger, digger, assistant foreman, foreman, engineer, general manager,



HARRY J. MEEHAN

superintendent and practically every other position in the business. Mr. Meehan will establish headquarters in Johnstown with offices in the Swank building. He will have supervision over the following plants represented by Cosgrove & Co.: Lenox Coal Co., Barnesboro, Cambria County, Penn.; Thermal Smokeless Coal Co., Portage, Cambria County; Homer City Coal Co., Homer City, Indiana County; Grazier Coal Mining Co., Foustwell, Somerset County, Penn.; Neel Smokeless Coal Co., Blough, Somerset County; Millerton Coal Co., Casselman, Somerset County; Moxham Coal Co., Johnstown, Penn.; Ernest Coal Co., Johnson City, Ill.; Marion & Pittsburg Coal Co., Marion, Ill.; Sootless Coal Co., Pittsburg, Ill. He will also have charge of the management of the Marion & Eastern R.R., in Illinois.

E. B. Sutton, the mining engineer who has charge of rescue work in southern

mines for the Bureau of Mines, has resigned to enter private employment.

Thomas J. Dunbar, formerly Buffalo representative of B. Nicoll & Co., of Pittsburgh, has taken the position of Canadian manager of the lately organized Ontario & Pittsburgh Coal Co., with headquarters in Toronto.

Richard W. Gardiner, of Pittsburgh, Penn., Commissioner of the Pittsburgh Coal Producers Association, with offices in the Farmers Bank Building, at a recent meeting of the operators' association was appointed district representative in the distribution of coal.

Daniel A. Wentz, a Philadelphia coal operator, has been added to the staff of General Goethals. Mr. Wentz has been in Washington since the early days of the war as an assistant to George A. Peabody, chairman of the coal committee of the Council of National Defense. He now has been placed in charge of the fuel and forage division of the quartermaster department. Preston Davis, a New York lawyer, has been named as Mr. Wentz's assistant.

Obituary

William Law, native of Dunmore, and one of the pioneers in the development of the coal-mining industry in Lackawanna County, died recently at the home of his daughter, at Albany, with whom he had been visiting for several days. In 1874 Mr. Law was at the head of the Hillside Coal and Iron Co., leaving this company to form a partnership with J. M. Robertson, of Moosic, and operated several collieries in and around Scranton and Avoca. After disposing of his coal interests he purchased Bruff's Island, in Chesapeake Bay, and later made his home at Chevy Chase, just outside of Washington. He is survived by his widow and three children.

Lieut. Gordon D. Cooke, formerly with the McGraw-Hill Company, Inc., publisher of "Coal Age," died at the base hospital at Fort Bliss on Jan. 10 from pneumonia. Lieutenant Cooke was graduated from the University of Michigan in 1916. As a preliminary training for his work in the Field Service department of the McGraw-Hill Co. he served on the editorial staff of the "Engineering News-Record" for a short period, and later took up quarters at his home city, Detroit, Mich. On Sept. 1, 1917, Lieutenant Cooke entered the service of the United States at the age of twenty-four, with the commission of Second Lieutenant in the Engineer Corps. He was temporarily stationed 75 miles from a railroad in New Mexico doing miiltary mapping for the United States Geological Survey.

Freedom N. Ulrick, who was the Philadelphia sales agent of the Lehigh Coal and Navigation Co., and had been connected with the company since 1907, at which time he became Eastern sales agent with headquarters in Boston, died suddenly on Tuesday afternoon, Jan. 22, from heart failure. After serving the company in Boston for some time, he was brought to Philadelphia as assistant general coal agent. Prior to his service with this company, he was connected with the Philadelphia & Reading Coal and Iron Co., Coxe Brothers & Co. and M. L. Cobb, and sold coal for them in the New England market. Mr. Ulrick was about 47 years of age and had a host of real friends. His funeral took place at his residence in Germantown on Friday, Jan. 25, and was largely attended. He is survived by his widow.

Industrial News

New Baden, Ill.—The coal mine here was reopened Jan. 28. It was closed on account of a cave-in. The mine employs 325 loaders, 20 electrical machine workers and 150 laborers.

New York, N. Y.—All anthracite waiting transport from New Jersey tidewater terminals to New York city will be pooled to avoid delays in shipment. The step was taken by dealers, administrators and others without consulting the Federal fuel administration.

DuQuoin, Ill.—The Scott Brothers coal interests, with offices in the Pierce Building, St Louis, Mo., have acquired a large coal acreage near here, and will soon be ready to begin operations on what is said to be one of the largest strip mines in this part of the state.

Pittsburgh, Penn.—It has been announced that the Republic Iron and Steel Co. has bought the Bessemer Coal and Coke Co. for $3,000,000. The Republic Iron and Steel Co. has plants in the Shenango Valley, as well as a few in this city and quite a number in the South. It will use the Bessemer coal in many of its byproduct plants.

Cincinnati, Ohio—At the annual meeting of the Cincinnati Coal Exchange, held on the evening of Jan. 25 at the Business Men's Club, the election of officers was held, R. A. Colter being chosen as the successor of R. A. Reilly, and both the retiring and the new presidents made appropriate addresses to the members. President Colter also announced standing committees for the year.

Louisville, Ky.—Estimates of Louisville engineers are to the effect that during the five heatless days the city saved 25,000 tons of coal, while, for the rest of the state, the reduction in consumption was 40,000 tons, making an estimated reduction in consumption of coal of 65,000 tons. An estimate had it that 31,000 workmen were idle in Louisville during the five days.

Birmingham, Ala.—At the annual meeting of the Alabama Safety Association recently held, S. L. Morrow, chief engineer of the Woodward Iron Co., was elected president as the successor of James L. Davidson, who had filled the office for several years. John N. Vincent was elected as secretary-treasurer to fill the vacancy caused by the removal of E. B. Sutton to West Virginia.

Middlesboro, Ky.—Four Kentucky coal operators, all charged with selling coal at prices higher than those prescribed by the Fuel Administrator, are under arrest by the United States Marshal and are answerable to the United States Court at Covington or at Pineville, Ky. Other warrants making similar charges are to be served. The four defendants are J. W. Gayle, Mayor of Covington, Ky., and C. C. Lancaster, of the same city, partners, and J. W. and Gillus Nolan, of Harlem, Kentucky.

Clearfield, Penn.—In the License Court here on Jan. 21 applicants in seven little mining towns, namely Houtzdale, Osceola, Madeira, Ginter, Ramey, Smoke Run and Glen Richey, showed that their receipts totaled $336,168.73 during the year, which does not include the receipts of the Madeira brewery. The dry federation is attempting to show that, besides decreasing the output of coal, a considerable amount of coal could be conserved by closing all barrooms until after the war.

Louisville, Ky.—On a warrant sworn to by E. L. McDonald, member of the local fuel committee, R. C. Tway, president of the James Coal Co., Louisville, has been arrested by the United States Marshal. He is on bond to answer to charges that he has persistently refused to make the reports on his business demanded by the Fuel Administration. This arrest followed two days after the arrest of Mr. Tway on the charge of an assault on a customer whom he is alleged to have undertaken to overcharge on a ton of coal for retail delivery.

Cincinnati, Ohio—Plans for the opening of a new coal route by rail from the Kanawha coal district of West Virginia at a rate reduced from $1.55 to $1.15 a ton for coal have been erected for the benefit of Cincinnati coal men, through the action of the Interstate Commerce Commission in approving on one day's notice, instead of the usual 30 days, a special freight tariff filed for that purpose. The new route, which is designed to avoid the congestion existing on the usual route, is by way of the Kanawha & Michigan and the Baltimore & Ohio railroads.

Columbus, Ohio—General Manager Connors, of the Hocking Valley Ry., states that the road will at once get ten additional engines loaned by the Pere Marquette, Ann Arbor and Kanawha and Michigan roads. The Hocking has loaned 1000 coal cars to Eastern lines in carrying out the plans for clearing up the coal blockade. The cars will be returned as soon as additional motive power is available to move all of the loaded cars out of the valley. During the present state of weather, he stated, the engine efficiency was not more than 40 per cent. of normal.

Roundup, Mont.—The Republic Coal Co., operating the big mine at Klein, has brought suit against the treasurer of Musselshell County for a refund of $4429, alleging that the operation of the mine for the year ending June 1, 1917, netted a loss of more than $45,000. The tax was paid under protest. The complaint alleges that the production for that year was 618,000 tons, and that the cost of production, overhead charges and repairs exceeded the value of the coal. The mine supplies the Milwaukee R.R. with its coal and does no commercial business.

Columbus, Ohio—Coal shippers as well as operators in Ohio are very favorably inclined to the zone plan of distribution, which many believe will aid wonderfully in relieving the present stress. It is thought that by that plan the shortest haul can be secured and much railroad work will be eliminated. Under the tentative plans West Virginia and southeastern Ohio mines are to be used in supplying eastern and central Ohio and the State of Michigan. Kentucky mines are to be used in supplying western Ohio and eastern Indiana. A strong campaign will be waged for the adoption of the zone system.

Columbus, Ohio—The Columbus Shippers' Terminal Pool Association, which is now working with a complete force of employees, is showing up efficiently during these days of stress. The pool is handling on the average of about 70 cars daily. Of that amount about half is taken for domestic consumption and the remainder for utilities and steam users. The Columbus Railway, Power and Light Co., the large Columbus utilities, was quite short of fuel for a portion of the past week, but toward the close it had sufficient fuel for some time in the future. For a while street car service was suspended, mostly in the evenings.

New York, N. Y.—The Boston, Cape Cod and New York Canal Co. has temporarily established a reduced rate of toll for steamers carrying miscellaneous freight, and steamers, barges and "boxes" carrying crude material. The reduction of toll charges is equivalent to about 20 per cent. of prevailing rates. To further increase the efficiency of the Cape Cod Canal, this company has requested the New England Coal Barge and Towers' Association to place several tugs at the canal to assist in delivering coal to New England ports. Buzzards Bay could be made the distributing point where barge tows might be broken into several units if necessary, thus avoiding the loss of time now entailed in taking complete tows to Boston for distribution elsewhere.

Jackson, Ky.—The Breathitt Coal Fields Exchange, with capital of $10,000, has been organized and will buy coal from operators and sell in the market, operating under Government price regulations. R. C. Musick, of Jackson, is interested. E. B. Cardwell is manager.

Luzerne, Penn.—The Raub Coal Co. is rushing to completion the erection of its new breaker to replace the structure recently destroyed by fire.

Floodwood, Ohio—The Manhattan Coal Co. is opening a new mine at Floodwood, located on the Hocking Valley R.R., which will have 300 tons and possibly more capacity. It is a shaft mine and the equipment will be modern in every respect. The company controls a fairly large acreage at that place.

Cincinnati, Ohio—The Hamilton County Fuel Administration on Monday, Jan. 21, issued an order commandeering all coal on tracks in the county, amounting to more than 600 cars, not including those on private industrial sidings. This action was considered necessary in view of the dangerously small amount of coal on hand to supply domestic consumers, essential public utilities and city and county operating and charitable institutions. Relief was so far effected that there was no interruption to the operation of street cars or of light and power plants serving the public, and no actual lack of coal at institutions or among residents, so far as can be discovered. The inadequacy of the fuel supply for manufacturing plants is now the most serious phase of the situation, as the needs of these large consumers have been postponed to the more pressing requirements of the other consumers referred to.

Louisville, Ky.—The Louisville Gas and Electric Co., which pipes natural gas from West Virginia, fails to supply the needs of its consumer customers when the temperature is low. Under the franchise it is penalized by enforced discounts. The total discounts for December and January have now reached 110 per cent., an average of 55 per cent. on each consumer's net bill for each month. The company pleads that unprecedented conditions should absolve it from the letter of the franchise and is now asking that the city permit it to ration gas. Large householders, apartment house owners and others are getting most of the present supply—6 per cent of the consumers, according to the company's statement, burning more than half of all the supply. The city administration is insisting that the company's contract must be enforced. Every residence in Louisville is on the distributing lines of the Louisville company.

MARKET DEPARTMENT

GENERAL REVIEW

Lack of improvement in coal situation largely due to bad weather conditions. The greatest help the coal situation could have would be mild weather.

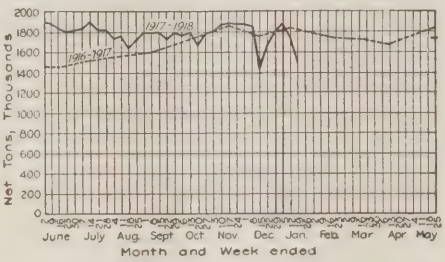
The coal-conserving holidays and the following heatless Monday have had less effect in relieving the scarcity of coal than was probably anticipated when they were ordered. While the railroad situation shows considerable improvement in some localities, the "Weather Man" has apparently shown great sympathy for the Kaiser. Storm after storm has swept the country until in many regions the snow is now 2 ft. or more deep on the level, with huge drifts in many places. Thus far the winter is generally conceded to be the worst in many years. Of course, the heavy snowfall has its redeeming features as in many localities, particularly in the West and Southwest, it is an indication of abundant crops the following year. But crops do not keep people warm in the winter. From all over the country come reports of the small and inadequate supplies of fuel on hand being doled out in half tons and ton lots to consumers who never quibble over price or quality, their only concern being to secure the coal. In many instances, all over the East in particular, long lines of people are besieging coal offices and yards, carrying away 100-lb. sacks of coal in all types and descriptions of vehicles from a barrel-stave togoggan to a high-powered automobile. Strange as it may seem, this clamor for coal is probably as insistent in Philadelphia, within 150 miles of the coal fields, as it is in any other city. The fact that coal cannot be supplied has furnished ammunition for all manner of criticism and complaints against everyone in any way whatsoever connected with the coal industry, from the meanest trapper-boy in the mines to the President of the United States. In more than one instance, and in more than one city, the police have been called upon to preserve peace and order in the offices of coal retailers. Lately there has come forward a demand from comparatively well-to-do citizens who had laid in their ordinary winter requirements of coal, but owing to the severe weather have consumed this supply months earlier than is normally the case. It now seems difficult for this class of people to understand that they cannot secure all of any commodity that they have the inclination to buy and the money to pay for.

One bright spot in the situation that has developed in the recent past is that bunkering of steamships at Tidewater is now approximately normal. There are not at present, thanks to the partial cleaning up of congestion in Tidewater rail yards, the long delays in bunkering of ocean-going freight and passenger vessels that prevailed two weeks ago. If the transportation of sea-borne freight is essential to the American cause, a long step in this direction has been made.

The atrocious weather conditions, extreme cold and heavy snow have exerted an adverse influence on mining, as well as on transportation. Not only is the placing of empties and the removal of loads at the mines made extremely difficult, but the operation of tipples and breakers is hard to maintain. In many instances in the recent past the loaders underground have had to be moved to the surface to use their shovels in clearing tracks and switches of snow. Another adverse influence of the extreme cold is the shortage of water supply. Many mines depend upon surface streams for boiler and washery water. These have sometimes frozen almost solid to the ground, and in several instances water must be hauled by rail several miles in order to supply the collieries. This method of water supply always unsatisfactory and expensive is doubly so when the thermometer is well below the zero mark. To sum up the whole situation, although under the circumstances considerable progress has been made and every effort is being exerted to relieve the coal shortage, permanent relief will probably only come with milder weather.

COAL PRODUCTION

Another alarming depression nearly equaling in severity that of mid-December affected the bituminous industry during the week ended Jan. 19. The total production of soft coal, including lignite and coal made into coke, is estimated at 8,602,000 net tons. The average per working day was 1,434,000, the lowest reported since the week of Dec. 15, when the daily average fell to 1,406,000 tons. The cause of this profound depression was again an unprecedented storm which paralyzed railway traffic over much of the North and Middle West, during the early days of the week. The production of beehive coke is estimated at 527,000 tons, an average per working day of 88,000 tons, as compared with 84,000 for the week ended Dec. 15. Anthracite shipments dropped from 36,178 to 31,861 cars.



CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

	Dec. 29	Jan. 5	Jan. 12	Jan. 19
Bituminous shipments, 121 roads.	158,596	168,936	180,411*	151,567†
Anthracite shipments, 9 roads....	29,476	25,604	36,178*	31,861†
Beehive coke shipments, 4 roads....	10,211	9,348	11,560*	10,826†

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

The Iron Age.—With so large a part of their product, particularly in heavy lines, going to the Government or its Allies, or to plants having Government contracts, the iron and steel industries, felt less than others the closing down order of the Fuel Administration. Fresh snows and intense cold combined to aggravate the freight blockades, as the order went into effect, and made more difficult any measure of its effects.

Bradstreets.—"Business as usual" was abandoned as a trade slogan in the territory east of the Mississippi river this week, thanks to the Fuel Administrator's order closing industrial plants for a period of five days and business in general for one day. The repression thus developed strikingly contrasts with relatively smart activity in that part of the country west of the river just named. However, the industries of the country are all backlogged with heavy orders, principally for governmental account, and while the stoppage of work brought about by the Government decree plus the baneful effects of inclement weather, crimped production and restricted trading over a wide area, some slight improvement in the fuel situation has resulted.

Dry Goods Economist.—The important developments for the retailer are the probable effects of the temporary cessation of output through the manufacturers' general adherence to the Fuel Administrator's order. Of course, there are many merchants who are concerned over that feature of the order which closes all stores east of the Mississippi River on each Monday for a period of ten weeks. At this writing it is too early to attempt to gage fully the extent of the curtailment, but some of its results are apparent in the higher prices made this week on cotton, wool and silk fabrics.

The American Wool and Cotton Reporter.—Last week was a quiet one in the local wool market. The enforced closing of the mills by order of the Fuel Commissioner was merely one more adverse factor in the already uncertain situation.

Marshall Field & Co.—The current wholesale distribution of dry goods for the week equals the heavy volume of the corresponding period a year ago. The volume of road sales for both immediate and future delivery is considerably larger than in the same week of 1917. Customers have been in the market in greater numbers. The market on domestic cotton continues strong. Collections are normal.

Atlantic Seaboard

BOSTON

Receipts extremely small, and outlook bad. Government priorities at loading ports take the coal and other needs wait. Under order of Jan. 17 fuel authorities refuse emergency supplies for any but vital needs. "Storrow coal" comes forward both all-rail and by water, but shipments hampered. Anthracite shipments recover slightly from paralysis of last month, but deliveries are small and irregular.

Bituminous—The prospect for fuel is so disheartening that already the owners of large factories are preparing to save their property from injury by reserving enough fuel for bare heating purposes. The state fuel administrators are warning all manufacturers, whether working 100% on Government orders or not, unless specially exempt by order from Washington that emergency coal cannot be supplied except to the "current necessary requirements" of consumers on the preferred list beginning with railroads and domestic consumers. The rule is most drastic, but in no other way can the utterly inadequate supplies now coming forward reach the really vital needs and save the people from undue privation. Utilities like the Cambridge, Mass., and Hartford, Conn., electric light plants are running on a hand-to-mouth basis and the railroads are on narrower fuel margins than the public realizes.

Inland cities like Worcester, Mass., normally depending almost exclusively upon all-rail deliveries are now feeling the pinch. Coal is being taken from school-houses and city buildings to provide for hospitals and for the wants of people who buy in small lots. Retail dealers who have had a prosperous business now confess their inability to get coal and the number of those who look to the fuel administration for relief is increasing by leaps and bounds.

The Panama R.R. transport "Achilles" has now made her third trip to Boston from Hampton Roads, but as yet there is no certainty she will continue in the service. Each trip has brought upwards of 12,000 tons of bituminous which has been distributed as prudently as the fuel authorities could manage and it has helped in many serious cases from Maine to the Connecticut line, but the situation is even more acute now than when the cargoes were received. From the second and third cargoes of this ship as well as from other vessels with emergency coal consigned to J. J. Storrow, fuel administrator for New England, not a single car was sent to any industrial plant, excepting one or two instances where Washington had granted special exemption.

Manufacturers who are being pressed by the War Department to show delivery of goods ordered find it difficult to understand why they cannot be included on the preferred list. Colleges and other educational institutions are anxious to be classified as "domestic consumers," but the order of Jan. 17 is being interpreted strictly and the coal will hardly be forthcoming. As it is, it takes constant vigilance to keep the railroads, hospitals, and other preferred needs supplied for more than a few days at a time.

The list of mines directed to load assigned cars on the "New England order" of Jan. 3 was further modified on Jan. 22. Several mines that were shipping up to capacity on other priorities were taken off the list and others substituted. Most of the substitutions are of relatively small operations, although this time each mine substituted is required to load only from one to three cars per day, as the case may be, and this arrangement it is hoped will furnish a larger percentage on the 500-car quota than heretofore. Of the cars that have been shipped for the fuel administration considerably more than half have been required by the New England railroads.

Congestion at Maybrook, N. Y., one of the principal gateways for New England, got so bad last week that an embargo was placed. Coal usually routed via that point is now being sent to New York ports for dumping into boats in the hope this will hasten delivery to the points in distress. Coal on the New England priority that emanates on the B. & O. will also be forwarded via tide-water, for the same reason.

Loading at New York has been extremely slow for anything but coal for Government uses. At one port a barge has now come to the top of the list for five times for loading, only to find each time that the coal has been taken on priorities. Appeals are constantly being made to the fuel administrations to protect boats from such delays.

At Hampton Roads there exists what might be called a "decidedly decreased improvement." More than 100 bottoms are waiting while more than 25 ships for Government purposes have cleared. The extreme slowness with which the Hampton Roads situation has been handled calls for radical treatment, and there is a prospect that something drastic will be done.

Meanwhile, the discussion of a zone system of distribution is interesting the trade. Just how New England will fare in the allotment is not disclosed, but certainly there sems no possible change that would not make for improvement. Operations ordinarily loading for this territory are swamped, many of them, with priorities of one kind or another, and together with the heavy supplies demanded for engine fuel there is no coal left for ordinary commercial contracts. The percentage now coming forward on contract is extremely small, either by water or rail.

In Boston practically all bituminous coming to retail dealers is being pooled for distribution under the direction of a committee which has control over all deliveries of more than a ton each. This has been found necessary in order to assure necessary institutions sufficient fuel to keep them running. The bunkering of ships is a problem of increasing difficulty in view of the light receipts of commercial coal.

Anthracite—The ice embargo lifted last week enough to let a few barges out of the Delaware, but loading is even slower than before, and it is increasingly difficult for cargoes to run the gauntlet of New York retailers. Domestic sizes are again ill-assorted and several cargoes are coming forward with broken and egg when the market requires nothing so much as stove and chestnut. To this extent receipts may be said to have "improved," although receipts of water-borne coal especially are light and more than intermittent.

All-rail shipments are slowing up, partly because of congestion at the transfer points, but chiefly through interruptions in mining because of the weather. "Solid trainloads" are therefore in the discard for the present.

Boston retail prices have been advanced 40c. on domestic sizes by authorization of the local fuel committee, making the present figure $10.25 per ton of 2000 lb. sidewalk delivery. There are several dealers today without a ton of anthracite in their yards.

NEW YORK

Not much improvement noticeable in situation. Receipts do not increase and storms balk efforts of officials. Pooling of anthracite expected to help. Bituminous operators complain of lack of cars and of men leaving for other industries. Bunkering nearly normal.

Anthracite—Whatever improvement may have been expected in the situation here was dispelled by a storm of snow and sleet and a considerable drop in temperature the first part of the week. Fuel administrators and tradesmen were hopeful that within a few days with a continuance of favorable weather conditions the fuel situation so far as the Metropolitan district was concerned, would show much improvement. Larger receipts of fuel were reported at the Tidewater docks and with the ice clearing out of the river and bay it would have been an easy matter to deliver the coal to the retail dealers yards, and the prospects for accomplishing it were encouraging.

While no decision has been received from Washington regarding the pooling of anthracite, as advised by State Fuel Administrator Wiggin in a telegram to Dr. Garfield last week, the shippers to several of the coal loading docks have gone ahead on their own initiative and are pooling their own coals according to sizes. On Monday of this week shippers of coal to Perth Amboy met and decided to pool their coals. The shippers to some other docks had previously decided to do the same thing and it is expected that within the next week the shippers to other docks will make the same decision.

The pooling of coal was also advocated by the railroad officials and coal operators at a meeting held late last week at the conclusion of which President Loomis of the Lehigh Valley issued a statement which said that in order to reduce the accumulation of cars on hand each day at the docks and avoid a large amount of switching it was agreed subject to the approval of the Administration, to pool all anthracite coal at New York tidewater ports.

Mr. Wiggin in his telegram to Dr. Garfield suggested that the pooling be done by the reduction of sizes from 8 to 4.

A modification of the new demurrage order has resulted in shipments coming forward in good volume, it having been feared that a continuance of the order which reduced the free time for cars would cause producers to send their coal elsewhere.

An important development during the week was the sending to this city by Dr. Garfield of James B. Neale and Arthur Leroyd, his two assistants who are thoroughly acquainted with the anthracite situation. Several conferences were held with the Fuel Administrators and others and then Mr. Neale and Mr. Leroyd returned to Washington to lay their recommendations before Dr. Garfield. So far no word has been received from Washington as to the outcome of the conferences.

The selection of J. D. A. Morrow, general secretary of the National Coal Association to take charge of the distribution of coal meets with the approval of the local trade, many members of which know Mr. Morrow personally. A few weeks ago he addressed the members of the Wholesale Coal Trade Association in this city.

The second coalless and heatless Monday in compliance with Dr. Garfield's order resulted in more places being closed than on the previous Monday, and it is expected that the saving of coal will be larger. Inspectors were scattered throughout the city to see that the order was lived up to. Very few violations were reported.

Many complaints are heard of higher prices charged by the cellar peddlers than those fixed by the Fuel Administration. There is still much suffering among the poorer class because of their failure to get coal as needed.

The mayor's committee of women on national defense has started an educational campaign on the scientific methods of building fires, and will also report all complaints of over-charging and hoarding by coal dealers to the authorities.

In view of the present conditions and the none too bright prospects for next summer and winter, people living in the rural sections and small communities of the state have been advised to cut and store all available wood.

It was learned early this week that on Friday, Jan. 25, a meeting of anthracite operators was held here, at which a comittee of three was appointed to arrange plans for the proper distribution of anthracite coal during this year. This committee consists of President Richards, of the Philadelphia & Reading Coal and Iron Co.; Samuel Warriner, president of the Lehigh Coal and Navigation Co., and Joseph Dickson, of Dickson & Eddy.

It is said that the distribution will be based upon average tonnages consumed in the year 1916 or 1917, allowing increases where the population is greater.

The pooling of anthracite is expected to be general within the next few days. A meeting of shippers on the Philadelphia & Reading was held at Philadelphia on Tuesday of this week, at which the matter of pooling coal was discussed.

Production is better than for several days past. Heavy storms impeded railroad transportation but coal moved quickly and without much delay. Many of the collieries are now working to full capacity and production is heavy. Warnings have been issued regarding possible floods as soon as the weather moderates because of the heavy snow now covering the mountain sides.

Local middlehouses and shippers are being urged to send coal to New England and into Canada, dealers from the Dominion claiming the shortage to be severe.

Locally there is not much change in the situation. Some dealers fail to see any betterment while others see a slight improvement. There is no coal in many of the retail yards, while the surplus in the consumers' bins continues to become smaller owing to the unusually hard winter. The situation on Long Island and in Brooklyn is particularly alarming. Receipts to these points have not been as large as within the past few weeks, although shipments through the Pennsylvania tubes has been resumed.

Many barges loaded with coal continue to get sunk because of the heavy ice floes. With the exception of a narrow channel the Hudson River is said to be frozen entirely across north of the New York City line.

Urgent call for coal comes from several of the smaller towns in New Jersey but adjacent to Newark and Jersey City, no coal having been delivered in some of them for the past week or ten days.

While there is no surplus of buckwheat and the two smaller sizes there is no absolute scarcity and dealers are able to keep enough coal in the bins to keep the fires going.

Current quotations, per gross ton, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buck	4.30@5.00	5.50@6.00
Rice	3.75@3.95	4.50@5.00
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—The one bright spot in the bituminous situation is the reduction in the number of ships waiting in this harbor for fuel before taking on cargoes. Special efforts have been made to secure fuel for the vessels which a few weeks ago exceeded 150, and which was given as one of the reasons for the issuance by Dr. Garfield of his drastic order.

There is not much change in the supply of free coal. Contract coal is not moving as freely as is desired and complaints of slow deliveries are numerous.

Some mines were idle for ten days at a stretch this month because of the lack of cars while on other days the average time of employment has been less than 3 hr. daily. This has resulted in much uneasiness among the workers and there have been many deflections to other industries.

The railroads continue to confiscate whatever coal they desire and when they have taken all they want and the other priorities have been satisfied there is very little left for the producer to send to his regular trade. However there is little complaint heard because of this.

The Wholesale Coal Trade Association has forwarded to Dr. Garfield a resolution asking that after the present accumulation of ships in the harbor has been supplied with bunker coal by the United States Shipping Board and the Fuel Administration, the coal bunkering companies be allowed to have their business back.

The embargo on all shipments except fuel, food and a few war necessities over the Pennsylvania lines east of Pittsburgh, the Baltimore & Ohio and the Philadelphia & Reading roads helped to move coal to tidewater considerably.

No definite announcement has yet been made concerning the renewal of contracts some of which will soon expire, but whatever is done will be subject to examination by the Fuel Administration in Washington.

Strenuous efforts were necessary this week to get coal to the factories lining the Brooklyn water front, as well as Newtown Creek and the Gowanus canal. Heavy tugs were used for breaking the ice and it was proposed to appeal to the Federal authorities for permission to use army and navy vessels for the work.

Reports indicate that the New England situation continues serious. Many urgent calls are received by local dealers for supplies.

PHILADELPHIA

Anthracite situation at its worst. Snow and cold interfere badly. Thousands of homes without coal. Mild weather only hope of relief. Weather conditions more serious at mines. Bituminous coal seized for domestic use. Suspension order helps freight movement. Bituminous famine continues, with situation critical. Heavy arrivals of bunker coal. Operators demand change in Lever law.

Anthracite—With the arrival of the snow storm early in the week the climax in the anthracite shortage seems to have been reached. Notwithstanding all the earnest efforts of the state and city fuel authorities conditions have grown steadily worse until thousands of homes are without coal and steady streams of unfortunate people besiege the coal yards. In many cases when a dealer receives a car of coal the entire contents are sold in small quantities directly to the consumers, who carry it away in buckets and baskets, in addition to express wagons, sleds and even baby carriages.

Late in the week the chairman of the city fuel committee admitted that the suffering is becoming greater and more acute, and that he sees no way out of the difficulty.

except a spell of mild weather. Goaded on by the newspapers many people vent criticism upon every person in any way connected with the coal business. Dealers state that they are threatened almost daily and have at times been compelled to summon the police to clear their office of angry would-be customers. Even Chairman Lewis of the fuel committee has not been immune and it is not unsual for irate citizens to be ordered from the office. The two principal reasons for the inadequacy of the supply—war and weather—seem to be completely ignored.

On account of the continued severe weather those people who were fortunate enough to fill their bins in the spring are now becoming in need of fuel and insisting on having it. In many cases these people are unable to understand why they cannot have what they have the money to pay for. If it was not for the seriousness of the situation the influence which this class of people seek to bring to bear in order to procure a ton of coal would really be amusing. We even know of retail coal men who have less than a quarter-ton in their own cellars.

Early in the week the State Fuel Administrator again appealed to Dr. Garfield for reconsignment to Philadelphia of coal that could not go forward promptly to New York and New England owing to car congestion and explained that unless some action were taken there would be suffering here to an incredible degree. It is not believed, however, that any such request will be granted. The newspapers continue to print in large type that coal is being diverted in transit from here, but overshadowing all other troubles word comes of a water famine in the mining region which has tied up a number of the largest operations in the Schuylkill region. The frigid weather has frozen the mountain streams almost solid and in some instances water is now being hauled for boiler use at the mines. In addition snow is an almost daily occurrence, with at least two feet on the level for the past three weeks. In order to keep the sidings clear about the mines the mine workers are called upon sometimes for the greater part of the week to shovel snow.

The most important action taken by the fuel committee to relieve the domestic situation was the commandeering of 50 cars of bituminous coal which have been distributed to a number of retail yards. While this is a strange fuel to the consumers here there is not the least doubt that it will be eagerly taken by all who are fortunate enough to get it. The committee has arranged to distribute at least 5000 tons of this coal, of which the above 50 cars was the initial shipment.

While there is little complaint from the consumers, the retail prices appear to have an upward trend, while the quality certainly does not improve. In West Philadelphia especially the average price for stove and nut is close to $10. Most of the dealers in this section of the city are paying the individual operators premiums of 75c. a ton. As to quality the big companies seem to be furnishing the better prepared coal, while some of the smaller operators have apparently neglected all caution in their desire to get out tonnage.

In the steam trade all grades continue to be sold up and some of the larger shippers are getting behind on their barley orders. This is on account of much of this coal coming from washeries and stock piles, which are difficult of operation in the present wintry weather. The sales of culm, principally by the individuals, continue to show good increases.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buck	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—There is no abatement in the soft coal famine. Despite much bitter criticism to the contrary it cannot be denied that the suspension order has at least done some good in providing coal for some vital needs. This began to show itself on the first Monday holiday when the railroads brought into the city 1100 cars of bunker coal, all of which was promptly delivered to the waiting ships, and good quantities have been received daily for the same purpose.

It has been a most active week for the operators, with a continuous succession of meetings. Anticipating the zoning order of the national administration the local shippers got together and in conference with Administrator Garfield appointed a committee of four from their number to be in touch with the state fuel authorities at all times. This committee has taken office room near Chairman Potter and some one of the committee will be on hand at all hours. If there is any criticism of the zoning system it is only on the score of consumers being accustomed to certain grades of coal, which must of necessity be eliminated under the present plan.

The operators of the central Pennsylvania district with offices in this city have passed a resolution asking the U. S. Senate to amend the Lever food law insofar as it relates to the production and distribution of coal. In this resolution they ask that the present national fuel administration be superseded by a committee of 15 men, to consist of 9 coal men, two from the railroads, two from the Government and two citizens. The resolution has already been forwarded to Senator Knox of this state, asking that he introduce a bill covering this point.

The need of fuel has become so critical that the matter of a new price seems almost to have been overlooked, but notwithstanding this the producers have no doubt that eventually they will be granted relief in this respect. They point to the anthracite trade, where from the beginning a satisfactory price has been allowed the operators and as a result production has been greatly stimulated.

While many consumers seek to secure contract protection, even to making propositions which are simply out of the question, there is practically no activity in this line, except possibly in the case of certain public utiliites, a few of which occasionally state they are being protected on fair quantities at the Government price. These instances, however, are usually where former contracts have expired and simply resolve themselves into the question of the old shippers continuing a supply to the best of their ability.

A careful review of the entire situation must bring one to the conclusion that the fuel needs of this district are still in a critical state and at this time it would appear that further suspensions are but a short time off. While there continues to be much harsh criticism of the national fuel administration there is a growing tendency to consider the difficulties which daily arise to hamper each new move.

BALTIMORE

Blizzard-like conditions here have tied up traffic. Thousands of homes without coal, and many industries run on shortened time. Hard coal prices advanced.

Bituminous—This section, blizzard swept at a time when it was hoped that fuel movement was to improve, has been caught desperately short of coal of all character. Hundreds of industries, large and small, are running on a day-to-day supply, and many have been forced to curtail production.

On best days recently the unloadings for strictly local consumption have run only about an average of 50 cars of soft coal a day, whereas the normal consumption, when normal winter stocks are on hand, is around 125 cars a day. The snowstorm cut the unloadings here at the outset of the week to less than 25 cars a day. Mining districts report the arrival of empties as being far below their capacity to load. Serious congestion is reported at all coal junction points. Several hundred cars of soft coal have been diverted the past week at Hagerstown and Brunswick by the American Railway Association Special Committee of National Defense, from commercial consignment to the account of Fuel Administrator here for domestic and public utilities use. Many of these diverted cars have failed to get through to terminals here, however.

Anthracite—The situation here is so desperate that hundreds of householders have turned to the use of bituminous, where that coal could be secured. The hard coal unloadings here are reported around 10 to 25 cars a day, whereas the normal receipts in normal winter times is around 100 cars a day. The straits of the consuming public here are shown in a report of a census made by the lighting company through meter inspectors. This shows in $^{19}/_{25}$ths of the city blocked off that there were up to January 22 a total of 9685 homes without coal of any kind. This was a 50 per cent. increase over December figures, and it is estimated that there are now fully 15,000 families in Baltimore without coal in their cellars.

Stating that the reclassifying by Washington as independents some of the important mining supply concerns that formerly sold on low price schedule required a rearrangement of hard coal prices at retail here, Fuel Administrator Meyer has announced the following new schedule of rates, which are a 75 cent advance over the old prices allowed the trade:

Hard White Ash—No. 1, broken, $10.40; No. 2, egg, $10.10; No. 3, stove, $10.35; No. 4, chestnut, $10.50; pea coal, $8.85; buckwheat, $8.10.

Sunbury—No. 2, egg, $10.35; No. 3, stove, $10.60; No. 4, chestnut, $10.75.

Lykens Valley—No. 2, egg, $10.85; No. 3, stove, $11.10; No. 4, chestnut, $11.10.

Lake Markets

PITTSBURGH

Situation somewhat improved. Better weather the chief reliance. Monongahela River frozen, but probably will be opened.

The local fuel situation has improved materially in the past week. The plant-closing order helped some, by reducing the consumption of coal, while the railroads have operated somewhat better, especially in the past two or three days. A 17-ft. crest of water is coming down the Monongahela River and steamboats will embrace the opportunity to break ice in the lower pools, with prospects they can open the first three pools. As soon as the crest is past, coal will follow, and by the end of the week a good supply of river coal is expected for Pittsburgh, enabling several plants that have been idle over three weeks to resume.

Coal shipers attach much more importance to the weather as a factor in coal supply than to the artificial means being used to combat the elements. It is believed that with anything like moderate weather the railroads will be able to operate and plenty of coal will be shipped. Car supplies at the mines late last week and at the beginning of this week were the best for two or three weeks, but that is saying little. Unless there is a fresh cold snap, however, the empties are expected to get through in larger numbers day by day.

Pittsburgh is not among the six of the 20 coal districts for which at this writing district representatives of the Fuel Administration have been appointed. Under the zoning system cross hauls are to be eliminated and coal is to be moved by the most direct routes from point of production to point of consumption. Byproduct coal, it is understood will be excluded from the system. Locally it is regarded as high time that the system should be put into operation, not only for what it is aimed to accomplish, but by reason of some practices that have grown up that will presumably be eliminated. It is claimed that under the old system some diversions of coal have been ordered that were not entirely warranted under the circumstances, the need of coal by the consumer in whose interest the diversion was ordered being clear, but the need of the original owner being perhaps equally pressing, although by chance not emphasized to the authorities.

A great deal of coal is changing hands at the set prices, by reason of requests of the authorities, but of coal purchases in the open market, without any influence being exerted by the authorities, there have been very few. The market remains quotable at the set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. permissible to be added in the case of sales by brokers.

TORONTO

Transportation conditions improved. Shipments of coal coming forward freely. Dealers delivering only small lots. Some suffering in suburban localities.

Conditions as regards the supply of coal show improvement, as notwithstanding unfavorable weather, shipments have been coming in with comparatively little delay. Local deliveries continue to vary from day to day, dealers being overwhelmed with orders and generally limiting deliveries to small lots. Centrally located consumers have little difficulty in obtaining supplies for immediate requirements, but numerous cases of hardship in the outlying districts, where the streets are in bad condition, are reported. There is no change in prices.

Quotations for best grades per short ton are as follows: Retail anthracite: Egg, stove, nut and grate, $9.85; pea, $8.85; bituminous steam, $9; slack, $8 to $8.50; domestic lump, $10; cannel, $9. Wholesale, f.o.b. cars at destination, three-quarter lump, $7 to $7.50; slack, $6.85 to $7.

BUFFALO

Slight improvement in bituminous. Cars badly bunched by priority orders. Permanent relief not before warm weather. Few plants shut down as yet, many near closing. Arthracite in better supply, but consumption much increased.

Bituminous—The situation is a trifle improved and there is promise of a better supply of coal hereafter, but it is by no means a certainty for the priority orders, which sent more coal to certain points than could be handled has made that side of the situation about as bad as possible. Shippers now say that there is coal enough

mined to meet the requirements, but the car supply has been wasted and it will be some time before that can be straightened out.

Complaint of the management of bituminous continues. Shippers say that the new zone system of handling will work, for coal men are to head it, but the cars have been so tied up that it will take some time to get them to moving as they should. Reports of cars bunched at various points with no motive power in sight are common. Jobbers say the zone system will put them out of business.

The fire insurance agents have begun to take alarm at the prospect or possibility of loss from plants shutting down and are threatening cancelations.

Government prices of bituminous are not common, but they are becoming more so steadily and will be the regular prices soon. There are at the same time reports of coal sold at extra prices here and there. Quotations, per net ton, f.o.b. Buffalo are as follows:

	Slack	Lump
Pittsburgh	$3.75	$4.25
Bessemer	3.70	4.20
Allegheny Valley	3.60	4.10

Anthracite—The local supply has increased considerably of late, but if it had not the distress would have been great. As it is the distribution cannot be made to meet the needs exactly. Hundreds of emergency cases sometimes develop in a day, which have to be met by investigation and the giving out of coal by the single ton to save it from too early exhaustion. Some of the retailers are said to disfavor one-ton business and try to make it appear that they are too busy to bother with it.

Anthracite shipers agree that there will be no real relief till spring and they do not look for it to take place then, though the suffering for want of fuel ought to disappear soon thereafter. It is the weather that makes it so hard to keep the consumers supplied and the trade has to reflect that ordinarily all of our coldest weather usually comes after this time of the year.

The snow is deep especially on side streets and the deliveries of single tons have to be made in a deep bank, to be dug out and carried to the cellar by a slow and laborious process.

DETROIT

Coal scarcity daily becomes more acute. Scores of factories in Detroit and throughout state close; tie-up of others threatens.

Bituminous—New transportation tangles produced by the snowstorm and low temperatures of Jan 26-7 dropped another monkey wrench into the mechanism of the fuel administration's system of coal supply for Detroit, which had been seriously disarranged previously by heavy snowfall and zero weather in the three weeks preceding. Throughout the city and state, hundreds of manufacturing plants are being forced to close through lack of coal, while scores of others are facing the necessity of following that course. Among the latter is the gigantic Morgan & Wright plant of the United States Rubber company in Detroit, which is working on Government contracts.

Closing of the public schools of Detroit to permit distribution of their coal supply among suffering domestic consumers is being urged but is temporarily deferred. More than 3000 applications from domestic coal users are on file in the Detroit police department, which is administering the local distribution, in connection with the Detroit Terminal pool organized by shippers and jobbers.

Anthracite—Reports given by railroad committees indicate Detroit received something like 25 cars of anthracite during the week ending Jan. 26. Few of the retail yards have any in stock and the continued transportation troubles due to weather conditions render arrival of additional supplies uncertain. Little or no coke is to be had. Many domestic consumers having heating plants designed to use only hard coal, are struggling to use soft coal, when they can get it. With the two months usually productive of the severest winter weather yet to come, the outlook is causing great apprehension among coal dealers as well as consumers.

COLUMBUS

There is still a marked shortage of fuel in central Ohio and strenuous efforts are being made to avert suffering. Domestic consumers are now being served first. The county and state fuel administrations have been busy confiscating coal for domestic use.

The coal situation in Columbus and central Ohio territory during the past week has been the worst in several months. Owing to zero weather which stopped railroad traffic to a large extent receipts of coal were kept at a minimum and fuel administrations have been having their hands full in distributing the available supply. Domestic users have been given the preference and what was left over was permitted to be used by public utilities and commercial consumers. On the whole the situation has been extremely bad although instances of actual suffering were kept at a minimum.

Steam users have been hard hit during the past week. Owing to restrictions of the fuel administration, many plants have been compelled to suspend operations entirely. The public service concerns have been giving only partial service because of short fuel supplies. Hospitals and charitable institutions have been provided for and the same is true of public buildings. But schools have been short and suspensions have been made necessary in many sections of the state.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.70	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

Moderating weather promises relief from the serious fuel situation, but so far it remains necessary to stint industrial consumers in order to supply domestic demand. Transportation conditions are still bad, congestion being unrelieved.

Although it is estimated that 10,000 tons of coal were saved on the first Monday "holiday," and probably four times that much by the five-day suspension of industrial operations, in and around Cincinnati, relief from the fuel famine which made widespread suffering imminent was not immediate, and has not yet been safely accomplished. While it was not expected that complete relief from the general congestion on railroad lines would result immediately from the suspension order, it was believed that the beneficial effects would be far greater and the improvement in both transportation conditions and in the fuel situation much more tangible than was the case.

As a matter of fact, while there has been some improvement, brought about by the concentration of all thought on the movement of coal, continued severe weather would have rendered this almost negligible. Much more moderate weather beginning on Wednesday of last week served to furnish the needed remedy, by reducing the emergency demand for coal, and by making it possible to expedite general freight movements, which had been badly hampered by heavy snow and by low temperatures.

LOUISVILLE

Moderating weather most hopeful influence in Kentucky coal market. Traffic failure ties up much coal on Kentucky tracks. Production less than 50 per cent. Retail market chaotic.

Several days of moderating temperature have brought much encouragement to the Kentucky coal trade, holding as they do promise of easing up of the traffic situation and, with an improved supply of gas, a let-up in the panicky demand of retail consumers. There are 3000 or more cars of coal between the mines in southeastern Kentucky and the Ohio river gateways some of which have been on track for two weeks or more.

Unable to move this coal the railroads have been unable to place empties and numbers of night crews have been laid off as much as three days at a time by the railroads. A 30 per cent. car supply was the week's record, while one operator's estimate of total production was that it would not equal 50 per cent. of normal. Some of the mine operators have had to contend with plant breakdowns at the mines, while derailments and wrecks of coal trains have from time to time further slowed things up. In many parts of the state operators have had to take their miners to the surface and set them to shoveling snow off roofs to prevent collapses and to clearing the yards and terminals.

The retail trade throughout Kentucky is still in a chaotic state. Consumers hang on the telephone and dealers must have extra clerks to answer them, while all have many orders on their books with local fuel administration assignments to deliver coal piled up on top of them. Here and there the situation has been further disorganized by the well-meant though mischievous efforts of amateur coal traffic regulators to find solutions. Meanwhile the coal trade is pegging away, patiently where possible, overtime in most cases, doing what it can to keep production and distribution alive.

BIRMINGHAM

Local situation much improved by warmer weather and more liberal receipts. Production also bettered by more favorable weather conditions, though there is still an acute shortage in both domestic and steam grades.

The stress in the domestic situation locally and throughout the state has been greatly relieved by several days of warmer weather, and increased shipments, and although there is still an acute shortage, all urgent appeals have been met, and in a few instances local yards have been able to get a car or two ahead. Considerable tonnage was commandeered at different points in the state for both domestic and steam use, but only about 20 cars were taken over by the local fuel board. The distribution of coal donated by operators continued this week and the poorer classes were afforded relief in this manner. The steam situation remains unchanged—the demand being far in excess of the available supply, essential industries and utility companies receiving some benefit from the closing down of non-essential operations for the five-day period.

Good results are expected to be attained in the distribution of Government requirements and federal priority orders among the mines under the direction of E. A. Holmes, district representative of the fuel administration, recently named for the Alabama field, as it will undoubtedly avoid much confusion and disturbance in the normal movement of coal from the mines of the district.

The proposed zoning of the distribution territory of each field is also looked upon with favor by operators provided boundaries are established in line with the territory normally supplied from this district.

Coke

CONNELLSVILLE

Cross movements largely eliminated. Car supplies beginning to improve. Blast furnace operations very light.

Cross movements of coke are being rapidly eliminated, practically all interests being now willing to make what exchanges the conditions dictate. The exchanges now in operation involve a few tens of thousands of tons a week. Practically all the coke that reaches the main line of the Pennsylvania through Latrobe and Greensburg is now going east.

Car supplies in the coke region improved slightly late last week and expectations are that this week's supplies will be much better. There has been practically no improvement in supplies to blast furnaces, as the furnaces in the past few days have been feeling the effects of the light shipments previously made. There is nothing like quick movement as yet, and any increase in shipments this week would scarcely be felt by the furnaces even next week. While the amount of coke en route between ovens and furnaces has materially decreased in the past two or three weeks, shippers attribute the decrease more to the lightness of shipments than to the railroads being in better working order.

The plant-closing order has not directly affected blast furnace operations, as the blast furnaces are exempted on the ground of their representing seven-day work. Blast furnace activity in the Central West is now averaging between 60 and 70 per cent. of capacity.

There is no open market for coke as the limited shipments are all taken up by contract requirements. The market is nominally quotable at the set prices: Furnace coke, $6; 72-hr. selected foundry, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 29 at 238,425 tons, an increase of 718 tons, and shipments at 247,487 tons, a decrease of 43,231 tons.

Buffalo—The situation continues quiet, with operations not badly hampered by the general fuel situation. Coke is by no means easy to get, but the supply has not been reduced as in the case of bituminous coal, for both production and consumption are in few hands and the relations are easily made. It is believed that the supply will continue at least fairly good and that as much iron will be turned out in future as is the case with other necessary manufactures. No popular price for commercial coke has been adopted, at least if the Government regulation prices have prevailed anywhere the fact has not been made public. A good many of the manufacturers of byproduct

coke are selling the smallest size, called breeze, at about $2.75 net at the ovens. It is eagerly taken by all sorts of consumers of fuel. Much more of it could be sold if it were to be had.

Middle Western

GENERAL REVIEW

Continued zero weather throughout the Middle West puts railroads almost out of commission. Coal production limited.

Continued cold weather has almost put the railroads out of commission, resulting in their supplying the coal mines throughout this section with 25 to 40 per cent. enough equipment to load their potential capacity.

Franklin County, the largest producing county in the State of Illinois, produced 180,000 tons less from Jan. 2 to 22 inclusive, than for the same period in 1917.

In Saline County output was reduced from 160,000 tons in 1917, to 34,000 tons for the same period in 1918.

Williamson County, the second county in the state in production, has had less than 40 per cent. car supply.

In various sections of the state mine operation is seriously handicapped for the need of water, and the mines are compelled to depend on the crippled railroads to switch water cars from some near-by supply to the mines. In many instances this service has been so delayed that the mine was either compelled to close or wait indefinitely on delayed switch engines to perform the service.

Dr. Garfield's closing order has been strictly observed throughout this territory, but not without some complaints. These complaints usually arose in those cases where the persons or firms affected had made provision for their fuel supply, and could have continued operation with what they had on hand.

The past week has as yet had no equal as far as demand is concerned. In every section of the country the cry for coal by the dealers and steam users continues to reach the operators. Most of the available supply is being handled through local and state fuel administrators. In most cases where it was evident there was actual suffering coal has been supplied, because of state fuel administrators' orders that homes must be protected with heat at the earliest possible moment, and regardless temporarily of the needs of manufacturing industries. During the week past there has been in effect an order that compelled the producer to ship 10 per cent. of his production to the state fuel administrator at some reconsigning point. This it was calculated would give a sufficient amount to relieve any urgent needs. However, the railroad break-down did not create the tonnage contemplated.

This order was rescinded late in the week, and a committee of association secretaries together with the president of the Coal Operators Association of Illinois, looked after, and worked with the state fuel administrators' orders on those cases that required immediate attention.

The appointment of J. D. A. Marrow, present secretary of the National Coal Association, as General Manager of Distribution, by Dr. Garfield has the hearty approval of coalmen throughout the Mid West. Many of the active operators firmly are convinced that with the coöperation of state and local coal association secretaries the question of distribution can and will be handled in a more satisfactory manner than by state and local fuel administrators. It is planned to organize a central bureau under the general direction of which all subsequent Illinois-Indiana and possibly Southwestern coal will be distributed.

CHICAGO

Chicago is still in the grip of the Weather Man, with no relief in sight.

Regardless of the action of the city fuel administrator in pooling, and confiscating all the coal in sight, Chicago is at this time in the grip of the most far-reaching fuel shortages ever experienced. When it is considered that with schools, both public and parochial, closed, hundreds of manufacturing plants observing Mondays as holidays, and not enough coal arriving each day to relieve urgent and distressing needs, we may understand how desperate the situation is.

There can be no relief until the railroads provide more cars and are able to get them moved to the customers. And railroad relief will be forthcoming when the present cold spell abates. City Fuel Administrator Durham is limiting deliveries to half tons, with the hope that production in some way will be stimulated, and more coal brought into this market at an early date so as to keep suffering down to a minimum.

In the meantime parent and civic organizations, are clamoring that schools be allowed to open, and that saloons be closed instead.

Quotations in the Chicago market are as shown in the table at the foot of the page per net ton f.o.b. cars at mines.

MILWAUKEE

Shipments of coal to interior points show an improvement. Rail receipts slow, owing to weather conditions. Illinois forbidden to confiscate Wisconsin-bound coal.

While snow-buried streets are seriously hindering coal deliveries in Milwaukee, the closing of factories for several days gave the railroads an opportunity to move fuel trains into the country, and the shipping record of the past week was about normal. Receipts of coal are considerably less than usual, however, owing to storm conditions. January receipts average 50,000 tons. Last January 160,000 tons were received, but this was unusual, as it included heavy consignments for the use of the railroads.

Fuel Administrator Fitzgerald has arranged to supply plants in the interior which are out of fuel with coal from Milwaukee, Superior and Sheboygan. More than 60 cars went out to such points on the 24th.

Cars loaded at Illinois and Indiana points for Wisconsin yards, factories and public utilities were confiscated while in transit by the fuel administrator of Illinois. This brought a protest from Mr. Fitzgerald, with the result that orders were issued from Washington forbidding a repetition of the practice.

Milwaukee has weathered the coal crisis and the outlook is that with the practice of reasonable economy no home or factory will suffer because of a lack of fuel. The delivery situation is strenuous, however. Four horses are necessary for a full-sized load and high-powered trucks make slow progress through the snow. The cost of delivery is eating up the profits of dealers and in many cases leads to loss. In one instance it cost $40 to deliver five tons of coal to a private sanitarium in the outskirts of the city, all of which fell upon the dealer.

Owing to complaints that coal dealers are exceeding the prices allowed by government regulations, the city of West Allis has inaugurated an investigation with the intention of making prosecutions.

ST. LOUIS

The St. Louis situation much easier. Weather moderated and enough coal coming in to take care of current needs. Railroad situation still extremely bad and mines idle for several days straight. Country districts in distress with promise of prompt relief. Steam needs in fair shape. No outside coal coming in.

The past week has been perhaps the most strenuous in the history of the St. Louis coal trade, but relief came about the middle of the week through the conservation methods employed and because of the system of distribution at work.

The railroad condition is in a deplorable shape. There does not seem to be any system at all in the St. Louis terminals for the regulation of traffic and it just happens along as it will and the contingencies permit.

The Illinois Central is still plugging along without anything definite in sight as to ability to take care of obligations. It is a case of perhaps we will and maybe we won't.

The eastern part of the State of Arkansas has been out of fuel and all efforts on the part of the fuel administrator for relief have brought but little relief from the Illinois field. That section of Louisiana depending upon Illinois is in the same condition, without coal. Southeast Missouri, however, suffers more than any other section. Between the roads from Williamson and Franklin County that lead into southeast Missouri confiscating coal and the other roads from the other fields placing embargoes against that gateway, a condition has been brought about that is shameful when one considers that the country as a whole should bear the burden and that one section should not be deprived of necessary fuel to cater to the white-way life of another.

For one week Missouri was a lightless state. Practically everything closed at 7 o'clock. Administrator Crossley lifted this for the coming week on certain lines until 11 o'clock, but four-fifths of all business for the present week closes at 7 p. m., excepting factories working on Government orders.

Throughout the State, while there are sections that are without coal, these are being taken care of promptly during the present week and the coal is distributed so that while there is no surplus anywhere it is the aim not to have any suffering in any section.

In Williamson and Franklin County the conditions are not good. The railroad tonnage seems to be getting greater and such available domestic coal as is produced goes to the northern markets, while the natural markets of the past, west of the river, are getting practically nothing. There are no rates to many of these points from any other regions than the Carterville field, and coal can't be shipped there.

In the Du Quoin field conditions are about the same. Mt. Olive is not much different. The railroads seem to be getting the bulk of this coal, although more of this tonnage is coming into St. Louis than coal from the Carterville or Du Quoin field.

In the Standard field the mines have had extremely poor working time. Some mines worked only two days this past week and since the snow storm some mines have gone for ten days straight without working. It is estimated that about a quarter million tons of coal from the southern Illinois fields have been lost through railroad inefficiency in the course of two weeks time.

The Terminal condition at St. Louis is not good. Cars have been hanging around the Terminals for upwards of three and four weeks and are still undelivered. The railroads still continue to confiscate coal and are not making prompt reports to either consignees or shippers.

The conference in Kansas City this week between the administrators of Iowa, Nebraska, Missouri, Kansas, Oklahoma and Arkansas brought forth the fact that all of these States were opposed to the zoning of the southern Illinois field unless the zone comprising the above States included certain producing zones in the southern Illinois region.

They did, however, go on record as being opposed to the zoning of the country west of the Indiana state line, showing they had no confidence in the zone system as proposed by the Illinois operators excepting those in the 5th and 9th districts.

They further recommended that the Fuel Administrator arrange for a reduction of 75c. a ton on April 1 from all fields, this to increase 15c. a month to assure the early storage of coal.

The local situation is easy. Small consumers are being taken care of and steam plants have normal requirements.

The prevailing market is as follows per net ton f. o. b. mine:—

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin Co. rate is 87½c. Other fields, 72½c.

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, LaSalle, Bureau and Will
Prepared sizes	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings and washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Penna.	Hocking	West Va. Splint
Prepared sizes	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Mine-run	2.40@2.55	2.40@2.65	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

CINCINATI	Jan. 30, 1918	One Month Ago	One Year Ago
No. 2 Southern foundry	$35.90	$35.90	$18.90
No. 2 Northern foundry	35.90	35.90	21.76
NEW YORK			
No. 2X Northern foundry	34.25	34.25	22.00
No. 2 plain Northern foundry	33.75	33.75	21.00
No. 2 Southern foundry	37.25	37.25	22.00
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	16.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	22.00
No. 2 Southern foundry	37.00	37.00	....
PITTSBURGH			
Bessemer iron*	37.25	37.25	24.95
Basic iron*	33.95	33.95	20.95

*These prices include the freight charge from the valley to the Pittsburgh district. †Delivered Tidewater, New York.

Note—On Sept. 24 the President approved the new schedule of steel prices, that of pig iron being set at $33.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York, Jan. 30, 1918	New York, 1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.195	$3.25	$4.27	$4.20
Channels, 3 to 15 in.	3.00	4.195	3.25	4.27	4.20
Angles, 3 to 6 in., ¼ in. thick	3.00	4.195	3.25	4.27	4.20
Tees, 3 in. and larger	3.05	4.245	3.40	4.27	4.25
Plates	3.225	4.45	4.00	4.52	4.45

BAR IRON—Prices in cents per pound at cities named are as follows:

	Pittsburgh	St. Louis	Denver	Birmingham
Dec. 31, 1917	3.50	4.45	4.05	4.50

NAILS—Prices per keg from warehouse in cities named:

	Mill, Pittsburgh	St. Louis	Denver	Chicago	San Francisco	Dallas
Wire	$3.50	$4.30	$4.85	$4.25	$4.60	$4.50
Cut	4.00	5.25	....	4.40	6.15	....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh, Jan. 30, 1918	Pittsburgh, One Year Ago	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$2.65	$6.00	$5.00	$6.45	$7.25	$5.30	$5.00
Track bolts	4.90	3.25	8.90	6.25	Premium	8.80	6.75	6.00
Standard section angle bars	3.25	2.00	....	4.50	Premium	4.65	....	....

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+10%	+35%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$4.75	$6.30	$6.50	$6.00	$7.50	$6.25
Assorted	4.90	6.30	6.50–7.00	6.25	7.75	6.50

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York, Jan. 30, 1918	New York, 1 Month Ago	New York, One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$58.35	$58.35	$44.50	$57.30	$57.00	$66.40	$61.00
6 in. and over	55.35	55.35	41.50	54.30	54.00	63.40	58.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh, Jan. 30, 1918	Pittsburgh, One Year Ago	Chicago, Jan. 30, 1918	Chicago, One Year Ago
Standard bessemer rails	$65.00	$38.00	....	$38.00
Standard openhearth rails	67.–68.	40.00	....	40.00
Light rails, 8 to 10 lb.	....	52.00	....	47.00
Light rails, 12 to 14 lb.	....	52.00	....	46.00
Light rails, 25 to 45 lb.	67.00*	50.00	$67.00*	44.00

*Government price of $3.00 per 100 lb. Note:—Combria Steel Co. reported to be taking orders for standard sections.

OLD MATERIAL—Prices per net ton in Chicago and St. Louis (including delivery to buyer's works and freight transfer charges):

	Chicago, Jan. 30, 1918	Chicago, One Month Ago	St. Louis, Jan. 30, 1918	St. Louis, One Month Ago
No. 1 railroad wrought	$31.25	$29.50	$30.50	$31.00
Stove plate	21.50	16.00	20.50	16.50
No. 1 machinery cast	26.00	20.00	26.00	21.50
Machine shop turnings	17.00	16.50	17.50	16.75
Cast borings	16.50	16.50	17.00	16.00
Railroad malleable cast	26.80	26.50	26.00	25.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.16	$0.15	$0.16

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis
Solid	14c.	16c.
Hollow	24c.	25c.

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel, Inches	Black	Galvanized	Iron, Inches	Black	Galvanized
⅛, ¼ and ⅜	44%	17%	¾ to 1½	33%	17%
½	48%	33½%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black, New York	Black, Chicago	Black, St. Louis
¾ to 3 in. butt welded	38%	42.8%	40.1%
3½ to 6 in. lap welded	18%	38.8%	36.1%

	Galvanized, New York	Galvanized, Chicago	Galvanized, St. Louis
¾ to 3 in. butt welded	22%	27.8%	25.1%
3½ to 6 in. butt welded	List	24.8%	22.1%

Malleable fittings, Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 15 and 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair-sized orders the following amount is deducted from list:

	New York, Jan. 30, 1918	New York, One Year Ago	Cleveland, Jan. 30, 1918	Cleveland, One Year Ago	Chicago, Jan. 30, 1918	Chicago, One Year Ago
Hot pressed square	$1.00	$0.50	$1.40	$2.60	$1.05	$3.00
Hot pressed hexagon	1.00	.50	1.20	2.60	.85	3.00
Cold punched square	1.00	.50	.75	3.00	1.00	2.50
Cold punched hexagon	1.00	.50	.75	3.00	1.00	3.00

Semifinished nuts sell at the following discounts from list price:

	Dec. 31, 1917	One Year Ago
New York	40%	50%
Cleveland	60%	50—10%
Chicago	50%	50—10%
St. Louis	50—10%	....

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St. Louis
⅜ by 4 in. and smaller	30%	50%	40—10%	40%
Larger and longer up to 1 in. by 30 in.	15%	40%	30—5%	30—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..$1.00 Cleveland..$2.00 Chicago..$3.00 St. Louis..$3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York..$5.00 Cleveland..$4.50 Chicago..$3.50 St. Louis..$2.75

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	30%	35%	40%*
Tinned	30%	35%	40%*

*For less than keg lots the discount is 35%.

Button heads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in., sell as follows per 100 lb.:

New York .... $7.00 Cleveland .... $5.85 Chicago $5.50

Coneheads, same sizes:

New York .... $7.10 Cleveland .... $5.95 Chicago $5.60

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	Chicago	St. Louis	Birmingham	Denver
Cup	7	5¼	6.1	8½	10
Fiber or sponge	8	6	6.4	15	15
Transmission	7	6	6.4	10	15
Axle	4½	4	3.3	3	5
Gear	4½	4½	6.5	5½	5½
Car journal	22 (gal.)	3½	4.6	5	5

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Jan. 30, 1918	One Year Ago	Jan. 30, 1918	One Year Ago	Jan. 30, 1918	One Year Ago
Best grade	70.00	60.00	93.00	51.25	70.00	50.00
Commercial	40.00	30.00	21.50	18.50	25.00 to 30.00	20.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	40%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade... 30% Second grade... 30-5% Third grade... 40-10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	40%
Denver	40%	40%
Birmingham	35%	40%
Chicago	30—10%	40—5%
Cincinnati	40—10%	40%

RAWHIDE LACING—40% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.77
Asbestos for high-pressure steam	1.54
Duck and rubber for piston packing	.88
Flax, regular	.66
Flax, waterproofed	.99
Compressed asbestos sheet	.99
Wire insertion asbestos sheet	1.21
Rubber sheet ¼	.55
Rubber sheet, wire insertion	.88
Rubber sheet, duck insertion	.44
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.10
Asbestos wick, ½- and 1-lb. balls	.65 to .70

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York	St. Louis
Galvanized iron rigging	List + 20%	+20%
Galvanized cast steel rigging	Net List	List
Bright plain rigging	30%	30%
Bright cast steel	17½%	17½%
Bright iron and iron tiller	5%	5%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is the price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.35½	Kansas City	$0.33½
New York	.34	Los Angeles	.33½
Chicago	.32½	Seattle	.33½
Denver	.33½	St. Louis	.33
Birmingham	.37	Cincinnati	.33

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin.Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1 -in.	.30
1½-in.	.45
2 -in.	.60
2½-in.	.75
3 -in.	.90
3½-in.	1.05

85% magnesia high pressure ..... 15% off

For low-pressure heating and return lines..... 4-ply.... 58% off; 3-ply.... 60% off; 2-ply.... 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Jan. 30, 1918	One Year Ago	Jan. 30, 1918	One Year Ago	Jan. 30, 1918	1 Year Ago
Raw per barrel	$1.31	$0.96	$1.35	$1.00	$1.32	$0.98
5-gal. cans	1.41	1.06	1.50	1.10	1.45	1.08

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Jan. 5, 1918		1 Year Ago		Jan. 5, 1918	1 Yr. Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
25- and 50-lb. kegs	11.50	11.00	10.50	11.00	10.50	10.50
12½-lb. keg	11.75	11.25	10.75	11.25	10.75	10.75
100-lb. keg	11.25	11.50	11.00	11.50	11.00	11.00
1- to 5-lb. cans	13.25	13.00	12.50	12.50	13.00	12.50

CALCIUM CARBIDE—Price f.o.b. cars at warehouse points in Eastern States is $102.50 per ton for Union miners' lamp carbide, and $97.50 per ton for Cameo miners' lamp carbide. Union sells in 25-lb. cans for $1.46 per can.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$13.50	Birmingham (clay)	$8.00
St. Louis, salmon	8.06	Birmingham (shale)	9.00
Denver	8.50		

FUEL OIL—Price variable, depending upon stock. New York quotations not available owing to this fact. In Chicago and St. Louis the following prices are quoted:

	Chicago	St. Louis
Domestic light, 22-26 Baumé	5c.	5½c.
Mexican heavy, 12-14 Baumé	7c.	none

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York and Chicago:

	1-Ply		2-Ply		3-Ply	
	c.l.	l.c.l.	c.l.	l.c.l.	c.l.	l.c.l.
No. 1 grade	$1.15	$1.40	$1.45	$1.60	$1.75	$1.90
No. 2 grade	1.10	1.25	1.25	1.40	1.50	1.65

Asbestos asphalt-saturated felt (14 lb. per square) costs $6.50 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.85 per roll in carload lots and $2.10 for smaller quantities.

Shingles, red and green slate finish, cost $4.75 per square in carloads, $5 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less Than Carload Lots
Tar felt (14 lb. per square of 100 sq.ft.)	$61.00	$62.00
Tar pitch (in 400-lb. bbl.)	15.00	16.50
Asphalt pitch (in barrels)	29.00	30.50
Asphalt felt	60.00	62.00

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Jan. 30, 1918	One Month Ago	One Year Ago
$4.50 to $5.00	$4.50 to $5.00	$2.60 to $2.70

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$79.00	$135.00
Chicago	79.00	137.00
Denver, per ton	110.00	200.00
Kansas City	58.00	112.00
St. Paul	55.00	138.00
Boston	95.00	171.00
Birmingham	56.80	106.50
Cincinnati	68.80	129.00

LUMBER—Price of yellow pine per M in carload lots:

	1-In. Rough, 10 In. x 16 Ft.	2-In. T. and G.	8 x 8 In. x 20 Ft.
St. Louis	$33.00	$30.00	$31.50
Denver	29.50	32.50	41.75
Birmingham	25.00	23.00	24.00
Cincinnati	35.00	37.50	35.00

Price per M in carload lots:

	1-In. Rough, 10 In. x 16 Ft. and Under			2-In. T. and G. 10 In. x 16 Ft.	
	Y.P.	Fir	Hemlock	Y.P.	Fir
Boston	$45.00	....	....	$50.00	$50.00
Cincinnati	35.00	....	....	37.50	....
Kansas City	43.00	$50.00	$50.00	51.00	55.00
Seattle	....	27.00	27.00	27.00	27.00
New Orleans	36.00	....	....	28.00	....
St. Paul	....	53.00	34.00	61.00	37.50
Denver	....	30.00	30.00	....	32.00

	8 x 8-In. x 20 Ft. and Under				12 x 12-In., 20 Ft. and Under	
	Y.P.	Fir	Hemlock	Spruce	Y.P.	Fir
Boston	$52.50	$52.50	....	$40.00	$60.00	$60.00
Cincinnati	35.00	....	....	....	35.50	....
Kansas City	42.00	34.00	....	....	48.00	35.00
Seattle	27.00	27.00	$27.00	27.00	27.00	27.00
New Orleans	28.00	....	....	....	38.00	....
St. Paul	....	38.00	38.00	38.00	....	51.00
Denver	....	34.00	....	30.00	....	36.00

COPPER WIRE—Prices per 100 ft. for rubber-covered wire:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$10.90	$15.10	$27.25	$11.30	$13.37	$26.08	$15.00	$17.90	$36.80
10	23.70	27.05	49.35	23.16	26.34	....	29.00	34.30	67.60
8	33.60	37.35	74.45	32.32	35.96	....	39.90	46.85	....
6	....	57.15	....	....	62.92	....	58.95	74.60	....
4	....	81.70	....	....	88.20	....	97.20	106.55	....
2	....	121.80	....	....	127.38	....	154.50	163.00	....
1	....	158.50	....	....	167.80	....	197.45	209.50	....
0	....	189.40	....	....	192.00	....	276.00	285.50	....
00	....	298.05	....	....	245.78	....	317.00	330.00	....
000	....	362.15	....	....	300.00	....	414.40	428.00	....
0000	....	448.50	....	....	364.32	....	508.00	516.00	....

EXPLOSIVES—Price per pound in 200-lb. lots at cities named:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder*
New York	.....	$0.27½	$0.34½	.....	$2.50
Boston	.....	.....	.36¼	$0.43¾	....
Kansas City	$0.20	.26¼	.33¼	.43¼	....
Los Angeles	.20	.27	.35	.....	....
Seattle	.18½	.24¾	.31¾	.41¾	....
Chicago	.19¾	.23¾	.33	.43	2.45
St. Paul	.20	.26¼	.33¼	.....	2.55
St. Louis	.20	.26¼	.33¼	.43¼	2.05
Denver	.19	.25¼	.32¼	.42¼	....
Dallas	.25	.29	.39	.49	....

*Keg.

FREIGHT RATES—On finished steel products in the Pittsburgh district, including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates are effective in cents per 100 lb.:

Boston	21.5	Minneapolis	35.5
Buffalo	11.6	New Orleans	30.7
Chicago	21.5	New York	19.5
Cincinnati	18.5	Philadelphia	18.5
Cleveland	13.5	St. Louis	27.0
Denver	79.0	St. Paul	35.5
Kansas City	47.0	Pacific Coast (all rail)	90.0

COAL AGE

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Wars Are Not Won By Contraction

By Floyd W. Parsons

AGENTS of Germany, if granted freedom of action here in the United States today, could not do more for the Kaiser than has been accomplished by those Americans who are daily advocating the curtailment of industry.

No man can win a race who starts in believing that he must slow down his speed to accommodate the pinch of a shoe that hurts. The wise runner would throw off the ill-fitting shoe and put on one that wouldn't hamper his gait.

Instead of correcting the weak link in our industrial life, which is transportation, we seek the easy way out and lay off all other effort, hoping that summer winds will come soon and blow away our troubles.

DIRECTOR GENERAL McADOO two weeks ago could not see the advisability of a freight embargo. Fuel Administrator Garfield consequently took the only step possible to relieve the freight congestion and shut down production. As a purely fuel-conservation measure, the closing-down order is not in any way justified. As a railroad remedy it did some good, for it permitted the release of hundreds of miles of cars that were blocked at many points. On the Chesapeake & Ohio R.R. there were 80 miles of cars loaded with coal, and 75 miles of such cars stood on sidings in the Pittsburgh district. Such congestions have been broken up, but an extensive freight embargo would have done the job better and cheaper.

Such a winter as this has not been known before. We were not prepared, and a crisis developed. The closing-down plan was ordered by the Fuel Administrator, but it was forced by the Railroad Director, who would not recognize the need of a general freight embargo. The "fuelless" Mondays would not have been continued, in spite of the hysterical protestations of several of the State Administrators, if Mr. McAdoo had consented to the embargo plan this week.

AS A result of the whole controversy, the United States today is trying to win its fight by poking with one hand instead of smashing with both fists. If the situation is so critical, then why not spend a few million dollars directly relieving freight congestion? Why not insist on a heavy demurrage charge? Why not build temporary terminal facilities and get the cars unloaded and moving? Why not notify consignees within something less than two weeks that shipments have arrived? Why not give two days' notice and discontinue passenger service 48 hours, repeating if necessary, using the passenger locomotives to increase freight-moving motive power? A few mail trains might be run with a passenger car attached to carry Government officials on necessary business. The biggest thing about this idea is the clear tracks thus provided for freight movement.

This is an extraordinary occasion, and it calls for extraordinary treatment. If the railroads have slowed us up, let us rather insist that they go faster and not that the whole Nation shall go slower. Exhilaration comes from breaking records; only dejection and discouragement result from curtailed effort. We talk of loaning money to other peoples; why not loan ourselves a little in a crisis? The more severe the weather conditions, the more men and money that must be employed.

WHAT is to be the effect of all this enforced idleness and reduced earnings on the next Liberty Loan? What is the effect of such a policy on the spirit of a people, 99 per cent. of whom submit but do not approve? What is to be gained by forcing a remedy on the railroads that they maintain is ineffective? Why assume responsibility for forcing restrictions that would have come automatically, been more equitable and less destructive?

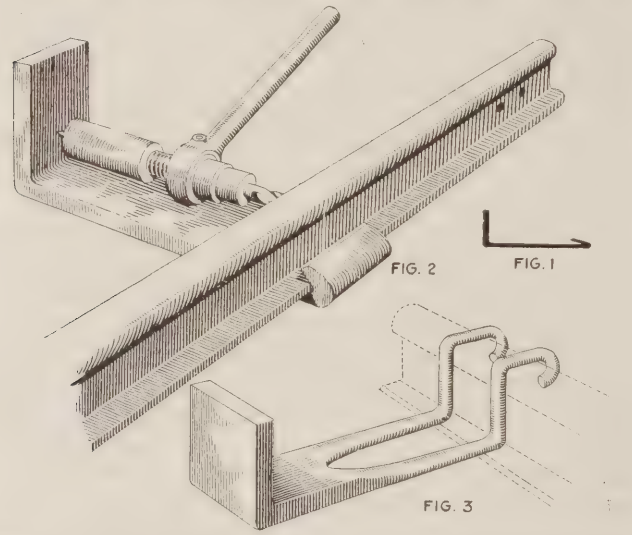
Mr. McAdoo has control of the railroads and at the same time is custodian of Uncle Sam's money. Congress wants to win the war and will pay to do it. The workmen of the Nation are a willing lot. There, Mr. McAdoo, is the formula—Railroads, Money, Men. The mines are working but three or four days a week, and the people are shivering in idleness. We ask you, Mr. Railroad Director, "What's the answer?" Isn't the solution in your hands?

IDEAS AND SUGGESTIONS

Rail Bonding and Drilling

BY FRANK HUSKINSON
Trinidad, Colo.

It is important in maintaining an electric haulage system in a coal mine to keep the tracks well bonded. Both rails should be bonded and cross-bonds put in at least every 100 yd. At all switches and frogs the circuit should be complete. This may be accomplished by the use of long jumpers of wire, bonded to the rails and run around the switch and frog. The system should be inspected regularly to see that this bonding is kept



FIGS. 1 TO 3. DEVICES FOR HOLDING A RATCHET DRILL IN PLACE WHEN DRILLING RAILS

in proper shape. A poorly bonded track is a source of grief and expense. In addition to causing delays and cutting down the output, it results in excessive heating of the fields and armature coils in the locomotives, in some instances causing these coils to heat to such a degree that the insulation becomes so badly charred that the coils will short-circuit within themselves and take an excessive amount of current. In a short time it then becomes necessary to rewind the armatures and replace the field coils.

At almost all mines there is a machine for drilling the rails for bonds and fishplates, but there are times and places where the machine cannot be used and it is necessary to adopt other methods for drilling the rails for bonds and bolts. For this purpose a ratchet drill and old man may be employed.

In Figs. 1, 2 and 3 are shown two good devices called "old men." I have used these for holding the ratchet drill when drilling rails. The old man shown in Figs. 1 and 2 is simple and handy. It hooks underneath the rail, and if the ratchet drill is set up on the outside of the track it can be left in place whenever a trip passes, as it is in the clear. The ratchet handle must be left lying flat, however, so as to clear the locomotive and cars.

The old man shown in Fig. 3 is hooked over the top of the rail and is only used in places where the other devices cannot be employed. This one has two prongs that hook over the top of the rail. These prongs are separated about 1 or 2 in. so as to allow the drill to operate between them. These attachments can be easily and quickly put on or removed from the rails.

I have also found it a good plan to have at least two of these devices the only difference in them being the length. One is for use with long drills and the other for short drills. This is more satisfactory than using blocking in a long attachment to compensate for a short drill.

Survey of Industrial Power Plants To Determine Coal-Burning Efficiency

BY F. H. SPARKS
Louisville, Ky.

The recent action of Dr. Garfield, the United States Fuel Administrator, in closing industrial plants on certain days will undoubtedly relieve the present serious shortage in fuel, but it will hardly correct some of the faults that are largely responsible for present conditions; and if suggestions for the permanent correction of almost criminal waste of coal as burned under many boilers in industrial plants are welcome, I suggest measures be put into effect which will place the burden of responsibility on those who through a "penny-wise-and-pound-foolish" policy have neglected to put their plants on an efficient fuel-burning basis, and who in a very large measure have contributed to this present condition of fuel shortage.

If A evaporates 10 or 12 or more pounds of water with every pound of coal burned, and B evaporates but 5 or 6 lb. of water with a pound of the same coal, the natural deduction is that something is wrong with B's plant, or with his method of burning coal; and before taking A's coal from him and dividing it with B, would it not be well to investigate the conditions of coal burning at both plants and learn why A evaporates twice as much water with a pound of coal as does B?

Any competent engineer can survey an industrial plant and determine just how much coal, efficiently burned, will be required to operate the plant.

Now, would it not be a good plan, and teach a lasting lesson, to have made surveys of all industrial plants using coal under boilers, to determine just the amount of coal necessary to operate each plant, and then allow each plant per day or week or month, just the amount shown by the survey as necessary?

For instance, if a plant has been burning 1000 tons of coal per month under inefficient methods, and the survey shows that, efficiently burned, 500 tons would carry the load, then say to the manager of that plant: "Efficiently burned, 500 tons of coal per month will

carry your load, and we will allow you just that amount. If you care to burn up 500 tons in half that time, you may then shut your plant down—or use the balance of the time to put your plant on an efficient coal-burning basis."

The chances are good that the man who is burning coal efficiently is also operating his whole plant efficiently, and his is the plant that should be permitted and encouraged to operate continuously. Therefore, I suggest an investigation of the methods of burning coal under boilers in all industrial plants, and the instituting of corrective measures wherever waste is shown.

Safety Switch Boxes

By Electrical Engineer

A wise provision of the state law in regard to the electrical equipment in and around a coal mine is that all electric switches shall have a suitable guard or protection around them, making it impossible for any person to come in contact with the metal parts of the switch. In order to comply with this law, I made up quite a number of safety switch boxes, as shown in Fig. 1. This is the cheapest and most reliable safety switch box I know of. It consists of only six pieces of fireproofed wood—the back, two sides, the front and the two-piece top. The switch is mounted on the back

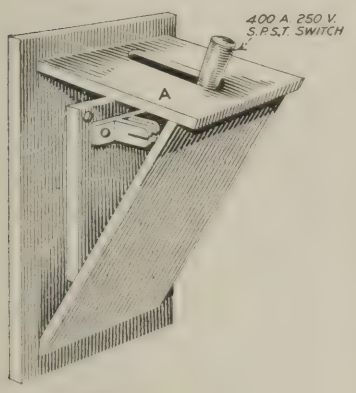


FIG. 1

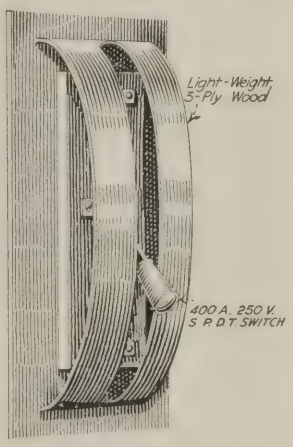


FIG. 2

FIGS. 1 AND 2. TWO TYPES OF SWITCH BOXES THAT ARE SAFE AND ECONOMICAL

board, while the top pieces are so fitted as to allow only sufficient room for the handle of the switch to operate in. In this style of switch box only the wooden handle of the switch is visible, and this is the only part of the switch that can be taken hold of.

In Fig. 2 is shown a safety box for a double-throw switch. This is an excellent switch box for this type of switch. The back and sides are made of plain fireproofed wood, while the front is constructed of three-ply light-weight built-up board. This material is flexible and can be shaped easily. A slot is cut in the front just large enough to allow the switch handle to project through. This makes a safe and reliable switch box.

These two switch boxes were devised after a series of experiments with various kinds of guards and boxes, and were only adopted as standard after they had proved themselves successful and had passed a rigid examination by the mine inspectors. The boxes are given two coats of paint. This results in a neat appearance and prevents the wood from absorbing any moisture.

I have found it a good idea to give all switch bases a coat or two of shellac. This prevents the slate from absorbing moisture. I have had trouble with slate bases absorbing moisture, this causing a considerable leakage of current across the switch terminals; not enough to light a lamp, but enough so that a person or a mule coming in contact with the trolley line would receive a severe shock. I have found that the use of shellac will prevent this leakage. It is therefore recommended that all switch bases be given two coats.

The use of untreated asbestos for lining switch boxes is satisfactory in dry places; in damp places the asbestos should be given at least two or preferably three coats of shellac to prevent its absorbing moisture. Another good idea is to have a lamp burning at all times inside the switch box or cabinet in damp places. This gives a visual signal that the current is on and keeps the switch box dry and safe.

One of the rules in installing switches that is often overlooked is that a knife-switch should always be placed in such a position that the blade will have a tendency to fall out, or open. Always connect the live, or positive, side of the line to the stationary contact of a switch, never to the blade, or hinged, part.

The Issue of the Day

By Robert Littlehales
Smithton, Pennsylvania

Coal mining, like other industries, has advanced rapidly in the last few years. It has kept pace with the times. Modern equipment, systematic extraction and efficient management have replaced the crude methods of former days.

A mine official's training, today, should embody more than mere practical knowledge. I will admit, however, that it is essential; but without technical training an official is greatly handicapped. The combination of the two makes him a more efficient manager; consequently, he is more qualified to take care of any situation that may arise.

The past few years have brought about considerable mechanical changes in coal mining, but there is still a greater movement of a similar nature on foot. The coal-mining industry is fast approaching a revolutionary state. Too much handling of coal is still required; some kind of mechanical conveyance would remedy the evil. In any crisis or difficulty, whether it be political, religious or industrial, there are always some who will arise and meet the issue, bringing about victory from defeat and success from seeming impossibility.

Necessity is the mother of invention; likewise opportunity is the maker of men. What are you doing to meet the issue?

In Canada the Coal Content of the Western coal beds is estimated to amount to 1,217,386,000,000 tons, of which 830,000,000 tons are anthracite and semi-anthracite, 282,313,000,000 tons bituminous, 847,821,000,000 tons sub-bituminous, and 86,422,000,000 tons lignite. This coal is found in the geological ages between the lower Cretaceous and the Tertiary.

Preparing No. 3 Pocahontas Coal

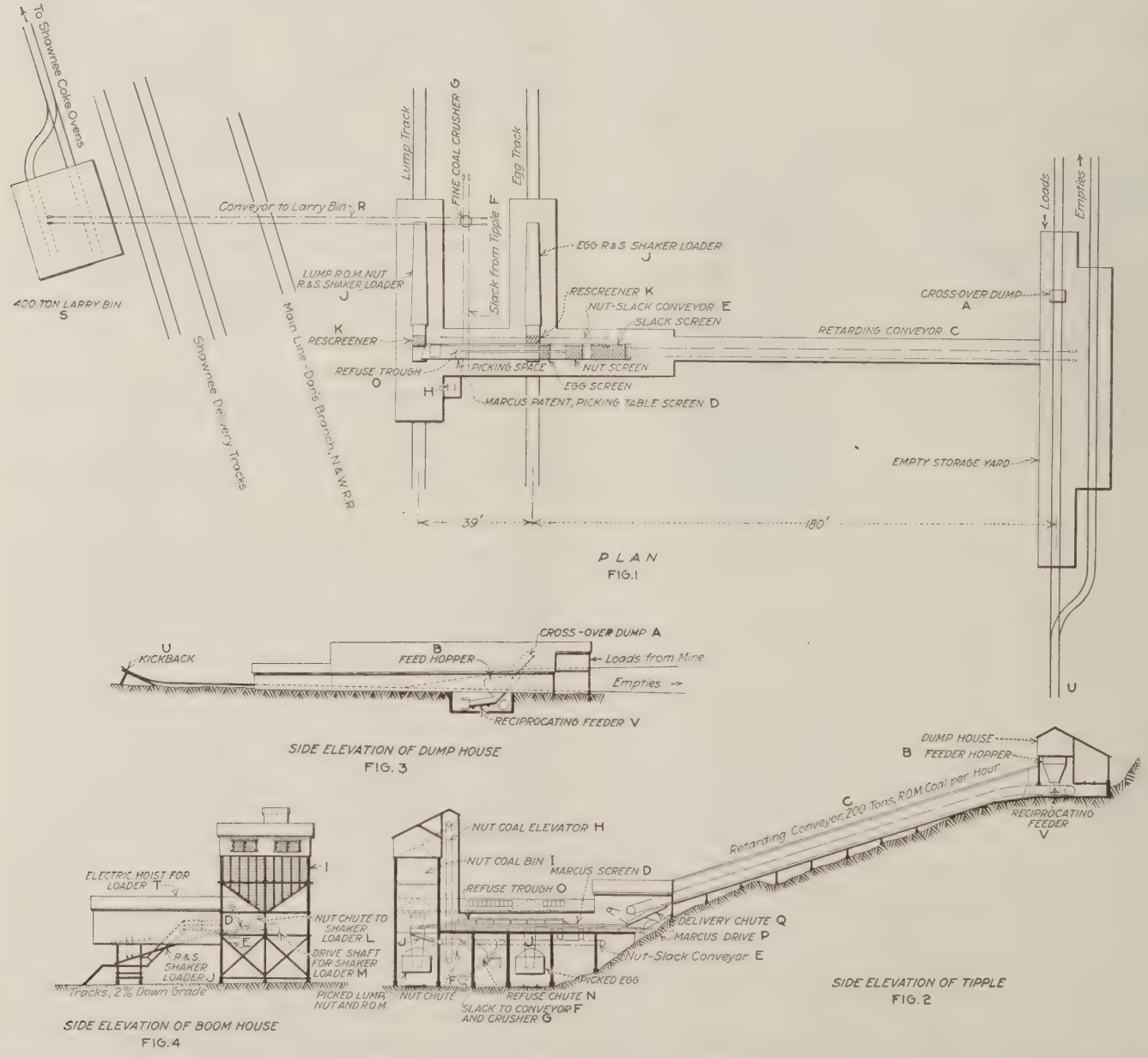
By RICHARD G. MILLER
Chicago, Ill.

THE Pulaski Iron Co., of which Percival Johnson is general manager at Pulaski, Va., and Floyd E. Cunnyngham is superintendent of coal mines, has been operating its coal property of approximately 1400 acres at Eckman, W. Va., for more than 25 years. The plant, including the entire top works with beehive coke ovens, handles the entire output, and until recently over an inadequate tipple, containing various types of screening, picking, conveying and elevating machinery unsuitable and, for the most part, unnecessary in modern preparation.

This company is generally recognized in the "Pocahontas Field" as being progressive but, at the same time, wisely conservative. Handicapped by the improper kind of equipment for cleaning and preparing No. 3 Pocahontas coal (one of the most friable coals known), and having an existing plant of large proportions, it faced a problem which called for increased capacity and simultaneously the best preparation possible to obtain.

It also became necessary to increase the coke-oven capacity. This naturally required a larger tonnage of run-of-mine coal over the preparation plant. The company was enabled to acquire the coking facilities of the Shawnee Co. nearby, increasing the annual coke output from 100,000 to 150,000 tons. Arrangements were accordingly made to deliver the necessary crushed coal to that point as well as to continue supplying the ovens on its own site, as formerly.

The type of preparation plant and machinery adopted was the result of a thorough investigation, locally and in other fields, with the idea of getting a modern plant



FIGS. 1 TO 4. GENERAL ARRANGEMENT OF PLANT, INDICATING TYPE AND CHARACTER OF CONVEYING MACHINERY

that would reduce maintenance and labor, and at the same time increase efficiency. Moreover, it was important that the building and installation of the new plant closely adjacent to the existing structures should not interfere with continuous operation.

The following descriptions and explanations illustrate the type and character of machinery adopted to fulfill the special conditions and meet the needs of the Pulaski company. This plant effects the saving of ten men in its operation over the old plant. The entire new plant is electrically operated with 250 volts direct current, generated locally.

The general arrangement is clearly shown in Fig. 1. The new equipment immediately adjoins the existing plant, the retarding conveyor *C* being but 50 ft. away. Trips of loaded mine cars are delivered to the dump-house, Fig. 3, over the Phillips crossover dump *A*, and thence to the kickback *U*, which in this case is of unusual proportions because of the fact that the grades had to be worked in with the existing haulage systems from three mine openings. This feature had the attendant advantage of providing a storage yard for empties, which greatly facilitates operation.

Run-of-Mine Delivered by Reciprocating Feeder

In the side elevation of the tipple, Fig. 2, it may be noted that run-of-mine coal is delivered from the feeder hopper *B* to the retarding conveyor *C* by the reciprocating feeder *V*. This is so constructed as to inclination, mechanical features and speed that it prevents leakage of fine coal at the rear end.

The retarding conveyor *C* is composed of two strands of standard, long-pitch, steel-thimble roller chain, carrying strong steel flights that control the travel of the coal and permit its easy delivery over the chute *Q* onto the Marcus patent picking table screen *D*. This prepares four sizes and at the same time enables pickers to remove refuse and dispose of it onto the refuse trough *O*, over which it is conveyed to the refuse chute *N* for disposal by carts.

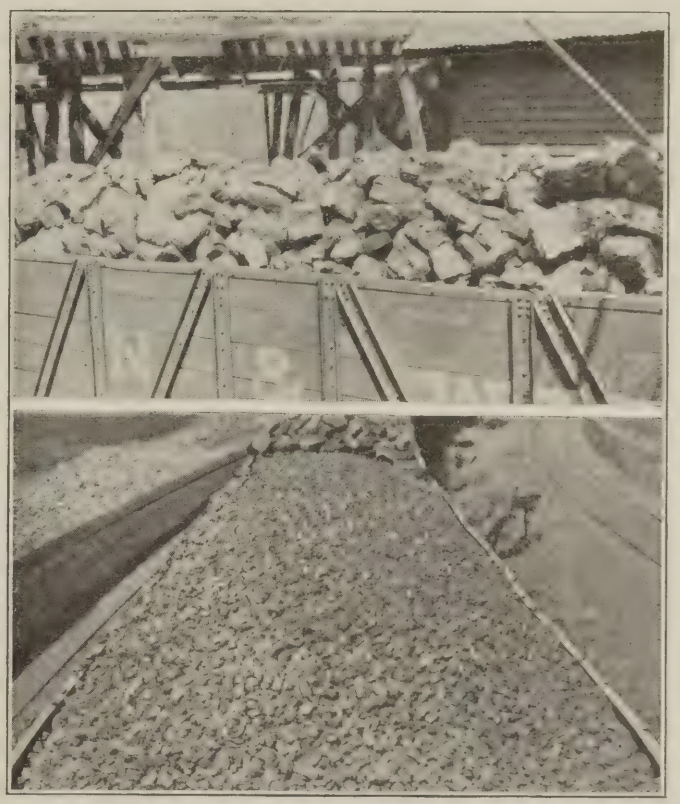
The Marcus, in conjunction with the "Rands" shaker loaders *J*, Fig. 4, made possible the simplicity of design which would have been very difficult to obtain by other means. On the screen, the coal passes successively over $1\frac{1}{8}$ in., 2 in., and 4 in. in diameter circular perforations, as well as the blank picking spaces where the pickers thoroughly clean it and remove all impurities, which they dispose of as described in the foregoing. This conveying trough *O* is rigidly connected to the screen *D* so that it has the same conveying motion.

The preparation of nut coal in this plant is accomplished in an unusual manner. This material is delivered from the Marcus to the nut-slack conveyor *E*, directly beneath. This conveyor is made with two compartments, one carrying nut coal and the other slack. The elevator *H* receives the nut coal from one compartment of the conveyor *E* and delivers it to the bin *I* where it is stored, since the quantity is relatively small. When it is desired to ship this nut coal, the nut chute to the loader *L*, Fig. 4, is opened and the loader on the lump track lowers it gently into railroad cars. In passing over the loader *J*, the rescreener *K*, Fig. 1, removes the fine coal made in handling so that an excellent quality of nut is prepared for shipment. This is illustrated by Fig. 6. The "Rands" shaker loaders *J* each consist of an upper and lower section balanced against each other. They possess few wearing parts and because the coal is placed (not dropped) into the railroad cars at a low point they cause a minimum of degradation.

The upper sections do not raise or lower, but the lower, or boom, sections are raised by the electric hoists *T* as the railroad cars fill. Both sections receive a reciprocating motion from a drive shaft actuated by an electric motor.

On account of No. 3 Pocahontas coal being of an extremely friable nature, sections of perforated plate called rescreeners (*K*) were inserted in the upper sections. The coal is thus given a final rescreening in lump, egg and nut sizes just before passing into railroad cars.

All the slack screened from the run-of-mine (also all rescreenings from the nut, egg and lump) is carried by



FIGS. 5 AND 6. KIND OF COAL PREPARED BY PLANT

the conveyor *F* parallel to the lump track and reduced in the crusher *G* to $\frac{3}{8}$ in. for coking.

To deliver slack to the newly acquired Shawnee ovens, the conveyor *R* was built through a concrete tunnel under the railroad tracks and thence on a 30-deg. incline to the 400-ton larry bin *S*, shown in the plan view, Fig. 1. This conveyor *R* handles the $\frac{3}{8}$-in. crushed slack at the rate of 100 tons per hour so that the Shawnee supply can be easily maintained and the balance of the stream of slack diverted to the old plant, as in the past, for reduction in another crusher for use in the original Pulaski ovens.

The entire new plant (including all the units illustrated in Figs. 1 to 4 inclusive) was designed and built by the Roberts & Schaefer Co., engineers and contractors, Chicago, Illinois.

The Briquetting of Anthracite*

By W. P. FREY
Fuel Engineer, Lehigh Coal and Navigation Co., Lansford, Penn.

SYNOPSIS — *Briquetting of anthracite culm or silt, up to a few years ago, was not a financial success. The introduction of the Dutch oil process and certain improvements in equipment have altered this situation. Silt of a proper quality may now be briquetted at a substantial profit.*

THE briquette plant of the Lehigh Coal and Navigation Co., at Lansford, Penn., has been previously described. Fighting its way like the pioneer of early days through trials and discouragements, it has passed the stage of experiment and has become an institution resting on a foundation practically and financially sound. How the goal was reached it is the purpose of this paper to show, and explanation will be made as to why success was easier along the roads finally chosen. An attempt will be made to set standards for the development of hard-coal briquetting that will eliminate future failures.

All conclusions here drawn are based upon actual facts and achievements, and therefore all speculation and theorizing have been avoided. It is hoped that this article will awaken interest that may positively and successfully answer the call of national emergency—the necessity for fuel.

New Method Did Away with Fumes

Up to three years ago, the Lehigh Coal and Navigation Co. made hard-coal briquettes, using coal-tar pitch as a binder. The plant operated with a monthly output of from 300 to 600 tons and was unable to meet its own expenses. Naturally no one was satisfied, especially as the ideal of a smokeless briquette was still unrealized. Then came the Dutch oil process, introduced into this country by the General Briquetting Co., of New York. This process uses a small percentage of heavy petroleum residuum as a binder. This, being liquid, achieved great economy of handling and did away with the fumes.

This oil (called "Hydrolene" 160 deg. melting point) is not absolutely smokeless; in fact, the heating up of a fresh supply of fuel to the temperature of red heat liberates low-volatile hydrocarbons that produce a white smoke. This is, however, not objectionable. On the other hand, this oil adds to the briquette about 7 per cent. of volatile matter, making the product so far as heat content is concerned the equivalent of the best free-burning anthracite coal.

The average silt used in the manufacture of these briquettes, or boulets, averages 16.5 per cent. chemical ash, corresponding to 12,000 B.t.u. per pound of coal. The hydrolene used as a binder runs about 17,500 B.t.u. per pound, and approximately 7 per cent. of it enters into the mixture, hence:

$$12{,}000 \times 0.93 = 11{,}160 \text{ B.t.u.}$$
$$17{,}500 \times 0.07 = 1{,}125 \text{ B.t.u.}$$

Total B.t.u. = 12,385 per pound of briquetted coal.

The gain over the original coal is 385 B.t.u., or, in other words, the net gain in heating value amounts to 3.2 per cent. Thus, the briquetted anthracite averages 12,385 B.t.u. per pound, and contains 12 per cent. volatile matter and 16.5 per cent. chemical ash.

This is a most valuable fuel; it is the best fuel in its adaptations to the requirements of the kitchen range, from the small household to the large hotel, be it for cooking, baking or broiling; it is an excellent fuel for the hot-air furnace and steam boiler; it is a good fuel for general purposes and has successfully replaced, around the mines, the bituminous coal necessary for the operation of certain classes of steam shovels, steam rollers and mine locomotives. It has been tried out on the heavy freight engines of the Lehigh & New England R.R., in narrow, semi-wide and wide fireboxes, and has always shown steaming qualities equal to the best free-burning coal of the same ash content.

Briquettes May Be Mixed with Soft Coal

Of course, even the free-burning coal cannot replace high-grade bituminous in the firing practice of locomotives, but the briquettes may be mixed half and half with such coal, either mechanically by introducing anthracite briquettes into soft coal, or more intimately by briquetting a hard-soft coal mixture. This 50-50 mixture will burn with the same steaming qualities and efficiency of combustion as the original bituminous coal. The mixture can even be compounded in the proportion of 15 per cent. bituminous coal and 85 per cent. briquettes, but in this case the consumption will be greater by 15 to 25 per cent. for the same rating. Several instances could be cited where factory owners, unable to secure coal for their bituminous-coal boilers, had to replace it entirely by anthracite briquettes, and did so without materially increasing their fuel bill.

The anthracite briquette as a fuel does not mix with straight anthracite coal. As is self-evident, the anthracite briquette must be made of a raw material of such low ash content as will prevent clinkering. In general this result will be secured if the ash content is kept below 18 per cent. Emphasis must be laid upon this particular point, as such requirements exclude from direct briquetting most of the large anthracite culm banks now available at the various mines. It is a consideration of prime importance in the successful manufacturing and marketing of this new product. Not until lately has it been possible to develop machinery that will practically and cheaply furnish such silt as is required. The Lehigh Coal and Navigation Co., using a combination of cone separators and shaking tables, has been entirely successful in solving this problem. It is almost unnecessary to add that the briquette made from hard coal and hydrolene is waterproof, tough and hard. This results in minimum breakage in loading and dumping.

The balance of the problem of successful briquetting requires purely mechanical engineering only. The remodeled Lansford plant serves as an illustration. The output of any similar installation is limited by the capacity of the presses. In this case it is 40 tons per

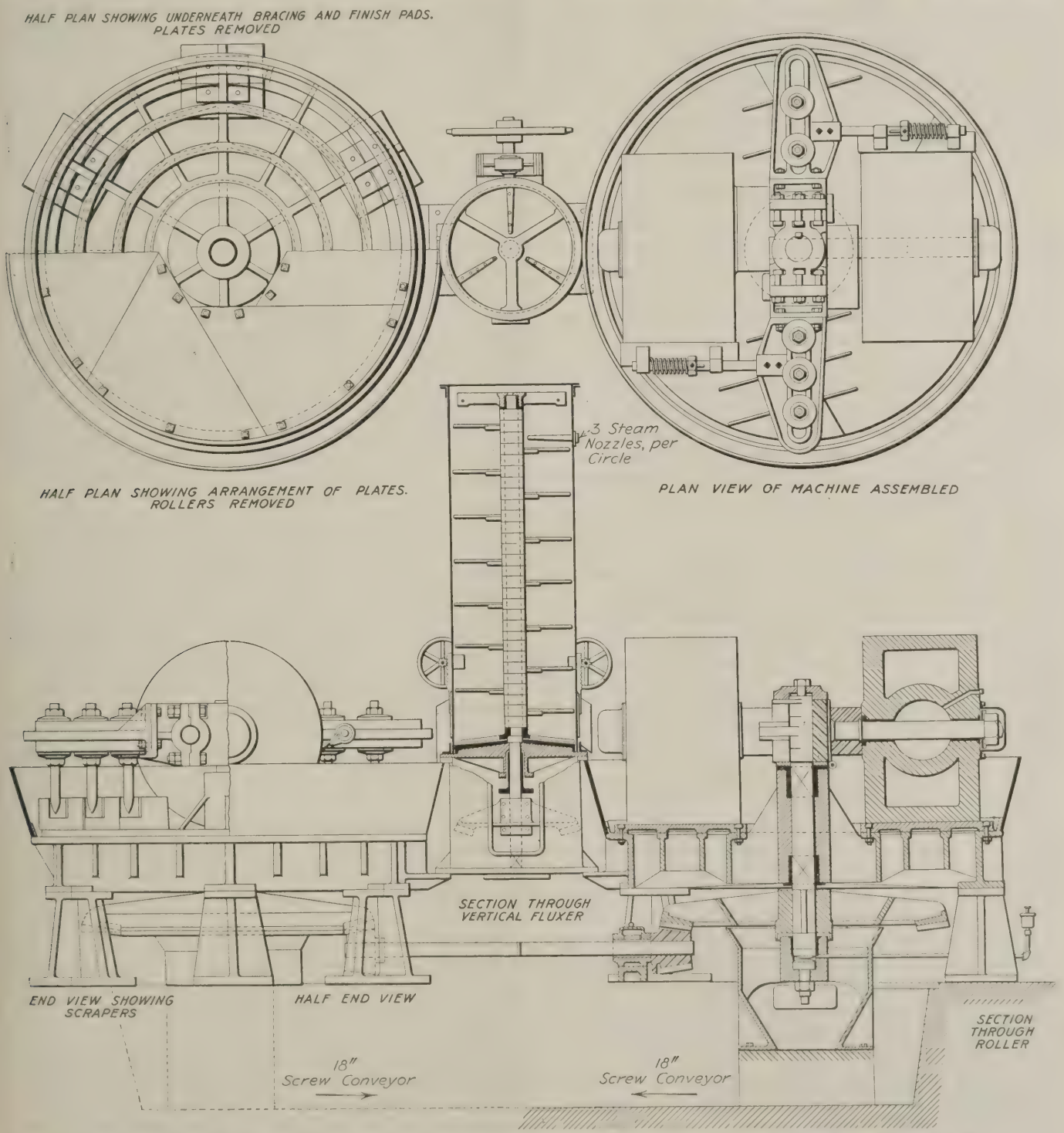
*Paper to be read at the American Institute of Mining Engineers, at its February meeting, New York City.

hour. Forty tons per hour will thus dimension the dumping arrangements, the driers, the mixers and the presses. Much care should be exercised in the choice of a dumping arrangement; it should be light enough to be entirely automatic and heavy enough to stand the wear and tear of the rubbing of the coal and the corrosion of the acid water. It should be arranged to be frostproof, well drained and easily accessible.

The steel dumping hopper is provided with an adjustable gate. The bottom of the hopper is formed by a steel apron feeder, which dumps the coal on a V-bucket elevator. This in turn takes the coal to the top of the drier building and dumps it into steel chutes leading to the two driers. The apron feeder has a speed of 30 ft. per minute. The V-buckets are each 15 x 16 in., rigidly mounted on No. 1112 Link-Belt chain; their speed is 80 ft. per minute.

The two driers are of the rotary single shell type, 36 ft. long and 6 ft. 5 in. in inside diameter. They are pitched ⅜ in. per foot. The number of revolutions is 11 per minute. This arrangement is simple and cheap but has the disadvantage of sending a heavy black cloud of coal particles up the stack. This can only be prevented by dust collectors or incomplete drying. The fuel used for the drier furnace is No. 3 buckwheat. So efficient is the arrangement, that under good conditions 70 tons of culm are dried per ton of coal burned. A screen attachment at the end of the driers removes all oversize and foreign material.

The dried coal is fed directly into two double-strand



BIG CHILEAN MILL MIXER WHERE COAL AND BINDER ARE GROUND INTO INTIMATE CONTACT

continuous bucket elevators with steel casing and 12 x 8 x 12-in. buckets, and delivered to two dry-coal bins of 100 tons capacity each. Sufficient silt is always kept in cars outside of the plant to insure continuity of operation. The contents of the dry bins equalize the dry coal supply to the mixers and presses, and eliminate fluctuations due to time lost in dumping cars or to machinery breakdowns in the drying plant. Fifty horsepower is required to drive the driers and dump.

The culm being now dry, special attention must be paid to the prevention of undue dust. As dry-culm carriers, screw or belt conveyors only may be used, and these must be inclosed in dustproof casings. Both types of conveyors have their advantages and disadvantages. Belts always drop coal on the under side, and provision should be made so that this waste material may easily be removed or recovered without loss of time. Screw conveyors can be used advantageously for either wet or dry silt. Such conveyors, over 100 ft. long, are in use and give little trouble. However, belt conveyors are found preferable because they are lighter, cheaper and faster.

How to Handle the Hot Mixture

From the dry-coal bins the coal should be delivered by the shortest possible route to a mixer, where the hot oil can be thoroughly mixed with it. A preliminary purely mechanical mixing of oil and coal is done in a slightly inclined paddle mixer 3 ft. long. This mixer measures 20 in. over the paddles and its number of revolutions is 75 per minute. The oil is fed in at a temperature of about 250 deg. F. The coal is at a temperature of about 100 deg. The handling of this hot oil and coal mixture presents some difficulties, since in chilling the oil becomes sticky and naturally will adhere to metal as well as to coal. There are different ways to overcome this. At 250 deg. F. the oil will flow like water; at about 70 deg. F. it becomes hard and brittle; at about 175 deg. F. its sticking qualities are most pronounced, while at 135 deg. they disappear. It is necessary, therefore, to either keep the coal and oil mixture at temperatures close to 200 deg. F. or else hold the coal and oil mixture around 150 deg., keeping the shell and metal parts so cool that in contact with them the oil chills immediately to a nonsticking mass. This latter method has been chosen in the Lansford plant, though for reasons of ecomony the mixture should be kept hot, and it is expected to improve this machinery to the point where it will be possible to successfully handle a hot coal-and-oil mixture.

The paddle mixing trough is kept cool by a steady flow of cold water. This water enters into the mixture as surface moisture and then helps make the mass flow more freely. From the short paddle mixer the coal-and-oil mixture is discharged to a vertical paddle mixer, or fluxer, so called because here, in addition to mechanical mixing, a moistening and heating effect is obtained, which brings the mass to the plasticity of a perfect flux, hot enough to be adhesive and moist enough to make handling easy. The flux then passes through the masticator, a Chilean mill of huge dimensions, where a thorough intermixing of ingredients occurs.

The use of the masticator is the backbone of the patents covering the Dutch oil process. It could be eliminated, but the saving in royalty is generally offset by the cost of additional oil necessary. The masticator makes 20 r.p.m. It is built either in single or twin-unit types, local conditions will determine the choice. Twelve and one-half tons of material per hour are efficiently masticated. One hundred horsepower will drive the single-unit type and 150 hp. the twin-unit type of this machine. The masticator discharges centrally through a horizontal 12-in. screw conveyor, operating at 60 r.p.m., to the presses.

The vertical feedbox on top of the press contains a vertical stirrer which keeps the flux in motion, insuring equal and continuous feed. The press shafts should be well dimensioned, as they often break from fatigue. The type of press used in this plant is known as the "Belgian eggette press." The choice of this machine is the result of investigations covering several other types of presses. The peripheral speed of the press rolls is 80 ft. per minute. The die rings are either steel, cut and milled, or chilled cast iron.

The output of each press is now over 10 tons per hour. This increase from four tons to ten (the original guaranteed press output having been four tons per press per hour) was a vital factor in the success of the plant.

As the briquettes leave the press warm, some care has to be taken in handling them until they are sufficiently cooled to become hard. At this plant the boulets drop onto a 24-in. belt conveyor and are taken to a rotary screen, where all waste breakage is removed and sent back to the presses. The boulets leaving the rotary screen are delivered by a single 24-in. belt to a double-strand continuous bucket elevator with 18 x 8 x 12-in. buckets, which in turn discharges into a 300-ton pocket with a perforated screen bottom. Here sufficient time is allowed them to cool before being loaded into cars. During the hot season this cooling process is accelerated by water sprays. Breakage through storing and loading amounts to less than 2 per cent.

Ample Storage Capacity a Necessity

The handling of the oil requires special steam-heated installations. As the oil is a manufactured product, provisions should be made for ample storage capacity, amounting to at least a two-weeks' supply. Any kind of insulated tank will answer the requirements, provided there is a good nonleaking radiator arrangement with a temperature control. Oil should not be kept too hot or its melting point will rise due to evaporation of its volatile constituents. A 70,000-gal. tank is being used at Lansford, as the main storage unit, with the oil at 180 deg. F. A 12,000-gal. tank is employed for direct use, with the oil at 275 deg. F. A steam-heated, electrically driven Kinney pump maintains circulation in the oil system and has satisfactorily answered all purposes. It has been in continuous service for over two years.

Generally speaking, all oil lines have to be steam-heated. This is done by running 1-in. steam lines beside the oil lines (not smaller than 2 in.) and wrapping the two together with good insulating material. Only quick-closing gate valves should be used. In order to have a uniform flow of oil, an overflow feeder tank is provided where the mixing of coal and oil is performed. By keeping the tank full constant head is obtained. A steam-heated gate valve will give the necessary adjustment facilities. Much attention has to be paid to the

good working of this outfit, as the cost of oil is the biggest single item entering into the manufacturing cost of boulets.

At the present market prices and wage scales, the following cost statement applies to the manufacture of hard coal briquettes per ton:

Oil binder	$1.25	Depreciation	$0.20
Clean silt delivered at plant	1.00	Insurance, compensation and taxes	.05
Superintendence and labor	.40	Royalty	.10
Power, light, heat and water	.15		
Supplies	.05		
Maintenance	.05	Total cost per ton	$3.35
Interest on investment	.10		

These figures, though conservative, will give ample protection to the prospective manufacturer. A plant such as this represents at the present market prices an investment of $250,000, exclusive of ground and tracks. The boulets find a ready market at $4 per ton, leaving a comfortable margin of profit available.

Unusual Method of Drainage

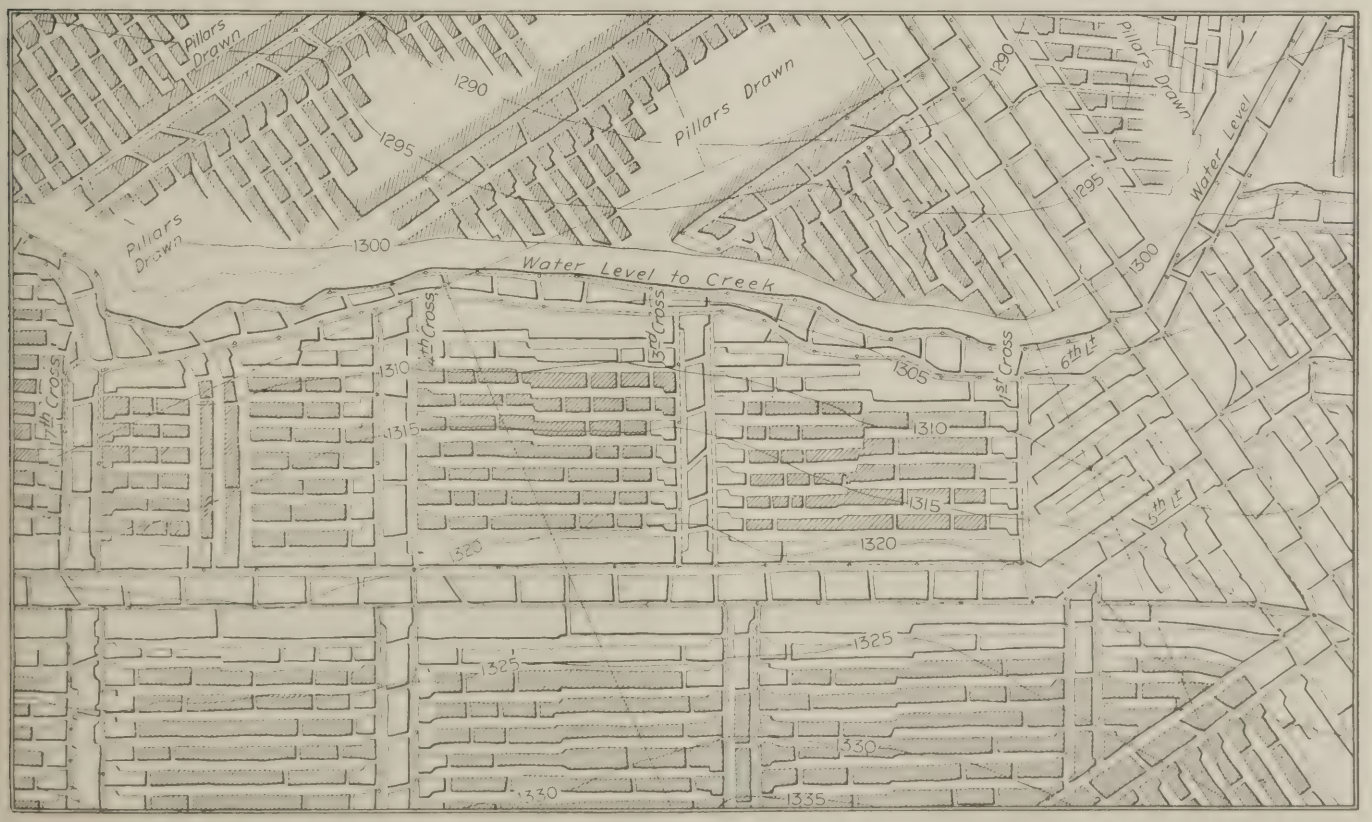
At one of the mines of a large coal company in central Pennsylvania the main slope was driven from the highest point on the outcrop of the coal instead of the lowest, as is usually the case. The point at which the opening was made was selected because it was nearest to the railroad which controlled the mine, while the lowest point, where the coal outcropped on the property, was on another railroad four miles away. Even if the mine had been opened at the lowest point about one-half of the operation would have been below the drainage level. After operating the mine for a number of years, the quantity of water handled by the pumps, particularly during the spring, became so great that some other method of drainage had to be devised.

It was known from the outcrop survey that the lowest point on the outcrop was about 100 ft. below the slope opening. A drift was started here. The main slope was extended until it reached the level of the new drift opened from the outside. Two drifts on this level were then started from the main slope, one to the right and the other to the left. These drifts and similar drifts at three other slopes in adjoining mines of the same company were then driven, the floor being kept level. These drifts were driven until they joined, making a water level connecting all four mines draining to the outside. Practically all this work was in virgin coal. A pillar of solid coal, 100 ft. thick, was left on the lower side of the water level, the only breaks in the pillar occurring where the main slopes from the mines pass through it.

Later it was found that there were some parts of the water level that had bad roof and the upkeep of which was too expensive. These places were lined with concrete, and in some cases rock tunnels were driven. As the workings of the mine progressed, cross-entries were driven on the upper side of the water level to connect these workings with the water level.

Most of the coal has now been taken out from the upper side of the water level and almost all of the workings are below it. All of the worked-out portion of the mine is drained into this water level, and in normal weather a stream of water that would fill a 24-in. pipe flows through it. In rainy seasons the water is 3 ft. deep. A part of this water level is shown by the heavy lines in the mine map below.

The main slope has now been driven in 2½ miles, and the same system is now being installed to drain all the water between this new water level and the upper water level. Instead of being drained to the outside, the water is carried to a pump and from there it is pumped to the surface by three 600-gal. Morris centrifugal pumps.



MINE MAP, SHOWING WATER LEVEL AND DETAILS OF DRAINAGE METHOD

Efficient Coal-Mine Gatehouse

By R. M. MAGRAW
General Superintendent, Utah Fuel Co., Hiawatha, Utah

THE foreword in the Dec. 8, 1917, issue of *Coal Age*, "The Coal-Mine Gatehouse," appeals with peculiar force to me, as undoubtedly it does to many others of the coal-mining fraternity who have had experience at mines where the gatehouse, or check cabin, was considered an unnecessary luxury or bill of expense. Many companies claiming to have efficient checking systems have overlooked the salient features which the name usually denotes.

The mere fact that the employee is required to hang a check on the board when entering the mine and to remove it when coming out does not spell that state of preparedness and efficiency mentioned by the editor in the last paragraph of the foreword mentioned above, as such a practice only serves to indicate the number of men in the mine and does not follow out the main objects of a checking system as they are contemplated by the editor.

Where a single check is hung on the board at the beginning of the shift and removed at the quitting time of the individual, the system breaks down, to quote the foreword, "in that day of disaster which every mine operator hopes he'll never see," in that it cannot be of assistance in identifying the unfortunates.

I have seen some very elaborate checking systems where celluloid checks of different colors were used to segregate the labor into classes. The complications arising from too much system, however, and the inflammability of the celluloid itself, detract from the value of such installations.

The effectiveness of any checking system is governed by its addition to the safety of the employees, to the efficiency of the organization, to the ease and economy of its operation, and to the value of the information which is compiled from the records of the checkman.

Gatehouses can be made as expensive as the resources of the company will permit. They can also be economical of construction and at the same time embody most of the essential features of the more costly installations. Such a structure, as standardized at the mines of the United States Fuel Co., at Hiawatha, Black Hawk, Mohrland and Panther, Utah, will be described. The building itself is of no particular interest, except to show that a satisfactory arrangement can be secured at moderate cost; but it is believed that a description of the system involved may prove of value.

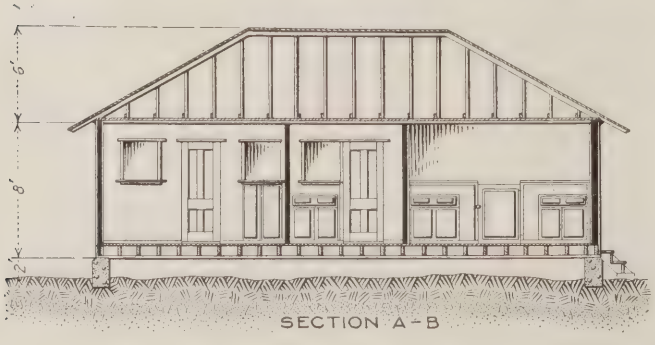
The building is of frame and galvanized-iron construction, and a glance at the accompanying floor plan (Fig. 1) will serve to show the arrangement of the interior. The building is located about 20 ft. from, and to one side of, the manway entrance to the mine, so that in case of a disaster it would be in the clear.

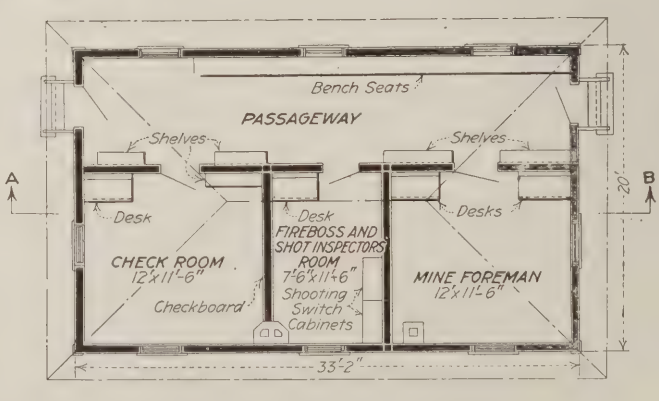
The employee enters at the end of the building farthest from the mine, passes by the office of the mine foreman, who, if necessary, issues instructions relative to the day's work, care of working place, etc.; then by the fireboss' window, where the condition of his working place as regards safety is given him, as are also any instructions relative to immediate safety precautions; then finally past the check window, where he has delivered to him a circular aluminum check bearing his number, which he is required to carry at all times while in the mine. A square brass check, containing the same number, is hung over his space on the checkboard at all times as long as he remains in the employ of the company. When he leaves the mine he returns his aluminum check, which is hung over the brass check.

This system shows the checkman, foreman or other officials at a glance the number of men working and the number idle, and at the end of the shift the board shows the men who have checked out and those still remaining in the mine.

It being a strict rule that no shots shall be fired while men are in the mine, all the shots being fired electrically by a switch located in the check cabin, the checkboard is a necessary feature. If John Jones, or, as it is more apt to be, John Pappadametropopoulos, goes home without delivering his check it is up to the shotfirer to locate him before throwing the shooting switch. Formerly it took an hour or more to locate him, due to his proclivity to change his domicile without leaving any forwarding address. The fact that he was charged a dollar for his forgetfulness, which went to a fund to furnish the children of the camp with a treat on the Fourth of July, did not pay for the loss of time and efficiency.

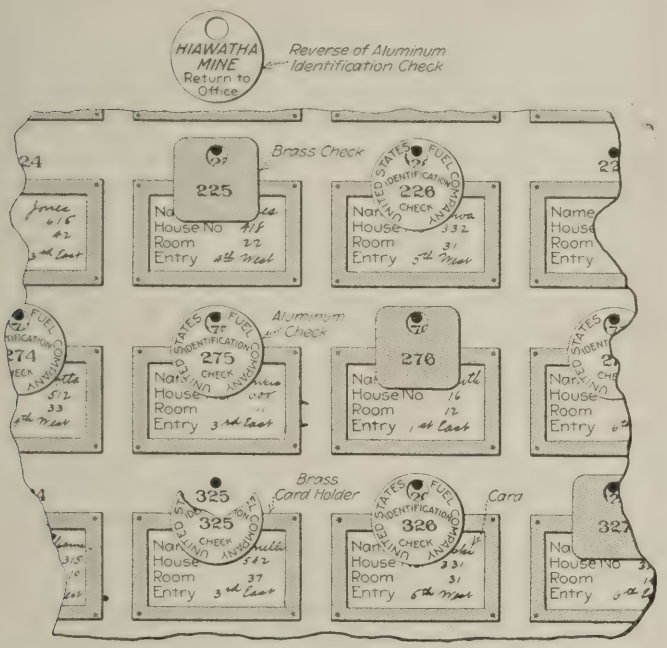
It very often happened that a telegram or other urgent message would come for a man while he was in the mine. It was difficult to remember just where he was working, and occasionally valuable time was lost in finding him.





PLANS OF STANDARD CHECK CABIN OF THE UNITED STATES FUEL CO., HIAWATHA, UTAH

In order to make it easy to locate a man either in or out of the mine, a card system has been inaugurated, which has in a large measure solved the difficulty. Under each check number a brass cardholder has been tacked in which is fastened a card 1½ x 2½ in. The card is given to the man at the office, where he signs an application and gets a check number, and contains his name, occupation, residence and working place. This is of great assistance to the foreman, boss driver and



PORTION OF UNITED STATES FUEL CO.'S CHECKBOARD

others, as at a glance the number and location of idle places can be determined, and the day's campaign laid out accordingly.

The wall space in the passageway is used for hanging miners' coal checks, for posting safety-first signs, bulletins, etc.

The checkman is paid by the month, and in addition to his duties as checkman he issues powder to the miners before they enter the mine. After all men have checked in, the checkman takes a tally of the board, noting in a record book the number of loaders, pick miners, machinemen, drivers and other classes of labor at work that day. Each individual is entered separately, and at the time he checks out the number of hours worked is entered.

Anthracite Operators Take Hold

The following circular notice was issued Feb. 4, by the General Committee of Anthracite Operators, Lafayette Building, Philadelphia:

A special representative committee was appointed Feb. 1 by the anthracite industry to work out and give effect to a constructive program for the increased production and more equitable distribution of coal. It held its first meeting in Philadelphia today. The committee consists of Joseph B. Dickson, of Dickson and Eddy, New York; W. J. Richards, president, Philadelphia & Reading Coal and Iron Co.; S. D. Warriner, president, Lehigh Coal and Navigation Company.

What is being attempted is done with the knowledge and approval of the Federal Fuel Administration. The anthracite operators are coöperating with the Fuel Administration and the Government authorities in every way possible in the hope of meeting the difficulties of the current situation, and they are looking ahead to prevent similar trouble next winter.

A plan has been roughly outlined and adopted and it will now be worked out in the detail necessary to make it practically effective. It aims to establish a central organization through which a complete coöperation of all anthracite producers may be obtained. This will coördinate with the Federal Fuel Administration and the Director General of Railroads, the purpose being to accomplish the following ends:

1. To provide an increased production of anthracite.
2. To take such measures as may be necessary to maintain the standard of the coal produced and to restrict the sale of any output unsuited for economic use.
3. To prevent the substitution of bituminous coal and coke by anthracite, which substitution cuts down the available supply of anthracite to anthracite consumers.
4. To catalog the war requirements of the Government for anthracite.
5. To determine the needs of the consuming public throughout the territory in which anthracite is normally used.
6. To apportion the output of anthracite by districts, cities and towns, to the end that each shall be assured of its fair supply.
7. To route the anthracite from points of production to points of consumption by traffic lines that will afford distribution on the quickest and most economic basis.

The above forward-looking plan cannot be given full effect immediately. But while it is hardly possible to have it completely operative before Apr. 1, the purpose is to get it working as fast as possible, and in the meantime to meet the general need and specific needs so as to afford the greatest relief.

The committee of three is getting the data necessary for the practical working of the plan. It will be perfected in detail and submitted to the Federal Fuel Administrator as quickly as possible. It is expected that the adjustments made will cause a material increase in output and a better distribution of anthracite. When the coal gets to points of consumption it will be for the local fuel administrators to see that it is equitably distributed and not wasted or diverted into channels not intended. When the coal reaches the retailer the operators, as producers and wholesalers, have no control over it.

Why Concrete Tanks Fail

Old chain, wire rope and like materials are unsuited to tank reinforcement as they cannot accurately be placed in the forms nor kept in proper position while placing concrete. However strong such reinforcing material may be in itself, says "The Ransome Book," the effectiveness of it is not secured when used in reinforced-concrete tanks or similar structures. For small concrete tanks mesh fabric may be used, but large tanks require suitable sizes of steel rods and bars. Tanks which are made from concrete lean in cement, or from ill-proportioned mixtures or which are made from concrete placed either too wet or too dry are apt to be leaky. If the newly placed concrete is not protected from drying prematurely, the result is similar.

Coming Meetings

American Institute of Mining Engineers will hold its annual New York meeting Feb. 18 to 21, in the rooms of the society, 29 West 39th St. Secretary, Bradley Stoughton, New York.

American Society of Mechanical Engineers will hold its spring meeting June 4 to 7. Secretary, Calvin W. Rice, 29 West 39th Street.

Canadian Institute of Mining Engineers' annual meeting will be held Mar. 6 in Montreal, Canada. Secretary, H. M. Lamb, 503 Drummond Building, Montreal, Canada.

Economical Generation of Thermal Power at Coal Mines—III

By JOHN B. C. KERSHAW
9 Grosvenor Road, Colwyn Bay, North Wales

SYNOPSIS—*The type of boiler to be employed in a mine power plant should be decided upon after careful consideration. Both the internally fired and the water-tube types have their advantages. The adoption of hand-firing or the employment of mechanical stokers depends largely upon the skill of the available help.*

REFERRING again to the subject of the air mechanically retained in feed water, it may be pointed out that the presence of this impurity is sometimes due to the faulty packing of the feed-pump barrel. The best remedy for this evil is to repack the barrel, and if this fails, to raise the feed-water supply tank to a higher level and thus reduce the lift on the pump as much as possible. The delivery of the feed water inside the boiler should also be made within the steam space, and not below the water level, since in the latter case the mechanically held air will be diffused through the water contents of the boiler and will have time to effect considerable harm before its escape with the steam.

As regards chlorides, it is advisable not to use a water containing this impurity in any considerable amount; but if such use be unavoidable, it is well to clamp zinc plates inside the boiler shell at suitable points and to renew these as frequently as they are dissolved by the action of the chlorine upon them.

Boilers and Furnaces

In this section of my article I am not going to advocate the use of any particular boiler or furnace, but only to indicate the scientific basis upon which the choice of these for mining power plants ought to rest. The best types of boilers and furnaces for burning particular classes of coal will be indicated, but mine owners and engineers will be left to make their own selection among the various makers and manufacturers of the design recommended.

The fundamental requirements of a good boiler are that it shall produce a maximum quantity of dry steam with the consumption of a minimum amount of fuel, and that it shall also possess some reserve of steaming power. For coal-mining plants which intend to make use of good lump or well-graded small coal, the choice lies between the large shell type of boiler, such as the Lancashire, horizontal multitubular marine, and the large water-tube boiler.

The advantages of the former over the latter type are that its much larger water contents contain a big reserve of heat units, and that it can respond to a sudden demand for steam without much forcing or loss of pressure. It can also be used with a hard water supply, with less risk to the boiler than the water-tube type, since the cleaning of plates from scale is more easily carried out than the cleaning of partially stopped-up tubes.

The disadvantages of the Lancashire shell type of boiler are its water-cooled furnace, which sometimes leads to incomplete combustion and smoke production with highly bituminous fuels, and its poor circulation, which leads to a low steam-raising capacity for the volume of water contained. The former disadvantage can be overcome by the use of a preheated air supply and artificial draft, while the latter defect can be remedied by any of the well known devices for displacing the water from those pockets and corners where no movement occurs naturally. With these improvements in its methods of working, the Lancashire type of boiler is one of the most reliable for colliery work, with ordinary well-screened slack or coal testing up to 12.5 to 15 per cent. ash. In the United Kingdom it is the one most generally employed for coal-mining power plants.

It is quite a mistake to suppose that bituminous fuel testing up to 35 per cent. volatile matter cannot be burned in these boilers without excessive smoke production, for with proper regulation of the air supply and some arrangement for admitting secondary preheated air at the bridge or through the furnace door, during the period of maximum evolution of the hydrocarbon gases, high efficiencies and smokeless combustion are possible. There are many of these air-regulating devices on the market, and Fig. 1 shows one that has been operated with success in the Manchester district of Lancashire.

The Lancashire shell type of boiler, however, is not adapted for burning low-grade fuels with high ash contents, since these demand some form of brick-lined combustion chamber and mechanical ash-handling equipment for their satisfactory combustion. The comparatively restricted furnace and ash space of the Lancashire boiler is inadequate for these additions. When low-grade fuels, either in the dust or lump form, are to be burned, therefore, the large water-tube boiler must be adopted.

In large plants where the power demand is considerable and a battery of 10 to 20 boilers is required it is the wisest course to install boilers of each type, so that the plant, regarded as a whole, may possess the special advantages of each. The battery of Lancashire boilers would thus be fired with the better classes of fuel, either by hand or by mechanically operated stokers, and would be relied upon to provide the main steam supply and to take any bad feed water that came along. The water-tube boilers, on the other hand, would be operated with mechanical stokers and the poorer classes of fuel, and would provide steam for the periods of exceptional activity.

In very large plants a Bettington vertical tubular boiler might also be included, in order to make use of the fine coal dust which collects on the floors and ledges of the mines. This would only require drying in order

to yield a fuel of high calorific value, and its removal from underground would increase the safety of the operation. The dust from a large number of mines would be required, however, to keep one of these boilers in constant operation, and its installation is only suggested where the conditions warrant the expenditure.

As regards the method of gasifying poor fuels, described in Article I of this series, either type of boiler can be adapted for gas firing, but the form of burner employed must be different in the two cases. A long conical luminous flame is required in the Lancashire type of boiler and a spreading nonluminous diffused flame in the water-tube boiler. The difference is due to the fact that in the former case the greater portion of the heat which is transferred to the water passes through the plates of the boiler chiefly by direct radiation from the flame itself, while in the latter case the brickwork is the chief source of radiated heat. With suitable burners and baffling arrangements, however, high efficiencies up to 70 per cent. and over are attainable with gas heating, and if the Boncourt system of flameless combustion be used, still higher efficiencies are possible.

The Design and Setting of Boilers

The general conditions which must be observed in the design and setting of either type of boiler, if high efficiencies are to be obtained, are the following:

a. The furnace grate and combustion chamber of the boiler must be adapted to the physical and chemical characteristics of the fuel to be burned, and the heated gases should not be allowed to come into contact with the water-cooled plates or tubes, before perfect combustion has been attained.

b. The plates or tubes which are in contact with the water on the one side and with the hot gases on the other should be of ample superficial area to raise the steam required under normal conditions from each boiler without undue forcing of the fires, and the internal design should be such that the discovery of any corrosion or cracks may be made easy during the periodic inspections.

c. All portions of the heating surfaces exposed to radiation or contact with the hot flame and gases should be constantly covered with water, and the accumulation of scale on these surfaces should never be allowed to exceed $\frac{1}{8}$ in. in thickness.

d. The circulation of the water in boilers of the internally-fired Lancashire type should be promoted by some mechanical means at the dead points, notably underneath the ash boxes.

e. The side and end flues of the boiler should be provided with mechanical scrapers in order that flue dust may be regularly removed without interfering with the work of the boiler. Poor draft, especially when burning low-grade fuels, is often caused by the blocking of the flues with dust which ought never have been allowed to accumulate. The poorer the fuel the more frequent should be the cleaning of the flues.

f. In water-tube boilers the arrangement and number of the baffles have great effect upon the efficiency, and it is a mistake to assume that one fixed arrangement of the baffles is the best for all classes of fuel. The experiments of Henry Kreisinger and W. T. Ray upon "The Adaptation of Boiler Furnaces to Available Fuels" prove that there is great scope for improvement in this direction in the majority of existing water-tube boilers. This paper appeared in the *Journal of the Western Society of Engineers* for November, 1913.

g. The outer brickwork of the boiler setting should be air-tight, since the infiltration of air into the flues through faulty bricks and cracked joints not only spoils the draft, but leads to large heat losses. It is well to build the outside walls with a 3-in. air space inclosed between the two thicknesses of brickwork, and to paint

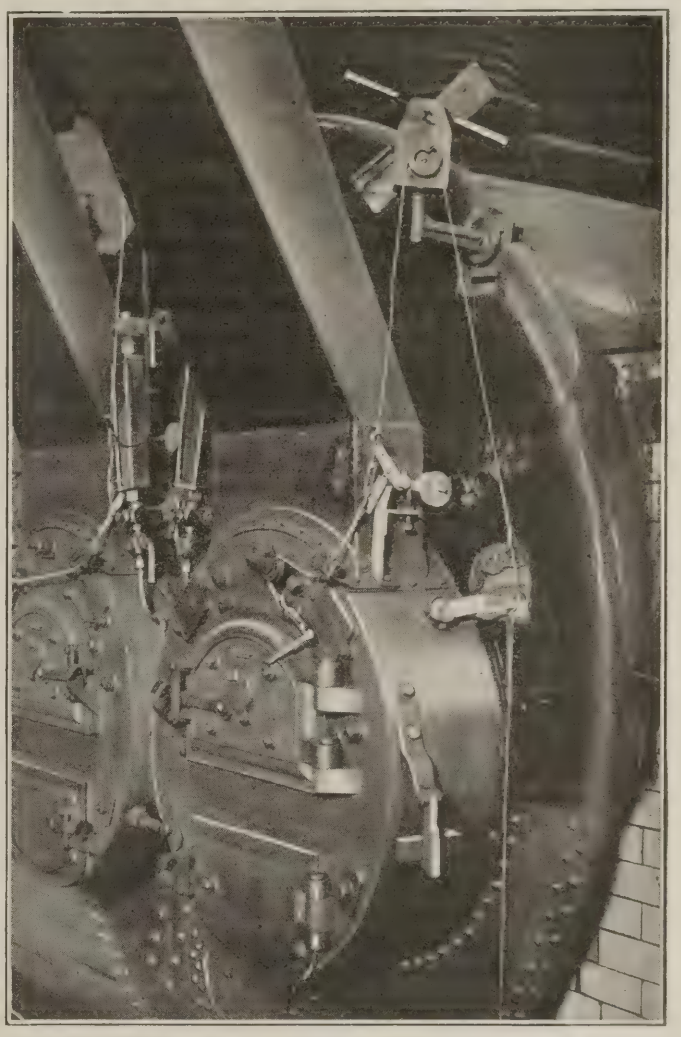


FIG. 1. MILLS AUTOMATIC ARRANGEMENT
For controlling primary and secondary air supply to a Lancashire boiler 8 x 30 ft., fitted with forced draft

or tar the outer wall at frequent intervals, in order to close all cracks and joints. In some cases sheets of asbestos or iron plate have been built into the wall for the purpose of rendering the brickwork air-tight. The boilers at the new Ashley St. Station, New York, described in *Power* for Oct. 9, 1917, are an example of good construction in this respect.

h. The exposed portions of the boiler shell and main steam pipes should be covered with a thick layer of some good heat-insulating material, in order to reduce convection and radiation losses. The spongy substance obtained by blowing air through slag as it solidifies, and known as "silicated cotton" or "slag wool," is one of the best materials for this purpose. I have been on the top of a battery of 8 x 30-ft. Lancashire boilers covered with this material, where it was cool enough to spend an hour without any discomfort from excessive heat.

The heat lost by radiation from uncovered boilers, especially when they are unprotected from atmospheric influences, is far greater than is suspected.

The diagram, Fig. 2, shows that under normal good conditions over one-fourth, or 27 per cent., of the heat of the fuel consumed in boiler furnaces is lost either by radiation or with the waste gases. It is wise, therefore, to take all possible precautions when installing boilers to reduce these two items of loss to a minimum. The fuel saved by even a 5 per cent. reduction of these losses would speedily pay for the better material or skill put into this work.

The methods of checking and controlling the work of the boilers will be dealt with in the last article of this series, when the losses in the waste gases will be more closely examined.

The three essentials required for good combustion and high efficiency in the burning of fuel are: (a) A sufficiency but not a great excess of air; (b) a thorough admixture of this air with the volatile hydrocarbon gases produced when the fuel is heated; (c) a temperature sufficiently high to cause the ignition and complete combustion of this hydrocarbon gas and air mixture.

The poor evaporative results obtained in many steam-boiler plants are due to the utter failure to maintain

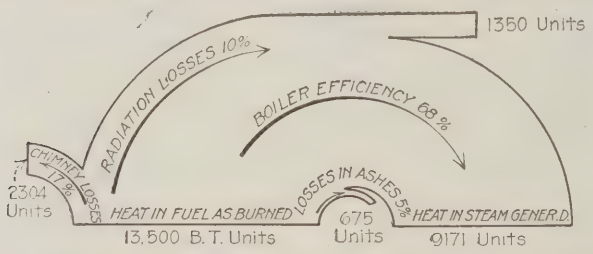


FIG. 2. DIAGRAM SHOWING HEAT LOST BY RADIATION OR WITH THE WASTE GASES

one or more of these three conditions of good combustion, and this failure is quite as often due to faulty design of the furnace and combustion chamber of the boiler as to want of skill on the part of the fireman.

Thus condition (a) demands mechanism or apparatus for controlling and regulating the air supply, condition (b) requires means for mixing the air and volatile hydrocarbons, and (c) necessitates the provision of combustion chambers in which the burning of the hydrocarbon gases can be completed before they come into contact with the water-cooled surfaces of the boiler. No fireman, however skilled, can obtain good results from boilers which are not provided with these requirements.

Considering, first, hand-fired furnaces, these as usually planned and operated fail as regards conditions (a) and (b), for it is evident that the opening of the furnace door for charging fresh fuel, or for cleaning the fires, must allow large volumes of cold air to pass through the furnace, thus abstracting much heat from the fires and plates of the boiler, with no useful result. No hand-fired boiler ought therefore to be started up without an automatic connection between the furnace doors and the dampers, so that when the firing door is opened the appropriate damper is closed (or nearly closed) and the draft through that particular furnace is cut off or considerably checked. The system known as the "balanced draft" system of working boilers attains this end by other means.

Such an arrangement is simple to install and easily maintained in working order, yet one seldom finds hand-fired boilers provided with it.

Again, in hand-fired furnaces there ought to be means provided for varying the air supply at different stages of the combustion process, for a furnace which has just received a charge of solid fuel and is filled with hydrocarbon gases demands more air than one which contains only glowing coke and cinders. The automatic arrangement shown in Fig. 1 is designed to meet this need. As already stated, other forms of regulating devices have been brought out, but are seldom used; yet no hand-fired boiler ought to be allowed to work without one or another of these attachments.

The best types of furnace for hand-fired boilers are provided with closed ash pits; with the mechanical or automatic devices described above for regulating the air-supply; and with means for providing a controlled supply of preheated air at the bridge or end wall of the furnace, for use during the periods of maximum evolution of hydrocarbon gases. The length of each furnace should not exceed 6 ft., or its width 3 ft., since this is the limit of size which one man can cover with fuel by aid of a shovel, in a reasonable time.

Air Leakage Should Be Guarded Against

The corners of the grate on each side of the door should be fitted with nearly straight firebars, giving very slight air apertures between them, since it is in these corners that much air leakage into the furnace may ordinarily occur, with bad effects upon the efficiency. The superficial grate area and depth of fuel bed must be adapted to the fuel burned. It is a mistake to assume that the conditions which suit one fuel are also the best for another of different composition and physical structure. The rate of combustion and depth of fuel bed which will give the best results under given conditions of draft can only be ascertained by actual trial. The average figures of 15 lb. of fuel per square foot of grate area per hour, with a fuel bed 8 in. thick and a draft equal to $\frac{1}{2}$ in. water gage behind the fire, may be widely departed from in practice.

In small power plants any hand-fired boiler equipped as described above and placed under the charge of a well-trained man can show quite as high efficiencies as any type of mechanically operated furnace. It is only where larger boiler installations are concerned, or when low-grade fuels are to be burned, with the production of large amounts of clinker and ash, that mechanical stokers show any economic or other advantage.

Considering now the maintenance of the three essentials of good combustion in mechanically operated boiler furnaces, it is evident that with a regular and constant fuel feed and no opening of the furnace doors for firing or cleaning purposes, the regulation and control of the air supply becomes much simplified. The maintenance of condition (a) of good combustion is therefore provided for in all the best-known types of mechanical stoker, but conditions (b) and (c) are not always observed, especially when burning fuels which evolve large amounts of combustible gases.

Brick-lined combustion chambers which store up heat and assist by radiation in maintaining a high temperature in the furnace are particularly useful in such cases. A large amount of heat is absorbed when these

gases are being evolved from the freshly charged fuel, and unless this can be supplied from the furnace walls the fires are damped down every time fresh fuel is spread over them.

On account of the restricted size of the furnaces and flues the provision of refractory lined combustion chambers is not possible in the Lancashire type of boiler. In this respect it is at a disadvantage when compared with the water-tube and other boilers possessing an independent furnace and grate. In many instances, however, the combustion chamber of these boilers, as originally planned and erected, could be enlarged with advantage, and the raising of the boiler shells and tubes on their supporting framework 18 to 24 in. has often led to a considerable increase in the efficiency of the boiler.

As regards the methods for attaining a thorough admixture of the air and volatile hydrocarbon gases, mechanically operated stoking appliances and steam jets, hot-air jets and "baffling" are the devices employed.

The use of steam jets is the most popular, but unless carefully controlled these jets consume much more steam than is suspected and lead to considerable losses of heat in the chimney gases. Steam consumptions of from 4 to 8 per cent. of the total steam generated are quite common with these aids to more perfect combustion. The steam also has an erosive action on the jets, so that these are continually passing more steam than they were designed for.

A small pump to provide hot air and arrangements for forcing this air under pressure into the combustion chamber at selected points, in order to produce whirling and eddying effects upon the burning gases, is the better method of aiding the chemical changes in the combustion chamber. If this plan be combined with the skillful use of "baffles," the efficiency of the furnace will be raised to its maximum point. As already stated, striking effects can be obtained in some cases by altering the number and arrangement of the baffles in water-tube boilers.

The best method of baffling, however, can only be found by actual trials with the selected fuel; and no one arrangement of the baffles will suit all classes of fuel.

Finally, it may be pointed out with respect to mechanically operated furnaces that it is a mistake to assume, as is often done, that when once the best rate of fuel feed and speed of travel of the fuel along the grate has been determined for any particular grade of fuel the boiler can be left in charge of common laborers or unskilled men. The lesson taught by experience is that mechanical stokers demand skilled supervision and management if they are to yield their highest results. The economic gain resulting from their use lies chiefly in the fact that one skilled operator can attend to double or treble the number of boilers he could attend to if these were hand-fired.

The labor costs are therefore considerably reduced, but this saving is often balanced by the interest charges on the capital represented by, and upkeep charges upon, the mechanical portions of the plant.

In those places and mining districts, therefore, where there are plenty of intelligent men available who can be trained to make good firemen, it is perhaps unwise to install mechanical stokers, unless the other circumstances of the case render their adoption unavoidable.

(To be concluded)

Minecdotes

In Which Mine Bookkeepers Find an Unexpected Ally

"If you would really like to be of some use in the world, instead of merely occupying space," the mine boss said to the master mechanic in one of their numerous arguments, "you might invent an automatic mine bookkeeper and thus relieve the coal industry of one of its necessary nuisances."

"He wouldn't let me overdraw, either," replied the master mechanic.

"You're off on the wrong foot as usual," answered the mine boss, with a flush however that indicated the insinuation was perhaps, not altogether, amiss. "What gets my goat is the way a bookkeeper can take a deadwork report, a few cars of coal and some material orders, and jumble them up so it would take a man a week and two adding machines to figure out whether he ought to buy bonds or strike somebody for a loan."

"Did you ever keep books at a mine?" asked the master mechanic.

"No, I never did," replied the mine boss disgustedly.

"Well, if you ever tried it you would change your tune. The reason why I know is that one time, when the bookkeeper at old No. 12 got sick, I had to fill in; and believe me, I'll take mine in the shop. I would start in the morning posting the ledger, and would no sooner get my pencil sharpened than the 'phone would ring. I'd answer that. Then the boss would want to know the price of spikes somewhere back in 1887, and I'd look that up. The material clerk would butt in and want the waybill reference on a car of props that was lost between here and California. I'd dig that up. By the time I had done a hundred-or-so chores for every idiot who took a notion to come in, I had spent most of the time hunting for my place after the last interruption. I'd get through after awhile, somehow, and then take off my balance; and about the time I'd get halfway down a long column of figures some sucker would breeze in and say, 'Well, ol' timer, how do you like it as far as you've gone?'

"Then, in the afternoon, all the loafers in camp would come in to get store orders and argue about their accounts. Some gink would say he wanted an order and had $26.43 coming to him. His balance would show $26.13. I'd check his account back with him, and show him his error, after which he would shrug his shoulders as much as to say that he knew you were beating him out of 30c., but that he was too much of a gentleman to accuse you of it. I'd then start to give him the $26.13, when he'd say he only wanted 75c. anyhow. Finally, after I'd got worked up to where I'd determined to lick the next fellow who said beans, the whistle would blow, and I'd knock off to do the very same thing all over again the next day. No, sir; a mine bookkeeper earns all he ever gets and generally a whole lot more. There's only one thing about the job that has any advantage in it. After the bookkeeper got well and I went back to the shop, my wife told me that it was the first time I'd had my hands really clean in seven years!"

A Stripping Retrospect

IN THE early seventies, a superintendent of two collieries in the Hazleton anthracite region of Pennsylvania, learning of an interesting experiment in the Wyoming field, visited the operation to obtain further information in regard to it. At that time it was a decided innovation to remove the cover from a coal seam and mine the coal in the open. In a very primitive and limited way this was being done on the outcrop of a coal seam "somewhere in the Northern anthracite field."

This superintendent made a favorable report to his people, and as a result stripping operations shortly afterward were commenced at Milnesville, on the lease of the Stout Coal Co., a few miles north of Hazleton.



OLD NO. 6 COLLIERY OF A. PARDEE & CO., HAZLETON, PENN.

Quite a large area of flat Mammoth coal, with only about 10 to 20 ft. of cover, eventually was mined in the open. The stripping attracted considerable attention and various were the comments in regard to it—some even holding it up to ridicule.

In the light of present-day practice, when this method of mining contributes such a large tonnage in most of the coal states, it seems hardly credible or creditable that it should have had such adverse criticism in its early days. However, its advantages soon were so evident that other Lehigh operators began to strip coal, and the unsightly dirt banks and excavations, so characteristic of this region, began to disfigure the landscape.

Shortly after stripping was under way at Milnesville, a colliery was opened up at Hollywood, an adjoining lease. Here considerable work of this kind was carried on as the Mammoth seam "spooned out" on this property and lent itself especially to this method of mining. H. M. Chance covers the Hollywood strippings at length in Vol. AC of the Pennsylvania Second Geological Survey.

The Middle anthracite coal field of Pennsylvania, including Hazleton and adjacent territory, is characterized by a number of comparatively small local basins quite in contrast with the large, deep coal deposits of the Lackawanna and Pottsville regions. In the Middle field the Mammoth seam, or "Big Vein," as it is known to the trade, reaches its greatest development, attaining a thickness of from 30 and 40 ft. up to 50 ft. and over in special cases. In most of the other anthracite fields of Pennsylvania, the Mammoth seam is split up into several distinct beds, to be mined as such.

It was natural in the early days of stripping coal, that operations should be much more limited than at present. In the days of competitive rate-cutting by the individual operators, coal sold occasionally for about cost of production. In those days it was considered good practice to remove a yard of dirt provided a yard of coal was thereby recovered. At some of the extensive present day anthracite strippings, 8 yd. of material is removed to obtain one yard of coal; and the material overlying the "pay coal" may consist of dirt, loose rock and solid rock.

It would be interesting to compare the relative cost per yard of stripping at the different periods, but exact figures are probably not readily obtainable. The first work of this kind was done by company men, but soon contractors undertook it on much the same basis as rail-

road excavation of a similar nature. Doubtless this comparison would throw some light on the subject. At several collieries at which the writer took up the stripping estimate each month, the prices were—dirt, 19c.; loose rock, 35c., and solid rock, 50c. per yard. The time referred to was about 1890.

The photograph from which the accompanying illustration was made was taken about this same time. It is interesting not only from a stripping point of view, but it also illustrates a typical Lehigh coal basin. The Mammoth seam stands out in bold relief in the center of the picture; the outcrop on the left can be traced almost to the slope of the breaker on the horizon; on the right the coal rises somewhat to an anticlinal and then pitches heavily, forming the north dip of the main Hazleton basin. The illustration shows the old No. 6 colliery of A. Pardee & Company.

In further explanation of this illustration it may be said that most of the "spoon" coal of this basin has been stripped and the coal sent to No. 6 breaker for preparation. Following closely on the foregoing operations is further work of a similar nature, the dirt bank of which is seen in the foreground at the left.

Thorough prospecting by a churn drill, operated by two or three men, frequently located large bodies of coal which were profitably stripped. This was especially true of the ends of basins and along the side crops, where the coal often folded over, flattened out and would likely have been lost by ordinary methods of mining.

It is a rather singular coincidence that while stripping in the Lehigh field started at the colliery of the Stout Coal Co., on the other hand probably the most extensive work of the kind in recent years is at the operation of the old Ebervale Coal Co. In the seventies these two collieries were under the same management and associated in the sense that the Stout interests were prominent stockholders in the Ebervale company. The latter property is now controlled by the Markle brothers, whose extensive strippings at this place are described in the Sept. 25, 1915, issue of *Coal Age*.

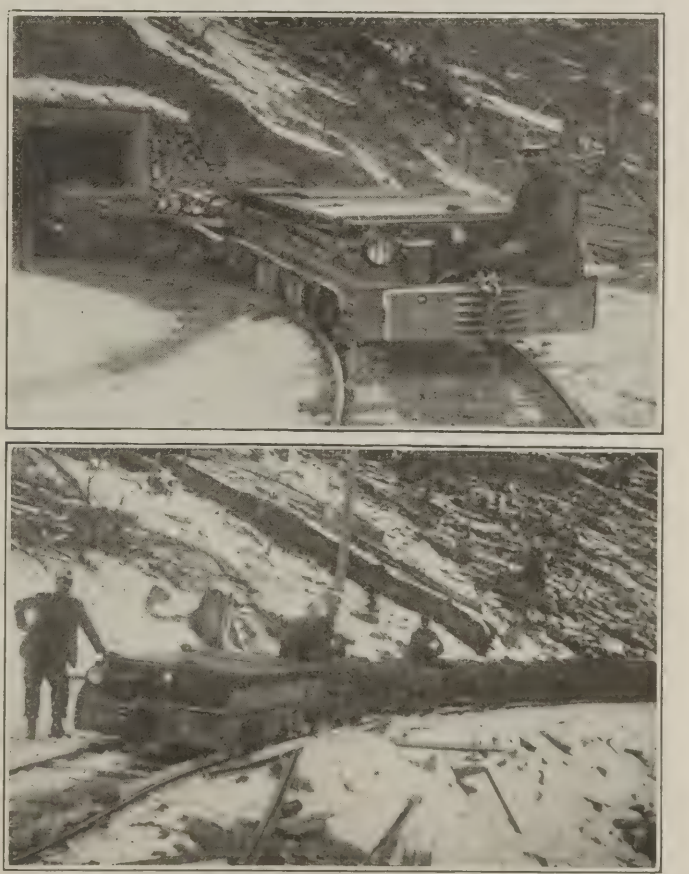
Legal Department

RESPONSIBILITY FOR HOISTING ENGINEER — An engineer employed at a mine to operate a cage in a shaft used in hoisting and lowering miners is to be regarded as a representative of the mine operator, and not a fellow servant of the miners in such sense as to absolve the mine owner from liability for injury sustained by a miner through such engineer's negligent operation of the hoist. It was manifestly negligent for the operator of an electric hoist to release it without using the brake or clutch, whereby the cage was dropped suddenly 110 ft., resulting in serious injury to plaintiff while riding on the cage for the purpose of going from a 500-ft. level to the 600-ft. level in defendant's mine, and the injured man is entitled to recover damages. (Utah Supreme Court, Farnon vs. Silver King Coalition Mines Co., 167 Pacific Reporter, 675.)

RISK ASSUMED BY COAL-CUTTING MACHINE OPERATOR—The operator of a coal cutting machine is not entitled to recover damages on account of injury sustained through the rear jack falling upon him while he was at work, where he knew as well as, or better than, any one else the defective condition of the machine and fully appreciated the danger to which he was exposed, voluntarily remaining at work for three months under such conditions, without any assurance from his superiors that the machine would be put in safe condition, although he had repeatedly taken the machine to the shop for repairs. (Kentucky Court of Appeals, Stonega Coke and Coal Co. vs. Bush, 197 Southwestern Reporter, 389.)

PUBLIC COAL LANDS—The fact that one was disqualified to hold title to public coal lands did not invalidate a title acquired by him from one who was so qualified and transferred to another who could lawfully receive it. And the fact that one has conveyed title to coal lands which have not yet been granted to him by the Government does not affect the validity of the conveyance, if he afterward obtains such grant, which will inure to the benefit of his grantee. (Utah Supreme Court, Ketchum Coal Co. vs. Pleasant Valley Coal Co., 168 Pacific Reporter, 86.)

RIGHT TO COMPEL CONVEYANCE UNDER CONTRACT—Although the courts will not compel specific performance of a contract to convey land where it appears that any degree of fraud has been practiced by the party who seeks performance, representations made to induce the owner of the surface of coal lands to convey his rights to the corporation which owned the coal, in exchange for stock in the company, concerning the profits which the company would probably earn, cannot be deemed to be such representations as to form the basis of fraud, they being mere matters of opinion. The stock issued to the grantor being worth about $3500, and the surface rights having been virtually valueless except for mining purposes, it cannot be said that the consideration for the conveyance is so inadequate as to deprive the corporation of the equitable right to a specific performance of the contract. (Kentucky Court of Appeals, Bartley vs. Big Branch Coal Co., 169 Southwestern Reporter, 601.)



IRONTON STORAGE BATTERY LOCOMOTIVE OWNED BY RAVEN COLLIERIES CO., RED ASH, VA.

Above—Locomotive coming out of company's No. 3 mine. Below—Same locomotive with a trip of loaded coal cars from No. 3 mine

Who's Who In Coal Mining

J. D. A. Morrow

BY THE application of horse sense and sound business methods, J. D. A. Morrow expects to get tangible results in the matter of coal distribution. Mr. Morrow has been designated by the Fuel Administration as manager of apportionment and distribution. Since all have agreed that distribution is the big problem to solve in the coal situation, Mr. Morrow has been thrust into a position hardly less important than that occupied by Dr. Garfield.

Mr. Morrow was associated intimately with Edward N. Hurley, now the chairman of the United States Shipping Board, when he was a member of the Federal Trade Commission. Mr. Hurley's ability to apply business methods to Government activities so impressed Mr. Morrow that he is thoroughly imbued with the same policy. He expects to work as if he were the general sales manager of a private company, and he expects to get private-company efficiency out of his organization.



J. D. A. MORROW

Practical coal man who has charge of apportionment and distribution of coal for the Federal Fuel Administration

It was Mr. Morrow who started the Federal Trade Commission's bituminous coal investigation. In justice to Mr. Morrow, however, it must be stated that he simply initiated the work and is in no way responsible for the general pooling recommendation and the other suggestions made by the Federal Trade Commission in connection with that investigation.

Mr. Morrow was importantly connected with the investigation made by the Federal Trade Commission which led to its recommendation to Congress that American firms be allowed to coöperate in the conduct of foreign trade. This report resulted in the Webb bill.

Just at this time Mr. Morrow's whole attention is concentrated on preliminary arrangements for a drive for more efficient transportation conditions as they apply to the furnishing of cars to the mines. It is his hope to be able to build up an organization of coal distribution which soon will compare favorably with that of England and with that of Germany. Mr. Morrow is a graduate of Ohio Weslyan. He was born at Campbellstown, Ohio.

The Fuel Administration's announcement of Mr. Morrow's appointment reads as follows: "The United States Fuel Administration announces the appointment of J. D. A. Morrow to be manager of apportionment and distribution. This appointment is in accordance with the general plan of centralizing the authority and lines of report at headquarters. It is intended also to facilitate the introduction of the new plan of partial decentralization of apportionment and distribution without overburdening the present organization.

"Mr. Morrow will have general charge of the apportionment and distribution from producer to consumer of all fuel except petroleum. He will supervise all budgeting and statistical work, as well as pools and other transportation matters. He and the bureaus reporting to him will have no connection with the fixing of operators' base prices or retail prices, nor will he have authority or supervision over state administrators on matters other than apportionment and distribution.

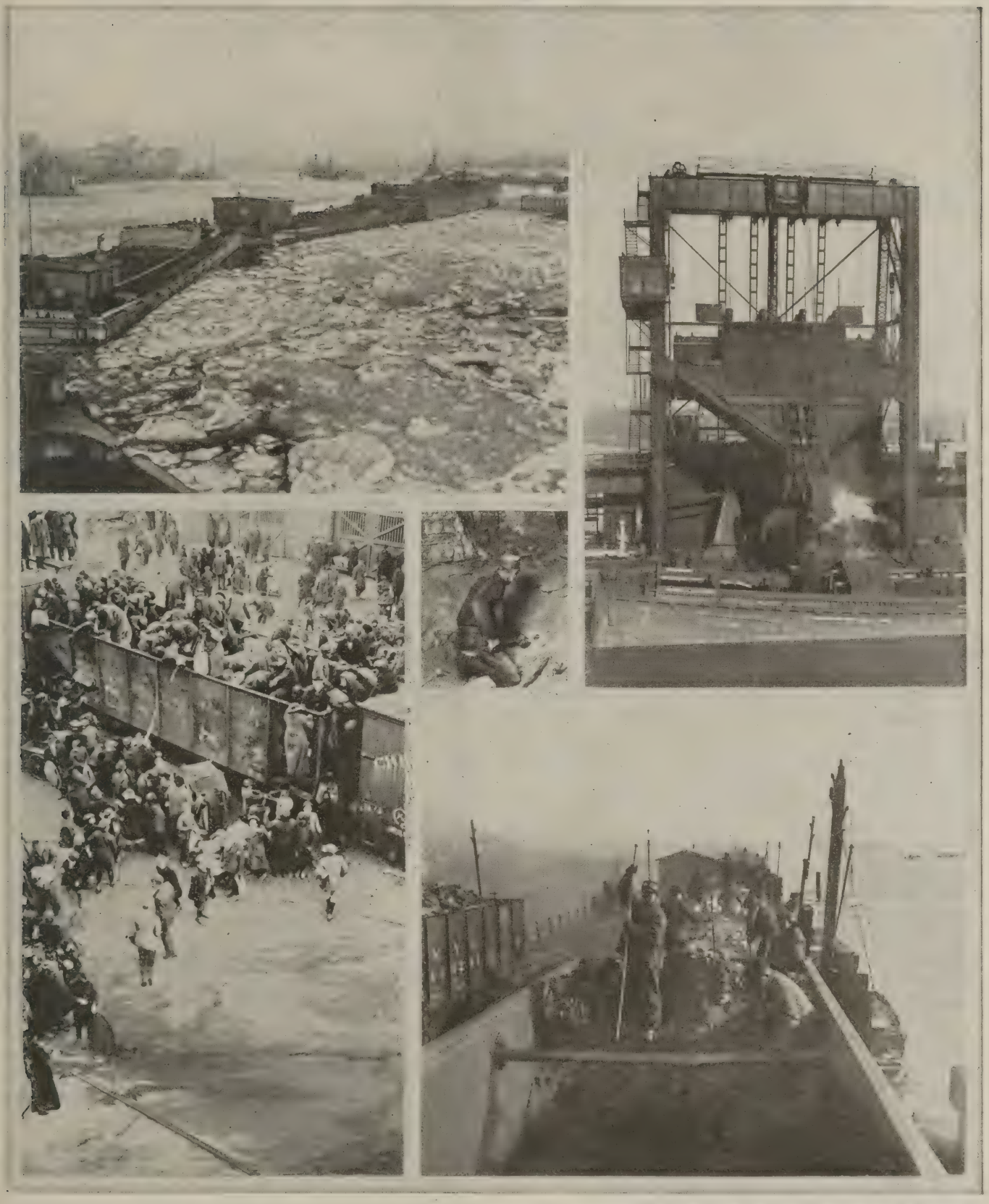
"Mr. Morrow has been assistant secretary of the Federal Trade Commission, commissioner of the Pittsburgh Coal Producers Association and recently general secretary of the National Coal Association, representing the bituminous coal operators of the country."

Women Learn First Aid on Bureau of Mines Rescue Cars

With the wives of miners and other women members of mining committees as pupils, the United States Bureau of Mines has entered upon an active campaign to reduce casualties. Eight "mine-rescue cars," each with a crew of men highly trained in modern rescue methods, have been equipped and are making the rounds of the mining communities. Five hundred women have taken the course given and the bureau has been overwhelmed, since the declaration of war, with applications from women who wish to replace men on the cars.

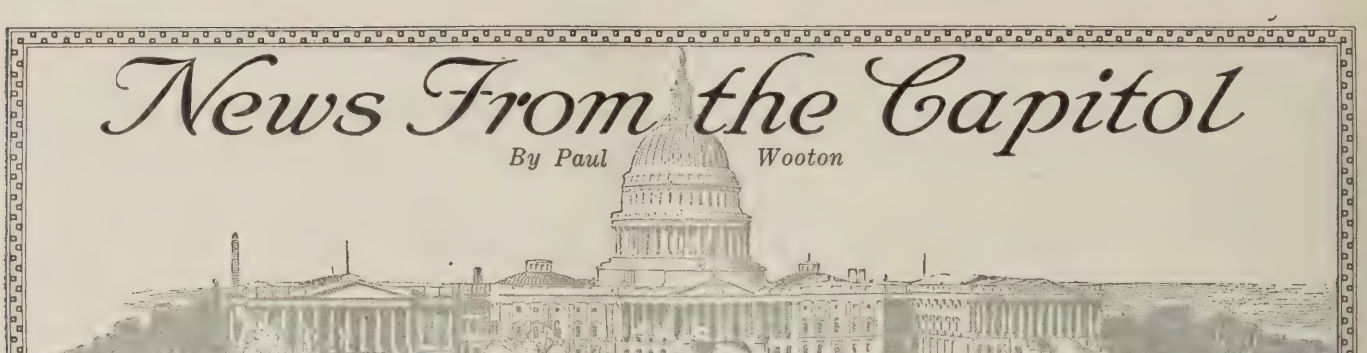
Casualties in American mining have been large and the fatalities have been figured by the bureau at 3.30 for every thousand men engaged. According to reports from mine operators during the months in which the first-aid courses have been conducted, the loss of time from accidents has been materially reduced. The results of the campaign are also noticeable in the better school attendance of miners' children.

Before Coal Gets to the Ultimate Consumer



Photographs copyright Underwood & Underwood

The photographs on this page illustrate some of the things that happen to coal before it reaches the ultimate consumer. In the upper left is shown a string of barges plowing its way through the ice of New York Harbor during the recent cold spell; it was the first time in many years that the harbor had been practically frozen over, and this was one of the hindrances that intensified the coal shortage in New York City. In the lower left is shown a not unusual scene in railroad yards where cars loaded with coal were unable to be moved on account of congested transportation facilities. Many people, driven to desperation by the cold, came with carts, wagons and bags to carry the coal away. The view in the upper right is of one of the great modern coal dumps in use at large coal-distributing centers. The dump illustrated can turn over a car loaded with coal, emptying it at one stroke. This modern invention saves a great deal of labor and makes for great efficiency in the unloading of coal. In the lower right is a general view of a crew of men on top of some coal cars trying to loosen frozen coal by the aid of crowbars. The coal is frozen in huge lumps to the sides of the cars. Conditions such as these make it hard to speed up the movement of fuel to the places where it is most needed.



[Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Union Trust Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 307, Union Trust Building, Washington, D. C., while at the capital.—Editor.]

Weekly Production Statistics

Bituminous coal production was 10,018,000 tons, beehive coke production was 491,000 tons, and anthracite forwardings were 33,406 cars for the week ended Jan. 26, according to an estimate based on the returns from a high percentage of production made to the United States Geological Survey.

The coal production for the week, which averaged 1,670,000 tons per working day, still is much below normal and under the rate of production for the corresponding week of the year previous, but shows a decided improvement over production for the week preceding, when it was 8,566,000 tons.

Beehive coke production fell to the lowest point since June. The average per working day was 82,000 tons. During the week preceding, the average per working day was 88,000 tons, while during the week of Jan. 12 it was 94,000 tons.

Anthracite shipments, while somewhat greater than those during the week of Jan. 19, are still considerably below the normal forwardings.

Byproduct coke also reflects the depression in the coal industry, but not to the same extent as does beehive. Production during the week ended Jan. 19 was 319,524 tons. This is 65.9 per cent. of full-time capacity. Inability to secure coal, owing to transportation difficulties, is charged with 23.7 per cent. of the loss. This does not apply to Minnesota, where ample coal supply allowed continuous operation. In addition to cutting down the available coke so badly needed at steel mills, the reduction of output at byproduct plants decreases the badly needed supplies of ammonia, benzol and toluol.

Unfilled car orders at mines was the principal cause for the ratio of tonnage produced to full-time capacity. During that week, production fell to 55.8 per cent. of full-time capacity, or the lowest point reached since early in the year. The trouble to a considerable extent was the result of heavy snows. In Ohio, production fell to 40.3 per cent. of full-time capacity.

More District Representatives Appointed by Fuel Administrator

J. P. Cameron, of Altoona, Penn., has been designated as district representative of the Fuel Administrator for the coal fields of central Pennsylvania. With the announcement of Mr. Cameron's appointment, the names of the three assistant representatives who will work under him were made public.

John Lloyd, Jr., of Altoona, will be in immediate charge of coal produced at mines in Huntington and Bedford Counties; in that portion of Somerset County served by the Pennsylvania R.R., as well as the mines on the Pennsylvania between Crosson and Blairsville, and on the South Fork division and the Indiana branch.

Harry B. Scott, of Philipsburg, Penn., will be in direct charge of Center County, Cambria County (except that part coming under the jurisdiction of Mr. Lloyd), eastern part of Indiana County and all operations in Greenfield County tributary to the New York Central and Pennsylvania railroads.

Samuel A. Rinn, of Punxsutawney, will be in immediate charge of the producing district served by the Buffalo, Rochester & Pittsburgh R.R. in the western half of Indiana County; mines in Armstrong County served by the same railroad and by the Buffalo & Susquehanna R.R.; mines in Greenfield County tributary to the Buffalo, Rochester & Pittsburgh R.R.; mines in Jefferson, Elk, McKean, Cameron and Clinton Counties.

C. M. Roehrig, of Ashland, Ky., has been appointed district representative for the coal field comprised of the Counties of Boyd, Carter, Floyd, Johnson, Letcher and Pike (except the mines served by the Norfolk & Western Railway).

W. R. J. Zimmerman, of Charleston, W. Va., is district representative for the New River coal field in southern West Virginia, comprising operations on the Chesapeake & Ohio Ry. south and east of Hawks Nest, and all operations on the Virginian Railroad.

E. S. Howe, of Bluefield, W. Va., will be the district representative for the Tug River and Pocahontas coal fields in southern West Virginia and the Clinch Valley and Virginia anthracite fields in Virginia, comprising all operations on or tributary to the Norfolk & Western Ry. in West Virginia east of Panther, and embracing Mercer County and parts of McDowell and Wyoming Counties, West Virginia, and Tazewell, Montgomery, Pulaski and Russell (east of Coulwood on the N. & W.) Counties, Virginia.

Interstate Commerce Commission Allows Changes in Demurrage Rules

Changes in demurrage rules, regulations and charges, governing cars containing anthracite coal, bituminous coal or coke for transshipment by vessel, have been allowed, effective Feb. 10, by the Interstate Commerce Commission. The new regulations provide that:

Cars containing anthracite coal, bituminous coal or coke for transshipment direct by vessels, or to be stored for shipment by vessels when held for or by consignors or consignees for unloading, forwarding directions, or for any other purpose are subject to these rules except

a. Cars reconsigned or reshipped for rail delivery or to another rail destination will be subject to the National Car Demurrage Rules (Tariff I. C. C. No. ———) from arrival.

An average of three (3) days per car free time will be allowed.

A. A notice of arrival must be sent or given to the consignee in writing or as otherwise agreed to by carrier and consignee upon arrival of cars and billing at ———— (destination yard) ————.

Time will be computed from the first 7 a.m. after the day on which notice of arrival is sent or given to the consignee.

Note—In computing time Sundays and legal holidays (national, state and municipal), but not half-holidays, will be excluded. When a legal holiday falls on Sunday, the following Monday will be excluded.

B. A car shall be considered as released:

1. At the time vessel registers for the cargo or fuel supply of which the coal or coke dumped into such vessel is a part, except that when cars are unloaded before the vessel registers such cars shall be released when unloaded.

2. The date shipments are transferred by written order and acceptance to another party shall be considered the date of release of the car for the account of the original consignee and the detention shall follow the car and be charged in the account of the new consignee.

3. Any fraction of a day will be computed as one day.

Settlement shall be made on basis of the detention to all cars released during each month. The date of arrival notice shall be subtracted from the date of release. From the total days detention to all cars thus obtained deduct three days' free time allowance for each car; the remainder, if any, will be the number of days to be charged at the rate of $3 per car per day. Excess credit days of any month can not be deducted from excess debit days of another month.

Exceptions at Lake Ports: (1) Cars released during April and May shall be considered as May detention and treated as one month. (2) The season of navigation shall be considered as extending from April to December. Loaded cars on hand at the close of navigation will be recorded released on that date in computing the average detention and subsequent detention will be subject to the National Car Demurrage Rules, as per Tariff I. C. C. No. ———.

Bureau of Internal Revenue To Issue Income Tax Regulations

Regulations governing the administration of the income-tax law are about to be issued by the Bureau of Internal Revenue. The rulings relating to depletion in mining properties and to dividend payments from depreciation and depletion reserves are among the more important. With regard to mining corporations, it is stated that in passing on values, as of Mar. 1, 1913, as a basis for depletion, the Commissioner of Internal Revenue will give due weight to market quotations of capital stock as of that date and to values stated by the corporations in their capital stock returns. It is held that dividends paid of depletion or depreciation reserves are in the nature of a liquidation dividend and are a return of capital to the stockholder and not taxable as income. Such dividends will not be so regarded, however, unless the income and surplus first have been distributed and the fact that their capital has been reduced or partly returned is made public in their published statements.

A ruling has been provided for computing the amount necessary to return capital invested in oil and gas wells. The rule is based upon estimate of the units contained in the property, and fee owners and lessees are placed upon the same basis in so far as bonuses actually have been paid for leases.

State Fuel Administrators Must Conform to Washington Regulations

Some confusion is resulting, due to the inequalities in the administration of various restrictive regulations issued by the Fuel Administration. To prevent this, state fuel administrators have been instructed to conform to the regulations as promulgated in Washington. This, it is believed, will prevent the inequalities in the requirements of different communities. Some latitude is left to state administrators to cope with local conditions, but it is expected that most of the additional regulations, which have been issued by the state administrators, will be revoked. In some cases these additional regulations have resulted in inconvenience to the public, which is said to be out of all proportion to the saving of fuel effected.

"Most Expensive Coal Purchase in Country," Says Senator from Michigan

Only six tons of coal were saved at 37 furniture factories at Grand Rapids, Mich., on each of the fuelless Mondays, according to a statement made by Senator Smith, of Michigan, on the floor of the Senate. In part, he said:

I wish to say, if the chair will indulge me, that the most expensive coal purchase in the United States on any day was purchased in my home city of Grand Rapids, where six tons of coal cost over $22,000. The consumption capacity of the city of Grand Rapids, Mich., with 135,000 people, is 3000 tons of coal a day. Monday 37 of the leading furniture industries of that city, and the leading furniture center in the world, were closed down by order of the Fuel Administration to save six tons of coal that could be carried upon two wagons. It would have taken, by a very careful and painstaking review among our factories, six tons of coal more to have operated 37 factories in the city of Grand Rapids Monday than it took to close them down, and nearly 8000 workmen were put into the streets on that day, and their wages wasted by Government order. That is a high price to pay for coal in the United States; a tremendous sacrifice for labor to make in order to humor a caprice, a mere caprice. If that is wisdom, I do not understand it. No, Mr. President, it is reckless indifference to individual liberty and the rights of citizenship.

I rise in my capacity as a Senator to protest against the sacrifice of labor and of business to the whims of a Fuel Administrator who will not see his error. Think of it, sir! Thirty-seven great furniture-manufacturing plants closed down a whole day to save six tons of coal! And in the nine idle days that are to follow, if this order stands, 54 tons of coal—scarcely a carload—will be saved and over $250,000 in wages to workmen lost.

At a conference between McAdoo and Garfield on Tuesday it was decided not to withdraw the order for workless Mondays for the present.

THE LABOR SITUATION

General Labor Review

The outstanding event of the last two weeks is the decision of the operators in Alabama to accept the provisions of the agreement written by Rembrandt Peale, the representative of the bituminous operators in Mr. Garfield's "cabinet." The mine workers signified their approval of it Dec. 21 of last year, and on Jan. 12 the Fuel Administration demanded that the operators signify their accession to its terms. The contract will be found in abstract on pages 152 and 153 of this volume.

The operators object to taking men into their employ who they say never worked for them and only joined the union to prey upon it and upon the mine operator. The operators say that they will not recognize the union. The contract accepted does not involve this recognition, but it establishes committees of workmen such as will almost inevitably be union organizations. Alabama is to all intents and purposes unionized. The wage question is regarded as of less importance by the operators. They say they will raise wages if they find it necessary to do so in order to maintain production.

Trouble with the Laflin "I Won't Works"

The strike of the mine workers of the Traders Coal Co., at Ridgewood near Laflin, Luzerne County, Pennsylvania, is approaching an end. On Jan. 30 half the men on strike went back to work. The mine has normally about 500 employees. As stated last week in the General Labor Review, over half these went on strike because the superintendent could not lower the men into the mine owing to the late arrival of the engineer. The mine workers demanded the discharge of the foreman, T. J. Conway.

Between Wilkes-Barre and Scranton on the southern edge of the northern anthracite field are some towns inhabited by "willful men." In these villages trouble seems chronic. Not even the war seems entirely able to make these men give up their striking propensity. The towns particularly affected have been Dupont, Laflin, Avoca, Moosic, Inkerman and Forty Fort.

Union Is Not To Blame for This Strike

At one time it was seriously proposed to arrest the ringleaders under a charge of helping the enemy, but when some of the men returned to work the intention was given up. Many of the men are Italians and Industrial Workers of the World. The strike cannot be charged to the United Mine Workers of America.

There have been several attempts to make trouble in central Pennsylvania. On Jan. 31 John Homick, of Winber, was arrested and a warrant was issued for Andy Janacz, also of Winber, the charge being that they endeavored to induce Austrians to quit work and naturalized Austrians to refuse to join the United States Army. Janacz is critically ill in the Winber Hospital and so has merely been put under surveillance.

Serbians and Turks Fight Battle To Death

Another evidence of the reaction of the war on industry was at Edna No. 1 of the United Coal Corporation. At this mine, which is near Adamsburg, Westmoreland County, Pennsylvania, two Serbians had, on Jan. 22, a fight with three Turks. One Turk was killed and the other two wounded. The Serbians escaped victorious.

The miners at a small mine (37 men only) at Denning, Ark., have written to Dr. H. A. Garfield complaining of the inadequate equipment of mine No. 2 of the McGraw Coal Co., at which they work. This company is a subsidiary of the Western Coal and Mining Co. The men say that at the Denning Coal Co.'s mine and that of the Douglas Coal Co. the output of each miner is nine tons, whereas at the two openings of the McGraw concern the tonnage is only five tons, though the coal is of the best.

The miners ask for more company men and more mine cars. There are only 13 for 37 men, and they have been in use, the men say, for 20 years. The men offer to work on Sunday, if necessary, to "do their bit." They are, they say, "as patriotic as" they "know how to be."

Though the mine is small, the protest is worth recording. The anxiety of the men to work, their impatience with inefficiency, their readiness to submit to every inconvenience to do their part in the work of supporting the nation shows that we do wrong when we generalize about the great Southwest. Apologies from the editor of this department may yet be in order. By the way, these are union men—Local Union No. 1814.

It is reported that the Nova Scotia Steel Co. succeeded in making a satisfactory settlement with the men at its Jubilee mine when representatives of the miners and the company met with R. W. Crothers, the representative of the Canadian government. The company will pay the miners a regular contract rate for each ton mined. The miners are not members of the United Mine Workers of America as are those in western Canada. Their union is known as the Amalgamated Mine Workers, Silby Barrett being president and J. D. MacLachlan, secretary-treasurer.

White "Passes the Buck" to Operators

Little stock is taken by John P. White, former president of the United Mine Workers, but now a member of the Fuel Administrator's staff, in the cry that has been raised against dirty coal. It is Mr. White's opinion that it shows poor judgment on the part of mine operators especially, to be making extravagant claims regarding the amount of noncombustible matter contained in coal being shipped under the President's prices, which make no provision for a higher price for coal that has passed through a washery.

Mr. White says that if any considerable increase has taken place in the amount of noncombustible matter being marketed it is the fault of the operator. In this connection he pointed to the resolution regarding the penalties for loading impurities, which is a part of practically every agreement entered into between mine operators and their employees. This resolution, which is substantially the same, in all fields, reads as follows:

(a). Both the miners and operators realizing the importance of getting clean coal, to insure the sale of same, it is mutually understood and agreed that the miners and loaders will produce their coal in such a manner as not to increase the percentage of fine coal either by carelessness or reckless shooting, and will load the coal free from impurities as nearly as possible.

(b). It is the duty of the miner and loaders to clean their coal in their working places and load it as nearly as possible free from slate, sulphur, and other impurities, and if any miner be docked for sending out dirty coal, he shall be notified by the mine foreman; if he be docked a second time, he shall be fined 50c.; if he be docked a third time within 15 days from the time of the first offense, or if he at any time sends out large quantities of impurities, in any one car, he shall be fined $1 or discharged at the option of the operator. But before discharge the pit committee and superintendent shall investigate such case, and if found guilty the discharge penalty may be enforced. It is understood local agreements shall govern the amount that constitutes a dock or large quantity at each mine. When there is no local agreement the local officers and superintendent of the company shall make such an agreement.

(c). It is hereby agreed that the local officers shall cooperate with the coal company to insure clean coal.

Mr. White is unwilling to believe that there is any foundation in fact for many claims that are being made that the equivalent of thousands of cars is being used monthly to transport the noncombustible matter loaded with the coal. If it is the case, he says that it means that the operators are not exercising their well-established right to insist on receiving a reasonably clean product from their mines.

Mr. White has just returned to Washington after the Indianapolis convention. He is very proud of the 19,135 stars in the United Mine Workers service flag. He is proud of the fact that nowhere in America is there a coal strike. He says the mine workers are ready to flood the country with coal if someone will arrange to furnish them with all the cars they can load.

Some Convention Decisions

The United Mine Workers at their biennial convention provided that no member of the Industrial Workers of the World should be allowed membership in the United Mine Workers of America. The resolution was as follows:

Any member accepting membership in the Industrial Workers of the World, the Working Class Union, or any other dual labor organization not affiliated with the American Federation of Labor shall be expelled from membership in the United Mine Workers of America, and no members of any such organization shall be permitted to have membership in our union unless they forfeit their membership in the dual organization immediately upon securing membership in the United Mine Workers of America.

They declared that they approved of the taking over of the coal mines by the Government so long as their right to the making of collective bargains was not impaired.

They asked no special privilege in the selective draft unless "it should be demonstrated that the members of our organization can render greater service to the country by remaining in the mines than they would be able to render by being drafted into the military service of the Government." The mine workers also passed an amendment permitting boy scouts to become members of the union.

The per capita tax was increased from 25c. to 50c. per month. The salary of the president of the union was made $5000 a year, the vice president is given $4125, the secretary-treasurer the same. The editor of *United Mine Workers' Journal* will receive $2500 a year, and international executive board members $175 a month when employed; tellers, auditors and the delegates to the American Federation of Labor will receive $7 per day when in service. All will receive in addition to their salaries all legitimate expenses when employed by the organization away from their places of residence.

Central Illinois Fills National Coal Bin

In contrast to the action of the Pana miners in causing a loss of two days' output for a trivial reason is that of the 375 miners employed at the mine of the Woodside Coal Co., at Springfield, in working on Sunday, for the first time in the history of the central Illinois coal industry. Without persuasion from the company officials or the fuel administration the men had a meeting on Saturday night and voted to make it seven straight by working the next day. They so notified President William B. Jess and were all on hand when the whistle blew Sunday morning. There were enough cars on hand and 1400 tons were hoisted. Besides filling the cars the Sunday workers supplied coal to teamsters, who also worked on Sunday making urgent deliveries.

Miners of St. Clair and Madison counties are considering Sunday work. In some cases operators have discussed it with union officials and asked them to take it up at their meetings. It is expected that action will be taken at the monthly meetings of the locals. The suggestion of the operators is that the miners agree to work on Sunday when cars are available and lay off some other day in the week when there is a scarcity of cars.

Two hundred and fifty miners employed by the Pana Coal Co. are the first in the central Illinois field to feel the weight of the automatic penalty clause. From each $4 was withheld on the last payday because they violated their agreement by refusing to work on two consecutive days. The men claimed that the wash house at mine No. 1 was cold and damp, and for that reason they refused to work. Officials of the company say that they warned the men that they would be fined but they persisted nevertheless. They grumbled when $3 was deducted for the first day and $1 for the second, but as their only recourse was another strike which would have brought more fines they finally submitted.

Coal teamsters of Springfield, Ill., have applied to Fuel Administrator Converse for permission to charge from 80c. to $1 a ton for delivering coal. Converse informed them that an inquiry into present costs and conditions would be made before he would give his decision.

Operators claim that miners are badly needed in central Illinois. The Central Illinois Coal Operators' Association has sent a letter to all the exemption boards in the six counties of the Springfield district, requesting that no more of their employees be taken into the army. The letter, which bears the signatures of President H. C. Adams and Secretary W. J. Walsh, says in part: "The mines of this district as a whole are now operating short-handed and could use advantageously 20 per cent. more skilled laborers than they now have, thus increasing the output of the much-needed coal in corresponding measure. Any further reduction in the number of skilled laborers available for coal mining will seriously reduce the output, not only by the loss of the individual tonnage of the men who leave, but also by cutting down the manpower of the mine below the point of most effective production for each man employed.

"In this situation we feel it is our duty to urge upon the exemption boards of this territory that the needs of the country demand that skilled workmen in mines, including diggers, drivers, clerks, engineers and bosses be in all cases given the deferred classification that has been provided for necessary skilled labor, such as these individuals can perform. In order to produce coal effectively it is absolutely necessary that all the classes of skilled labor engaged in mining shall be left in the mines." The letter states that there are 25 mines in the organization, producing 3,000,000 tons a year.

When the North Mine No. 2 at Pana, Ill., resumed work the other morning, $50,000 having been spent in overhauling it and in installing new equipment during the shutdown, only 50 miners reported for work, whereas 300 could have been accommodated.

Right of Aliens In Union Restricted

On Jan. 10 the Ohio district of the United Mine Workers in session at Columbus voted that "any unnaturalized miner in Ohio not a subject of a country at war with the United States will forfeit his membership in the United Mine Workers of America if he does not declare his intention to become an American citizen as soon as he has been here the required time to make the declaration." The Ohio men urged government ownership of railroads in a resolution.

Hist! The Bogie Man

Miners in the bituminous coal mines of the Newcastle Coal Co., near Newcastle, in Young County, Texas, have resumed operations after remaining out of the mines for several days because they declared that German spies and German sympathizers were planning to blow up the mines. Last Monday the miners poured from the mouths of the shafts declaring that a strange man carrying a light had been seen in the mine and that he ran and disappeared when followed. Guards were stationed at all the mine openings, and searching parties were sent into the tunnels to explore them and search for the strange person. The search that lasted several days and extended to the remotest parts of the mines failed to locate anything, and the miners were induced to return to work.

EDITORIALS

Quit Attacking the Coal Industry

THE railroad company officials sadly need efficient leaders for publicity purposes. The transportation companies have shown a large sense of their obligation to the public since the war began, and the public is beginning to realize that the failure of the railroads is the result of the public's persecution.

We, as a nation, are beginning to learn that we are being punished for the sins perpetrated against the transportation companies. They have not lacked locomotives, cars, sidetracks and what not without there being a reason. That reason has been lack of profit. The anthracite railroads, which have made profits, until the present cold spell supplied their subsidiary mines with the needed cars and had the locomotives to move them, even though the tonnage had increased heavily.

As the condition of the railroads is chargeable to the public, and as the railroads are now in the hands of the Government and need not fear therefore to acknowledge their utter failure under stress, why do they not admit it and demand generous consideration of their needs? Instead they attack the coal producers, declaring them avaricious, incapable and unpatriotic.

In their plight the railroads should not deliberately go out of their way to make enemies of those who have not injured them. They are very ready to be vocal against the coal men who have not hurt them and cannot help them, and silent about those who have injured them and who can, by better treatment, reëstablish them in their rights.

The railroad men need publicity, for not even the greatest of their wrongs has yet been righted. The Interstate Commerce Commission, which by its restraining action ruined the railroads of the country, still maintains its existence. That commission, and the public which has supported it with unanimity in the past, is to blame for the situation. With the evidences of its work so painfully manifest, why is it not done away?

It is said that it is retained to advise the National Railroad Administration. We would think that Railroad Director W. G. McAdoo would look for advice elsewhere. It seems entirely unnecessary to keep a commission—and such a commission—for that purpose. Let the public show its good will to the railroads by lifting this Old Man of the Sea from the shoulders of the transportation interests. The United States Federal Courts would still remain with us and would furnish a sufficient corrective and, when the war is over, if they would not serve the purpose, another commission with another name and no unfortunate precedents should take the place of the Interstate Commerce Commission. There are some good men on that commission. Those on that body whose clarity of vision foresaw the failure of the railroads and whose good judgment pleaded that a more generous treatment be given them, might well be appointed to the new organization with the approval, we hope, of every reasonable man.

But, meanwhile, let the railroads show a little good sense and quit attacking the coal industry. It is shown by the United States Geological Survey returns that the railroads have been inadequate to perform their duties as coal carriers. Even though strikes laid a few of the mines idle, the railroads could not have supplied the cars needed had the mines been working, or hauled the coal had it been loaded. So there was little coal lost from this cause.

And if we grant, what is not true, that every mine laid idle by a strike or a breakdown caused a reduction in tonnage at the market, the failure to supply cars was shown by the Geological Survey to be a far more important cause of shortage than the failure to operate the mines. That is, more days were lost from lack of cars than from the combined causes—strikes, other labor troubles and mine disability.

Again, the report of the Geological Survey, while made from information furnished by operators, is not really favorable enough to the coal industry. Many mines get a miserable quota of cars and report a run. The statistics based on such meager runs, though they convict the railroads of inadequacy, do not do it as convincingly as one might wish.

Should the same basis be taken by Teutonic statisticians, there could be found no shortage of food in Germany at present and with the same manner of reckoning there never will be any shortage conceded as long as every man has a meal or a part of a meal every day in the year. Statistically the Germans may starve to death and yet be accounted well fed.

The railroads, being wronged, have suffered; in consequence, they have been unable to take care of the coal industry. They deserve commiseration and assistance, but they will not get it if they deny the facts and assail the coal industry. Was ever so large an industry as ill advised as is the railroad business?

Anthracite Committee Promises Action

IT IS well that, at last, action has been asked of the anthracite operators. They have stood back for fear of prosecution and persecution, for fear their activity would arouse suspicion; but it was not because they did not understand the needs of the nation nor because they did not desire to alleviate them.

They are not pleased to see culm shoveled into cars as coal and paid for as if it were a superior article. They are going to see hereafter that the quality of coal delivered at the market is kept up to a reasonable level. We can see hard times ahead for those who want to ship all the rejects of old washeries as if they were good coal that needed no preparation. The bigger companies which use these "tailings" of former operation submit them to a further washing process that removes the rock with which they are mixed.

The committee also intends to try to discourage the use of anthracite where it is displacing bituminous coal. That is a good measure of the larger patriotism of the anthracite companies. They are putting an obstruction in the way of their own trade. It is to be hoped that, as a result of their activity, anthracite will not be shipped to regions where bituminous coal is more easily obtained. We trust that the army officer at a camp near a Kentucky mine, of whom we recently read, will not continue to get shipments of anthracite to satisfy his acquired taste for that smokeless fuel.

We may trust the anthracite operators to take a patriotic course in all they do. We wish they could do something for the straightening out of crooked retailing. It seems unnecessary that prices should be so high at local coal yards. It seems a right cause for suspicion when we find that local dealers refuse to sell to some of their customers, but will sell to ice men who peddle the coal around to those same customers at a high figure.

It seems unnecessary that long lines of shivering men, women and children with bags, baby carriages, go-carts and sleds should be lined up at the yards of almost every coal dealer. Even if coal is short why cannot orders be taken and coal be delivered at the house? A limitation on orders is always possible.

Unfortunately, the anthracite operators are setting bounds to their activity. They leave these retailing problems to the local fuel administrators, who seem to be neglecting them. Meantime the victimized public blames the big companies and overlooks as beneath contempt the peculators who carry away a money sack almost as large as the sack the poor man puts on his go-cart.

Who Is It Loads the Dirt?

JOHN P. WHITE, in a recent statement, has carried the modern doctrine of responsibility to its limit. The tendency of modernists has been to look entirely for the remote cause of wrong and to ignore the direct agent of that wrong, to condemn society and not the murderer, to exonerate the thief and condemn his employer.

Mr. White blames the operator for the bad coal in the market. He says, in effect, the operator is divinely appointed to see that the mine worker puts out clean coal. If the coal miner evades his contracted obligation, then it is due to the negligence of the wicked, careless and negligent mine owner. Such rascals should be held responsible for the poor coal the workingman is producing.

It is somewhat pitiful that Mr. White should deliver himself of such a statement; for if we were to reason after his manner in regard to his performance of his duties as head of the Labor Department of the Fuel Administration we could readily come to the conclusion that he is to blame for the bad coal now furnished. As head of that department it is his task to make the mine workers keep their contract, which includes the loading of clean coal. If they are not producing clean coal then he, himself, is the remoter cause of that delinquency. The more remote, the more reprehensible, is the modern doctrine to which Mr. White seems to subscribe. So Mr. White appears as the most reprehensible cause of the whole shortcoming of the coal industry.

Everybody knows that if the coal companies were to endeavor to enforce the clean-coal, or any of the clauses of its contract with the miners, it would have a strike or at least a heavy loss in its mining forces. All that can be done is to appeal to patriotism. With most men that is a remarkably strong plea, but with a few it is worse than useless. There are men who do not care for the interests of the nation. They do not favor John P. White, but they are members of the union, and many of them are strong enough, as Mr. White well knows, to make much trouble for any operator who would hold them to their contract.

It seems to us that the union, wherever there is a union, has a wonderful chance to create a wholesome spirit on the dirty-coal question. The union is surely more clearly responsible for the observance of the contract by its members than is the coal operator. It is the union which should stop the loading of dirty coal. The union's notices and the union's pressure should be active in suppressing the evil of which complaint is so general.

Producing clean coal is the work of the union and the work of the men. The contract proves it clearly. Let the union prove hereby that it is a national asset, that it is not established merely to filch a higher wage from consumers of all kinds—rich and poor—and to profiteer, but to secure essential justice between coal-mine worker, operator and public. Let it be well advised. On the road of good product and high ideals dwell esteem, progress and happiness, and on the road of irresponsibility and low aims will be found nothing but the contempt of the public, retrogression and regret.

Why the Wilsons and Garfield Did Not Go to Indianapolis

SOME people are disposed to think that British labor, and labor in general, is honored by Lloyd George's visits to labor councils. But it is a doubtful honor. Lloyd George was compelled to neglect his proper duties to conciliate men who were disposed to put their special interest above the interest of the nation.

The President of the United States, the chief of the Department of Labor and the United States Fuel Administrator did not go to Indianapolis, because they knew that the United Mine Workers of America was dominated by patriotic and intelligent men who could be relied upon to support the nation in its crisis. It is to the lasting credit of the mine workers that the Administration could address short letters to the workingmen in council and leave the whole matter in their hands without trepidation.

It is fortunately not necessary, though often it might be expedient, for the head officials of the nation to go touring the country to plead with any class of people, capitalists or workingmen. Their time can be given to the war and to the needs of the whole nation rather than to the demands of any particular trade. We have had a few strikes, it is true, but we are pulling together and we will pull together indefinitely if the truth, the whole truth and nothing but the truth is told by the press and the leaders on both sides.



Demurrage

(The crime of holding a railroad car idle)

THE war makes new crimes. A manufacturer or mine owner who holds a car a long time without unloading it has to pay a $10 per day fine. He is a criminal. After a while the Government may even provide a jail sentence for such people.

It's as bad an offense today to hold a car idle as it is to steal a pocketbook. No matter how hard it is to get the car unloaded or to get it loaded, and no matter how slow the railroad may be in hauling the cars, the man who is loaned a car by the nation must not keep it.

The miners are not required to pay any such fines. Anyway, they are going to do their level best to load cars as promptly as they can. No demurrage for theirs.

For this reason you will see the miners hustle to their work as soon as cars appear

DISCUSSION BY READERS

First Aid to the Uninjured

Letter No. 2—I read the letter in *Coal Age*, Jan. 19, p. 156, entitled "First Aid to the Uninjured," by Charles Arnold, and want to say it should call forth a hearty response from a goodly number of mine foremen. It is a topic on which much can be said, and the opinions of these men may help to reduce the number of accidents in our mines.

As first aid to the uninjured, in my opinion, we need the following: Safe haulage roads; all machinery suitably safeguarded; sufficient pure air in circulation in the mine; miners' houses well built and equipped; educational facilities; and strict discipline in the mine.

To make the haulage roads safe requires rails of a size capable of carrying the loads that will be hauled over them; good ties spaced close enough to hold the rails firmly in their place and well ballasted. In short, the roads must be built in a good substantial manner. There must be plenty of headroom and at least three feet of clear space on one side of the entry, and this must be kept free of all loose material, as rock or timber, on which a man could trip and fall. Where there is danger of cars running away on a grade a suitable derailer or safety switch should be installed and kept in such shape that cars could not possibly cross it without being derailed. In this way, many serious accidents may be prevented.

The mine law compels operators to have a specified amount of air in circulation, for each man employed in the mine, but sometimes abandoned parts of a mine or portions temporarily idle do not receive the attention they should and the lives and safety of a large number of men are endangered. Too much care cannot be given to the ventilation of a mine.

The problem of housing miners and their families is receiving more attention today than it has in the past, and this certainly goes a long way toward aiding the uninjured. A good house with clean yards does quite a bit toward reducing accidents and sickness. We sometimes see mining towns with all sorts of rubbish lying about, pig pens in a filthy condition and no sanitary measures taken to keep filth and germs away. As a consequence, sickness and disease abound in those places.

Much can be done to make conditions in such communities better, by having lectures on the subject of sanitation and health, or by offering a prize to the family having the cleanest yard and neatest appearing home.

All men should be taught how to avoid accidents to themselves. Much can be done by posting safety bulletins with illustrations showing the different dangers men continually encounter, and giving instructions how to avoid them. A list of rules for the mine should be prepared and posted in several conspicuous places. These should be in different languages so all the miners could read them and know the requirements.

Last, but by no means least, a strict enforcement of the mine rules must be maintained if any good is to come from them. I feel sure that discipline is one of the most essential requirements to prevent accidents and avoid sickness. I do not wish to be understood as saying that all miners are careless and stubborn in respect to obeying the rules of a mine, which are made for their own safety; but too many of them are and their disobedience is often the cause of injury to themselves or to some other miner who is obeying the rules.

It is far better to discharge one reckless man than to have a dozen or more killed or injured by his recklessness and disobedience.

If every man would consider himself his brother's keeper there would not be as many armless and legless men in the coal districts, nor so many widows and orphans in hard circumstances. We should all make it our duty to prevent injury to a fellow workman in any way that the circumstances may demand.

J. H. TIPTON,
Hooversville, Penn. Mine Foreman.

Relative Size of Intake and Return Airways

Letter No. 4—In answering the examination question, "Which, if either, should be the larger, the main intake or the return airway? Explain why," *Coal Age*, Dec. 15, p. 1033, the editor stated that, under the conditions common to coal mining, the return airway of a mine should have a larger sectional area than the intake, giving as a reason for this statement, the expansion of the return current owing to its higher temperature, and the increase in its volume because of the presence of mine gases. It was further explained that the larger area was necessary in order to avoid an increase in the velocity of the current and an increased mine resistance.

In his letter, Jan. 5, p. 32, F. E. Schroyer says he does not agree with *Coal Age's* answer, and gives as a reason for his disagreement that the main haulage road of a mine should be the larger, on account of the cars passing in and out and obstructing the air currents. It seems to me that Mr. Schroyer is laboring under the supposition that the main haulageway is necessarily the main intake air-course, which is not always the case. As I understand the question asked and the answer given, such was not the case in this instance, and consequently the answer given in *Coal Age* is unquestionably the correct one.

Where the main haulway, in a mine, is also the intake airway, especially where there is a rope or motor system of haulage, it is true, as contended by Mr. Schroyer, that the passing trips of cars will obstruct the circulation of air more or less. The extent of this increased resistance will depend upon the speed of the traveling trips and the relative size of cars and entries. The empty trip going in with the current increases

the velocity of the current, while the loaded trip coming out against the current, decreases its velocity. I have often had occasion to observe this in taking air readings on an entry while the trip was in motion.

Assuming the haulageway is also the intake airway in a mine, I would be glad if *Coal Age*, or some one else who is able, would figure out and tell us whether or not the intake haulway should really be larger than the return air-course, as claimed by Mr. Schroyer and, if so, how much larger. JOHN ROSE.

Dayton, Tenn.

Coal Production and Booze

Letter No. 4—I am glad to see that attention is being given to the booze question in its relation to coal mining. It would seem that some way should be found by which intoxicating liquor can be kept away from coal-mining camps and towns, especially at this time, when the Government is asking that every coal miner do his best to increase the output of coal from the mines.

It would surprise almost anyone, except those who by long acquaintance with miners have come to know their habits, to go into a mining camp and see how many of these men are out of the mine one or more days following payday. They would be inclined to ask the question, Is this patriotism? Some might even be inclined to wonder if there was not a pro-German spirit prevailing among some of the men. Their staying out of the mine certainly does not exhibit a spirit of patriotism and devotion to the cause or loyalty to the flag.

In its efforts for conservation why is it not possible for the Government to limit the shipment of liquors to mining districts, so that each district would receive a weekly or monthly allowance, which should be a prescribed percentage of their accustomed consumption? This would give but a small amount that each man could receive, and prevent drunkenness.

A PRACTICAL SUGGESTION WORTH CONSIDERING

Orders could be issued requiring saloonkeepers and bartenders to issue tickets to their regular customers that would restrict the number of drinks they could obtain in a given time. Such a practice was adopted and carried out by the food administrator during the recent sugar famine, when customers were only able to obtain a limited supply of sugar each week, on presentation of a ticket given to them by the store where they traded regularly.

If the same scheme could be put into effect in respect to the sale of liquor over the bar, in mining districts, it would go far toward keeping men in their places in the mine and in fit condition for work. The temptation to remain out of the mine a few days or a week, following payday, would be removed. Then with a little persuasion, not to say compulsion, on the part of the mine foreman and other mine officials, the production of coal would not fall off in the days immediately after the men receive their regular pay.

In the little town where I am living there is a population of 375 persons, and it is safe to say that there is shipped and brought into this place 200 gal. of intoxicating drink a week. All the men in the place are not confirmed drinkers, and this amount of liquor consumed by the remaining portion should be and is sufficient to greatly impair their work in the mine.

While I am not a temperance crank, I am fully convinced that to limit the supply of intoxicating drink is a good policy to pursue, at this critical time when our country needs the services of miners working in coal mines just as much as it needs men in the trenches. In order to win the war, for our benefit at home and for the generation to come, the soldier at the front is rated at $30 a day, 30 days in the month, and 24 hours a day. When these restrictions are forced on men of the draft age, why should not we be governed by similar restrictions that would make our efforts in the winning of the war as effective as those of the men called to the front?

To the man who is an habitual drinker, let me say in closing, Look around among your friends and near neighbors. One and another have sent their sons to the front to take your part and fight your battles. Then, ask yourself what are you doing to share this burden? Are you doing right when you stay out of the mine a day and fail to send to the top your share of the coal that is required to make the war a success and give these men at the front the support they should have from home?

I hope this matter of the supply of drink to the mining districts of the country will be so brought to the attention of the Government that they will take the necessary action to limit its effect on the production of coal.

JOHN BUGGY,
Mine Foreman.

Chambersville, Penn.

Shotfiring re Explosion

Letter No. 2—This subject of shotfiring and explosions, it seems to me, is worthy of more than passing comment, particularly since "Gas Inspector," who writes in *Coal Age*, Jan. 12, p. 71, cites an explosion that he states was "an explosion of powder smoke, intensified and propagated by coal dust," in which two shotlighters lost their lives.

This citation is given to refute the claim of Mine Inspector John Verner, that powder smoke produced in blasting contains so much carbon dioxide as to reduce the liability of an explosion being started.

In this connection I recall that Mr. Verner, in discussing "Shotfiring in Mines," Jan. 5, p. 33, advocates "a reduced circulation of air in the workings of a mine at the time of firing." This, he claims, lessens the liability of an explosion taking place. My own experience in the blasting of coal causes me to favor strongly increasing the volume of air in circulation at the time of firing rather than reducing it.

Considering the large number of shots that two men can fire in a mine, in a short period of time, it is clear that much carbon dioxide will be produced. But, on the other hand, if we consider the overheated atmosphere, charged with a considerable quantity of fine coal dust, there is presented just the conditions that favor the development of an explosion.

To depend on a reduced current of air to avoid such an occurrence appears to me as inviting disaster. Is it not true that, in a limited supply of air, a larger quantity of carbon monoxide will be produced, which will increase the explosive condition of the mine air? If that is the case, does it not follow that the cure suggested by Mr. Verner would seem to be worse than the

disease? My opinion is that no chance should be taken in this regard.

The use of a safety lamp by the rescuers, as described in the citation to which I have referred, would seem to indicate the importance of shotfirers working in a pure atmosphere. This would not be the case if the circulation is decreased before firing. The work of firing shots should start on the end of the air. If the circulation is slack, the shotfirers will then be compelled to work in an unhealthful atmosphere.

My conclusion is that in order to properly and safely perform this work it should be done in an abundance of pure, fresh air. All places where shots are to be fired should be sprinkled carefully with water before shooting, and a reasonable time be allowed to elapse between the firing of the shots. This, I believe, is the only safe practice in blasting coal. R. W. LIGHTBURN.

West Leisenring, Penn.

Letter No. 3—The incident given by "Gas Inspector," regarding an explosion in which two shotlighters lost their lives, *Coal Age*, Jan. 12, p. 71, calls to mind a similar instance in my own experience. For 24 years I have studied carefully the nature of gas and dust explosions, and want to say that the gases produced in the explosion of black powder, assisted by the presence of more or less gas issuing from the coal under the influence of the heat due to the explosion, form a very inflammable mixture.

In one instance, I remember firing a shot on the loose end of a crossheading in longwall work. The shot had been mined at the top. After firing it, I returned too quickly to ascertain the result and, sticking my light in behind the coal, was surprised by the gas igniting on the lamp. A considerable volume of flame was produced.

When working at Urpeth, in the "Busty seam," County of Durham, England, I recall that three or four men were killed in a local explosion that, according to the evidence given at the inquest, was due to the gases produced in the firing of the first shot being ignited by the flame of the second shot. As is usually the case, the force of the explosion was intensified by some marsh gas being present and by the coal dust blown into the air by the first shot. W. H. LUXTON,

Linton, Ind. Mine Foreman.

Letter No. 4—It is my opinion that the present-day methods of mining and blasting coal are responsible for the explosions that occur so frequently in blasting. Formerly, when this work was performed by experienced miners, more care was taken in placing shots; and the amount of powder in a charge was well gaged.

The use of squibs and the needle made it necessary to tamp the hole more thoroughly in order to be sure that the shot would go off. The working places were not as well ventilated then as they are today; more coal was broken by a single shot, and fewer shots were fired per man, each one doing his own shooting. The result was that the coal was properly mined, and a windy or blownout shot practically never occurred.

Comparing these conditions with those that exist today in relation to the blasting of coal in mines, it is not difficult to determine the real cause of the frequent explosions that now occur at firing time, and which cause the death of so many shotfirers. The majority of these shots are improperly placed, poorly prepared and frequently overcharged. Fuse is generally used to fire the charge, which is often tamped with paper dummies filled with coal dust or other poor material and but loosely rammed into the hole. To add to the danger, the shots are fired in quick succession. It cannot be denied that these conditions favor the occurrence of a dust or hot-smoke explosion.

It has fallen to my lot to investigate five cases where explosions occurred as a result of blasting and which caused the death of three men and severely injured two others. They were all windy shots and dust explosions. It is worthy of note that these never occurred at the face of a deep room where there was ample space for the expansion of the gases, even though the rooms were poorly ventilated.

All the explosions to which I refer occurred in tight places at the head of entries and close to the intake, where a fairly good air current was passing. In addition to these experiences, allow me to cite a few instances that have come within my observation. The first of these is proof, to my mind, that poor tamping, or lack of sufficient tamping, will generally cause a blownout shot.

LACK OF TAMPING CAUSES BLOWNOUT SHOT

A miner, in charging a hole in the face of an entry, chanced to ignite the fuse when he had but one dummy rammed in the hole as tamping. Finding that he was unable to extinguish the lighted fuse, he ran to notify the men in the other entry, and all escaped; but the shot blew out and tore up the entry for a distance of 200 ft. back from the face, knocking out crossbars and timbers, and throwing cars and tool boxes about in great confusion.

An hour and a half later one man was found overcome with the afterdamp and was taken out for dead, but artificial respiration revived him. Investigation showed that the shot was well prepared and would have done good work had it been properly tamped. It cracked the coal through the line of the hole; but the force of the blast was expended through the hole, and the coal was not broken down. Had these entries been filled with dust or hot smoke from a preceding shot, there is hardly a doubt but the result would have been much worse.

Another instance in which a shotfirer lost his life occurred as follows: A pair of entries were being driven on the strike of the seam and the rooms turned to the rise of the upper entry, the lower entry being the intake. All the shots were fired at one time, those in the upper entry being timed to go off first. There were but two shots in the face of the lower entry, and these were the last to explode.

UNBALANCED SHOT AND "DEAD HOLE" BLOW TAMPING

One of the shots in the lower entry was very heavy, measuring about 7 ft. at the point and 2 ft. at the heel, the hole being 7 ft. deep. This shot blew its tamping and slightly cracked the coal. The blast blew out the stoppings for a distance of 200 ft. back from the face, throwing great masses of rock and gob into the upper entry. The shotfirer was found dead at a point 300 or 400 ft. back from the face, his death being caused by the afterdamp.

Another instance was where four shots of dynamite were exploded, two being located in the face of each of a pair of entries. Two shots were placed in the center of each face, the holes being drilled straight in and 6 ft. deep, starting 18 in. from the floor and one shot being 18 in. above the other. Eight sticks of 40 per cent. dynamite were used, the intention being to make an easy place to put in a 6- or 8-ft. cutting. There is little doubt but the last of these shots to explode ignited the fine dust raised by the other shots, as the timbers, cars and tool boxes were badly burned, and charred coal and coke dust was in abundance everywhere.

Seven Shots Fired at One Time Cause Explosion

I will mention but one more case where an explosion occurred in which two men lost their lives and others were severely burned. Seven miners were driving a slope on a pitch of from 8 to 12 deg. An intake air-course was driven on each side of the slope and four new entries had been started, two being driven off each air-course, near to the face.

The new entries were each in from 20 to 30 ft. Seven shots were fired, all of which were charged with 40 per cent. dynamite, which it was the custom to use in tight shots, black powder being used only in open shots. The explosion occurred on the night shift, and set fire to the timbers and shifted the trapdoors for a considerable distance up the slope.

These incidents lead me to believe that a poorly placed shot, an overcharged shot, or one that is tamped improperly, will cause an explosion that will be greatly intensified in the presence of hot powder smoke or fine coal dust, especially if a fresh-air current is passing the place.

R. J. Pickett,
Shelburn, Ind. Mine Foreman.

Clearing a Heading of Gas

Letter No. 6—Having had considerable experience in moving gas, I have been interested in this discussion and would like to add a few words in addition to what has been said by others.

When making my rounds as mine examiner, a few mornings since, I proceeded with unusual caution as the fan had been stopped for two hours to make necessary repairs, and I expected to find trouble at some point in the mine, which was a very gassy one requiring the exclusive use of safety lamps.

On reaching a certain point in a cross-heading, I found, as I had expected, that the face of the heading was full of gas for a distance of 60 ft. back from the face. Fencing the place off with the usual danger board, I returned to the surface and reported the case, whereupon I was told to get a man to help me and move the gas.

It was my first experience in attempting to move a large body of gas and, entering the mine with my helper, I began to study how it was best to proceed. My first step was to throw all the air possible into that heading, and I arranged the doors and curtains accordingly. After a short time, my observations convinced me that this produced little effect and that other means would have to be adopted to move the gas, which was too strong for the air.

Therefore, starting from the outby rib of the last crosscut, I began setting a row of posts with a string of 2 x 4's above them against the roof, to enable me to hang the canvas to form a brattice. Having extended this brattice along the rib a short distance, I went back to the mouth of the heading to watch the result on the return side.

I found that the return air was a very explosive mixture and, in order to relieve this condition, returned to the crosscut and opened the curtain at that point for a short time. This had the desired effect of diluting the return current. By repeating the method of alternately opening and closing this curtain and extending the brattice by degrees toward the face, I was able to move the entire body of gas from that entry.

Moving a Large Body of Gas

My experience is that one should never attempt to move a large body of gas at once, but proceed to do this a little at a time. Another point that should be carefully borne in mind when moving a large body of gas is to carry it out of the mine by the shortest route possible. Never permit it to pass around the mine or through the working places when it is possible to give it another course. Get it to the shaft or slope bottom as quickly as possible. Then, after the gas has been removed, restore the ventilation to its proper course and examine the mine thoroughly to see that it is safe for work.

I agree fully with what Samuel Jones said in his letter, *Coal Age*, Jan. 5, p. 31, advising that the brattice should be set a sufficient distance from the rib of the entry to provide enough air space for the current to travel. As he explains, too small a space behind the brattice will choke the air current and reduce the quantity of air circulating in that split.

In my opinion it will have the same effect as a large roof fall on an entry if the attempt is made to force the air through a narrow space at the face. To move gas successfully one must have good ventilation, and this requires good air-courses and ventilating equipment.

Jacob Riley,
Bicknell, Ind. Mine Examiner.

Blacklisting To Prevent Accident

Letter No. 9—Permit me to say that I am strictly against the idea of "blacklisting" a man who has been careless or reckless in his work. The only condition that would induce me to put a man on the blacklist would be drunkenness, which cannot be tolerated in coal mining.

Because a man is careless, at times, is not to say that he is a hard man to work with, or that he is inclined to disobey the orders of the mine boss. The man is not always lazy; he may be inclined to take a chance, which is common with most miners. They put the longed-for dollar before safety, but the same thing can be said of a large majority of mine officials and operators.

My belief is that many mine bosses (foremen) fail to realize that they hold their position because they are supposed to have a superior knowledge of mining, and it is their duty to give their best to the workmen in their charge. Especially is this true with regard to the prevention of mine accidents.

A mine boss should strive in every way to prevent the occurrence of accidents, not because the law demands it, but because of the loss to the operator and the injury to workmen. When a miner neglects to make his place safe by setting the necessary timbers as ordered, the easiest way to bring him to time is to stop his turn. He will not delay long, then, to set the timbers required.

Since coming to this country, eight years ago, I have worked in one mine six years, for the reason that I concluded the mine was fairly safe, although my place was not visited by the mine boss as often as was the custom in England, where the deputy (fireboss) visited each working place daily. When employed as deputy, in the old country, I would often visit a man's place three times a day.

Machine Men Fail to Reset Post Under Bad Top

An instance that occurred not long since illustrates the need of more frequent supervision of miners' places to avoid accidents. I had set a good timber to protect me while loading some machine-cut coal, in a room where the roof showed a very distinct slip. The coal was hauled away and a fresh cut made with the machine. On returning to the place, I found that the timber had been removed to operate the machine and had not been reset.

Seeing the post lying where it had been thrown, I remarked to my buddy, "Now, George, it has gone well this time, but that won't always be the way"; and my words proved true, for a few months later, one of the machine men was caught by a fall of slate and killed. Yet it would be hard to find a more careful, steady and industrious man, although he was somewhat venturesome. The thought came to me, then, very forcibly, that the only way to prevent such accidents is to inspect the working places more frequently. It was the first fatal accident in that mine.

Accident Impresses Need of Closer Supervision

The second fatal accident occurred not long after, when a close friend of mine was caught and killed by a fall of slate in his room. At the time I was one of the mine committee. Our committee and the mine inspector had considered the place well timbered, and I could not help thinking that the accident might have been avoided by a more frequent inspection of the place, as danger may often develop in a short time at the working face.

So deeply was I impressed with the thought that more frequent inspection was needed, that my contention in this regard angered the mine boss, and I might have been blacklisted if that method had been in use at that time. At each of the fatal accidents mentioned it so happened that the room boss for the section was away at the time, and his duties were supposed to be performed by the boss of another section, who was thus compelled to do double work.

While room-bossing at one time, I started the practice, in the mine where I am now employed as a miner, of making more frequent visits to the working places. I am glad to say that this practice is still continued and there has been but one fatal accident in this mine in eight years.

The remark is frequently heard that "a mine boss is expected to do as much as two ordinary men." It is my opinion that, when this is the case, the operator is the loser in the end. My advice is to give mine bosses more opportunity to visit the working places and instruct the men and see that they keep their places safe for work. In this way good results are sure to follow.

Linton, Ind. MINE FOREMAN.

Letter No. 10—Having worked about the mines during the last 25 years, mostly as a miner, I was somewhat surprised to read the article advocating the blacklisting of miners for carelessness, neglect or disobedience to orders, which has been under discussion in *Coal Age*.

It is strange that blacklisting should be considered for any purpose whatever, and least of all for the purpose of promoting safety and getting men to work more steadily.

The book system for keeping a man's record, as suggested by Gaston Libiez, in his letter, Jan. 5, p. 29, in my opinion is only another method that is calculated to do much harm, not only to the workmen but to mine foremen as well. It is stated that the method proved successful in France, but I believe it would not work in this country.

An Obstacle to Blacklisting

Every man has his friends, and all men are not of the same mind or temperament. For this reason, a man may work well under one foreman, while he fails to suit another foreman. In time a good miner will work for a large number of foremen, good, bad and indifferent. He may quit a place of his own accord or he may be fired for some slight cause or because of prejudice. The record entered in the book may be just or unjust, according to the relation of the man to his boss and, for this, the workman is not always responsible. There was a time when I would have scorned to ask a foreman to fix my book so that I could secure employment elsewhere.

In reading different letters on this subject, that of Robert A. Marshall, Jan. 12, p. 74, appeals to me as setting forth the more sensible method of procedure in the management of men. Mr. Marshall advocates showing appreciation of a miner's efforts to make his place safe and says that this is "a big incentive to him to continue so doing." In my opinion a word of commendation when merited, as well as a deserved rebuke, comes closer to the mark than keeping a man's record or blacklisting him. My motto is, Treat men as though they were human.

Many times, when instructing a miner or his laborer to do or not to do a certain thing, a little explanation of the why and the wherefore will prove a great help, as the man then sees the reason why he should do as he is told and is more inclined to obey.

Most men can be brought to the place where they will do what you want them to do if judgment and tact is used in instructing them. Driving men under the lash was abolished more than half a century ago. Our fathers fought to free the slaves, and this is reason enough to make our blood boil at the mere mention of serfdom. Fairness will accomplish more than force.

Bolivar, Penn. W. H. CLARK.

[This letter will close the discussion of blacklisting to prevent mine accidents.—Editor.]

INQUIRIES OF GENERAL INTEREST

Dynamos and Motors

Kindly explain the difference between a dynamo and a motor. Can a dynamo be changed into a motor, or a motor be made into a dynamo? I am referring now to direct-current machines. I have heard these terms used so indifferently that I am much confused in regard to their proper application. MINE MECHANIC.

Johnstown, Penn.

It is true that the two terms, dynamo and motor, are used very indiscriminately in practice. The word "dynamo" is an abbreviated form of "dynamo-electric machine" and originally referred to a device by means of which mechanical energy can be converted into electrical power.

The dynamo consists of a series of coils of wire forming a conductor and mounted on a shaft in such a manner that they can be rotated in a magnetic field. Briefly stated, the principle of the dynamo is that when an electrical conductor is made to cut the lines of magnetic force an electromotive force is generated, which causes a current to flow in the conductor when the circuit is closed. The coils mounted on the shaft are called the "armature" of the machine.

It was found, however, that this machine, familiarly called a "dynamo," was capable of being operated in two ways: For example, when the armature was rotated by power applied to the armature shaft an electromotive force was generated that caused a current to flow through the conductor whenever the circuit was closed. On the other hand, it was found that when connection was made, allowing a current to pass through the conductor, the same reaction took place between the live conductor and the magnetic field of the machine and the armature was again rotated.

It is important to notice that, in the first instance, mechanical power was applied to turn the armature and the electromotive force generated then makes the dynamo, properly speaking, a "generator." In other words, a *generator* is a dynamo-electric machine, or simply a dynamo, operated by mechanical power and producing electrical energy.

In the second instance, on the contrary, the electric current sent through the conductor that composed the armature windings made the dynamo a prime mover, thereby converting electrical energy into mechanical power. In this case, therefore, properly speaking, the dynamo is a *motor*.

It is evident, therefore, replying to the question of whether a dynamo can be changed into a motor, or a motor into a dynamo, that a dynamo may be employed either as a generator or as a motor, according to the manner of its operation. As a generator, the input is mechanical power and the output electrical; while, as a motor the input is electrical and the output mechanical. In either case tne dynamo is not an independent source of power but a means of converting one form of power into another. It is this fact that gives the word a broad application, which is sometimes mistaken for a misuse of the term. To be specific, a dynamo should be spoken of either as a generator or a motor, which would designate its use.

Flow of Water in a Ditch

I have been working over what seems to be a simple question and yet have not been able to satisfy myself as to the correct answer. I have submitted the question to others and their results vary from 14,000 gal. to almost 5,000,000 gal. in 24 hours. Kindly show what quantity of water will flow in a ditch 20 in. wide on top, 10 in. at the bottom and 8 in. deep, in 24 hours.

Renton, Wash. STUDENT.

The question is incomplete, as it does not state the mean velocity of the water flowing in the ditch. In a small ditch of the kind here mentioned the mean velocity of the flow for the entire cross-section of the ditch may be taken as approximately 0.9 of the observed surface velocity.

For example, assuming that a surface float, in this ditch, was observed to pass over a distance of, say 100 ft. in 30 sec., the observed surface velocity would be $60/30 \times 100 = 200$ ft. per min. and the mean velocity of the flow can be estimated as $0.9 \times 200 = 180$ ft. per min.

Again, assuming the ditch is running full of water or that the surface of the water is 20 in. wide and its depth 8 in., the wetted cross-section of the ditch is then $8 \times \frac{1}{2}(10 + 20) = 120$ sq.in. On this basis the quantity of water flowing in the ditch in 24 hours is

$$24 \times \frac{60(180 \cdot 12)120}{231} = 1{,}615{,}790\ gal.$$

The estimated quantity of the flow will vary with the assumed mean velocity, which is here taken as 200 ft. per min.

Handling a Gob Fire

Please state if water should be used to extinguish a gob fire that has gained much headway.

McAlester, Okla. MINE FOREMAN.

Assuming that the fire has spread over a considerable area in the gob, it will be impracticable to load out the burning material and, in order to extinguish the fire under these conditions, it will be necessary to seal off the places so as to exclude air from the fire. Having done this, time must be given for the fire to die out, which will be when all the available oxygen supporting the combustion has been consumed. The use of water for extinguishing a fire in the gob will generally only make matters worse, as the moist material will heat and the trouble be extended.

EXAMINATION QUESTIONS

Alabama First-Class Examination, Birmingham, Jan. 21-24, 1918

(Selected Questions)

Ques.—Describe the continuous-current system of ventilation.

Ans.—Where a mine is ventilated by a single current of air that is not divided at any point of its passage from the intake to the return opening of a mine, the system is called a "continuous-current system" of ventilation. This system is only adapted to the ventilation of small mines having but few working places.

The efficient ventilation of larger mines requires that the air current be split one or more times in its passage through the mine, the purpose being to prevent the gases generated in one section of the mine from being carried into other sections of the mine. Also, a larger quantity of air is circulated by the same power. This is called the split system of ventilation.

Ques.—What are the advantages and disadvantages of the split-current system?

Ans.—The advantages of splitting the air current in a mine, are that less power is required to circulate a given volume of air; fresher air is supplied to the working places and the circulation is under better control, as the quantity of air supplied to each section of the mine can be proportioned to the needs in that section; the velocity of the air current passing the working places is reduced and causes less inconvenience to the workmen; an explosion occurring in one section of the mine is less apt to be carried into another section; and, finally, splitting the air current avoids the necessity of doors on the main haulage roads.

The only disadvantage, if such it can be called, of splitting the air current in mines is the necessity of building air bridges or air-crossings at points where the air is split and where it is required to conduct the current over the parallel entry.

Ques.—How would you proceed to reënter a heading with safety, after an explosion has occurred therein?

Ans.—The first step is to withdraw all the men from the mine before any attempt is made to enter the heading in which an explosion has occurred. Only safety lamps of an approved type must be used. The circulation must be increased and the mine entered by following the intake air, making frequent tests with the safety lamp to ascertain the presence of afterdamp or any remaining firedamp, which often drains out of the rooms, after an explosion has occurred in other rooms or at the face of the heading.

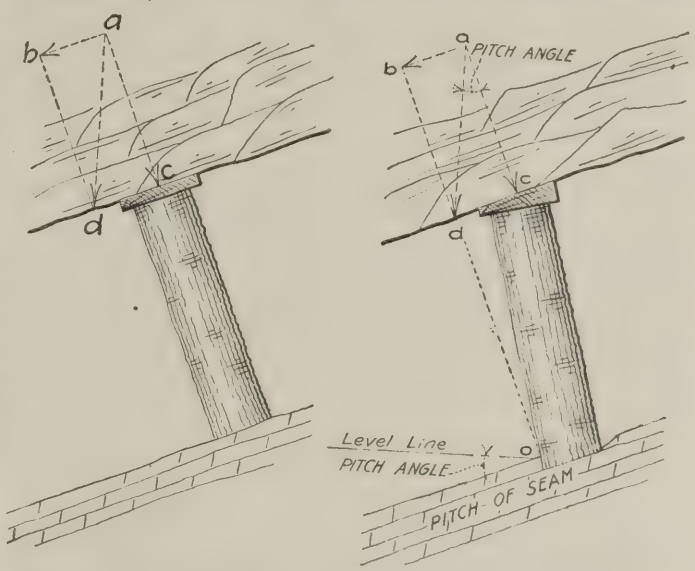
Proceed slowly, taking every precaution to avoid being entrapped in gas issuing from the rooms. The fresh air current should be conducted by brattices, if necessary, and made to sweep the working faces and other void places where gas may have accumulated. Continue in this manner until all the gas has been removed from the rooms and the heading.

Ques.—What proportion of firedamp in an air current forms an explosive mixture of the least dangerous character?

Ans.—The least dangerous explosive mixture is that where the proportion of gas to air is 1: 13, which is the lower explosive limit of marsh gas. As the proportion of gas to air is increased, the danger increases. Firedamp mixtures above the maximum explosive point are more dangerous than those below that point, because the addition of any air to those mixtures renders them more explosive. On the other hand, the addition of air to firedamp mixtures below the maximum explosive point renders the mixture less explosive.

Ques.—Show by sketch the difference between properly and improperly set timbers on a 30-deg. pitch.

Ans.—The accompanying figure shows two posts set on a steep inclination. The post on the left is set normal



RIGHT AND WRONG METHODS OF SETTING POSTS ON AN INCLINE

in the seam and, in this position, the slightest movement of the roof, by which it tends to slip down the pitch, will loosen the post. This is the improper method of setting a timber on a pitch.

The post shown on the right of the figure is "underset"; that is to say, the head of the post is inclined up the pitch at a slight angle from the normal in the seam. In this position, it is evident that any movement of the roof downward in the direction of the pitch will tighten the post. The foot of the post is set in a shallow foothold cut in the floor of the seam.

Ques.—Is it safe to pass a current of intake air through the abandoned portions of a mine and then conduct it to the face of the workings?

Ans.—This should never be done, for the reason that the abandoned portions of a mine are liable to contain accumulations of blackdamp or firedamp, which would be absorbed by the current and carried past the working faces, making the mine unhealthy or dangerous.

COAL AND COKE NEWS

What Happened in January

Jan. 10—M. L. Requa is given full charge, under the direction of Dr. H. A. Garfield, of the activities of the Fuel Administration in connection with oil.—To save fuel, manufacturers of boxboard, paperboard, strawboard, pulpboard, binder board, tag board and other like boards agree to close down from 7 a.m. on Saturdays till 7 a.m. on the following Monday.

Jan. 12—Dr. H. A. Garfield demands that the Alabama Coal Operators' Association accept the Fuel Administrator's decision, already approved by the mine workers Dec. 21 of last year.

Jan. 14—Authority to divert coal and coke to meet emergency demands was conferred on State Administrators by Dr. H. A. Garfield, United States Fuel Administrator.—Senate passes Walsh-Pittman coal and oil-lands leasing bill for the general leasing of coal, phosphate, oil and gas, and sodium lands.

Jan. 14—Frank S. Hayes and nine other officials cited to show cause why they should not be declared in contempt for violating an injunction restraining representatives of the union from attempting to organize the employees of the Hitchman Coal and Coke Co., in West Virginia.

Jan. 15—United Mine Workers of America convene at Indianapolis, Ind., in biennial convention.

Jan. 17—"Workless" five days commence under order of Dr. H. A. Garfield.—M. L. Requa announces that the drilling and operating of oil or gas wells and the transporting, manufacturing or distributing of petroleum and its products or of natural gas is not to be restricted on the days appointed for suspending operation in other forms of industry.—H. A. Garfield telegraphs J. P. White, saying that the mines would not be shut down on the "workless" days. A long list of exemptions was published.—Francis S. Peabody testifies before the Senate Investigating Committee urging the necessity for clean coal, the need for the zoning of the coal industry and suggesting a price for coal based on coal thickness.

Jan. 18—Garfield adds another long list of firms exempted from the "Workless Days" order.

Jan. 21—First "Workless Monday."—United Mine Workers of America approve by vote of convention the Washington agreement signed on their behalf by the International officials of the union, Oct. 6 of the last year.—Interstate Commerce Commission approves under certain conditions refusal of the Baltimore & Ohio Ry. to supply coal cars to wagon mines.

Jan. 23—Explosion at Stellarton, N. S., at the Allan shaft of the Acadia Coal Co. Eighty-seven men are said to have been killed.

Jan. 24—J. D. A. Morrow appointed commissioner with the title of Manager of Apportionment and Distribution for the zoning of all fuel except petroleum.—Anthracite operators pool all coal at New York City.—The Fuel Administration reduces the prices for run-of-mine coal and prepared sizes produced in the Deerfield or Palmyra fields and the Massillon and Jackson fields in Ohio, 5c. per ton. (It would have been 50c. had the price not been offset by the 45c. increase.) However, the price of screenings is raised 45c.

Jan. 25—Fuel Administrator Garfield announces his coal distribution plan.—E. R. Stettinius appointed Surveyor General to the Army. He will make all purchases for military purposes.

Jan. 26—Mine Workers Convention comes to an end after having given the mine workers of all the states a word in the making of the contract of the Central Competitive Region.—Fuel Administrator forbids all unusual hours of labor introduced to evade the law relating to workless days and prescribes exceptions to the workless day provisions.

Jan. 29—Alabama operators agree to comply with the terms of the agreement proposed by the Fuel Administration through Rembrandt Peale and declare they will not recognize the union but will increase wages if necessary.

Harrisburg, Penn.

During the week Mr. Potter, state fuel administrator, seized many cars of coal destined to points outside of the state, among the cars being 1300 tons for the Weller Coal Co., at Jacksonville, Fla. That Mr. Potter's seizure of the Florida coal will "start something" in Washington, is held by virtually all interests close to the coal trade. It is known that such a move has been in contemplation by the fuel administration for some time, on advice of coal men called in as consultants. The need for drastic action, it has been pointed out, existed from the moment Dr. Garfield gave ear to the needs of New England, at the same time openly disregarding the situation in Pennsylvania.

Since the normal methods of distribution have been superseded by instructions from Washington, coal shippers do not know where they are at. Shippers contend that the way things are going at the present time there is no way of knowing, apparently, whether coal is stuck away in some railroad congestion or whether it has been confiscated for railroad or Government use.

On Jan. 29, Mr. Potter sent telegrams to all Pennsylvania representatives and senators and A. Mitchell Palmer, alien property custodian, and Vance McCormick, chairman of the War Trade Board, charging that the orders of Dr. Garfield giving priority to coal for New England has caused the present acute situation in Pennsylvania.

Pennsylvania members of the House held a meeting after receiving Mr. Potter's telegram and appointed a committee headed by Representative J. Hampton Moore, of Philadelphia, to confer with Dr. Garfield and William G. McAdoo, director general of railroads.

Dr. Garfield was interviewed by the committee and entered into a lengthy explanation of the fuel situation. He said the so-called priority for the benefit of New England did not prejudice Pennsylvania, and produced statistics showing that Pennsylvania's supply of anthracite had increased in larger proportion than that of New England or New York. In the course of the interview with Dr. Garfield, it was learned that preparations were being made for a systematic all-the-year distribution of coal during the period of the war. As to immediate relief for Pennsylvania, however, Dr. Garfield declared that the situation was being given close attention, and that conferences were being held and would continue, looking to some alleviation of the situation, which had been presented by the protestants from this state.

At a meeting of the Anthracite Board of Miners' Examiners on Feb. 1, it was decided that the members use their own discretion in giving miners' certificates to those applicants who qualify, whether they are natives of countries now at war with the United States or not. During the session certificates were issued to a number of Austrians and others, officially classed as alien enemies, who declared that they were not enemies but loyal and supporters of this country, although not as yet naturalized citizens.

Since the judges refused citizenship to natives of countries at war with the United States the members of the examining board have questioned the advisability of granting miners' certificates to such aliens.

Little or no seditious talk has been heard from mine workers in the anthracite region. Most of the employees seem content and satisfied with wages and conditions, and while a big majority of the workers are natives of alien countries, they are giving no trouble and are getting out as much coal as possible.

A movement has been inaugurated to reopen the Schuylkill Canal on a large scale. Petitions will be presented to the Government asking to have this waterway opened for transportation. The plan is to have the canal open to transportation of coal between Port Clinton and Philadelphia. It is believed that were the canal open the coal problem would be taken care of with ease. Thousands of tons could be moved cheaply, when ice did not obstruct navigation.

The canal is owned by the Schuylkill Navigation Co., and its purchase by the Reading Railway Co. and the virtual closing down of these water transportation facilities greatly increased the freight for the railroads. At one time 800 boats used the canal. Last year there were twenty-five.

Men connected with the state government are giving their help to the movement to have the National Government revive the canal. State engineers have made surveys and will tender their assistance. The Atlantic Deeper Waterways Association is also urging the reopening of the canal.

A ruling that "no employer or insurer has a right to stop payment of compensation until he has fully complied with the provisions of the act and the rules of the board" was announced by the Board of Compensation Commissioners in the case of Betzer vs. Gluck. The claim was made for compensation for death of a driver kicked by a mule when the former was in a tubercular condition, the injury hastening death. An agreement was entered into for payment of compensation and the employer paid it for a time and then stopped. The board orders full compensation payments made and the defendant also to pay the costs.

PITTSBURGH, PENN.

The thaw the latter part of last week started the ice to breaking in parts of the western Pennsylvania rivers, resulting in several ice jams and gorges, which did considerable damage to coal property. A number of barges and several towboats were sunk. The river end of the Diamond mine of the Diamond Coal Co., in the fifth pool of the Monongahela River, just above Brownsville, was carried away when the ice in that pool broke and gorged at the dam. The Hecla mine, of the Hecla Coal and Coke Co., suffered a similar fate and the Isabella-Connellsville mine, of the same company, had their big steel tipple moved three feet out of line.

The cold snap this week checked the breaking up of the ice and prevented serious floods and worse damage from the ice. Since the middle of the week every available towboat has been working up the Monongahela River, breaking up the ice and allowing it to move slowly out to give a clear way for the big gorge in number five pool above Brownsville, when it breaks and moves. The way is now clear to that point, and river men are considering using dynamite to start that gorge moving gradually before the river falls enough to allow it to settle.

PENNSYLVANIA

Anthracite

Plains—Scotch Hill and North Main St. sections continue to suffer from the effects of settling caused by mine caves in the workings of the Madera-Hill Coal Co. Residents of houses endangered by the settlings report that they are unable to find suitable vacant houses in other parts of the township and are, therefore, in imminent peril of being forced out of their homes at any hour of the day or night, and in any kind of weather.

Edwardsville—With officials of the coal-mining department of the Delaware, Lackawanna & Western Railroad Co. as guests of honor, a dinner was given by the officials of the Woodward colliery of the Lackawanna company. The dinner was held in celebration of the record output, a trifle over 1,200,000 tons of coal being mined at the Woodward during the year 1917. The output was the greatest in the history of the colliery.

Mount Carmel—To aid in breaking the coal blockade, the Philadelphia & Reading Coal and Iron Co., on Jan. 29, suspended operations at four of its largest collieries in this district and assigned about 1000 laborers to the Reading Railway Co. to aid in releasing long trains of coal from snow and ice-bound sidings. Railroad officials stated that as a result of the suspension at the mines and the opening of the sidings, coal shipments were moving with satisfactory regularity.

Carbondale—Fire destroyed a building near an air shaft leading into the workings of the Rackett Brook Coal Co. on the East Mountain on Jan. 28. Employees of the company tipped the building over from the shaft, so that none of the smoke could descend and cause disorder among the men who were working on the night shift in the mine.

Scranton—In suits filed in the county and federal courts on Jan. 31, damages to the amount of $72,000 are asked from the Clearview and People's Coal companies, over whose workings occurred settlings that have wrecked numerous homes. Attorneys who filed suits for the Scranton Surface Protective Association believe the cases will establish the illegality of the so-called waiver clause on deeds held by persons who purchased ground from the operators.

Oneida—Lehigh Valley Coal Co. detectives are investigating an attempt to fire the double dwelling occupied by Mine Superintendents Thomas Burns and James Ulshafer. The attempt was made during the night of Jan. 30, and but for the timely observation of the blaze by the watchman disaster would have resulted. After the blaze had been extinguished, investigation revealed the presence of a quantity of cotton waste and an empty bottle that had been filled with kerosene oil.

Lattimer—It cost $400,000 for the firm of Coxe Brothers & Co., Ind., to open the big strippings here. These are now showing signs of exhaustion and can only be operated about three years by the Lehigh Valley Coal Co. The strippings were started in 1900 and finished in 1904, while the Coxes still operated the chain of collieries now run by the Lehigh Valley Coal Co. When the first ten cars of coal were hoisted up the planes from the exposed veins, the late Edgar Kudlich, then general manager of the Coxe interests, remarked to an associate engineer that each car had cost the Coxe company $40,000. That the outlay paid is shown by the fact that the Lehigh Valley Coal Co. has taken 1,800,000 tons of coal out of the excavations so far. Lattimer strippings are among the show places of the Lehigh region, exposing veins of fuel 80 ft. thick and through which tunnels have been driven.

Bituminous

Connellsville—Removal of rib coal from under homes in Crawford Ave. by the H. C. Frick Coke Co., has resulted in the collapse of a number of foundations and damage to the houses otherwise. The purchase of the coal by the coke company antedated that of the surface by the householders, and there is apparently no redress. Notice was served on the property holders when the company began its final drive in that portion of the Davidson mine, as a precautionary measure.

Brownsville—Virtually every tipple of any importance, from Masontown to California, has either been swept away or greatly damaged by three enormous ice gorges in the Monongahela River. The damage done will mount up to many hundred thousand dollars.

Johnstown—Six men had their lives crushed out and traffic on the Pennsylvania R.R. was embargoed for hours on Feb. 1, when an overhead carrier used for conveying coal at the Cambria Steel Co.'s plant at Conemaugh, together with a bridge, fell. Freight traffic on the Pittsburgh division of the Pennsylvania was paralyzed for hours. Thousands of tons of coal consigned to points on the Atlantic seaboard were stalled as train after train was held up west of the wreck.

Nant-y-Glo—Ten families were made homeless and some of them destitute on Jan. 30, by a blaze of five double dwellings, along with a small store building, in which the fire started from an overheated stove. The houses were owned by the Warren Collieries Co. Owing to the snow-drifts and a shortage of water, the firemen were helpless.

Somerset—Forty miles of track on the Berlin, Salisburg and Boswell branches of the Baltimore & Ohio R.R., which have been blocked with snow for almost a week, were cleared on Jan. 29 by more than 1000 coal miners, who rallied to a call issued by the Somerset Coal Operators' Association. The miners were assisted by several hundred men furnished by the railroad company. The tracks were buried for a depth of six feet in many places.

Brownsville—Nearly 200 miners were removed from the shafts of the Fifth Pool Coal Co. near here on Jan. 30, when the rapidly rising waters of the Monongahela River approached within several feet of the openings. The shafts are 1200 ft. from the river, but the water, backed up by an ice gorge, quickly covered the lowlands.

WEST VIRGINIA

Newburg—The Virginia-Maryland Coal Co., of Adamston, W. Va., is closing down and abandoning its Newburg shaft. This operation is located in Harrison County, on the Baltimore & Ohio Railroad.

Elkins—A great ice gorge in the Tygarts Valley River, just below Junior, has backed up the water to such a depth that the fires of the West Virginia Coal and Coke Co. ovens have been drowned out. Several residences and stores have been flooded, and if efforts now being made to dynamite the gorge are not successful, heavy property loss is likely to result. At Belington a gorge is said to have formed just below the town, causing all the lower portion to be flooded.

Charleston—The West Virginia Coal and Coke Co. has furnished service flags to each of its plants, and one for its general office located in Elkins. Records show 47 employees having reported to the colors, and at least that many more awaiting orders.

ALABAMA

Birmingham—At the regular semi-annual examination of applicants for certificates as first- and second-grade mine foremen, and fireboss, recently held in the office of Chief Mine Inspector C. H. Nesbitt, sixty-nine applicants were successful in standing the tests. There were eight failures out of the total of 77 in the class.

OHIO

Byesville—Fire which is believed to have been caused by the explosion of a bomb, practically destroyed the tipple of Little Kate mine No. 1 of the National Coal Co., on Jan. 30, with a loss conservatively estimated at $50,000. The first intimation of trouble came when a muffled explosion was heard in the top of the building, and an instant later the huge structure was enveloped in flames.

Crooksville—Zanesville Coal Co. mine No. 6 was idle on Jan. 29, on account of the icy condition of the railroad tracks, making it impossible for the Pennsylvania work train to reach the mine. Several Crooksville mines are badly handicapped on account of lack of water for boiler use, and others have been idle on account of lack of cars for freight shipments.

ILLINOIS

Benton—The cage at the Benton Coal Co.'s mine here dropped 200 ft. with 11 miners on it, caused by failure of the engine to work properly. It is astounding in that no one was killed, but all suffered broken limbs and internal injuries.

B. F. Foster, J. W. Boyle, Dr. W. T. Short and William White, all Stonington men, have purchased the Blue Mound coal mine and intend to be ready for business soon. The work of pumping water from the mine has already been started. There is considerable rebuilding to be done before operations can be resumed.

Stonington—An explosion in Mine No. 21, owned by the Peabody Coal Co., on Feb. 1, killed three men. It was caused by escaping gas from an entry in which fire had broken out the day before and which had been walled up. The men who were killed, Jack McLaughlin and William Barker, of Stonington, and Walter Crouch, of Blue Mound, were in a working party that was making repairs. Thirty men who entered the mine after the explosion in an attempt to reach the bodies were driven back by the gas. Dick Clements, another member of the working party, was found an hour after the explosion wandering about the mine in a dazed condition. The bodies were finally recovered by a squad from the Springfield rescue station.

Lincoln—The Lincoln Coal and Mining Co. is renewing its efforts to reach and extinguish the fire which has necessitated sealing the mine for several months. Openings have been made to secure a freer circulation of air when the fan is again started and an effort is being made to locate the spot where the fire is still smoldering.

WYOMING

Kemmerer—No. 1 mine of the Union Pacific Co. at Cumberland, which some time ago had a squeeze, causing the company to allow the lower levels to flood, is to be pumped out. The new pump has already arrived and it is expected that from 50 to 100 more men will eventually be accommodated.

Casper—A meeting was held last week to organize a branch of the American Mining Congress. About 100 delegates attended from different points in Wyoming. The next meeting will be held at Cheyenne.

Foreign News

Amsterdam—It is announced that the Dutch government has stopped the importation of coal from Belgium, on the ground that Holland does not consider herself justified in accepting coal mined by compulsory labor.

Calgary, Alta., Can.—Miners in Alberta coal mines will be given exemption from military service so long as they work, Mr. Justice Simmons, of the military tribunal, has announced. If they strike or take holidays, the exemption ceases.

London, Ont.—The coal shortage here has raised the price of coal from $12 to $16 a ton. Many of the citizens are complaining against the dealers for charging $16 a ton for coal in quarter-ton lots, but the latter argue that owing to the shortage they have to bring in the aid of brokers and have to use other than ordinary channels to procure the coal, which makes the cost much greater.

New Glasgow, N. S.—Coroner Kennedy of New Glasgow has been empaneled to inquire into the deaths in the Allan mine explosion. As the jury did not have at least three miners in its panel, R. H. Murray, who represents the men, asked for an adjournment and a new jury. On Jan. 31 there was 4 ft. of water at the 1200 ft. level and three pumps had been installed to remove the water. Up to that date 43 men had been taken out of the mine.

Harbin, Siberia — The Tehermovo coal mining district, 70 miles from Irkutsk, Siberia, has been laid waste by order of the local Bolsheviki authorities. The district produces 2,000,000 tons of coal a year, supplying the Siberian Ry. The damage is estimated at 10,000,000 rubles. Many Austrian and German prisoners were working at the mines.

Personals

J. G. Vaughan has been made general superintendent for all the Beury mines in the New River coal field, of West Virginia. His headquarters will be at Nuttallburg, Fayette County.

Fred H. Smythe has resigned his position with the Richland Coal Co., of Moundsville, W. Va., to accept a position as superintendent at the Conklin Coal Co., at Coshocton, Ohio.

John McGregor has resigned his position as manager of the Rutland, Ill., mine of the United States Coal and Coke Corporation, and is succeeded by G. W. Harley, whose former home is in California.

Herman V. Hesse, for ten years manager of the Maryland district of the Consolidation Coal Co., has resigned, effective Mar. 1, to become manager of the coal operations of the Monongahela Traction Co., with headquarters at Fairmont, West Virginia.

Harry Phillips, formerly a mine foreman in the employ of the Consolidation Coal Co., which has mines in Maryland, West Virginia, Pennsylvania and Kentucky, has been appointed superintendent of the Hartland Colliery Co., whose operations are in Clay County, W. Va.

P. M. McClanahan, formerly president of the Milburn Coal Co., operating in the Paint Creek field of Kanawha County, West Virginia, has organized the Caudil Branch Coal Co., to develop a lease on Caudil's branch in the Hazard field, Kentucky. The company controls about 2000 acres and is capitalized at $400,000.

J. B. White, general manager of the West Virginia Standard Coal Co., of Huntington, W. Va., regarded as one of the best authorities on traffic in the country, has resigned his position, effective Feb. 1, as general manager of the West Virginia Standard Coal Co. to take charge of the traffic department of the Cleveland Furnace Co., of Cleveland, Ohio

Major O. B. Perry, of the 27th Engineers, the mining regiment, has been promoted to the rank of lieutenant colonel. He now is at Camp Meade and as the ranking officer is in command of the portion of the regiment which is being trained. Before the regiment leaves for France, it is expected that a colonel of the regular army engineer corps will be assigned to the regiment.

Obituary

J. D. Peters, of Carbondale, Ill., a few years ago general manager of the Chicago & Carterville Coal Co., with mines at Herrin, Ill., died in a hospital in New York City, where he had been for about five months. He was one of the pioneers in the southern Illinois fields. Born in Ohio, he drifted to Illinois and was with a coke and foundry firm at Grand Tower when the Big Muddy field was at its height. He later helped build the railroads that cover southern Illinois, and about 25 years ago began as an operator in the Carterville field. He retired a few years ago on account of ill health. He was a veteran of the Civil War and leaves a wife and grown family.

James E. Roderick, Chief of the Department of Mines of Pennsylvania for the last 20 years, died at his home in Hazleton, at 6 a.m., Feb. 4, from bronchial trouble, which became acute, due to a severe cold contracted on Jan. 20, at Okmulgee, Okla., where Mr. Roderick had gone for a few days to look after some personal interests in the oil fields.

Mr. Roderick was born in South Wales, January, 1842. He attended school until the death of his father, when, at the age of 13 years, he entered the mines. He continued his studies, however, attending night school until he came to this country, in the early sixties. Mr. Roderick then located, first at Pittston, Luzerne County, where he was engaged as a miner's laborer. Afterward he worked as a miner, doing all kinds of labor in the mines around Pittston and Wilkes-Barre, until Jan. 1, 1866, when he was appointed mine foreman of the Empire shaft, operated then by the Wilkes-Barre Coal and Iron Company.

On the first day of June, 1870, he resigned that position to accept the superintendency of coal mines for the Warrior Run Mining Co. In July, 1881, he went before the board appointed to examine applicants for the position of mine inspector; and,



JAMES E. RODERICK

having answered over 90 per cent. of the questions asked, he was appointed inspector of mines, with headquarters at Hazleton. He served as mine inspector until June 1, 1889, when he resigned that position to become the general superintendent of the coal interests of Linderman & Skeer. At the expiration of the lease of Linderman & Skeer, June 1, 1896, Mr. Roderick became general superintendent and manager for A. S. Van Wickle's extensive coal interests.

Mr. Van Wickle, having died, Mr. Roderick resigned his position June 1, 1899, to accept the appointment to the office of Chief of Bureau of Mines, under Governor Stone. He served in that position until Apr. 15, 1903, when he was appointed by Governor Pennypacker, as chief of the newly established Department of Mines, for a term of four years. In 1907, he was reappointed by Governor Stuart for a third term of four years, and, in 1911, was reappointed by Governor Tener for a fourth term of four years. In 1916, Mr. Roderick was reappointed by Governor Brumbaugh for a further term of four years.

Mr. Roderick was chairman of the Commission which drew up the bituminous code in 1911 and was chairman of the subcommittee appointed to draw up a new code for anthracite mines in 1913, but which was defeated in the Legislature.

Since July, 1881, he has lived in Hazleton, where he was a member of the First Presbyterian Church, a director of the First National Bank and President of the Middle Coal Field State Hospital. He has served as a school director, and as select councilman.

Mr. Roderick is survived by his widow and three children: Edward R., a prominent physician, James E., Jr., an attorney-at-law, and Mrs. Nellie E. Jones, all of Wilkes-Barre.

New Patents

Keeper for Mine Cars. A. W. Spaht and G. R. Jacobs, Christopher, Ill., 1,249,231. Dec. 4, 1917. Filed Aug. 9, 1917. Serial No. 185,389.

Coal Producing and Byproduct Recovering Method. M. Marshall, Port Coquitlam, British Columbia, 1,248,883. Dec. 4, 1917. Filed Aug. 14, 1917. Serial No. 186,211.

Furnace. D. S. Jacobus, assignor to Babcock & Wilcox Co., Bayonne, N. J., 1,248,661. Dec. 4, 1917. Filed June 30, 1914. Serial No. 848,139.

Dump Car. H. R. Keithley, Michigan City, Ind., 1,248,666. Dec. 4, 1917. Filed Apr. 23, 1917. Serial No. 163,956.

Coaling Tank or Hopper. V. Z. Caracristi, Bronxville, N. Y., 1,248,610. Dec. 4, 1917. Filed June 2, 1916. Serial No. 101,315.

Automatic Stoker. B. V. Edwards, Newark, N. J., 1,249,048. Dec. 4, 1917. Filed Jan. 17, 1916. Serial No. 72,397.

Combined Coal and Gas Water Heater. H. A. Becker and A. D. Dukelow, assignors to Sill Stove Works, Rochester, N. Y., 1,248,793. Dec. 4, 1917. Filed Nov. 10, 1916. Serial No. 130,538.

Mining Machine. C. A. Pratt, assignor to Goodman Manufacturing Co., Chicago, Ill., 1,249,823. Dec. 11, 1917. Filed Oct. 31, 1910. Serial No. 589,836.

Apparatus for Lifting Furnace Doors. S. Dillon, Edgewood, Penn., 1,249,605. Dec. 11, 1917. Filed Apr. 15, 1914. Serial No. 832,402.

Grate for Furnaces. A. W. Finlayson, Detroit, Mich., 1,249,365. Dec. 11, 1917. Filed May 22, 1916. Serial No. 99,034.

Coal Gas, Manufacture of. A. Waddell, Dumfermline, Scotland, 1,249,864. Dec. 11, 1917. Filed Feb. 29, 1916. Serial No. 81,108.

Mining Machine. E. L. Hopkins, assignor to Jeffrey Manufacturing Co., Columbus, Ohio, 1,249,400. Dec. 11, 1917. Filed Sept. 9, 1913. Serial No. 788,853.

Chain for Mining Machines. C. E. Davis, assignor to Goodman Manufacturing Co., Chicago, Ill., 1,249,904. Dec. 11, 1917. Filed Sept. 9, 1913. Serial No. 788,853.

Safety Supporting Device for Mine Cages. G. H. Schofield, Leigh, Eng., 1,253,633. Jan. 15, 1918. Filed Apr. 11, 1917. Serial No. 161,330.

Trade Catalogs

"'Rimco' Rubber Insulated Pliers." Rubber Insulated Metals Corporation, Plainfield, N. J. Folder. Pp. 4; 3¼ x 6¼ in.; illustrated. Describes a rubber insulated plier that has been tested and passed for 10,000 volts. Insulation will not crack or break when dropped on a hard surface or from the arm of a pole.

"C-H Electric Air Heaters." The Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Folder. Pp. 6; 3¼ x 6 in.; illustrated. The heaters described are divided into a number of groups, several being for industrial or mill use, and are made in capacities of from 2 to 10 kw. Other heaters desirable for offices, bedrooms, bathrooms, etc., are also shown, and the dimensions, ratings and prices given.

"C-H Electric Space Heater Unit." The Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Folder. Pp. 6; 3¼ x 6 in.; illustrated. Describes a steel-jacketed unit which is approximately the size of a 2-ft. rule. A number of applications of this unit are also described and several ways of mounting are suggested. These units are put up in standard packages of 10 units each. Capacity of each unit is 500 watts and they may be used on either alternating or direct current circuits.

Publications Received

Methods for Increasing the Recovery from Oil Sands. By J. O. Lewis. Department of the Interior, Bureau of Mines. Bulletin 148, Petroleum Technology 37. Illustrated, 120 pp., 6 x 9 in.

Abstracts of Current Decisions on Mines and Mining, Reported from May to August, 1917. By J. W. Thompson. Department of the Interior, Bureau of Mines. Bulletin 159, Law Serial 12. Unillustrated, 110 pp., 6 x 9 in.

Gypsum Products, Their Preparation and Uses. By R. W. Stone, Geologist, U. S. Geological Survey. Department of the Interior, Bureau of Mines. Technical Paper 155. Mineral Technology 19. Illustrated, 61 pp., 6 x 9 in.

Compressibility of Natural Gas and Its Constituents, with Analyses of Natural Gas from 31 Cities in the United States. By G. A. Burrell and I. W. Robertson. Technical Paper 158, Petroleum Technology No. 32. Illustrated, 14 pp., 6 x 9 in.

Industrial News

St. Louis, Mo.—Since the municipal coal stations opened Dec. 7, they have sold 2571 tons, or approximately 64 cars. The revenue to Feb. 1 was $10,283.89.

Albany, N. Y.—The Albany Clay Products and Crucible Coal Co., Inc., has filed notice with the Public Service Commission of an increase in its capitalization from $1500 to $10,000 to provide for expansion.

Frankfort, Ky.—A bill has been introduced in the Kentucky Legislature, now in session, which would permit coal companies and manufacturing plants to operate on Sundays during the war.

Memphis, Tenn.—Local coal consumers have been advised on various occasions recently by coal shippers that the reason for failure of coal to arrive has been that the railroads took most of the output.

Chicago, Ill.—The Wolff Coal Saver Co. has filed notice with the Public Service Commission of an amendment to its charter increasing its capital from $2,250,000 to $2,700,000 to provide for extensions, etc.

Nicholasville, Ky.—On account of the difficulties in the way of obtaining coal, the municipal light and power plant of Nicholasville has gone on a reduced period schedule and is operating only from 5 to 11 P.M.

Dover, Del.—The Coxe Stoker Sales Co. has been incorporated here with a capital of $60,950, to manufacture stokers and fire grates. The incorporators are William Lloyd, G. W. Wilmot and L. O. Emmerlich, of Hazleton, Penn.

Plymouth, Penn.—Several hundred employees in the Powell Squib factory have been granted an increase in wages from 10 to 25 per cent. A strike was threatened at this plant, but the offer of the Federal mediation board was accepted.

Shawnee, Ohio—The White Oak Coal Co has been incorporated with a capital of $4000 to mine and sell coal. The incorporators are W. E. White, Theodore Schubert, Roy White, Frank White, Charles E. White and William G. Bartrow.

Sutton, W. Va.—The Pittsburg Summit Coal Co., which recently increased its capital from $25,000 to $75,000 for expansion, is planning for the immediate development of 98 acres of coal lands, to have a capacity of 250 tons daily. C. C. Davis is president.

Knoxville, Tenn.—The Knoxville Gas Co. is circulating petitions among its customers, asking them to agree to an increase of 20c. on the 1000 cu.ft. The rate is now $1. Increased coal costs and increased labor costs are set forth as the reason for the advance.

New York, N. Y.—J. D. Barnhill, Inc., of 110 W. 34th St., advertising and service agency, announces a change of officers, as follows: Philip S. Dodd, president; Clayton Du Bosque, vice president and treasurer; William T. Andrews, secretary and art director.

Chillicothe, Ohio—As a carload of coal was being dumped for use at Camp Sherman, 18 sticks of dynamite were discovered in the car. Opinion is divided as to whether it was in an attempt on the part of pro-Germans to blow up the camp or the result of carelessness.

Marion, Ill.—The St. Louis Coal Co. has taken over the shaft on the Goddard farm northeast of here and is sinking an air shaft and getting ready to develop and operate this property as fast as materials can be secured. It will have a capacity of 3000 tons per day.

Jackson, Ky.—The Breathitt Coal Fields Exchange, with capital of $10,000, has been organized and will buy coal from operators and sell in the market, operating under Government price regulations. H. C. Musick, of Jackson, is interested. E. B. Cardwell is manager.

Berryburg, W. Va.—The Berryburg Coal Co. is having plans prepared for the construction of 42 two-story miners' residences, about 26 x 30 ft., as the initial work on 60 residences to be built ultimately. A. B. Crichton, Farmers Trust Building, Johnstown, Penn., is engineer.

Columbus, Ohio—John J. Roberts, 1177 Leonard Ave., fell into the hands of police on a charge of having sold coal by short weight. The arrest was made on an affidavit sworn to by Edgar Watts, Shepard, who alleges Roberts sold him 530 lb. of coal for a half ton—1000 pounds.

New Baden, Ill.—There is no immediate prospect of the reopening of the New Baden mine here of the Southern Coal, Coke and Mining Co., of St. Louis, the main shaft of which has been caved in for the last couple of months. This means a loss of between 2000 to 3000 tons of coal per day.

Allentown, Penn.—Engineering and Auditing department of the Harwood Electric Co. will be removed to this city, which will mean that about 15 of the employees of the company will be transferred from Hazleton. Only the field corps of the engineering department will remain at Hazleton.

Cleveland, Ohio—Fifteen cents a ton increase in coal prices was allowed to the retailers by the local fuel committee. This advance to the consumer, however, is only for the month of February. A committee of the retail merchants presented a request to the committee for a 42c. raise on each ton sold.

Marysville, Ohio—A 50-ton carload of coal shipped here and consigned to the Marysville Board of Education for the West School Building was seized by the local fuel administrator and distributed to homes in half-ton lots, where families were entirely out of coal, through the coal clearing house.

Logan, Ohio—The Spencer-Hollow Coal Co. has leased from the Buckeye Coal & Railway Co. 300 acres, located on the Hocking Valley, upon which a 600-ton mine will be opened shortly. No. 7 vein will be mined at that place. Electrical power will be secured from the Hocking Power Co., at Floodwood.

Marion, Ohio — George Whysall, county fuel administrator of Marion County, has issued an order for all coal cellars and bins to be inspected. He claims that there is sufficient coal in cellars to supply all domestic and steam users for more than a week. It is planned to distribute all surplus coal so hoarded.

Perth Amboy, N. J.—New York Harbor police and Government employees began the task, Jan. 29, in coöperation with the owners, of raising 11 coal barges sunk by the ice during the recent cold wave, in Staten Island Sound. The barges, containing a total of 40,000 tons of coal, are blocking the channel.

St. Charles, Ky.—The C. M. Riker Coal Co., Paducah, has completed all organization plans, and is planning for the early development of about 972 acres of coal lands to have a capacity of from 750 to 1000 tons daily. The company is planning for the immediate installation of air compressor and cutting machines. C. M. Riker is president.

Stockton, Penn.—Announcement was made Jan. 29 by officials of the Bethlehem Steel Co. that the entire East End department, including the frog and switch department and bridge shop, would be closed because of the lack of fuel. Approximately 1000 men were thrown out of work. Coal is enroute to the plant, but the storms tied up traffic.

Columbus, Ohio—Robert Lake, president of the Michigan-Ohio-Indiana Coal Association, who resides at Jackson, Mich., was in Columbus last week in conference with B. F. Nigh, secretary of the association, relative to the mid-winter meeting of the directors. The meeting will be held some time during February, the exact date to be announced later.

Columbus, Ohio—Plans for handling the municipal coal yard, recently authorized by the city council, has been announced by city officials. Each of the fire-engine houses in the city will be made a retail point where coal is to be sold to consumers at the rate of 30c. per bushel. The limit to be sold to each customer is two bushels. Customers must come after the coal.

Orient, Ohio—The Orient Coal Co., recently organized at Columbus with a capital of $25,000, has taken over the working coal mine of William Crowe, located in Vinton County on the Hocking Valley, which will be enlarged by the installation of electrical equipment. There are 80 acres in the property. The present capacity is 50 tons daily, which will be increased to 300 tons. George W. Moss is president and E. H. Alton secretary and treasurer.

St. Louis, Mo.—Fuel Administrator Crossley has announced that within a few days, unless there is a decided change for the worse in weather conditions, the early closing order, under which nearly all branches of business have been closed at 7 p.m., will be rescinded. The rescinding of the order will not, however, extend to the electric signs and illuminated advertising devices, which will continue dark.

Columbus, Ohio—President Westlake, of the Columbus City Council, has offered a resolution calling on Homer H. Johnson, Ohio Fuel Administrator, to investigate the alleged action of certain railroads entering Columbus in permitting miles of coal cars filled with slag to stand on sidetracks while Columbus is suffering from lack of fuel. Mr. Westlake claims that he counted 300 cars on the Hocking Valley Ry. so loaded.

Nelsonville, Ohio—The Keystone Coal Co., of Nelsonville, has leased from the Buckeye Coal & Railway Co. a large acreage which will result in two new mines. The company will build two miles of railroad to connect with the Hocking Valley. The property is located in York township, and it is planned to have each mine produce 100 tons daily. No. 6 vein, which is 6 ft. thick, will be mined.

Paducah, Ky.—C. M. Riker, general manager of the Carbondale Coal and Coke Co., of St. Charles, Ky., and of the Eureka Coal and Coke Co., of Paducah, Ky., has purchased a tract of coal and timber land, embracing 972 acres, near Hamby, Ky., and has incorporated the C. M. Riker Coal Co. to develop it. Borings show deposits of 11,000,000 tons, and Mr. Riker proposed a development to produce 1000 tons daily in the near future.

Nelsonville, Ohio—The North Hocking Coal Co. has leased from the Buckeye Coal & Railway Co., of Columbus, 320 acres in Trimball township, Athens County, located on the Hocking Valley. An opening will be made just north of Murray City and a mine with a capacity of 600 to 700 tons daily will be opened soon. A modern tipple will be erected. The mine taps the No. 4 vein, which is 4 ft. 6 in. thick.

Columbus, Ohio—A feature of "Farmers' Week" at Ohio State University was coal conservation demonstrations by E. A. Frothingham, of the United States Forest Service, who came to instruct woodland owners in the best methods by which firewood can be "harvested." It is hoped to interest farmers in the project of woodyards, where not only fuel from woodlands, but refuse from sawmills and woodworking plants may be utilized as fuel.

Tulsa, Okla.—Opening of virgin coal lands in Tulsa and adjoining counties is urged by the Tulsa County Council of National Defense as a means of meeting the situation growing out of the coal shortage. Several thousand acres of rich coal lands lie undeveloped in Tulsa County, the coal veins being near the surface and easily mined. Several new coal mines have been opened recently, but still the possibilities of the county as a coal producer have not been touched.

Columbus, Ohio—Chief Inspector Dugan, of the Public Utilities Commission, claims that there are now 12,000 loaded coal cars on Ohio roads awaiting movement, a big per cent. consigned to points outside the state. It is estimated that this would furnish a ton to each of the 600,000 homes in Ohio. Administrator Johnson is making an effort to secure from Washington an understanding as to just how far his authority extends in confiscating this idle coal for the needy Ohio consumers.

Woodlawn, Penn.—Owing to lack of fuel several of the departments of the Jones & Laughlin Steel Co., the largest steel plant in the Ohio Valley, have been closed for several days. Officials of the company were of the opinion that it would be possible to obtain shipments of coal by river with the ice cleared from the Ohio. Only limited rail shipments of fuel have been received by the company for several weeks. As a result of the shutdown it is declared that several thousand men are idle.

Morgantown, W. Va.—The holdings of the Empire Coal Co., controlled by the Elkins estate, and consisting of 4000 acres of coal in the Grant district, Monongahela County, and the Pawpaw district, Marion County, W. Va., have been purchased by the New England Fuel and Transportation Co., a subsidiary of the Massachusetts Gas Co., of Boston, for $4,000,000. It is understood that the company intends to break up the tract by selling parts of it to other companies, with a view to securing as extensive a development of the land as possible without delay.

Harrisburg, Penn.—The Gamble Fuel Briquette Co. has given a lease to the Gamble Briquette Co. to operate its plant. The deal was closed by Hord & Co., of New York, and represents an investment of $75,000. Those interested in the deal are Israel H. Supplee and C. B. Johnston, of Wheeling, W. Va., both of whom have had wide experience in the fuel business. The new company intends to commence operating within about two weeks. The company will be under the management of the most expert briquetters in the country and expects within a short time to turn out 100 tons of briquettes a day.

Louisville, Ky.—The city's fuel difficulties have been increased by the washing out of one of the three feed lines leading to the compressor station of the Louisville Gas and Electric Co., whence the gas is directed into the main 180-mile pipe line. This has reduced still further an already inadequate supply of natural gas for the city and has increased the demand for coal. The last of January saw a total of 70 per cent. penalty discount against the bills of the company to its domestic consumers, making a total discount of 110 per cent. for the two months, or an average of 55 per cent. a month.

Birmingham, Ala.—The following coal companies have filed articles of incorporation in the office of Probate Court of Jefferson County: Atlas Coal Co., with a capital stock of $100,000, will develop properties in Walker County, near Dora, Ala. The officers of the company are G. H. Garmany, president; B. M. Hobson, vice president; J. C. Grant, secretary-treasurer. Head offices will be in Birmingham. Green River Coal Co., of Birmingham and Sebree, Ky., capital stock $10,000. N. O. Tyler, of Birmingham, is president; Ernest V. Moore, of Atlanta, vice president, and J. M. Anderson, of Birmingham, secretary. Ida H. Taylor is one of the incorporators.

Sunbury, Penn.—Record of a deed of trust for 22 parcels of land bordering on and in some cases reaching to the center of Shamokin and Mahanoy Creek, in Northumberland and Schuylkill Counties, made on Feb. 1, show what is apparently a plan to reclaim and sell coal that has been turned into these streams from the mines in the Shamokin district on a large scale. The deed shows that the property was secured by purchase or option at a total cost of almost $100,000 by a corporation known as the Eastern Coal Co. It is made in favor of Edwin S. Meade, of Doylestown, Penn.; Charles J. Farrell, of Mt. Vernon, N. Y., and Donald C. Mulman, East Orange, N. J., and the Central Trust Co. of New York is the grantor.

St. Louis, Mo.—The question whether the Illinois Fuel Administration or the Missouri Fuel Administration shall control the Illinois coal field adjacent to St. Louis has been brought to a head by a protest sent to Administrator Garfield by Administrator Williams, of Chicago, against diversion by the St. Louis Fuel Committee of coal requested by Gen. William H. Bixby, Chairman of the Mississippi River Commission, for coaling Government boats in an effort to save barges containing $3,000,000 worth of Government supplies, carried away by the ice at Memphis. The protest was made in spite of the fact that the St. Louis committee obtained the assent of one of Administrator Williams' assistants before ordering the diversion. Missouri Administrator Crossley has asked Administrator Garfield for an early decision on the question of control, which he has under advisement. The contention of the Missouri administration is that the Fifth and Ninth Illinois districts are operated from St. Louis and are the natural supply for Missouri and that the output should be assigned to the Missouri Administration.

Cincinnati, Ohio—The Monongahela Consolidated Coal and Coke Co.'s towboat "Charles Brown," with a number of barges, was sunk in the recent ice jam in the Ohio River, causing a loss of $60,000; the entire fleet of the Campbell's Creek Coal Co., at Ludlow, Ky., just across the river from Cincinnati, consisting of 40 empty barges, two fuel flats and a pumpboat, was lost, with damage of about $40,000; the Hatfield Coal Co.'s towboat "Rebe Reeves" was sunk, a loss of $15,000; the Marmet-Halm Coal and Coke Co.'s fleet at North Bend, Ind., near Cincinnati, 12 barges, was carried down the river and probably lost, with danger of further losses to the company's vessels; the towboat "Hattie Brown," with 20 barges, was caught in the ice and badly damaged. Besides these losses at Cincinnati, many barges carried down from unknown points up the river, loaded with coal, were observed floating down, some of them being crushed against bridge piers and sunk. The total damage done by the sudden breaking of the freeze-up and the movement of the ice has been estimated at $3,000,000.

MARKET DEPARTMENT

GENERAL REVIEW

The country again approaches a coal crisis. This is occasioned by inadequate motive power and bad weather conditions.

Again the "Weather Man" appears to evince a friendly spirit toward the Kaiser. The cold wave which descended upon the country the first part of the week was in many instances, with one or two exceptions, the coldest weather which had been encountered for years. This, of course, greatly interfered with railroad transportation and undid in large measure the good work which had been accomplished up to that time. Throughout New England the fuel situation is acute, both as regards manufacturing and domestic consumption. A short temporary priority order secured at Hampton Roads in favor of this territory helped to a certain extent. Railroads in many instances have but a scant supply of fuel, and in a few cases are enabled to operate only through the coöperation of connecting lines. In New York City and vicinity, due largely to adverse weather conditions, coal is extremely difficult to obtain, and practically no stocks are on hand, particularly in the yards of retail dealers. The severe weather has greatly hampered the dumping of cars at the various terminals on the Jersey shore. In Philadelphia receipts are by no means equalling requirements, and quite a quantity of bituminous coal has been commandeered and turned over to the retail trade for distribution. The people receiving this coal, not being accustomed to its use, are having their troubles, but these are doubtless less severe than would be occasioned if no coal could be had. Efforts to secure river coal at Pittsburgh were temporarily successful, and it was thought that a large part of the city's difficulties had been surmounted, when a new cold wave struck that region and undid the work which had been accomplished in the shape of opening the lower pools of the Monongahela. The warm weather which had preceded the cold wave had, however, loosened up the car situation to a considerable extent and car supplies the first day or two of this week were better than formerly. The coal trade in the Middle West is still operating under great difficulties imposed by the excessive snow-fall in the past few weeks. Traffic conditions are extremely bad, and mine operation is likewise. From all over the country come reports of industries cleaning their bins of fuel, and in many cases being down to bare boards. Certain plants have been forced to shut down, while others are only able to keep running on a hand-to-mouth basis through special orders of the local fuel administrators. The domestic situation is scarcely less serious, and the suffering in many homes is intense. It is not believed that these conditions will permanently and entirely right themselves until warmer weather has relieved the adverse conditions under which the transportation of the country is now laboring.

A Year Ago—Anthracite quiet but prices continue firm. Foreign complications upset the bituminous market at tidewater. Movement slow and supplies very short at some interior points. Shortage very acute in some sections of the Middle West.

BUSINESS OPINIONS

The Iron Age—The pig-iron statistics for January give a measure of what the steel industry has suffered from the unparalled weather and transportation conditions of the past month. Output fell to 2,411,768 tons, or 77,799 tons a day, against 2,882,918 tons in December, or 92,997 tons a day. January production was thus the smallest since May, 1915.

Bradstreets—Business in an industrial as well as a commercial sense is hobbled, either because of scarcity of goods, enforced weekly shut-downs, adverse weather conditions, paucity of fuel, insufficient production, or freight congestion, and after seven weeks of cold, stormy weather little headway has been made in working out of blockades

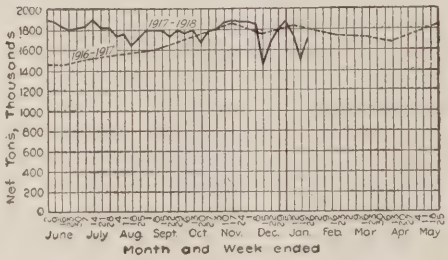
The Dry Goods Economist—Freight congestion continues to be the order of the day, efforts to relieve the situation having been largely nullified by the latest snowstorms. To the retailer this means delays in the delivery of goods needed for early spring selling, while to the manufacturer it carriers a threat of idle plants through lack of fuel and raw materials.

The American Wool and Cotton Reporter—The cotton goods market appears stronger than it has been. The relative supply of goods available for ordinary distribution is becoming smaller, the cost of production is increasing and the influence of supply and demand more apparent than it has been up to the present.

Marshall Field & Co.—The current wholesale distribution of dry goods is ahead of the heavy volume of the corresponding period a year ago. The volume of road sales for both immediate and future delivery is considerably larger than in the same week of 1917. Customers have been in to market in about the normal number. The market on domestic cotton continues strong. Collections are fully as good as a year ago.

COAL PRODUCTION

A recovery from the depression of the week before left production during the week of Jan. 26 still far short of normal. The weather was cold but the snow falling over most of the fields was not heavy enough further to impede transportation. The total bituminous production (including lignite and coal made into coke) was 10,018,000 net tons, or 1,670,000 tons per working day. The rate approximates that of a fortnight ago during the first week of the depression, when the daily average was 1,689,000 tons. The production of beehive coke did not share in the recovery made by the bituminous industry as a whole. The total production for the week ended Jan. 26 is estimated at 491,000 net tons, an average per working day of 82,000 tons. The estimated rate of production subject, of course, to revision, is the lowest recorded since these bulletins were begun.



Shipments of anthracite by the nine principal carriers amounted to 33,406 cars, as compared with 31,861 cars during the preceding week.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

	Jan. 5	Jan. 12	Jan. 19	Jan. 26
Bituminous shipments, 121 roads	168,936	180,411	130,865*	180,362†
Anthracite shipments, 9 roads	25,604	36,178	31,861*	33,406†
Beehive coke shipments, 4 roads	9,348	11,560	10,826*	10,078†

* Revised from last report. † Subject to revision.

Atlantic Seaboard

BOSTON

Slender stocks on hand in cities doled out under supervision of fuel committees, although rules are relaxed to include plants working on war orders that have license to operate on Monday holidays. Factories continue to close down, but in many cases emergency supplies are found and industrials have not yet ceased to the extent that was feared. New England in a precarious state. Railroads in certain cases are next door to fuel starvation and only through special provision by connecting lines are enabled to operate. Priority for New England cargoes secured at Hampton Roads for 72 hours. Anthracite receipts so light as to be negligible.

Bituminous—From present appearances "fuel tickets" are a possibility in the near future, especially in the cities. In Boston, Portland, Providence and other New England centers, deliveries of coal, except for governmental purposes, for public utilities, dwellings, and other uses on the preferred list, have been discontinued for more or less indefinite periods. The time originally prescribed in Boston was 48 hours, but this has since been extended 12 hours, and probably will be extended again. A large number of office buildings are heatless and elevator-less; others are made so after 10 A.M. The restrictions are being carefully observed and people generally show a remarkably fine spirit of coöperation. Their anxiety usually is to find out exactly what is prescribed.

In view of the marked decrease in output for January, and the unprecedented conditions at the loading ports there is no chance of decided improvement for weeks to come. At Hampton Roads an ice storm followed three weeks of the worst weather in the history of the piers. The latter, together with the coal in cars, were covered with ice and early in the week dumping was extremely slow. A day of rain helped in handling coal and more ships were cleared on Jan. 31 and Feb. 1 than in any similar period for several weeks. Car movement showed no improvement, however, and at the end of January the total of coal cars in transit was less than half normal.

These are some of the conditions that lead the fuel authorities to scrutinize every application for coal, whether from railroads or householders. The rules for observing preference fall hard in a great many cases and it is difficult to deal equitably with them all. Plants that are classed as "unessential" are often the only industries in towns where a large population is dependent and where there is no supply of fuel to distribute. There are colleges whose bins are fast getting down to bare boards, and the extent not only of inconvenience, but of actual privation, will soon be immeasurable. There are indignant protests at alleged "hoarding" by railroads and other utilities, but there is also less complaint of unfairness in distribution than might have been looked for. The public is learning to what extent the coal they get is dependent upon the operation of railroads and that the "stocking-up" of 20 to 30 days' reserve is only a necessary precaution. A pile of coal seems enormous until it is realized what a great utility requires, even on a daily basis, and that the movement of coal at all is largely dependent upon the effective operation of railroads.

Through emergency cargoes and the limited shipment of coal all-rail on the New England order the hospitals and pumping stations are gradually accumulating 30-day reserves, and already the Fuel Administration is allowing "Storrow" coal to reach munition plants and other industrials that are working 100 per cent. on Government orders. For a time only the most important, even on this classification, can be considered, but it is hoped that shipments in better volume from the various loading ports will increase the supply through the usual channels. Ice in Long Island and Vineyard Sounds still interferes with shipping and is only one of the difficulties that have arisen from the prolonged cold weather.

The Panama Railroad transport "Achilles" is secured for a fourth trip and helped a little to relieve the gloom that had settled upon industrial circles when it was feared no other ships were in prospect to help satisfy some urgent demands. A large part of the third cargo was forwarded for distribution through retail coal dealers for domestic use. A large number of communities are destitute of either hard or soft coal and even a relatively small supply of the latter is a godsend. Such shipments have gone forward as far as Rockland, Maine, and St. Johnsbury, Vt., while points 100 mi. nearer the mines from Boston were sent small shipments to tide them over for a few days. Notwithstanding such measures as the loan of the "Achilles" there is little optimism here over the outlook for February and March. Other ships are in line to load emergency cargoes, but in the aggregate, the tonnage is so relatively small that the relief given is extremely limited.

There is confusion, too, over the priority

in which different war industries should be served, and soon there will be wide-spread dissatisfaction unless a more careful supervision is exercised over distribution. Volunteer workers under the fuel administrators are doing what they can under hard conditions: for the most part they have been swamped with work, and find it difficult to get accurate information as to the really deserving cases. Applications are so apt to be "colored" through individual anxiety that should the present posture of affairs continue some plan of inspection and check will have to be put into operation.

A lot of apprehension is focussed on Feb. 15, so large a number of plants are certain to be bare of fuel by that date, unless something providential, like mild weather, should intervene. How important textile mills that burn coal by the thousands of tons weekly can possibly be kept supplied is a question no one seems able to answer.

The Maine Central R.R. was again within two days of being out of fuel early this week and the only relief in sight was the diversion of a steamer en route from Louisburg, C. B., to the New Haven R.R. at Boston. The southern division of the Central Vermont Ry. was also on the narrowest of fuel margins when relief came at the hands of a retail coal dealer! Scores of trolley and light plants have been in a similar predicament.

J. J. Storrow, New England Fuel Administrator, secured through Washington an order granting priority to bottoms wanting to load for New England, this to continue 72 hours from Jan. 31. On Feb. 1 the order was shown to be effective, and several ships, including a 7200-ton steamer for the Edison plant in Boston, on which the latter was dependent for an arrival by Feb. 4, were cleared. No doubt this order was the means of saving the situation in many instances. The difficulty is that all the emergency means thus far put through are only temporary and as such they may simply postpone what many are calling "the inevitable."

NEW YORK

Local conditions remain serious. Receipts are small, while demand continues heavy. Retail dealers establish zoning system. Bunker situation nearly normal but free coals are scarce. Storms impede deliveries. Too much coal going to Canada.

Anthracite—There has been no improvement in the anthracite situation. Supplies are no more plentiful although a few days of higher temperatures helped to alleviate conditions. The demand continues to be as heavy as at any time since the shortage of coal became acute and there are dealers who have practically retired from business so far as making deliveries are concerned. Any improvement that might have resulted as a result of warmer weather was dispelled by a sudden wave of low temperatures which rapidly extinguished any bright hopes that might have existed.

The pooling of anthracite at the various terminals which is now general, has aided the situation insofar as quicker deliveries go, but receipts have not been sufficient to overcome the shortage which is growing daily, now that the reserve stocks in the household bins are being gradually wiped out.

The saving of fuel accomplished as a result of Dr. Garfield's order for a coalless Monday has been variously estimated at from 15,000 to 20,000 tons but no actual figures are available. The report that Dr. Garfield might cancel all other coalless Mondays did not meet with the entire approval of the Fuel Administration officials here, it being contended that the situation did not warrant the rescinding of the order. It was said that not enough coal was coming into the city to supply all demands and that conservation must continue in order to prevent a greater closing down of business.

Local Administration officials attended a conference called by Dr. Garfield in Washington on Monday of this week at which the proposal to cancel all other coalless Mondays was to be considered.

A statement issued by C. E. Robertson, deputy state fuel administrator, calling attention to the shipments of coal to Canada attracted considerable attention. Mr. Robertson said that the seriousness of the anthracite situation in Greater New York and New York state has been aggravated by a wretched distribution of coal made by some shippers and some producers to retail coal dealers. After stating that anthracite production in 1917 increased 15 per cent. over that of 1916, Mr. Robertson says the dealers in Manhattan and the Bronx should have received several hundred thousand tons more than they did for the year 1917, while the reports of the County Administrators for Brooklyn, Queens, Richmond and Long Island show that these places did not even receive the tonnage for the year 1917 which was delivered in 1916. He then shows by figures furnished by the Department of Commerce that in the year 1916, from Jan. 1 to Dec. 1, there was delivered by shippers to Canada 3,776,427 tons; while in the same period of 1917 there was delivered 47,575,824 tons, an increase of 991,397 tons, or 26¼ per cent.

In calling attention to these figures Mr. Robertson says:

"As an instance of the flagrant violation of the law of equity and fair distribution, I will cite the case of the anthracite shipments of coal to Canada. No one wishes to deny Canada her proportionate supply of coal. We are willing to endure with her the sacrifices and sufferings occasioned by war, but we feel she has received a larger increased tonnage than she is justly entitled to, caused by the discrimination of some shippers of coal."

Mr. Robertson also says:

"When we bear in mind there has been an increase in the general anthracite production of only 15 per cent. we know that shippers have delivered to Canada 11¼ per cent. more than they should. In other words, an over-delivery of approximately 425,000 tons."

Efforts to provide for a better distribution of coal among consumers are under way following a conference between the local retail dealers and a representative of County Fuel Administrator Schley. It is intended to divide Manhattan and the Bronx into zones under the direction of a committee consisting of M. F. Burns, Thomas F. Farrell and George Eltz. It is proposed that where a dealer who has all his customers in what is known as Class One which consists of apartments and private houses, supplied, that whatever surplus coal he may have left over shall be pooled, if necessary, to supply the customers of another dealer or dealers who may not have been as fortunate in taking care of their customers. The coal shortage in apartment houses is causing much worry, it being estimated that there are between 400 and 500 such places in Manhattan and the Bronx without fuel.

Retail dealers complain bitterly of the lack of protection afforded them by the police when a boatload of coal is tied up at the unloading docks. Frequently, they say, much of the coal is stolen before the dealer has the time or opportunity to unload the boat. Instead of sending several policemen as is necessary because of the size of the crowd surrounding the boat, one patrolman is sent.

Complaint had been made that certain retail dealers had entered into competion with the peddlers and hucksters, but this trouble has been ended. The Mayor during the week issued an order that coal wagons be given the right of way like ambulances and Fire Department vehicles, in order to make quick deliveries.

It is reported that during the month of January there was received into the Bronx 41,000 tons of anthracite, while 155,000 tons were needed.

Buyers are not now asking for any particular size but are willing to take anything that is black and looks as if it will burn. Dealers are making deliveries in the same way and frequently broken coal is put into a bin instead of one of the smaller sizes, the consumer gladly breaking the chunks into the size he wants. The outcome of the investigation about to be started in the mining regions as to the quality of the coal shipped to market will be closely watched here, numerous complaints having been made as to the quantity of slate and rock received.

Rice and barley are about the only sizes to be picked up quickly.

Current quotations, per gross tons, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buck	4.30@5.00	5.50@5.80
Rice	3.75@3.95	4.50@4.80
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—Heavy snowstorms in the mining regions have naturally impeded shipments and the situation is extremely critical. The bunkering situation in this harbor has improved considerably and there are very few above the normal number of vessels here awaiting fuel supplies.

The shortage of fuel and the bad rail transportation, intensified by the weather, has seriously interfered with industrial conditions. Many plants are in a bad way for fuel and some of the corporations supplying power for factories in New Jersey have scarcely more than a couple of days' supply on hand.

The piers are handling the coal just about as quickly as it is received but the receipts are small and uncertain. Much trouble has been had with frozen coal. The roads leading to the mines have been covered with heavy snow and when it has been impossible to induce the mine employees to go out and remove the snow the railroads have found it necessary to take their employees from the railroad shops to do the work.

The question of contracts is being brought forward now that the time for renewal is drawing close. No word has been heard as to what the railroads might do as to obtaining next year's coal supply, and the operators have not made any announcement as to what they might do with regard to renewing their individual contracts.

The appointment of J. P. Cameron, of Altoona, to be the district representative of the Fuel Administration to control distribution in the central Pennsylvania fields under the zone system, was welcomed by the operators and shippers, many of whom are personally acquainted with Mr. Cameron. He will be assisted by John Lloyd, Jr., of Altoona; Harry B. Scott, of Phillipsburg, Penn., and Samuel A. Rinn, of Punxsutawney.

Mine employees are much dissatisfied with the poor car supply and are leaving for other industries where the work is more regular and wages as high if not higher.

In his statement calling attention to the shipments of anthracite coal to Canada, C. E. Robertson, Deputy State fuel Administrator, says that the shipments of bituminous to Canada for the 11 months, Jan. 1 to Dec. 1, 1917, were 14,912,698 tons, as against 11,078,665 tons shipped in the same period of 1916, an increase of 3,834,033 tons.

Representatives of several of the larger independent operators shipping to Port Reading and Port Richmond held a meeting on Tuesday of this week for the purpose of putting into effect the pooling of anthracite coal. A report was received from a committee appointed at a previous meeting to devise a plan for such pooling.

Thomas F. Farrell, of William Farrell & Son, has been chosen by County Fuel Administrator Schley to look after the retail trade as a result of the conference held last Saturday between the retail dealers and Mr. Schley's representative at which time the pooling of coal was discussed, with special reference to providing coal for apartments and domestic consumers.

The situation early this week was extremely serious. Coal supplies were scarce and rail transportation was in bad shape on account of heavy snow storms and the extreme cold weather.

The committee of operators appointed a few weeks ago to work out a plan of distribution for anthracite coal for this year, held a meeting in Philadelphia on Monday of this week. The plan or scheme adopted aims at complete coöperation of all anthracite producers, working through a central organization. The scheme will be in full operation by Apr. 1 it is expected.

PHILADELPHIA

Anthracite continues to be held back by weather. Bituminous coal seized to help family trade. Coal thefts alarm dealers. Retailers hard hit by labor shortage. Yard deliveries growing. Congressmen call on National Administrator. Complaints about culm. Steam sizes sold up. Bituminous situation grows worse. Essential plants on close margin. Soft coal for domestic use. Heavy bunkering, with new regulations.

Anthracite—The operating companies, in conjunction with the railroads, made a concerted effort this week to relieve the acute shortage existing. Plans had been laid to consign approximately 60,000 tons for family use to this market. Heavy shipments were at once gotten under way, but more snow came and in addition another severe spell of cold weather, sending the thermometer below zero. This locked rails and switches, and entirely upset calculations. According to those who made a survey of the situation the only remedy now is to wait for a thaw, and the hopes of the railroads may yet be realized as there are indications that the weather will loosen up.

This week the State Fuel Administration confiscated about 300 tons of bituminous coal, which were turned over to the dealers for domestic fuel. Members of the fuel committee have given assurance that they will, under their orders from Washington, confiscate all soft coal needed to keep the homes of the people warm. All this, of course, depends on the willingness of the people to accept it, which perhaps needs not to be reckoned with so much as their ability to use it.

With the first consignment of this coal to the retail men they adopted the practice of picking out the lumps for the family trade and disposing of the slack for smithing purposes, for which there is a heavy demand. Owing to the heavy seizures of soft coal for the anthracite trade it was reported that in this section of the state over 70 large manufacturing plants were closed for the lack of fuel.

A promise of relief from the critical conditions prevailing here was given by National Fuel Administrator Garfield, following the action of Pennsylvania congressmen this week, when at the urgent request of State Administrator Potter they called upon Dr. Garfield in Washington. Dr. Garfield personally informed the congressmen that the presidents of the largest producing companies fully realize Philadelphia's condition and are making unusual efforts to supply the coal. Their efforts to have the New England priority order cancelled in favor of this city were not successful.

In the meantime there is little change in the conditions of the local coal yards. What coal is received goes out almost as soon as it comes in. The several heavy snowstorms greatly hampered the dealers in the delivery of their small receipts. Motor-trucks became stalled and at no time this winter has labor become so scarce. On this account particularly the practice is growing among the smaller dealers of selling their entire receipts in small lots to buyers who will carry the fuel away themselves.

One unfortunate phase of the situation in the outlying sections is that many dealers being unable to secure enough coal to make the business profitable have gone out of the trade entirely leaving their customers dependent upon dealers from whom they have not purchased heretofore and who are reluctant to serve them while endeavoring to dole out their meager supplies to their regular clientele.

The wholesale thefts of coal from cars on railroad sidings has once more grown to an alarming extent. This pilfering has become a business with many, who peddle the coal by the bucket. Members of the Coal Exchange realizing that some immediate and drastic action must be taken called a special meeting to consider the matter. A committee was appointed, and it called upon the Director of Public Safety, who promised better police protection. Later 32 men were arrested and brought before a magistrate. He listened to many moving but fictitious tales of woe and discharged the whole crowd with a reprimand and threats of punishment for repeated offenses. The retailers still hope that they will be able to secure enough convictions to discourage the practice.

The trade is in a turmoil and the nerves of every one connected with coal seem to be on edge. However, it now begins to look as if the Fuel Administration has adopted a new policy, one that will take advantage of the services of operators and distributors who have had years of close study of their business and have built up efficient organizations. The latest evidence of this new policy is the appointment of John Edmonds, sales manager of Madeira, Hill & Co., as anthracite distributor for Pennsylvania. Mr. Edmonds assumed his new duties this week in a quiet but thorough manner. His ability is indisputable and his requests to the shippers are received with confidence and prompt attention. Improved conditions are expected as a result.

Dealers with water-front yards are much interested in agitation to open the old Schuylkill canal this summer under Government subsidy. A number of congressmen have already taken the matter under consideration. At present the canal is but nominally operated, with only 18 barges in use last summer, while years ago the fleet amounted to as many as 800.

Altogether State Chairman Potter has seized during the past week 14,800 tons of anthracite, which have been turned over to retailers for sale to the domestic trade. Mr. Potter has also again cautioned the coal dealers that they must strictly observe the rule not to sell any anthracite family coal to manufacturing plants, either for heating or steam use.

Large shipments of culm have lately been reaching this market. The market on steam coals is entirely sold up and it is hard to obtain a price even from the individual operators, several of whom say they cannot take any more orders even for culm until they are able to clear up some of the orders on their books.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buck	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—The soft coal situation has grown more critical and the stage is rapidly being reached where only the absolutely essential plants and institutions are receiving any fuel. From many of the mines the bulk of the production is taken for Government orders and railway fuel and in the Pennsylvania region numerous operations have not received any cars for commercial loading for over four weeks or more.

The railway lines continue badly congested and the frequent snowstorms have prevented any progress from being made. Nothing but several weeks of moderate weather can help the situation. Public utility plants hereabouts are running on a margin of from a week to ten days and in a number of the outlying sections the local fuel commissions have been compelled to seize coal in transit to prevent an entire shut-down. Most of this seized coal has been taken from stocks that had been stored on sidings by the railroads for engine fuel.

The non-essential manufacturing plants are gradually being eliminated simply because hardly any plants are receiving coal except by direction of the fuel authorities and the natural result is that the fuel is only going to those plants that must be kept going at all hazards. Another feature that is affecting the manufacturing industry is the heavy tonnage recently seized for domestic consumption and distributed to retail coal yards which heretofore have only handled anthracite. The coal is quickly taken by the public, but all sorts of complants are heard of inability to use it. If the bituminous shippers were not so engrossed at this time in the endeavor to preserve their industry it would be a good time to conduct a campaign of education in the proper use of soft coal for home use.

The various operators' organizations have been holding meetings all week endeavoring to formulate some plan whereby production can be increased and transportation facilitated. Unfortunately some of the newspapers have placed a misconstruction on these meetings, intimating an ulterior purpose on the part of the shippers.

The bunkering of vessels goes on actively under the priority orders which are in effect covering this business. This week a regulation was put in force requiring the masters of all ships bunkering coal to make a declaration at the Custom House of the exact amount of fuel taken on board. The master is also required upon reaching his destination to report to the custom officer, if an American port, or to the American consul in a foreign port, the exact amount of coal used since leaving port. The idea is to hold the vessels down to the exact quantity needed and no more.

As has been frequently stated here the entire situation is dependent upon the car supply. This has really grown worse of late principally due to the extraordinary weather conditions to which the railroads have been subjected. There still continues to be much difference of opinion as to the value of the closing orders of the Fuel Administration, but at this time there appears a likelihood of even more extensive periods of idleness without even official order, unless some way is found to increase the supply of coal coming to this district.

BALTIMORE

Fuelless days and railroad embargoes fail to bring relief needed, and many industries are desperately short of coal and thousands of homes are without fuel.

Bituminous—While it may be stated that there is a slight improvement in the number of arrivals of loaded bituminous cars here, the increase is mainly for tide and bunker loadings that do not reach local consumers, and hundreds of small and large industries are now so desperately short of fuel for even emergency operation that only the closest distribution has prevented many shut-downs. Curtailment of service has been noted in many quarters. A considerable part of the soft coal arriving here for other than ship loading is being diverted for domestic use, as it is now estimated that there are between 20,000 and 25,000 homes in Baltimore entirely out of coal of all kinds.

The average unloadings of soft coal here daily for local use do not run over 75 cars, and frequently drop below 50. This is scarcely a drop in the bucket. Transportation is still badly crippled, and cars marked for the fuel administrator at Brunswick and other points days ago have failed to arrive.

Anthracite—The hard coal situation is sadly mixed. A little better movement is noted, but it is counted a good day when from 25 to 30 cars of anthracite are unloaded here. This against a normal consumption of over 100 cars per day when thousands of bins in homes that are now empty are carrying stocks enough to last until spring.

The turning of hard coal consumers to soft coal, when they can get that commodity, has been the only source of relief which the hard pressed dealer had to offer. The recent jump of 75 cents a ton here under the Fuel Administration schedule hardly created a ripple because there was so little coal to sell. No one seems to worry about price just now; its merely a question of getting coal at any price.

Lake Markets

PITTSBURGH

Cold weather follows improvement in car supplies. No river coal movement now in prospect.

Car supplies at most of the mines showed a slight improvement last week, but there was no particular improvement in the dispatch and receipts at consuming points were about the same as formerly. The movement of byproduct coal continues better than that of other coal, but still is not adequate, the byproduct plants from Pittsburgh to Cleveland operating at about 75 per cent. capacity. The Fuel Administration lays particular stress upon the movement of byproduct coke, on account of the byproducts being used in the manufacture of high explosives.

Sunday saw a remarkable spell of warm weather for a few hours, the thermometer rising above 40 degrees and there was rather good movement in consequence, car supplies for Monday being rather good, but Sunday night the temperature suddenly dropped to the neighborhood of zero and the predictions are for continued cold, so that car supplies for the remainder of the week are likely to be poor.

As a result of strenuous efforts by the river steamboats the ice in the third and fourth pools of the Monongahela was either broken up entirely or a channel was cut through it, so that beginning Monday the fourth pool was able to load coal. The temperature went below zero Monday night, continuing Tuesday and forcing abandonment of effort to maintain the channel in four lower pools of the Monongahela River. No river coal movement is now in prospect until weather moderates somewhat. Rail movement was reduced Tuesday by extreme cold.

Zone representatives are being appointed by the Fuel Administration for the coal districts centering in Pittsburgh, but no definite action of importance has yet been put into practice under the new zone system.

Regular open market transactions continue to be of insignificant proportions, but the volume of coal that technically is sold at the set prices, under various instructions of the Fuel Administration, now amounts to a large tonngae. The set prices remain at $2.20 for slack, $2.45 for mine-run and $2.70 for prepared sizes per net ton at mine, Pittsburgh district, with 15c. additional permitted to be charged in sales made by brokers. Under the circumstances, however, the brokers have scarcely any opportunity to do business.

BUFFALO

Coal about as scarce as formerly, but not now said to be on account of lack of mining. Scarcity of cars and locomotives appears to be the reason. Thus shut downs may cease and efforts be made to hurry cars forward.

Bituminous—As the car situation is now said to be to blame for the scarcity of coal, especially bituminous, the authorities are going to take hold of that phase of the problem, as they should have done at the start and see if something cannot be done from this angle. The shippers all along said that it was cars and not production that was wanting and they now say that the mines are full of coal ready mined, waiting for transportation.

While the temper of the coal shippers is not of the best, it is not proper to say that dissatisfaction has been what it might have been if the orders, so many and vexatious, had led to real disaster. The idea is that we have got off so far better than was expected and with the return of mild weather, which cannot now be far away, the situation ought to right itself slowly. It will be some time before it is normal again.

The Government prices of coal prevail more generally as the weeks proceed and April ought to see everything selling at these figures which are as follows, f.o.b. Buffalo:

	Slack	Lump
Pittsburgh	$3.75	$4.25
Bessemer	3.70	4.20
Allegheny Valley	3.60	4.10

Anthracite—The complaints of no coal are heard everywhere, but it is always a hard matter to say how genuine they are. Men who put coal into cellars are saying that if the authorities knew how much coal they often find there the distribution would be different. In spite of all possible effort to prevent hoarding it goes on and will continue to do so till it is known that the supply is adequate, and that may be some months hence.

The local anthracite prices are now about 40 cents higher than they were last fall, on account of the need of distributing singleton orders and it is held that the retailers have no reason to complain, especially as the Fuel Administration really sells the coal for the most part and collects the pay for it.

DETROIT

Floods in Ohio further curtail scanty coal movement to Detroit. Lack of coal and oil threatens to force suspension of Detroit City Gas Company.

Bituminous—New curtailment of the inadequate shipments of bituminous coal from Pennsylvania and West Virginia, is to be experienced by Detroit, as a result of the floods along the Ohio river. The assertion is made by some of the jobbers that information received from the south indicates almost no coal is likely to get through for several days and possibly weeks, with the exception of shipments already enroute this side of the flood district and such coal as may be available from some of the Ohio fields.

With the supply already so low that suspension of operation is confronting hundreds of Detroit industrial plants, the new obstacle seems to render the situation almost hopeless. Efforts are being made to increase the movement of coal from Ohio, Illinois and Indiana fields but the available supply is small in proportion to the needs of Detroit and Michigan consumers.

The Detroit fuel administration announces it will confiscate any coal available for the gas company. It is unable to provide oil; and presidents of several railroad lines who have been trying to locate missing oil shipments, have found none near enough to insure prompt delivery.

Should the gas company stop operation, hundreds of manufacturing plants using gas in various processes, including a number manufacturing war supplies would have to close in part or altogether, throwing about 200,000 workers out of employment.

The Detroit Edison Co. is but little better off than the gas company and is daily reducing its scanty reserve of coal.

As regards domestic consumers, the situation is even more gloomy than a week ago. Low temperatures nearly all last week caused heavy home consumption, while receipts were cut off by snow and traffic blockades. Nearly 5000 applications were on the records of the police department Saturday morning. The Fuel Administration was unable to supply needs of these consumers.

Anthracite—Very few cars of anthracite are coming into Detroit. Retail dealers say they are unable to fill orders or form any idea of when they will get coal. Mayor Marx is arranging to have large shipments of wood sent to Detroit from interior points of the state.

COLUMBUS

Continued zero weather has further hindered railroad transportation. This is reflected in bad service for the mining industry. Production is reduced and the demand is exceedingly strong.

What changes have taken place in the coal trade in Ohio during the past week have been for the worse. With low temperatures continuing and with railroad congestion and traffic conditions as bad as at any previous time, coal has been distributed with difficulty. Some cases of actual suffering have been reported, although they are not as numerous as might be expected. Taking it all in all, the conditions are quite strenuous and there is little hope of immediate improvement.

Domestic trade has been attracting more attention than any other branch of the business. The county and state fuel administrations have been devoting their efforts to relieve the suffering of the householder. As a result, considerable coal, consigned to steam users, has been diverted to domestic consumers. This is especially true of school coal, which has been diverted and schools have been closed. Hospitals and charitable institutions are fairly well supplied for the time being. Domestic prices are firm at the levels which have maintained for some time. Pocahontas is quite scarce because a large proportion of the production is going East. Anthracite is also practically out of the local market.

The steam trade is strong in every way. The efforts of purchasing agents are now devoted to getting coal to keep the plants in operation. In some instances, outside of fuelless days ordered by the Federal Fuel Administration, manufacturing plants have been able to keep up production. Others have been forced to curtail their activities because of fuel shortage. Public utilities have been the hardest hit and have been often without sufficient fuel. The efforts of the fuel administrators have been devoted to getting coal for various utilities upon which the activities of certain communities depend.

CINCINNATI

Scarcity of coal for all purposes is pronounced. Transportation conditions have never been more difficult, and the weather remains unfavorable.

Such change in conditions as has occurred during the past week has been for the worse, if anything, although there has been some movement of coal toward the North which has tended slightly to reduce congestion. The difficulty is moving cars, growing out of the repeated snows and the icy sleet which was the latest variety of precipitation, has not been overcome, however, and returns of empties to the mines are negligible.

Severe weather has also returned, after a slight period of comparatively mild temperatures, and the domestic and industrial demand for coal has therefore been virtually at the top. Many manufacturing plants have been compelled to close down on account of inability to secure fuel, this being especially true on Friday and Saturday, following a sudden flood stage of the Ohio River on account of damming by ice. Many coal companies with plants on the river front were thus put out of business for the time being, and in some instances cars of coal on railroad tracks were also caught by the river.

LOUISVILLE

Marked improvement in Kentucky field and market due to better weather conditions. Industrial demand large and offerings few, but trade making progress and outlook encouraging.

A week of fair weather, with temperatures either mild or moderating, has been of invaluable assistance to the Kentucky coal producers and distributors. Temperatures have been below normal for the season, and the demand for all kinds proportionately increased, but, for all that, settled conditions of the railway lines, grounds about the mines and the roads and streets have done a great deal. This in the face of the fact that a larger volume of business is being done than usual for the season.

The disturbing feature of the immediate outlook is threatening flood-water. This may even inundate some of the workings, to say nothing of interrupting rail service through washouts and wreckage of bridges, while it has already put much of the river craft out of commission by sinking or damage. A slow, gradual thaw is all that will prevent serious floods, the river coal movement from western Kentucky points southward already having been affected.

There is considerable skeptical comment about the "heatless Monday" gains. However, most emergency needs are being taken care of and there are no reports of industrial plants in this section closing down for lack of fuel, while most of the coal concerns report that they have been able to take fairly good care of their customers. The retail coal situation throughout the section is also improved, in spite of the fact that high water has further reduced the supply of natural gas, and emergency measures are being discontinued.

BIRMINGHAM

Domestic trade conditions much easier as a result of continued mild weather and decreased consumption. Much steam coal goes to New Orleans for bunker use under orders of fuel administrator. Output affected by heavy rains and flooding of mines.

The domestic situation is now well in hand (thanks to the past two weeks of moderated temperatures) and with a continuation of favorable weather the yards will be able to stock against any future emergency conditions. Almost all the larger yards now have several hundred tons on hand for the first time in several weeks, and are filling all orders normally with the exception of the one-ton limit to each customer. Inventory of coal on hand in the yards of the Birmingham district at the close of the week showed 2536 tons as against 800 tons ten days ago. Also a much larger tonnage was reported in transit.

Restricted consumers of steam coal have felt the pinch in supply for the past 12 days on account of the order of district representative Holmes, of the fuel board, directing a large tonnage of Cahaba, Pratt and Black Creek steam coal to the port of New Orleans for bunkering ships at that point. This order had priority over all shipments of this grade of coal not consigned to public utilities and other preferred classes of consumers. The fact that the mines netted $1.35 per short ton over mine prices on all coal supplied for ship bunkerage rendered a more cheerful compliance with the priority order possible. The shortage in steam grades was accentuated to some extent during the severe cold weather on account of much mine-run coal being diverted to domestic channels.

Coke

CONNELLSVILLE

Coke shipments reach new low level. Additional transportation difficulties.

Coke shipments last week were the poorest thus far, probably running considerably under 200,000 tons. On account of a brief spell of moderate weather on Sunday the car supply for Monday loading averaged slightly above 40 per cent., but while the temperature passed above 40 degrees on Sunday it dropped to the neighborhood of zero in the night and the prediction is for continued cold, which, of course, means light car supplies for the remainder of the week.

Apart from car supply there are fresh transportation difficulties. The heavy snow storm in the East last Sunday week further retarded coke movement on the main line of the Pennsylvania and after four days' shipments had accumulated the Pennsylvania refused, beginning Friday of last week, to take any coke on the main line through the Pittsburgh and Latrobe gateways. The particularly unpleasant aspect of this development is that it was only two or three weeks earlier that an interchange of coke had been effected to avoid certain cross movements, whereby coke reaching Greensburg and formerly passing to Pittsburgh had been exchanged so as to be shipped East on the main line. This arrangement had been expected to produce a general improvement, as it had had difficulty in getting through west of Greensburg. Now it is not even permitted to go East. There is an accumulation of at least 1000 cars on the Monongahela R.R., which the Pennsylvania cannot accept, at West Brownsville, and the Redstone branch is about equally congested.

The blast furnaces of the Central West that depend upon Connellsville coke are producing pig iron at about 25 per cent. of normal, though their coke consumption is greater than this, on account of banking, irregular operation and poor quality of coke. The byproduct ovens are operating at about 75 per cent., every effort being made, at the instance of the authorities at Washington, to get coal to them, Washington being interested in the byproducts. The blast furnaces as a whole are operating at about 50 per cent.

There are practically no open market transactions, but considerable tonnages of coke are changing hands at the set prices, by reason of various redistributions arranged by the Fuel Administration, the set prices remaining at $6 for furnace, $7 for 72-hour selected foundry and $7.30 for crushed, over 1-in. per net ton at ovens.

The Connellsville "Courier" was unable to report shipments for the week ended Jan. 19. Production showed a decrease of about 10,000 tons, to 221,000 tons.

Birmingham — Considerable tonnage of foundry coke continues to move from this district to the shipbuilding plants working on Government orders and to the railroads for foundry use at their shops—virtually priority business. As a result regular customers of district coke manufacturers are suffering some inconvenience by having their supply restricted. Transportation difficulties have been minimized to some extent by more liberal rulings on consignment of equipment placed for loading. Coke manufacture has suffered some the past week or so on account of the decreased output of coal due to excessive water in the mines.

Buffalo—Complaint from the direction of the coke trade is seldom heard. This is mainly on account of the fact that the bituminous shippers, who used to handle a great part of the output, have gone almost entirely out of that part of the trade, leaving the consumers to buy from the ovens direct. This is no doubt a better way of conducting the trade in such an emergency and it appears that it is fairly satisfactory, for the furnaces keep running on practically full time. The supply of ore is adequate and the coke finds its way to proper destination somehow.

Middle Western

GENERAL REVIEW

More snow tangles up rail traffic. Deliveries slow and uncertain. Many trains cancelled.

The latest heavy snow struck the Mid-West the first part of the week, and continued cold weather caused rail traffic to again become badly disorganized. It was also responsible for the annullment of many trains throughout this territory. The only fortunate feature about the latest storm was that it did not snow heavily in the coal-mining districts. This allowed mines to continue to hoist and load coal where equipment was to be had. Northern Illinois and southern Wisconsin suffered severely, as a result of the tieup of all kinds of transportation, including passenger trains.

Monday was observed as "fuelless day" with patriotic spirit and few complaints of violations have been noted. Saloons and cigar stands were the chief violators. The large industries did their bit manfully—hardly a wheel turning, according to reports received by the State Fuel Administrator's office, excepting in those plants that had been granted exemption. In most large towns, Monday appeared as Sunday, the only places open being hotels and drug stores.

The continued cry throughout the country for relief has had the effect of a concerted movement by the Fuel Administrators and coal operators of Illinois. At a meeting of the Fuel Administration and representatives of the Illinois operators, it was mutually agreed that the Fuel Administration would withdraw its order requiring 10 per cent. of the daily production and that the operators through a committee, would undertake to supply industries and dealers needs through the usual channels.

In order that there would not be any duplication of shipments the Distribution Committee urges that a report be made by all shippers of coal within the State of Illinois to the committee each day, giving the number of cars shipped, grade and to whom consigned. Such an arrangement, it is contended, will more nearly equalize distribution and prevent any one dealer or industry securing more than their share of the available shipments. The result of recent pooling is still tangled because of the different prices of coal that found its way into the pool. Some coal, shipped direct by the producers to their trade on contract, the price of which was in excess of that fixed by the Government, was taken. In many instances dealers contended that the Government price should be charged. However, the ruling of the Fuel Administrator allowed contract price to prevail, plus 15c. per ton, to cover cost of rebilling and replacement.

Production throughout Illinois and Indiana is still far below normal. However, a marked improvement over the previous week is noticed during the present week. In Williamson County, Illinois, it is learned from association secretary's report that mines worked approximately 69 per cent., while in Franklin County, 54 per cent. working time was recorded. This difference is no doubt occasioned by a large number of mines in the former county loading railroad coal, with a full car supply.

The seriousness of the fuel situation in Illinois would seem to warrant, at least temporarily, the application of all coal produced in the state to Illinois points exclusively. Regardless of this situation, an attempt was made Thursday by Fuel Administrators of Indiana and Ohio to confiscate 565 cars of coal that was delayed at Danville, Ill., because of the failure of the railroads to provide motive power. The coal was mostly billed to steel plants near Chicago.

The railroads claim that they would, if left alone, clear this situation up in 24 hr. State Fuel Administrator Williams immediately got into communication with Dr. Garfield, in an effort to prevent the raiding of Illinois, by neighbor states. It is understood that the request of Mr. Williams was not granted, and the 565 loads from the Danville district were allowed to move East to points along the Big Four R.R., where the needs are most urgent.

The labor situation throughout this section is in good shape. Operators say they are in a position to provide the coal if they can be furnished sufficient equipment.

CHICAGO

Chicago coal famine continues. Zero weather prevails.

There is little prospect for relief in sight. The fact that daily receipts are not of sufficient volume to take care of the distressing need, is evidenced by the increasing requests made on the City Fuel Administrators office for coal. Most retail yards are absolutely bare of coal, and the incoming shipments are quickly unloaded from the car and distributed to the most needy in small lots.

Although Monday was observed as a fuelless day, little or no change was noted so far as getting any coal ahead is concerned.

The board of education held a session during the week with a group of coal dealers who urged the further suspension of schools but the school board declined to listen to any proposition that would close the schools and permit saloons and poolrooms to remain open. The schools use 1200 tons per day and have only 6000 tons left in storage—five days supply.

State Fuel Administrator Williams has demanded of the coal operators a daily statement of the tonnage produced, giving the car numbers, kind of coal, to whom billed and the destination. The request is made through the Illinois operators distributing committee, which meets daily with some part of the fuel administration forces.

The Chicago Association of Railway Managers announced that Thursday 210 cars of anthracite, 1789 cars of bituminous and 114 cars of coke arrived at Chicago. Two hundred and twenty seven cars were delivered to industries, 350 to team tracks 330 to yards and 692 cars of coal were unloaded, while 1587 cars were held for consignment.

Outside of hard coal and Illinois bituminous, this market is receiving but little fuel. It is now the conviction of the producers particularly those that have their head offices in Chicago that there is no remedy that can relieve the present situation except warm weather.

Prices are as given in the table below.

MILWAUKEE

Transportation and delivery the chief problems. City well supplied, but interior communities are hard up for fuel. Price schedule continues unchanged.

Transportation and delivery are about the only problems which face Milwaukee coalmen at this time. There is coal sufficient to last until spring, if proper care is taken. Hard coal is nearly gone, however, and more soft coal is being used by private consumers than ever before. There has been no change in the price schedule since the increase of 75c. ordered on Jan. 20 to cover growing delivery expenses due to the one-ton allotment and snow blockaded streets.

The coal supply in some Wisconsin cities and towns is practically exhausted because of inability of Milwaukee shippers to get cars enough to meet the demands upon them. Madison was a sufferer, but Gov. Philipp took a hand in the matter and secured thirty carloads of coal from Superior, Wis., by special train. La Crosse is in a bad way for fuel and it is said no more hard coal will be shipped to that point this winter. Emergency shipments were made to Watertown, Waterloo, Sun Prairie and Marshall. At these places coal was being doled out to consumers in bushel-basket lots. The Milwaukee road had not sufficient coal to run all of its freight engines on the Madison division. Milder weather and a let-up in the rail congestion will result in prompt replenishment of fuel supplies all over the state.

The University of Wisconsin is now saving 161 tons of coal each week as a result of fuel conservation rules it has put into practice.

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and W.ll
Prepared sizes	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings and washed slack	2.15@2.30	2.15@2.30	2.50@2.75	2.15@2.30	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West Va. Splint
				Smokeless			
Prepared sizes	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

ST. LOUIS

Current needs about taken care of, but St. Louis is 95 cars per day short of requirements. Railroad service extremely poor, especially on the Illinois Central. Terminal unable to cope with conditions. Country situation acute. This cannot be relieved unless weather becomes warmer.

The St. Louis situation, while a trifle better, is still somewhat acute. Extremely cold weather and the continued storms have kept the railroads in a precarious condition, and the Terminal situation is extremely bad.

The Terminal contrary to instructions has placed temporary embargoes against the Wabash, C. & A. and Rock Island, on lines west of the river. When this was brought to the attention of the Fuel Administration it was ordered raised.

If coal was moved in and around St. Louis by the Terminal as it should be, the situation would be from 10 to 20 per cent. better than it is, but the utter demoralization of the Terminal and some of its connecting lines is the principal cause of the coal shortage in this city.

Steam plants are receiving enough to get along on by the closest kind of economy, but a survey of the coal requirements of the city show that the daily shortage here is 95 cars. Eight hundred and sixty-four firms in St. Louis show requirements of 1450 cars a week, but the requirements for St. Louis including steam and domestic are about 550 cars per day and about 450 cars per day have been coming in.

Essential industries manufacturing food stuffs and working on war contracts number 243 and use 12,360 tons of coal a week. Firms claiming to be essential number 227 and use 14,550 tons a week.

The dealer demand in St. Louis is between 250 and 300 cars per day. There has been considerable trouble here on account of dealers and others violating the priority rule in the distribution of coal. The Union Electric Light and Power Co. investigation developed the fact that it was heating about 140 plants and that 8 of these had generators but the remainder were straight heating plants and were getting coal in preference to domestic users, although most of these plants were in wholesale houses and office buildings.

The situation in the Carterville district continues to be a serious one as far as this market is concerned. The Fuel Administration for Illinois, or rather the assistants therein, are draining the Carterville district in favor of Chicago and are neglecting contracts and trade in the territory west of the river. For that reason practically no Williamson or Franklin County coal is coming in. The same condition applies to the Duquoin district to some extent.

Working conditions in these fields are not good, one big mine getting 34 hr. work on commercial coal in a period of one week. The railroads seem to be getting most of this coal, and the Government requirements come next.

In the country districts the situation has been most acute in southeast Missouri and northeast Arkansas, which sections have in the past depended upon the Carterville field. Many of these places have no rates from the Standard field and are entirely without fuel. Sections that can be reached by Standard coal are being taken care of under the direction of Fuel Administrator Crossley, who in three days shipped 73 cars of coal to these points and coal is going forward now at the rate of from 15 to 20 cars per day to sections that in the past have never used Standard coal.

On the Iron Mt. lines in Arkansas and Louisiana there is much actual suffering as well as in some isolated places in Missouri.

The prevailing market per net ton f.o.b. mine is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin Co. rate is...87½c.
Other fields .....72½c.

COAL AGE

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ENEMIES WITHIN

BY FLOYD W. PARSONS

IT IS unfortunate that there can be no powerful government or great industry without its traitors. Often such enemies are fanatics who believe they are right while all others are wrong. The anarchist who plants a bomb to correct a seeming injustice risks his neck and is an honest gentleman compared to that Judas in the coal industry who today is allowing the shipment of dirty coal, and accepting record prices for a product he couldn't possibly sell in normal times.

"That's strong language," you say; and I reply, "It isn't strong enough to fit the case." Furthermore, let it be understood I wouldn't make such an accusation if I hadn't seen with my own eyes many times in many places instances of such a reprehensible practice. Yesterday I saw 60 tons of coal that cost a lot of money that couldn't even be burned without being mixed with real coal of decent quality.

The dishonest clerk who short-changes his customer is a thief, but he only hurts a few people and harms himself most. Here is what the dishonest coal shipper does today:

He is damning an industry that has developed through the exercise of greater individual courage and the endurance of more personal hardship than any other important business.

He is causing the finger of public condemnation to be pointed at honest, conscientious coal operators who have spent a lifetime in the organization and development of reputable mining companies.

He is wilfully and certainly bringing about a situation that can have no other outcome than to deprive efficient mining men of control of their own business, and to hasten government direction of mining, if not Federal ownership.

HOWEVER, these are only a few of the little things. Here is something more serious:

The very existence of this United States depends on our overthrowing German autocracy. The weak link in our entire war program is transportation. This deficiency in the last three weeks has caused our nation a billion-dollar loss through suspended effort.

HERE is what the dishonest coal shipper accomplishes.

The railroads of the United States haul about 1800 million tons of freight yearly; approximately 35 per cent. of this freight is coal. Some coal is sold locally and considerable is used at the mines. Assuming that 630 million tons will be shipped over the railroads this year, it will require 12,600,000 fifty-ton cars to move this output.

If numerous recent investigations are at all accurate, there is at least 9 per cent. additional adulteration in the coal now being shipped in America. It follows, therefore, that if the Nation's total coal output today carries 18 per cent. refuse, this same production has but 63 per cent. of the fuel value of coal carrying 6 per cent. ash, and requires the transportation of 37 per cent. more coal than is necessary. In certain localities the transportation facilities, due to dirty coal, are being taxed as much as 35 per cent. above normal requirements.

With coal carrying 6 per cent. ash, eight boilers are required to generate 300,000 lb. of steam per hour. With 20 per cent. ash, 19 boilers are required. A certain tonnage of coal running 6 per cent. in ash requires 11 cars to transport it; coal having the same fuel value, but running 20 per cent. ash, requires 17 cars to move it.

FOR every additional 1 per cent. of impurities in the Nation's annual coal production the railroads must haul more than five million tons of useless waste. Coal adulteration means more boilers, more firemen, increased fuel demand and more ash handlers. It is further true that as the percentage of ash in coal increases the percentage of combustible matter lost in the ashes increases.

It is physically impossible to mine and market coal that contains no noncombustible matter, but when the impurities in our total production average more than 10 per cent., a despicable crime is being perpetrated. The coal industry must rid itself of the pirates that would destroy it, and it is urgent that effective action be taken at once.

IDEAS AND SUGGESTIONS

Motor Troubles with Undercutters

BY FRANK HUSKINSON
Trinidad, Colo.

Recently I had two odd cases of trouble with the motors of two new coal undercutting machines that had just arrived from the factory.

One of the undercutters gave considerable trouble with the armature and bearings. The bearings would heat unduly, and the brushes would spark. The motor in general did not operate properly. Tests were made, and everything seemed to be all right. The armature was taken out and tested for a sprung shaft; the electrical connections were all gone over and traced out; all with the same result—everything was O. K. Finally a new armature was put in, but the result was no better. New fields were also put in, but no improvement in operation was obtained.

I was upon the point of referring the trouble to the factory, when I thought I would take the motor apart once more and thoroughly examine everything to make sure that nothing had been overlooked. This I did, and among other things I calipered the distance between the center line of the motor and the pole-pieces. I found that one of the pole-pieces was approximately $\frac{3}{16}$ in. closer to the center line than the other. I took out this pole-piece and removed $\frac{3}{16}$ in. from the flat side. On putting it back in the motor frame and calipering again, I found that both pole-pieces were the same distance from the center line of the shaft. The motor was then reassembled and tried out. It worked satisfactorily and never gave any more trouble.

The trouble resulting from the one pole-piece being so much closer to the armature than the other, made itself evident in the shape of a strong pull on one side of the armature and a considerably weaker one on the other side. In fact the longer pole-piece barely cleared the armature, while the opposite pole-piece had slightly more than $\frac{3}{16}$ in. of air gap. This caused the armature to be out of balance magnetically, and when the current was applied to the motor it had a tendency to drag the armature closer to the large pole-piece than to the small one, causing an undue pressure upon the bearings and making them heat. Also, on account of the armature being so much out of balance magnetically, the brushes sparked and the motor did not work properly under a load. Under no load the trouble was not so noticeable. The air gap between the pole-pieces and the armature was not visible in this motor, it being of the inclosed type.

Another odd case of trouble with a new machine that had just been put in operation was one where the motor would not run without excessive heating of the armature bearings. Upon a thorough examination it was found that the front endplate that contained the armature bearing and brush frame was not properly planed and fitted to the motor casing. It was out of true approximately $\frac{1}{8}$ in. on one side, so that when assembled the front armature bearing was not in line with the armature shaft. The result was that the shaft was practically clamped tight in the bearings when the motor was assembled. This caused excessive friction, resulting in the bearings becoming unduly heated in a short time.

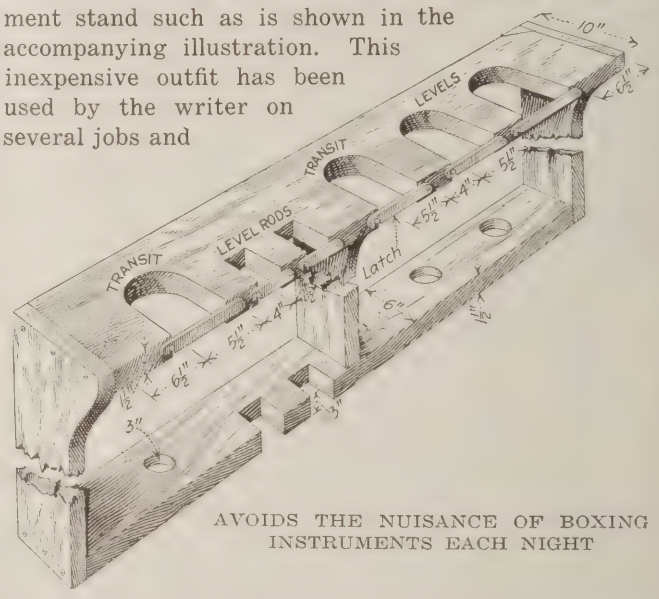
After properly lining up the front plate with the armature and motor casing, the motor gave good service and satisfaction.

The foregoing two cases of trouble with machines of the latest type and of a standard and reliable make are unusual, especially in a new machine. They evidently show that the best of us are liable to make mistakes.

Why Box Instruments Every Night?

BY GEORGE W. MCALPIN

All the trouble and waste of time in removing surveying instruments from their tripods and placing them in their boxes at the end of the day's work can be avoided if an office is provided with an instrument stand such as is shown in the accompanying illustration. This inexpensive outfit has been used by the writer on several jobs and has been found satisfactory in every case. The construction is simple. Slots cut into a 1½ x 10-in. plank provide recesses into which the tripods and levels may be set. The tripods are then held in the slots by metal latches hinged at one side and fitting over a nail at the other. The feet of tripods and the lower ends of level rods fit into holes cut in another plank set lower.—*Engineering News-Record.*



AVOIDS THE NUISANCE OF BOXING INSTRUMENTS EACH NIGHT

The hardening of concrete is not a drying process as some suppose. If concrete, after being placed, is left exposed to sun and wind, much of the water necessary to its hardening is lost by evaporation. Protection, says "The Ransome Book," is especially necessary on walls and floors, where a large surface area is exposed. It is not so necessary on mass work.

Concrete and Tile Lining for Headings

The Clearfield Bituminous Coal Corporation, at its coal operations in Pennsylvania, has a number of slopes and main headings which will be used for a number of years. As fast as the old timbering in these slopes and headings decays, the company replaces them with permanent linings of concrete and tile.

The old timbers *A*, in Fig. 2, are set on 4-ft. centers. The space between these timbers is filled with concrete



ENTRANCE TO HEADING, LINED WITH CONCRETE AND TILE

to a height of 5 ft. 8 in. from the top of the old mudsill *B* in Fig. 2. When the concrete has set the small post *C* is placed on top of the concrete and the 35-lb. T-rail *D* is placed across the heading from this post to a corresponding post on the other side. This T-rail supports the lagging when the cap piece *F* is removed, and as the work progresses is moved forward to catch the next set of lagging at *E*, and so forth. When the lagging is supported by the T-rail, the cap piece *F* and the post *A* as far as the top of the concrete *G* are removed. The support *H*, as in Figs. 1 and 2, is then set in place and the form *I*, as in Figs. 1, 2 and 3, is placed on top of this support.

On this form chimney bricks are placed in the position shown at *J*, in Fig. 1. These bricks are made of tile and are $6\frac{5}{8}$ x $5\frac{3}{4}$ x 9 in., and are so designed that they make a perfect arch of a radius of 5 ft. Over the top of the brick a covering of $\frac{1}{2}$ in. of concrete is placed. The space between the top of the arch and the lagging is carefully packed with rock.

When the arch is set the form is moved up and a new set of brick is put in place. Every time the form *I*, in Fig. 3, is moved up an advance of 20 in. has been made. The old timbers *A*, in Fig. 2, which were not removed are then taken out and the space filled with concrete.

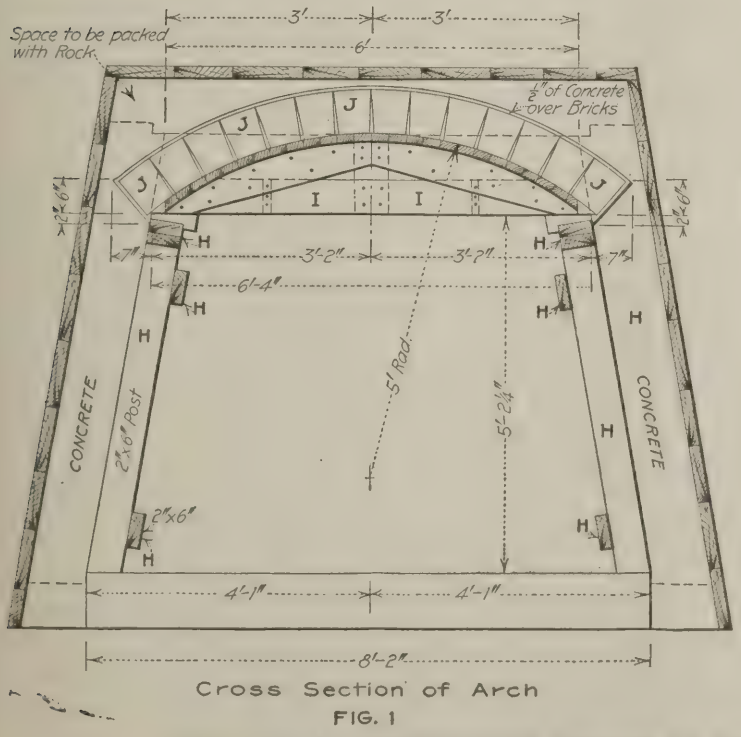
Power Loss in Coal Mines

By J. J. Nolan
Linton, Ind.

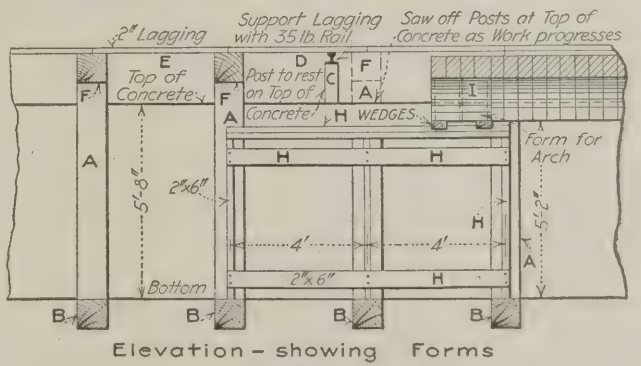
Here is a scheme I tried at one of the Vandalia Coal Co.'s mines near Linton, Ind., to increase the power in the bottom.

As is well known, the return is always more or less neglected, frequently containing bad bonding, poor connections, etc. I connected a 4/0 wire from the high-speed engine bedplate to the negative side of the switchboard. With a portable ammeter and with a 1600-amp. load on the switchboard, I got a reading from the bedplate to the negative side of the board of 550 amperes.

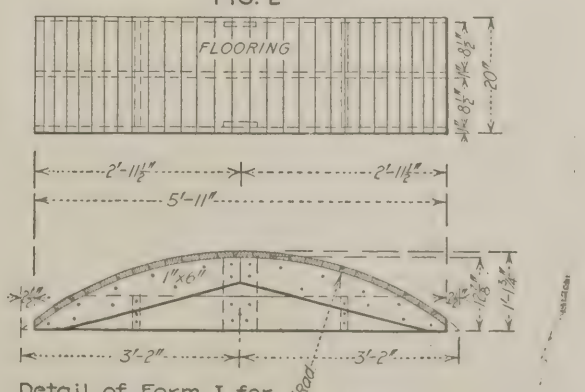
Since then similar connections have been made at six other mines, and readings have been taken in each case with portable ammeters. These showed from 275 to 550 amp. with normal load on the board. In one instance a 2/0 wire was used, but this became too hot to handle a few minutes after connecting.



Cross Section of Arch
FIG. 1



Elevation - showing Forms
FIG. 2



Detail of Form I for Arch
FIG. 3

FIGS. 1 TO 3. CONSTRUCTION DETAILS OF RELINED ARCH, SHOWING FORMS USED

Blacksmithing at Coal Mines

By J. F. SPRINGER
New York City

SYNOPSIS — Steel is structurally complicated, its structure and strength depending not only upon the percentage of carbon present but upon the working and the heat treatment to which it has been subjected. Steel loses its magnetic capacity at the temperature about right for hardening. Various molten baths may be advantageously used for tempering.

ALTHOUGH the various steels used in a coal mine are not subjected to the same service as is the rock-drill steel used in metal mines, still this is no real reason why more attention should not be given the former than is now customary. In most coal mines there is no system that requires the steel to be handled in the blacksmith shop in a really modern manner. That the owners lose money by this neglect can hardly be doubted. Because the ordinary blacksmithing operations suffice to produce good results when the tools are used in the coal is not a strong reason against getting still better results.

Only a small number of coal-mining blacksmiths really are familiar with the up-to-date methods of forging and hardening. I refer more particularly to the manner of using heat. The purpose of this article is to furnish the necessary information to two classes—the superintendents or foremen responsible for output and the cost of getting it, and the boss blacksmiths and their subordinates.

Should Know How Blacksmithing Work Is Done

A superintendent or a foreman should know exactly how certain blacksmithing work must be done and why it should be done in one way rather than in another. If he does not possess this information he will be at a serious disadvantage in discussing correct methods with the men who do the actual blacksmithing or have immediate control of those who do. The second class I referred to—the men in the blacksmith shop—obviously need the information for use in their daily work.

Some persons are of the opinion that to know how to do a thing is enough; and that to know why a thing is done is not especially important. This opinion, however, is most certainly wrong. The right way of doing a thing sometimes occasions more trouble than one of the wrong ways, and it is human nature to follow the easier road. If it is not explained to a workman why the longer road is the better, he is likely to lose his cheerfulness if urged to take it. If he understands just why he ought to do a thing one way rather than another, we can expect a greater readiness to follow directions based on these reasons.

Steel is a complicated material. During recent years the miscroscope has made this fact plain. It is now known—and it was not known formerly—where the carbon is located that exists in a piece of steel. In addition, the changes undergone by a piece of steel as it passes through different heats have also been studied. Furthermore, modern methods of testing steel for strength enable us to observe the effects of heating and cooling upon this valuable quality. A large part of this information has a direct bearing upon blacksmithing operations.

Steel is not homogeneous. It is built up of many layers, or particles. Some of these layers are practically pure iron, containing no carbon; other layers, or flakes, have carbon in them. The patches in which the carbon is found are true chemical compounds consisting of iron and carbon. That is, these patches are not mere mixtures of iron and carbon—a particle of iron and a particle of carbon—but combinations of such a character that both the carbon and the iron have lost their identities and a new substance has been formed. This new substance—this chemical compound—is carbide of iron. The metallurgists call it "cementite."

Heat Treatment Differs With Carbon Content

If the steel is in an ordinary annealed state and contains, say, 0.90 per cent. of carbon, it will usually be found that the entire mass will be made up of grains or crystals, each of which will consist of alternate layers of iron and cementite. The layers may be more or less crumpled. The material of which the grains are composed is called "pearlite."

The proper heat treatment of steel differs somewhat with the carbon content; that is, it depends on whether the steel contains more or less than 0.90 per cent. of carbon. This means, therefore, that in this percentage we have a dividing point. If the steel contains more than 0.90 per cent. of carbon then the grains will still be formed of pearlite, but they will be separated from one another by the walls of a honeycomb of cementite. If the steel has less than 0.90 per cent. of carbon there will still be a honeycomb, with grains of pearlite filling its spaces, only now the walls of the honeycomb will be of iron. It is with this quality of steel that we have most to do in coal mines.

Suppose we have a sample of bar steel of 0.90 per cent. carbon or higher. If we take an ordinary horseshoe magnet and apply it to this bar, the two will cling together. Let us now heat the steel, and every now and then apply the magnet. At first the magnetic action will continue to take place, and the magnet will grip the steel; but, as the heating goes on, we reach a point at which the steel loses its magnetic quality. The magnet will then no longer adhere. In fact, the magnetic action has been lost for this and all higher temperatures.

When the steel is cooled it will, after a time, again be attracted by the magnet. The temperature at which the change takes place is about 1275 deg. F. This is an important fact for a blacksmith to know, as he can use it to good purpose when hardening steel.

If the steel contains 0.90 per cent. (or more) of carbon, it can be hardened by heating it to just a little higher than 1275 deg. and then plunging it into cold water. If it is merely heated to a point a little below 1275 deg., it will not harden when plunged into the water. Try it. Use the magnet to tell the temperature.

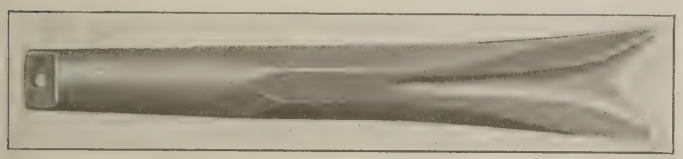
It so happens that the temperature at which magnetic activity disappears is just about what we want when we harden a piece of 0.90 per cent. carbon steel. As the magnet acts about the same on gloomy days as it does on sunny days, we have, for this particular kind of steel, something better than the color to go by.

In carrying out this procedure, go a little higher—but not much higher—than the point at which the magnet lets go. There are two reasons why we should go a little higher: (1) We want to be a trifle higher in order to be sure of an adequate heat for the hardening, and (2) we must allow something for the cooling that takes place before we can get the piece of steel into the water.

If the steel has less carbon than 0.90 per cent.—and this is the kind of steel the coal mine will rather likely be interested in—then we need to harden at a somewhat higher temperature. It is fortunate—for coal people—that the magnetic point of such a steel is also higher. In fact, the magnetic point and the hardening point are practically in agreement for all steels down to those having 0.50 (perhaps even 0.40) per cent. carbon. A 10c. horseshoe magnet is, accordingly, an excellent pyrometer for the coal-mine blacksmith. When he wants to harden cutter steel, puncher steel and the like, he heats it to the magnetic point and then goes a little higher, in order to be certain he has exceeded the magnetic point and to allow for loss of heat before getting the work into the quenching bath. He then chills the steel, and the hardening is done.

However, if the steel has a still lower carbon content than 0.40 or 0.50 per cent., then the temperature for hardening must be run up to a level higher than the magnetic point of this grade of steel. This kind of steel would be rather soft for cutting tools. What we are now concerned with is the steel used for the bits in chain-cutting machines, in punchers and the like.

Such tools should be made of carbon tool steel. Steel containing 0.75 to 0.90 per cent. of carbon is understood

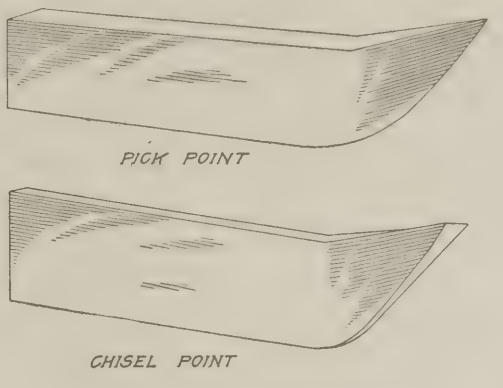


TWO-PRONGED PUNCHER BIT

to be advantageous for this purpose. However, the practice varies. Steel containing no more than about 0.40 per cent. carbon seems to have been used. The best grade to employ under most conditions is probably that containing the higher carbon content just given. Such tool steel is not especially brittle, particularly if the temper is properly drawn. It will cost more money, but in all probability will give better service. The magnet may be used with any of these steels to determine the hardening temperature.

Let us return to the matter of the crystals, or grains. When annealed steel of any carbon percentage is heated beyond 1275 deg. F., the grains begin to grow just after the temperature exceeds the 1275-deg. mark and continue growing as the temperature rises. It is possible that growth does not stop until the melting point is just about reached, this growth probably being the union of small grains. How this takes place need not detain us, however, as the important thing for us to know just now is that they grow. It seems to be well established that the bigger the grains of any sample of steel the weaker the steel.

Suppose, for example, we heat a piece of 0.80 per cent. carbon tool steel to 1800 deg F. The grains have been growing for 525 deg. and will be good and large. Whether we chill this piece suddenly or allow it to cool slowly, the grains remain the same in size. Experts seem agreed on this. Consequently, this steel, which has been heated as high as 1800 deg., is damaged metal and is known as "overheated" steel. There is a technical distinction between overheated steel and burned steel. Overheated steel is simply steel whose grain size has suffered enlargement. Unless the grain size is reduced to normal, the steel will remain more or less damaged. But burned steel is steel which has been heated, presumably in contact with the air, until it scintillates. The oxygen of the air appears to unite with some of the carbon in the steel to form carbon monoxide or carbon dioxide. That is, some of the carbon is actually burned out of the metal. Probably this action would not take place if the air were excluded.



TWO TYPES OF CUTTER BITS

Burned steel should be thrown onto the scrap pile. However, the burning may not have extended far. It may, for example, have affected only the tip of a cutter bit. In such a case it may be possible to grind or cut away the part actually damaged.

In general overheated steel may be restored—perhaps not always to its full original condition. That is, the big grains may be made small again and the strength restored more or less perfectly. There are two methods of doing this. One is by hammering or otherwise working the steel. A two-pronged puncher bit is apt to break, if anywhere, diagonally across one of the prongs. Such a break is probably due in part to a failure to restore the quality of the steel by the hammering process that was carried out. The whole prong may have been heated to a high temperature and the grain size greatly enlarged. When the hammering took place, the smith may have given nearly all his attention to the tip, leaving the part back of the tip in its damaged condition or else doing only a little work on it.

The prong would naturally break along a line marking the division between coarse and fine grains. However, the smith should not work steel after it has cooled to too low a point. I doubt whether investigation has gone far enough to warrant an exact temperature being given and insisted upon. At the same time, when

steel has cooled sufficiently to be attracted by the magnet, the smith may do well to be on his guard. Whatever blows are struck below the magnetic point should be light ones.

The second method of restoration is much more thorough and penetrating. This is restoration by annealing. It is a curious fact, but one that has been thoroughly ascertained, that a piece of overheated, big-grained steel will, if heated from below 1275 deg. to a level above that temperature, undergo a change in its grain size. This applies to steels of all carbon percentages.

While it is true that the size of the grain changes, we are not to jump to the conclusion that the size is uniform at any given temperature. For steels whose carbon percentages lie between 0.40 or 0.50 and 0.90, the rule is this: The grain-size changes are complete when the steel reaches the point where the magnet loses its grip. To anneal such steels we start with any temperature below 1275 deg. and heat the work until we are sure the magnet will not exercise its usual power.

Method of Annealing Steels

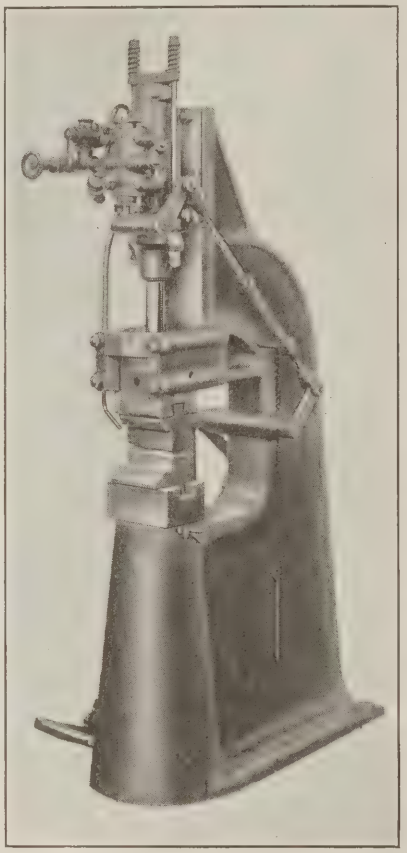
In order to be sure that we are below 1275 deg., which is approximately a full cherry red (perhaps somewhat below), we may let the work cool to a very dark red, to black, or even to the temperature of the shop. It makes no difference where we stop, provided we are below the 1275-deg. point. When we heat up from such a point to the magnetic limit, we will have a grain size corresponding to the temperature at which we stop; that is, the grain size will be small and the strength near its maximum. This is annealing.

A highly important lesson and one that will jolt a good many—not to say the big majority—of smiths is that we are forbidden by the foregoing from hardening the steel with the heat used for forging. It is quite easy and convenient for the smith to heat the work to a forging temperature, and when he has finished hammering to dip the tool into the quenching bath. This is all wrong. If we want the best results, we must get below 1275 deg. and then be on the rise in order to do the annealing. The thing to do is to reconcile one's self to heating the work twice. The first heat is used for forging, the second heating effects the annealing. We then dip the work and do the hardening.

A separate heating for each of the three operations would perhaps be the best procedure, but this is probably too much to expect. It is doubtful whether the additional benefit would be sufficient to warrant the full procedure. It so happens that the temperature at which we should halt the rise for annealing purposes is also the proper temperature for hardening. We take advantage of this and dip the work, thus avoiding the third heating.

The advantage of three heatings would be that the annealing heat could then be prolonged. The work might be packed and so on. It does not seem impossible to do the three heatings at a coal mine. The annealing and hardening operations can quite conveniently be done upon a considerable number of pieces simultaneously, particularly such small pieces as cutter bits.

The bits on a coal cutter may sometimes be purchased from the manufacturer of the cutting machine; but they also may be made in the mine's blacksmith shop from bar stock. The stock should be of the size required for the shank of the bit. Thus the stock may be rectangular bar $\frac{1}{2}$ x $\frac{3}{4}$ in. or $\frac{1}{2}$ x 1 in. in section. A belt-operated triphammer is a suitable forging tool. The bits will ordinarily be rather simple affairs. They may be given a chisel edge or a pick point. The chisel edge may be used to advantage in cutting sulphur sheets or blackjack, if either of these is present in any considerable quantity. But we may use chisel bits in the top and bottom blocks and put pick points in all the other places, provided the coal is fairly clean. The two forms are readily made with a triphammer or by hand. The bar is held in position and shifted until the proper point or edge has been secured and until the desired angle of bend is given to the bit. As bit after bit is forged, the smith should be on his guard lest he be using heavy blows on steel that has cooled to too low a point. There are one or two special forging machines on the market. A type manufactured by one of the leading companies is operated by compressed air. It is used to forge a brand new cutter or to reshape ("resharpen") an old one that has become dull from use. Where compressed air is available this machine is doubtless a fine thing. Steam may be used instead of compressed air, but the manufacturer should be notified of the intention to use steam at the time when the machine is ordered.



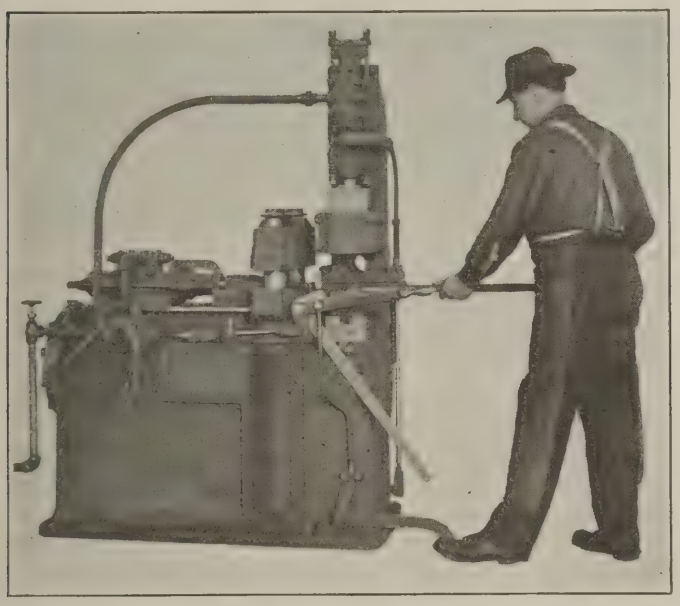
POPULAR TYPE OF MACHINE FOR SHARPENING OF CUTTER BITS

This machine differs from some of the drill bit sharpeners in that it is not necessary to upset the metal. The hammer operates vertically. Either a single blow may be struck or a succession of blows. The severity of the blow may be adjusted to suit the occasion, the operator having this matter under his control. Two swaging dies are employed, one serving as an anvil and the other as a hammer. The dies are of special form to suit the bits. Thus the form used for pick points will differ from that used for chisel edges. The dies are held in place by dovetail tongues which slip into similarly shaped slots. The special cutter-bit dies may be removed readily and ordinary forging dies substituted. The machine is then ready for general service in the blacksmith shop.

It is understood that a single machine can reforge as many as 200 bits an hour, chisel edges or pick points. Probably the bar has to be heated to a high point in

order to get this speed. In that case the job is done so quickly that the work is still highly heated when it is over. This is not good, for the reason that the grain size will naturally be about the size which corresponds to the temperature of the steel at the moment the work stopped.

As the point now under consideration is of importance —especially where only one heating is allowed—and is perfectly relevant whatever style of forging machine is employed, it will be well to have it fairly and squarely before us. The finishing temperature best for 0.50 per cent. carbon steel has been carefully investigated. The probabilities are that other steels behave similarly. Professor Bradley Stoughton cites William Campbell as having studied this type of steel. About 1908 Professor Stoughton, for the steels we are considering, expressed the matter in effect as follows: "Work below the magnetic limit greatly increases the brittleness of the material, while finishing the work at a higher temperature results in lower strength. Upon the evidence at hand, we may tentatively assume like conditions for these medium-carbon steels, and expect the best results if mechanical work is ended when steel is at a temperature which brings it exactly to the magnetic limit, but reserving the right to change this statement slightly when more data are obtained." It should be noted that Professor Stoughton in any event



REPRESENTATIVE FORGING MACHINE USUALLY EMPLOYED FOR ROCK DRILLS

only expects to make a "slight" change in this statement. I may add that in the 1911 edition of his work he allowed the statement to stand.[1]

Accepting this, we see that we will get the best results by not finishing the forging until the magnet takes hold or is about to take hold of the steel. If, however, we are not going to heat a second time, it will be impracticable for us to take full advantage of continuing to forge quite all the way down to the magnetic limit. The reason for this is that we must be above that limit when we harden. And, as already explained, we should see to it that we are allowing something for error and that we allow for the interval between stopping the heating and the plunge into the quenching bath. Consequently, if we forge with or without a machine and are going to omit a second heating, then we should begin with such a temperature as will bring us to the finishing point somewhat above the magnetic limit. With a power-driven machine this temperature of beginning should be lower than would be the case if we forge with a hand hammer on the anvil. In other words, the shorter the time of forging the lower the starting temperature should be.

However, if the work is afterward to be annealed, it would seem permissible to use high temperatures both with hand and machine forging; only we must be careful not to burn the metal. The ease and rapidity with which the work can be done at a high temperature would naturally result in a saving of time. This saving could then go to offset the extra time and trouble required to heat the second time. Let me recapitulate some of the foregoing results in the form of two rules:

Rule 1—If there is to be only a single heating, we heat to such a point as will allow just enough time to do the forging and still have the temperature distinctly above the magnetic point. We hardened instantly.

Rule 2—If there are to be two heatings, we heat to a point considerably higher than allowed by Rule 1 in order to get the advantage of easier forging, cool down to dull red or lower, reheat until distinctly above the magnetic point and then harden.

Tempering of Bits Reduces Brittleness

The tempering of cutter bits and other coal-cutting tools is done for the purpose of reducing the brittleness that exists after an ordinary hardening process. In many cases, perhaps the big majority, no tempering at all will be needed, especially if the hardening and quenching are done with intelligence. There are cases, however, where tempering may be the best solution of the particular problem in hand. Whatever the reason may be why it should be used in any particular case, the fact remains that tempering is a wonderfully successful method of adding to the toughness. There will be a decrease in hardness, but this may not necessarily mean a reduction in cutting ability.

Tempering consists in reheating a piece of hardened steel to a moderate temperature and a subsequent quenching. The hardening process seems to produce a strained condition in the mass of metal. A sudden shock may readily break a piece that has been highly hardened, even though the shock be quite mild. Thus a cutter point may strike a hard spot of some kind when at work and suffer fracture in consequence. If there is much trouble from such causes, tempering may cure it by appreciably reducing the internal stresses in the metal.

In general, the higher the temperature employed in tempering the greater the toughness and the more considerable the loss of hardness. A general rule can hardly be given for cutter points that will secure the best results under all circumstances. The cases will be different, and judgment should be based on the consideration I have just set forth. Some experimentation may be needed to get the cutters to the most efficient temper.

[1] I have changed the statement only to make it apply to the magnetic limit and the steels we have in hand. In Professor Stoughton's text ("Metallurgy of Iron and Steel," p. 377, ed. of 1908, p. 363f, ed. of 1911), the statement is unnecessarily technical for our present use, because he has in view all steels and refers to temperatures as given by degrees Centigrade and Fahrenheit.

After finding what is best, the next consideration is to secure the same result repeatedly. The man who settles the point of proper temperature, for example, may not do all the subsequent tempering.

Perhaps the simplest way to arrange a "foolproof" method of getting the right temperature is to use an alloy bath. An alloy of a given composition will melt at a fixed temperature. Lead and tin are melted together to form a molten bath and the hardened cutters or other tools dipped into it. The accompanying tables give various tempering colors, the corresponding pyrometer degrees and the composition of the suitable alloy.

LEAD-TIN TEMPERING BATHS

Color	Deg. F.	Tin Lb.	Tin Oz.	Lead Lb.	Lead Oz.
Faint straw	430	1	0	1	14
Straw	460	1	0	2	6
Light brown	490	1	0	3	8
Dark brown	500	1	0	4	2
Light purple	530	1	0	7	8
Dark purple	550	1	0	12	8

As antimony costs less than tin per pound, we may perhaps prefer to alloy the lead with it. The following table exhibits the fusion temperatures for various mixtures:

Deg. F.	Antimony, Per Cent.	Lead, Per Cent.
554	5	95
518	10	90
482	13	87

The question may properly be asked: How are we to keep these baths from getting too hot? After an alloy, or almost any metal, has been heated to the melting point, it is possible to go on raising the temperature. To meet this difficulty, we first find what alloy we are going to use. Suppose it is the one corresponding to the straw color. The alloy should contain the two metals in the proportions of 1 lb. of tin to 2 lb. 6 oz. of lead. We may prepare our alloy in the form of blocks or ingots. When a bath is wanted it will only be necessary to melt the ingots. At the time the ingots are got ready we cast a number of rods of small diameter, but in these we use somewhat more lead and not the relative amount used in the bath. This will have the effect of giving the rods a higher melting point. This may be seen by noting in the table how the temperature goes up with the increase in lead.

When the ingots have melted and the bath is thought to be just about ready, we test the temperature by dipping one of the rods into the bath. If the end of the rod melts, we regard the bath as too hot; if it refuses to melt, we regard the bath as at the proper temperature. All this is easy to carry out, both as to getting the ingots and rods ready and as to testing the bath afterward with one of the rods.

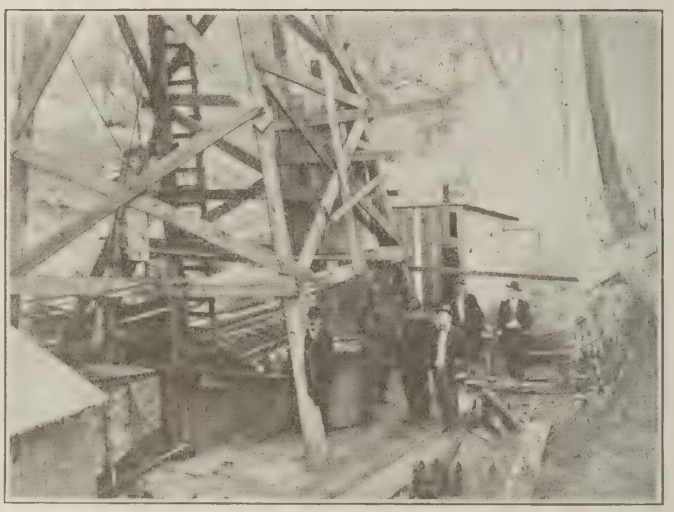
Record Shaft Sinking in West Virginia

The accompanying illustration shows the temporary headframe over the air shaft of the Rachel Coal Co., at Broomfield, W. Va., where a record was made in shaft sinking. The shaft is 370 ft. in depth to the bottom of the Pittsburgh No. 8 seam, which here attains a thickness of 8 ft. At a depth of 252 ft. the bottom of the Sewickley seam was reached. This was found to have a thickness of 5 ft. The Sewickley and Pittsburgh beds are separated in this shaft by 110 ft. of fireclay, limestone, sand-rock and various slates. The air shaft is 12 ft. in diameter.

The material encountered in sinking this shaft is shown in the following section, furnished by General Manager E. F. Miller:

	Feet		Feet
Surface and sand	27	Sandstone	18
Limestone	15	Fireclay	6
Fireclay	5	Brown slate	15
Limestone	7	Sewickley seam (bottom of seam 252 ft.)	5
Fireclay	22	Fireclay	36
Shale	16	Limestone	13
Limestone	5	Brown slate	4
Shale	15	Sandrock	22
Limestone	9	Brown slate	20
Blue shale	26	Black slate	15
Limestone	17	Pittsburgh No. 8 seam	8
Shale	2		
Limestone	2		
Fireclay	3	Total	370
Limestone	37		

Ground was broken for this shaft on June 11, 1917, and the first car of coal was loaded on Sept. 1, 1917—a fine record. Nine D. P. Sullivan No. 33 Jackhamer drills were used in sinking the shaft and the management—E. F. Miller, general manager, and J. C. Edwards,

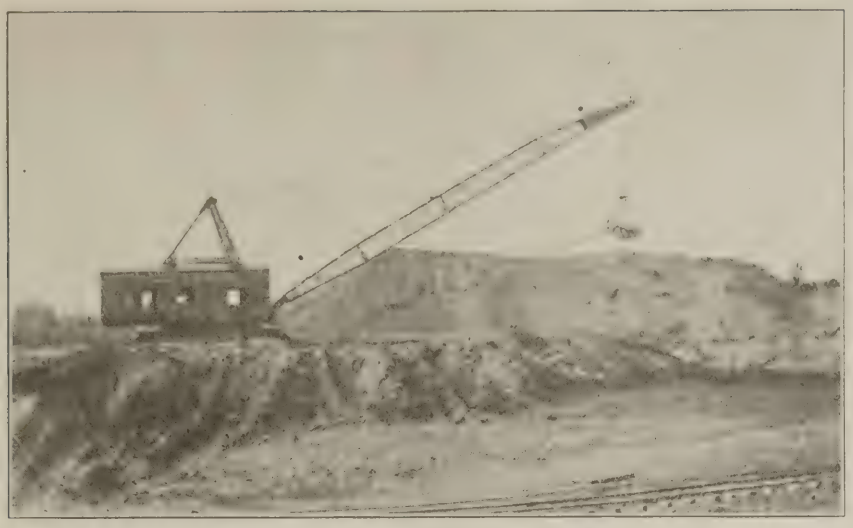


TEMPORARY HEADFRAME OF RACHEL COAL CO., BROOMFIELD, W. VA.

superintendent—states that the work could not have been completed as quickly except for the Jackhamers. The average number of men working per shift was seven, 3 shifts being worked per day—all company work. Ventilation was effected by a 4-ft. Robinson fan, the air being carried down the shaft in a 12 x 15-in. tongued-and-grooved wooden compartment. Forty-five feet of the shaft was concreted; 5-ft. section wooden forms were used. The concreting was completed with the original forms, on which there were no repairs.

Screen Gravel for Concrete

Gravel as found in a natural bank, "bank-run gravel," as it is termed, is not suitable for concreting without being properly screened. It usually contains twice as much fine material as coarse, while the proportions should properly be reversed. The natural run-of-bank gravel, says "The Ransome Book," contains 45 per cent. of voids or air spaces. To fill these and make a dense concrete, the amount of sand should be about half the volume of pebbles. If more sand than this is used, as would be the case when the bank-run material is employed exactly as coming from the pit, it is necessary to use a much greater quantity of cement to fill up these voids or air spaces so as to give the concrete the desired strength, which is uneconomical of cement.



Electric Control of a Dragline Excavator

By L. W. NICKEL
Now Serving in the United States Navy

SYNOPSIS — *The dragline excavator possesses certain obvious advantages over the steam shovel. Electrical driving permits operation with fewer men and insures against delays arising from cold weather.*

ONE of the most interesting applications of electric control in a field where reliability is essential can be found in the control of a dragline excavator. A machine controlled in this manner has recently been installed at the works of the Locust Mountain Coal Co., Shenandoah, Penn., and is shown in the leading illustration. This excavator is used for stripping a coal bed, the stripping being from 14 to 30 ft. in depth. The rock encountered in the stripping process is drilled by steam drills and then shot. With the dragline in one position it is possible to take a cut 150 ft. in width. Spoil banks are always dropped on surface which does not contain coal; that is, the excavator is always placed directly over the vein and is followed by a steam or electric shovel. The dragline method of stripping has been found to be much cleaner than any other, as no rock or dirt is spilled on the coal when once it is cleaned. This is not the case where it is necessary to run locomotive track for disposing of rock and dirt taken off the surface.

With an electrically operated dragline no fireman, coal passer or pipe man is needed. Further, there are no steam or water pipes to freeze, and on the coldest mornings no delay is experienced in starting the stripping operation, it merely being necessary to close the main-line switch and commence work. The only labor required for the operation of this machine is the dragline operator, an oiler and a few men in the pit; whereas where stripping is being done by means of steam shovels and the dirt and rock is hauled away by locomotives, the amount of labor required is increased six or seven times.

The dragline excavator under discussion has a turntable 24 ft. in diameter, a 150-hp. hoist motor and a 75-hp. swing motor. The turntable consists of 40 openhearth steel rollers revolving between two 90-lb. rail circles, 24 ft. in diameter, one attached to the bottom of the revolving frame and one to the top of the base.

The main machinery is driven by a 150-hp., 440-volt, slip-ring-type motor, operating at a speed of 565 r.p.m. This motor drives two drums, one of which winds the rope that drags the bucket through the dirt while the other operates the rope by means of which the bucket is hoisted. There is also a small drum for raising and lowering the boom.

The swinging machinery is operated by a 75-hp., 440-volt, slip-ring-type motor, driving a vertical swinging shaft through three gear reductions. A pinion on the vertical shaft engages the circular swinging rack on the base. The master controllers, brake levers, etc., are mounted at the front of the machine so that the operator can manipulate the excavator without danger to the pitmen.

The bucket has a capacity of 3½ cu.yd. and is suspended by a three-part hoist. It is dumped by locking or holding the third, or single, part of the hoisting line. This is attached to the front end, or arch, of the bucket, after which continued hoisting dumps the contents. The brake, or holding device, consists of a drum, with a spring-actuated pawl and ratchet located near the front of the boom and controlled from the operator's platform on the revolving frame.

The magnetic control panel for this equipment was furnished by the Cutler-Hammer Manufacturing Co., of Milwaukee, Wis. It consists of double-pole magnetically operated switches equipped with series relays. The master drums, which are mounted over the operator's head, are of the bevel-gear type equipped with punched brass fingers having a forged copper tip so designed as to prevent stubbing of the finger. The main motor controller is equipped with jamming relays so operated

that the resistance is automatically cut into the rotor circuit when the motor is stalled. The maximum current taken by the motor under these conditions will not cause the circuit breakers to open. Thus the operator has control over the motor while it is stalled. This feature of stalling the motor and providing absolute protection makes it possible to obtain digging characteristics similar to those of a steam-actuated machine.

The controller for operating the swing motor is equipped with a plugging switch so that it is possible for the operator to throw the controller quickly to the maximum speed position and to reverse at full speed. The current inrush during this plugging period operates the series relay having control of the plugging switch, and in this way resistance is cut into the rotor circuit of the swing motor, so that the motor is fully protected during the plugging period. Because of the momentum of the boom on an equipment of this kind it is not necessary, under ordinary conditions, to reverse at full speed ahead, inasmuch as the operator often throws the controller to central position at approximately 20 deg. ahead of the dumping pile, the momentum carrying the boom to this point, at which time the motor is plugged. The grid resistance for the motors is mounted at the rear of the control boards in open frames thoroughly protected and ventilated.

The power for this installation is furnished by the Harwood Electric Co.'s plant at Hazleton, Penn., 22 miles distant. It is transmitted at 25,000 volts to Shenandoah, where it is stepped down to 4000 volts and is again stepped down to 440 volts by the Locust Mountain Coal Co., at its strippings, so that when brought to the dragline system it is three-phase, 440-volt, 60-cycle current. The transformers are mounted on a wagon.

The current is commutated to the machine by means of a collector-ring equipment consisting of three copper rings mounted concentric with the center casting of the machine and revolving with it. Heavy brass brushes to which the cable is attached are anchored onto the machine, there being two brushes for each phase. This makes a total of six brushes for the three rings, the brushes being mounted 180 deg. apart.

In Table I is given the cost of stripping 256,710 cu.yd. during the year of 1915. It will be noticed that the cost is 4.23c. per cu.yd. The writer has no figures available on the cost of stripping by means of locomotives and steam shovel, but feels assured that this figure will be far in excess of that secured by the method described in the foregoing paragraphs.

In Table II are given some figures covering the cost of stripping 56,565 cu.yd. during the month of October, 1915. It will be noticed that this cost is reduced to 4.19c. per cu.yd., there being considerable saving due to the absence of a blasting charge.

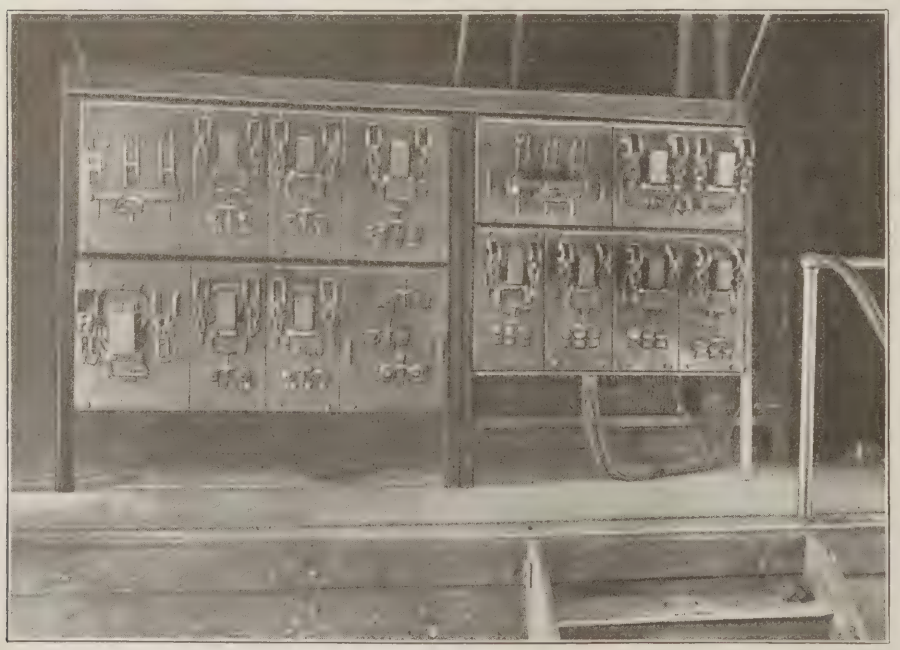
The control of this dragline excavator illustrates the tendency, on the part of mining operators, to adopt electrically driven machinery and thereby secure the advantages which it offers. The electric shovel is also finding its way into the mining field, one of these being used on the same stripping operation with the dragline described in this article. Frequently this equipment is operated day and night, stripping the dirt and rock from the coal beds and clearing the way for the shovels and locomotives that remove the coal to the breakers.

TABLE I. COST OF STRIPPING 256,710 CU.YD. DURING YEAR 1915

Classification	Labor Amount	Labor Per Yd.	Material Amount	Material Per Yd.	Total Cost Per Yd.
Shovel crew	$1,463.50	$0.0057	$82.26	$0.0003	$0.0060
Pitmen	1,697.80	.0066	5.16	.....	.0066
Blasters	107.02	.0004	1,804.22	.0070	.0074
Repair and maintenance	317.08	.0012	1,274.89	.0050	.0062
Electric repairs and maintenance	318.64	.0012	16.24	.0001	.0013
Transmission lines	74.56	.0003	7.60	.....	.0003
Power	.....	.....	2,038.26	.0079	.0079
Foremen, etc	339.16	.0013	2.25	.....	.0013
Clerk	40.50	.0002	.....	.....	.0002
Hauling	36.73	.0001	.....	.....	.0001
Miscellaneous	1,664.13	.0065	13.00	.0001	.0066
Total	$6,059.12	$0.0236	$5,243.88	$0.0204	$0.0440
Credit account timber, cutting brush, charged into colliery warehouse	427.25	.0017	.....	.....	.0017
Grand total	$5,631.87	$0.0219	$5,243.88	$0.0204	$0.0423

TABLE II. COST OF STRIPPING 56,565 CU.YD. DURING OCTOBER, 1915

Classification	Labor Amount	Labor Per Yd.	Material Amount	Material Per Yd.	Total Cost Per Yd.
Shovel crew	$391.97	$0.0069	$23.25	$0.0004	$0.0073
Pitmen	439.42	.0078	.....	.....	.0078
Blasting, repairs and maintenance	69.84	.0013	433.50	.0077	.0090
Electric repairs and maintenance	100.71	.018	50.34	.0009	.0027
Transmission lines	40.77	.0007	.79	.....	.0007
Power	.....	.....	369.67	.0065	.0065
Foreman, etc	111.86	.0019	.....	.....	.0019
Clerk	45.17	.0008	.....	.....	.0008
Hauling	79.25	.0014	.....	.....	.0014
Miscellaneous	157.61	.0028	53.34	.0010	.0038
Total	$1,435.90	$0.0254	$930.89	$0.0165	$0.0419



CONTROL PANELS FOR ELECTRIC DRAGLINE EXCAVATOR

THE DESIGNS OF TIPPLES and mine plants should be made a subject of competition among the bidders, and should be limited to a few responsible bidders. The best plan should be awarded the contract. Compensation should be made for all plans submitted, for although no charge is made, it must not be assumed that such work costs nothing. There is no such thing as free engineering.

Economical Generation of Thermal Power at Coal Mines—IV

By J. B. C. KERSHAW
91 Grosvenor Road, Colwyn Bay, Liverpool, England

SYNOPSIS—*The economical generation of steam requires an easy and exact control of boiler draft. This can be most easily accomplished by mechanical means. A boiler is designed as a vessel wherein steam is to be made; it is not a water purifier or heater. Best results are obtained when the feed water is raised to the boiler temperature before it enters the boiler proper.*

AN ADEQUATE supply of air has been shown (in Article III of this series) to be an essential requisite for good combustion. If this air can be preheated before entering the boiler furnace or the combustion chamber, the temperature attained and efficiency of the steam-raising process will be considerably increased.

The usual method of obtaining the necessary supply of air to the furnace and combustion chamber, in the past, has been that of relying upon the chimney which carries away the products of combustion. Chimney draft has, however, never been entirely satisfactory, even when aided by the use of steam jets; and in modern boiler plants either forced or induced draft apparatus is installed.

The assumption that chimney or natural draft costs nothing is quite fallacious, for not only is the capital outlay upon a chimney of 150 to 200 ft. high considerable, but its efficiency for producing draft depends upon the heat of the gases which pass up it. Thus to produce a suction equal to 1 in. on the water gage at the base of a chimney 150 ft. high, the temperature of the exit gases must be 600 deg. F., and below this limit the draft will fall off considerably. But with the exit gases at 600 deg. F., the heat lost will amount to between 17 and 33 per cent. of the fuel burned, according to the excess of air used for burning the fuel as measured by the CO_2 tests, the 33 per cent. loss corresponding to 6 per cent. CO_2 and the 17 per cent. loss to 12 per cent. CO_2 in the exit gases. The cost of chimney or natural draft with fuel at $2.50 per ton therefore varies from 43c. up to 83c. per ton of fuel consumed, over and above the interest and upkeep charges for the chimney.

Where new equipment is being installed, fan draft is in all cases the more economical and efficient; for not only can the fan be run at the speed best suited to the fuel being burned, but the draft can be altered according to the load on the boilers. With fans, also, the heat can be abstracted from the exit gases to the lowest possible limit without any fear of decreasing the draft, and the preheating of the air supply becomes a much more practicable and efficient proposition.

As regards the choice between the two systems of "forced" and "induced" draft, each method has its advantages, and the local conditions must be studied carefully in each case before deciding which to install. If the fan be placed behind the boilers at the foot of the chimney; that is, if the induced draft system be used, the heat losses by air leakage through the brickwork of the boilers and damper holes may be as high as with chimney draft, unless great care is taken to make the boiler and flue brickwork air-tight. For this reason, the "forced"-draft system is preferred by many engineers. In this case, if leakage occurs, the pressure is from within; and the smoke or flame that escapes from the crack calls attention to the loss at once.

As regards the draft required to burn ordinary lump coal or a well-screened slack, 0.33 in. on the water gage should be registered behind the bridge wall of the boiler furnace and 0.45 in. in the main flue behind the boiler, with either natural or induced draft. It is advisable to be able to increase these pulls to 0.50 and 0.70 in. respectively, when circumstances require it.

A fixed-draft gage, with the face dial marked in tenths of an inch, ought to be attached to every boiler furnace, so that the firemen may be able to judge of the pull on the furnaces and state of their fires without opening the furnace doors. Similar draft gages should also communicate with the main flues and the base of the chimney, in order that the engineer in charge may be kept informed as to the state of the draft on the whole steam-raising plant. With forced-draft apparatus the need for gages is just as urgent, but the places where they are installed must be altered to suit the system.

Advantages of the Fan-Draft

The following extract from a paper on "Fuel Economy," read by the writer in conjunction with W. H. Booth before the Institution of Electrical Engineers in London, summarizes the advantage of the fan-draft:

> Fan-draft must therefore be considered in the light of enabling an economy in chimney construction to be effected, and full use made of feed-heating apparatus. It is also useful as enabling boilers to be forced to rapid steam production, and presents itself as a safeguard against sudden load in lighting stations, and as a means of surmounting the load peak without excessive boiler plant. Fan-draft is thus useful as a means of reducing capital expenditure on chimneys and boilers, by promoting the rate of combustion of fuel at higher rates per unit of grate area. It enables the thickness of the fire to be regulated in better accordance with the fuel size and generally promotes elasticity. It is also useful in enabling the hot gases to be compelled to pass over all the heating surface, and baffles may be introduced that would otherwise be too great a hindrance. Its economy in other cases appears to demand the fullest practicable reduction of the calories in the exhaust gases by feed-water heaters, which in large stations may well be in two stages, and perhaps by air heaters for furnace supply.

The object of burning fuel under steam boilers is to produce "steam." The boiler itself, therefore, should be restricted as far as possible to this purpose, and

should not be used for purifying the water, or for preheating the water up to boiling temperature, both of which operations can be more efficiently carried out in other and specially designed forms of apparatus.

Fig. 1 shows, in the form of a diagram, the heat units absorbed in raising 1 lb. of solid steel and 1 lb.

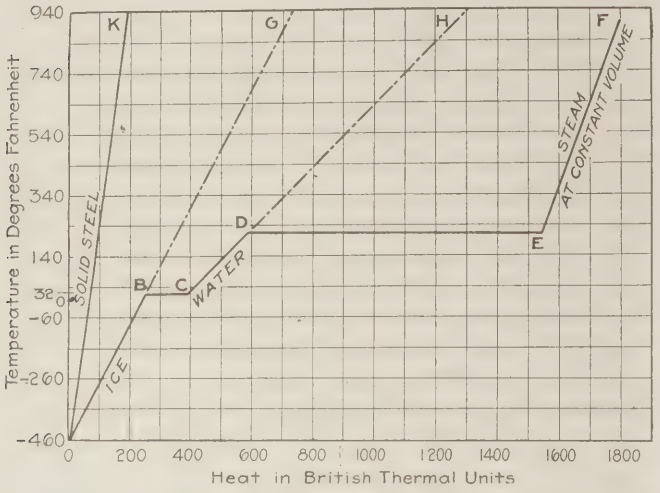


FIG. 1. DIAGRAM ILLUSTRATING HEAT TRANSFER TO WATER AND STEAM

of water respectively, from the absolute zero of temperature (—273 deg. C or —460 deg. F.) up to 940 deg. F. At 212 deg. F. a great absorption of heat occurs in the case of water, without any corresponding rise in temperature; and it is the great absorption of heat at this point which renders steam-raising different from many other processes of heat transfer. The vertical scale of the diagram represents the temperature in degrees Fahrenheit, while the horizontal scale represents the heat absorbed in British thermal units.

In the case of steel the heat absorption is indicated by a straight and continuous line (*AK*) and less than 200 heat units are required to raise the temperature from the absolute zero up to 940 deg. F. The heat absorption curve for water, on the other hand, shows that nearly as many heat units are required to raise it from the melting point of ice up to its boiling point (indicated by the line *CD*) and that at this temperature there is the disappearance of 966 heat units (indicated by the horizontal line *DE*) before any further increase in temperature occurs. These heat units in fact represent the energy required to convert the 1 lb. of water at 212 deg. F. into 1 lb. of steam at 212 deg. F., and are called the "latent heat" of steam.

From this point onward the temperature of the steam increases faster than that of the water for a given number of heat units, since 250 B.t.u. suffice to raise 1 lb. of steam from 212 deg. F. to 940 deg. F. (see line *EF* in diagram). The dotted lines *BG* and *DH* show the direction the heat absorption lines would have taken, had there been no internal molecular work required when the ice changed into water, and the water into steam, at the points *B* and *D* respectively, in the temperature curve of the diagram.

The lesson of this diagram is that 1300 B.t.u. are required to change 1 lb. of ice at 32 deg. F. into steam at 600 deg. F., or more than six times that required to raise 1 lb. of solid steel to the same temperature, and that had there been no change of state in the case of ice and water, this amount of heat would have produced a final temperature of over 2600 deg. F.

Conversely, the heat absorption of the water at this temperature, 212 deg. F., is exceptionally great, and the rate of the transfer of heat through the boiler plates is at its maximum.

In order to obtain the highest efficiency from steam boilers, therefore—that is, the greatest rate of heat transfer—the boilers should be fed with water at or near the boiling point, and the preliminary heating of this water should take place in accessory apparatus, such as feed-water heaters and economizers, using low temperature and other forms of waste heat which are inapplicable for steam-raising purposes.

Working under these conditions, with clean boiler plates, there is a wide margin for obtaining much higher evaporative results from steam boilers than are at present customary, without any loss of efficiency; since the danger of overheating the plates or tubes under these conditions of work is almost negligible.

The following extract from Bulletin 18 of the Bureau of Mines ("The Transmission of Heat Into Steam Boilers," by Henry Kreisinger and W. T. Ray) proves that this opinion is supported by the most advanced scientific workers on this subject in the United States:

> The results of the investigations described in this report indicate that the conductivity of the heating plates of steam boilers is so high that the present steaming capacities can be tripled or quadrupled by forcing over the heating surfaces three or four times the weight of gases now passed over them. With well-designed mechanical-draft apparatus this greater weight of gases can be forced through the boilers at a small operating cost. It is possible to increase the capacity of many of the present boilers in this way without reducing their efficiency much; in fact, by a proper arrangement of the heating surfaces the efficiency can be made higher than the present rating. The efficiency of any boiler can be increased by arranging its heating surfaces in series with respect to the path of hot gases. New boilers of high efficiency can be constructed by making the cross-section of the gas passages small, in comparison with the length.

Finally, the steam produced by the boiler should be superheated, in order to minimize the heat losses due to radiation during its passage through the steam pipes to the point where it is used, and also to insure that dry steam arrives in the engine cylinder or turbine drum, rather than a kind of Scotch mist, which too often has to do duty for steam in colliery plants.

Limits of space in this article will not permit the various types of feed-water heaters and economizers or superheaters to be discussed; but no up-to-date steam-raising plant can afford to be without these essential accessories to economical steam production, and at some later date I hope to return to this subject and deal with it more fully.

To summarize, however, what has been said; the production of steam from water should be carried out in several stages, beginning with the raising of the temperature of the purified feed water to 100 deg. F. by aid of exhaust steam. This warm water is then passed through one or more series of economizer tubes worked on the counter-current principle, and heated by the waste gases from the boiler. If still below the boiler temperature, the last degrees of heat are added, either by the use of live steam or by passing the feed water through the control apparatus which protects the superheaters from the direct heat of the furnace. The water

then enters the boiler at the critical temperature, and is at once ready for the absorption of the latent heat which converts it into steam.

The waste gases passing away from the boiler plant carry with them a large proportion (from one-fourth to one-third) of the heat of the original fuel, and if high efficiencies are to be attained for the whole power plant, it is imperative that the heat losses with these gases should be reduced to a minimum.

This reduction can be attained in three directions: (1) By cutting down the volume of the waste gases—that is, by working with a minimum excess of air. (2) By reducing the temperature of the gases by a skillful use of economizers and other forms of low-temperature heat-abstraction apparatus. (3) By substituting artificial for natural draft, and thus obviating the necessity of passing hot gases into the chimney shaft.

As regards the total amount of the heat losses through the exhaust steam and waste gases in a modern power plant, Fig. 2 is a diagram showing the whole of these losses. The large proportion of the heat which passes away in the waste gases and in the exhaust steam is at once apparent. In the case illustrated in Fig. 2, only 14.4 per cent. of the original heat value of the fuel is represented in the effective horsepower of the engines, over 80 per cent. of the heat energy of the fuel having been lost with the waste gases from the boilers and with the exhaust steam. As already stated, the heat of the exhaust steam can be most satisfactorily recovered by using it for the preliminary heating of the feed water for the boilers, and with a

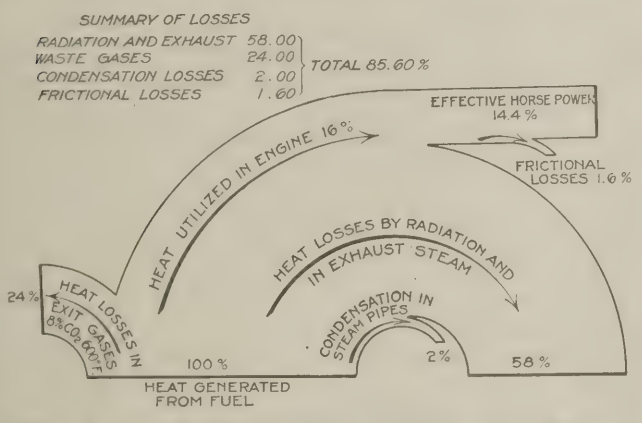


FIG. 2. HEAT EFFICIENCY DIAGRAM FOR STEAM BOILER AND ENGINE

well-planned and managed apparatus over 90 per cent. of this heat can be reclaimed.

The problem of the recovery of the heat of the waste gases is not so simple, since it is not possible, owing to the impurities which they carry, to abstract their heat by direct contact with the water intended for the feed. The usual plan is to abstract the heat by the aid of economizers—that is, a series of pipes placed in a special chamber at the rear of the boilers, through which the gases pass on their way to the chimney. As usually operated, the economizer system is capable of much improvement. Not only is the counter-current system of operating the flow of water and hot gases usually ignored, but the economizer tubes are not kept sufficiently clean, either outside or inside, to yield their highest efficiency. The number of tubes also is never sufficiently great to abstract all the heat of the gases, for the temperature at which the gases are allowed to escape to the chimney is usually between 550 and 650 deg. F., whereas with better equipment and management this might be reduced to 250 deg. F. Below this point the moisture contained in the gases would condense on the economizer pipes and would cause trouble owing to its acid constituents. But in time it is possible that even this difficulty will be surmounted, and that the whole of the heat contained in the exit gases from the boilers may be utilized.

Table I shows how rapidly the heat losses in the waste gases increase with their dilution, for while at

TABLE I. PERCENTAGES OF FUEL WASTED BY HEAT CARRIED AWAY BY EXIT GASES, AT VARIOUS TEMPERATURES AND PERCENTAGES OF CO_2

	Percentages of CO_2					
Temperature, Deg. F.	4%	6%	8%	10%	12%	14%
400	32.4	21.8	16.4	13.4	11.4	9.8
500	40.5	27.3	20.8	16.8	14.2	12.3
600	48.6	32.8	24.9	20.2	17.1	14.8

Adapted from "Smoke Prevention and Fuel Economy," by Booth and Kershaw.

12 per cent. CO_2 and 600 deg. F. the loss is 17.1 per cent., at 8 per cent. CO_2 and the same temperature the loss is 25 per cent.; and at 5 per cent. CO_2, 39.3 per cent. of the total fuel used is lost.

Turning now to the consideration of the customary methods of controlling the heat losses of the waste gases, temperature and chemical tests ought to be carried out regularly by the engineer or chemist in charge of the steam-raising plant. Even when automatic apparatus has been installed, it is still necessary to put a thoroughly skilled and well-qualified man in charge if the best results are to be obtained.

Limits of space will not allow a description in this article of the various forms of apparatus now on the market in the United States for checking and controlling boiler-house work, but a few general hints may be given upon their methods of use.

The temperature of the waste gases ought to be noted and recorded at frequent intervals—(1) at the exit from each boiler into the main flue, (2) at the inlet and exit of the economizers and (3) at the base of the chimney. Permanent and fixed thermometers may be placed at these points, or holes may be provided with 30-in. lengths of 1¾-in. wrought-iron pipe, the flanged top of which is kept closed with a tight-fitting wooden plug when it is not being used for making a test. Mercury thermometers filled with nitrogen are reliable for temperatures up to 1000 deg. F., but they must be mounted in a suitable carrier and must be left in the path of the flue gases long enough to attain the gas temperature—that is, 5 or 10 min., according to the thickness of the metal case surrounding the thermometer bulb.

The only point where the temperature of the gases may exceed the limit named above, as measurable by a mercury thermometer, is at the exit from each boiler into the main flue. But if the temperature here registers over 900 deg. F., it means that the boiler is dirty and badly scaled, and the sooner it is put out of use the better for the efficiency of the plant. The following are the temperatures which should be maintained in a well-managed plant: Temperature at exit from boilers into main flue, 650 deg. F.; temperature at exit from economizers, 350 deg. F.; temperature at base of chimney, 300 deg. F.

As already stated, with forced or induced draft the temperature of the gases that issue from the economizers may be reduced to the point at which condensation of the moisture commences to occur.

As regards the chemical tests which are necessary to determine the excess air and air-leakage of the boilers, it is obvious that only when these are made regularly and the records are studied by some competent person, can exact knowledge be obtained of the efficiency or otherwise of the firemen and furnaces. The waste gases contain carbon dioxide, moisture, nitrogen and unconsumed oxygen as regular constituents; and the percentages of carbon dioxide and oxygen respectively are the figures which enable one to say with what excess of air the combustion process is being maintained.

Excess of Air Necessary for Good Combustion

If it were possible to obtain good combustion of bituminous coal with the theoretical amount of air, the exit gases would contain 19½ to 19 per cent. of CO_2 and no free oxygen, and 12 lb. of dry air would be required to burn 1 lb. of coal. Since it is impossible to obtain good combustion of solid fuel with only the theoretical amount of air passing through the furnace, an excess of air is necessary, but the amount of this excess should not exceed 50 to 75 per cent. (corresponding to 12.6 and 10.9 per cent. of CO_2 respectively).

Tests showing percentages of CO_2 below the latter figure indicate that much more air is being passed through the furnaces than is required, and since all this air has to be raised to the combustion temperature, say 2500 deg. F., and carries off some portion of heat to the chimney, it is evident that the smaller the excess supply may be kept the better.

A CO_2 test showing 10 to 13 per cent. is therefore the best for obtaining high efficiency from the boilers. Above 13 per cent. of CO_2 there is grave danger of allowing carbon monoxide and hydrocarbon gases to escape unconsumed with the exit gases, and it is unwise to attempt to reduce the excess of air below the 50 per cent. margin represented by 12.9 per cent. CO_2. Where attempts are being made, however, to reach a still higher efficiency, it is necessary to test the exit gases regularly for carbon monoxide and for methane, as well as for carbon dioxide and oxygen, and this demands a more complicated form of gas-testing apparatus.

Composition of Exit Gases

In a future article I hope to return to this subject, and to give a full description of the gas-testing apparatus and methods of control best adapted for colliery use. Here, I can only indicate one short-cut method of arriving roughly at the composition of the exit gases.

Air contains 79 per cent. nitrogen and 20.8 per cent. oxygen, by volume. When burning a bituminous fuel of average quality, yielding 35 per cent. volatile matter on heating, about 1.8 per cent. of the oxygen of the air will be required to complete the combustion of the hydrogen contained in the coal, and therefore the air that remains will contain only 19 per cent. of free oxygen.

The tests for carbon dioxide and for oxygen when added together ought therefore to total 19 per cent.; and if there is a continued deficiency in the tests when dealt with in this manner, it indicates that carbon monoxide or hydrocarbon gases are also present in the exit gases. When burning coke or anthracite fuels which contain only a small percentage of hydrogen and volatile hydrocarbons, this disappearance of oxygen does not occur. The CO_2 and oxygen tests of the waste gases, in such cases, when added together should equal the original oxygen content of the air, namely 20.8 per cent.

In concluding this series of articles upon heat economy in coal-mining power plants, I must once again emphasize the fact that scientific management and control are necessary to obtain the highest efficiencies from steam boilers. It is useless to install complicated automatic apparatus in the boiler house, unless one is willing to provide skilled and properly trained men to take charge of it. In support of the view that there is plenty of work in the boiler house for the chemical engineer, the following extracts from a recent article by Joseph G. Worker, which were printed in an American journal,[1] may be quoted:

> Mechanical stoker equipment is not, and never can be, a substitute for intelligence and good judgment, and there are just as good reasons for intelligence in handling stoker-fired plants as in hand-fired plants. . . .
>
> A few years ago, a large plant in Chicago was using 7½ lb. of coal per kilowatt-hour, and at present it is using 2⅞ lb. of coal per kilowatt-hour, with the same kind of fuel. In 14 years this engineering progress in turbine, boiler and stoker equipment and methods of operation has been equivalent to a saving in one year of approximately 2½ million tons, or 58,000 carloads of coal. . . .
>
> When the statement is made, therefore, that the savings in a power-station must be made in the boiler room, this refers to operation and management and not to the design of the equipment used.
>
> Conditions in boiler-plants show that the operators must be trained in the combustion of fuel. The operation of boilers and stokers must be approached along more scientific lines. It is only necessary to examine the conditions of the plants in this country where coal is fired, in order to realize what is needed and how much it is needed. . . .
>
> Suitable instruments should be used for furnace operation, but with their installation should go training in their use. Too many instruments are now installed and inoperative, because the men in the boiler room have shown no real grasp of the subject of fuel combustion, nor do they know how to use the information indicated by them.

In Lighter Vein

Familiar Trait of the Mining Mule

W. B. Goldsmith, who is chief engineer of the South East Coal Co.'s plant at Seco, Ky., vouches for the truth of the following story. He relates that in the mines of the company there was a "balky," slow-going mule that the driver always put in front of an animal that moved along at a thoroughly satisfactory pace. On occasions when it became necessary to "back," says Mr. Goldsmith, this second mule would invariably grab the "balky" slow-going one with his teeth and pull him back, a feat which sometimes required the animal's whole energy and strength. The whole working force of the company are proud of the mule and would not part with him at any price.

[1]Electrical Review, Sept. 22, 1917.

Deflection Angles and Azimuth

By MINING ENGINEER
Scottdale, Penn.

HAVING visited the engineering departments of many small coal-mining companies, I was surprised to find that more than 75 per cent. of them were using the system of deflection angles in their surveys instead of the continuous vernier or azimuth. I will admit that deflection angles are more suitable for city engineering and railroad work, but for surveys in connection with mining engineering such as stream and outcrop location, topography and the establishment of the hundreds of stations on which the mine maps are based, it cannot help but be evident to anyone acquainted with the azimuth system that deflection angles are not nearly so efficient as azimuth.

I inquired at every office as to why they preferred to use deflection angles and was given the following two reasons: First, the astonishing fact that they were not familiar with azimuth and did not know its advantages; second, that those acquainted with azimuth and who realized its usefulness were afraid of changing their system for fear of causing confusion in their records.

In this article I will try to show just how much work such a change will involve, and also give a comparison of the two systems, azimuth and deflection angles. In using the azimuth system, it is necessary to have a transit graduated as in the accompanying sketch; all angles are to be measured to the right of zero, which should be north. At each set-up the transit circle is clamped in such a position that zero on it points to north and each reading of the vernier reads an azimuth angle measured to the right of zero, or north. Therefore, an angle of 40 deg. equals N 40 deg. E; 80 deg. equals N 80 deg. E; 170 deg. equals S 10 deg. E; 190 deg. equals S 10 deg. W, and the azimuth is recorded in the notebook.

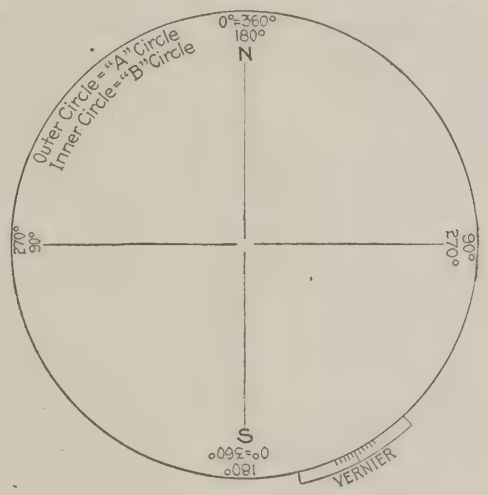
In making a survey the transit is leveled up, and when the backsight has been taken, zero on the instrument must always point to north; this is accomplished (the old notes showing the stations already established) in the following manner:

Station	Azimuth	Vert. Angle	Distance
149–150	86 deg.	0 deg. 00 min.	258.7

Stationed on 150, and before backsighting on 149, set the vernier on 86 deg. (the old azimuth from 149-150) + 180 deg. on account of looking in an opposite direction from what the old notes record; or another way is to set on 86 deg. on the *A* circle and when foresighting read the *B* circle, so that after the backsight has been taken, it is evident that zero on the transit circle is pointing to north, and any angle read to the right of zero will be the azimuth to the point being located. The azimuth for dozens of shots can be read because the transit circle is clamped in a position that makes zero point to north, and when changing the sight from one object to another the transit plate does not move from the position in which it is clamped, only the vernier moves.

When notes are sent in to the office the course is plotted with ease, as it can be seen by inspection that the course corresponds to the azimuth. There is absolutely no calculation necessary to plot the courses, which is certainly not the case with deflection angles. When the transitman makes a tie between two surveys he can compare his new azimuth with the old azimuth and see at a glance the closeness of the tie, without tracing back a lot of angles and then wondering if he has made an error in adding or subtracting.

In many mines headings are driven on a general course, but a heading is not always driven exactly on that line, and the survey will frequently vary from the projected course. If a line has been run up the haulage heading with deflection angles and the same method is used in the air-course or parallel heading, it is a job requiring accurate though not difficult figuring to know if the headings are driven parallel or not; and I can vouch right now that mistakes are plentiful. Whereas, if the survey is run on azimuth, the transit does all



HOW THE TRANSIT SHOULD BE GRADUATED

the figuring; and if the last azimuth in the haulage heading was 69 deg. and in the air course 69 deg., it is evident at once that the headings are parallel; and it is also evident that the course is north 69 deg. east in case the course is desired.

A good example of the roundabout calculations used in deflection angle work is given in the following illustration: The draftsman, in projecting some new work, decides that a new heading should be driven from a certain point to another fixed point; he takes the coördinate values and figures a course; in setting the sights, the transitman figures the deflection angle he must turn from the course; and finally in plotting the transit notes, the draftsman figures the course on which to plot the notes from the deflection turned by the transitman. The draftsman knew the course originally, and yet before he finally plots the notes it is necessary for both transitman and draftsman to transpose from course to deflection angle and vice versa; and I cannot see the necessity or advantage of a different system for the office than for the field work, and certainly most all office work is expressed in terms of courses. With the azimuth system, only one calculation is necessary to transpose from azimuth to course, and that calculation

is so simple an addition or subtraction that it is usually done mentally and can hardly be called a calculation.

In regard to changing the system, I think it safest to start in with some surface surveying, as it is much easier to break in a transitman to a new system if he is unhampered by the difficulties met with in underground work. For a short time continue to run surveys with deflections, but in addition, after having noted the deflection to the foresight, take a new backsight with the vernier set on the azimuth to that point, and then after sighting on the foresight read the azimuth to that point also. This will give the transitman a clearer understanding of azimuth than any written description will do.

After the transitman has a thorough understanding of the system, pick out some circuits that make close angle ties and write the azimuth from station to station in the notebooks. This can be done without disturbing the old notes in any manner, and if a dozen circuits are prepared in this manner in the different sections of the mine and on the surface, it becomes merely a matter of time until the whole field is in the same shape. The change in system will have been so gradual that I am sure there will be no confusion of records; and I am equally sure the results will be worth the effort.

The Storage Battery

By Electrical Engineer

Storage batteries are sometimes called secondary batteries. This is a term used to identify them from the ordinary type, which is called a primary battery. A secondary battery is one that is used as an accumulator or container wherein to store up electricity; it has to be charged with electric current before it is of any use. A primary battery is one that makes and delivers its own current, by the action of chemicals on plates of metal or other substances.

In the making and operating of the lead-acid type of storage battery, the positive plates are made of red lead mixed into a paste with sulphuric acid and pressed into lead grids, or frames. The negative plates are made up of metallic lead ground into a powder and mixed into a paste with sulphuric acid, and then pressed into a similar frame. The plates are then assembled into batteries, using wood and rubber separators to keep them insulated from each other. The battery is then filled with sulphuric acid and allowed to stand for 10 or 12 hours before being placed on charge. This gives a chance for all the sulphate in the acid to be absorbed by the plates, and if a hydrometer reading of the electrolyte were taken at this time, it would indicate water.

The batteries are then put on charge, one terminal being connected to the + or positive group, the other to the — or negative. The current is run through the battery, relying on the water or acid for a conductor to complete the circuit. As the current flows through the sulphate gradually comes out of the plates into the water, converting it into sulphuric acid. A battery is never fully charged until all the acid has been removed from the plates.

When the battery is put into use, a reverse action takes place, the sulphate leaving the water and going back into the plates until the battery is fully discharged.

A storage battery must be charged with direct current; never use alternating current for this purpose, as it will ruin the battery. If alternating current only is available, it will be necessary to provide apparatus for converting it into direct current. Several forms of apparatus are on the market for this purpose, either motor generators or rectifiers. Always connect the positive terminal of the battery to the positive wire of the charging current and the negative battery terminal to the negative wire of the circuit.

The charging rate of a storage battery varies with the different types. A current in excess of the regular rate, or too long a charge, will cause the plates to buckle and the cells to sulphate. It is important that a lead-acid type of battery have the best of care and attention. A battery charge is usually complete when, with charging current flowing at the normal rate, all cells are gassing (bubbling) freely and evenly, and the specific gravity and voltage of all cells have reached a maximum—that is, have shown no further rise during a period of 5 hours.

Once every week, or as often as may be found necessary, remove the filling plugs from the cells and add pure water until the level of the electrolyte rises to the proper height. It is necessary at all times to keep the plates and separators covered with electrolyte; water should be added to the cells before or during the early stages of a charge, as the electrolyte will then become mixed by the gassing, so that correct hydrometer readings can be taken and any danger from freezing in cold weather is avoided, as thoroughly mixed electrolyte will not freeze solid.

Seldom Necessary to Add Electrolyte

As only water evaporates from the electrolyte, there being no loss of acid, it is never necessary during normal service to add acid or electrolyte to a battery. If, however, a battery is upset and acid spilled, or if a jar is cracked and electrolyte leaks out, it should be replaced with electrolyte of the proper specific gravity. Positive plates in all types of batteries are usually dark brown in color; negative plates are usually gray in color. Separators usually consist of specially treated flat wooden veneers which are placed between adjacent plates of the element.

The fluid, or solution, in the cells, called the "electrolyte," is a mixture of pure sulphuric acid (oil of vitriol) of approximately 1.84 specific gravity and pure water. The specific gravity of the electrolyte in the average battery when fully charged should be between 1.250 and 1.280 at a temperature of approximately 70 deg. F. Decreasing specific gravity throughout the battery (when not due to insufficient charging) indicates that sediment is accumulating in the bottom of the jars. An inspection should be made when the specific gravity of the fully charged battery remains low.

Change in temperature of electrolyte affects the specific gravity, and where the change is considerable it should be allowed for when taking readings, as follows: For each 3 deg. in temperature above 70 deg. F. add one point to the hydrometer reading, and for each 3 deg. of temperature below 70 deg. F., subtract one point. Acid is usually furnished of 1.835 or 1.84

specific gravity, and may be broken down to a lower gravity by mixing with pure water. When mixing, always pour the acid into the water; and if it becomes warm allow it to cool before using.

The ampere-hour capacity of a battery, the cells of which are connected in one series, is the same as that of a single cell in the series. The ampere capacity of a cell depends upon the number of plates of a given type. The ampere-hour capacity of a plate depends upon the amount of available active material it contains.

Since acid and lead combine with each other in a definite proportion in producing current, it might seem possible to have acid and lead in a cell in such quantities that both would be completely exhausted. Toward the end of the discharge, however, the electrolyte would be so weak that it would not be capable of producing current at a sufficient rate for any practical purpose. For this reason, it is necessary to have electrolyte acid in excess of the amount actually used in the plates during discharge. Similarly, if all the active material were combined with acid, the plates would lose their porosity and conductivity, and an excess of active lead material is likewise provided. It is customary to make both outside plates in a cell negative. The cell contains, therefore, an odd number of plates and the capacity is fixed by the number of positives.

Batteries Should Be Carefully Charged

Since the current is produced by the action of sulphuric acid on the lead in the plates, the rate at which the acid can get to this material determines the maximum rate at which current can be produced. During any discharge of a battery, there is being formed sulphate of lead, without which there would be no production of current. If, however, charging is neglected, the sulphate reaches a condition which tends to fill the pores of the plates and make the active material dense and hard. It is this condition which is ordinarily referred to as "sulphated." The cause of this condition is some form of abuse, such as standing discharged for some length of time, habitual undercharging, neglecting evidence of trouble in individual cells, replacing evaporation with electrolyte, thereby restoring specific gravity by adding acid to the cell instead of bringing it out of the plates by proper charging. The lead sulphate formed in a normal discharge of a battery is in a form in which it absorbs the charge readily.

When a battery is sulphated, the sulphate is in a condition to absorb the charge with difficulty and the ordinary charge is insufficient. Continued and persistent charging at a low rate will restore any condition of sulphate, the time being in proportion to the degree to which the condition has been allowed to extend. It is a question of time; since a high rate will only produce gassing and high temperature, the low rate is all that a battery in this condition is capable of using.

A battery is sulphated only when acid is tied up in the plates. When the specific gravity of the electrolyte has reached a maximum, it shows that there is no more sulphate to be acted upon, since during charging the electrolyte receives acid from no other source. Hydrometer readings should therefore be taken at regular intervals during charging to determine if the specific gravity is rising or if it has reached its maximum. The charging should be continued until there has been no further rise in any cell during a period of 12 hours. The active material of sulphated negative plates is generally of light color, and either hard and dense or granular and gritty and easily disintegrated. It is the negative plates which require the prolonged charge necessary to restore a sulphated battery. Sulphated positives, unless physically disintegrated or badly buckled, are but little changed in general appearance and can be restored to operative condition, although their life will not be as great as if they had not been subjected to this abuse.

Sulphated plates should be handled as little as possible. Mining is rough, hard work, and mining apparatus must be exceptionally strong and rugged to stand the strain. Especially is this true of the storage batteries.

The Edison nickel-iron-alkaline storage battery consists of a combination of iron and nickel elements in a nonacid electrolyte. The characteristics of this battery are different from those of the lead-acid type. The elements—nickel hydrate and iron oxide—in an alkaline solution, are contained in a nickel-plated steel container. The gases evolved from this cell on charging do not carry with them any noxious fumes. No injury is done this cell by an overcharge nor if it is accidentally charged backward. It must be charged in the proper direction, however, to render service. Specific gravity readings on the electrolyte are not necessary. Many of the troubles encountered with the lead-acid type of battery are eliminated in the Edison battery. If the electrolyte is emptied out and replaced with new every nine or ten months, satisfactory operation may be anticipated.

Ventilate the battery room or compartment and never bring a flame or spark near the battery when charging. Always be careful, orderly and clean; never undercharge the batteries or try to hurry up the charge by an excess of current. Give the batteries proper and careful attention, and the reward will be satisfactory service and long life.

Lake Coal Receipts at Milwaukee

The following figures show the coal movement to Milwaukee by Lake during 1917 compared with that of the previous year:

Month	Anthracite		Bituminous	
	1917 Tons	1916 Tons	1917 Tons	1916 Tons
January	3,861	10,636	26,037	16,052
February	8,992	24,814	18,847	21,027
March	11,369	24,550	19,394	21,094
April	32,134	74,946	148,753	184,348
May	63,553	78,115	372,463	610,617
June	87,273	70,278	386,510	480,685
July	106,817	138,678	507,671	539,462
August	150,938	157,684	462,156	669,077
September	135,571	71,669	392,660	476,983
October	190,847	90,386	427,101	408,722
November	149,586	132,621	301,736	284,119
December	38,935	71,178	131,978	288,698
Total	979,876	945,555	3,195,306	4,000,884

These figures are from the books of the custom house and include coal which arrived on carferries from across Lake Michigan. This accounts for the winter receipts by lake. Carferry receipts should logically be classed as rail receipts. About 10 per cent. of their volume remains in Milwaukee. The rest goes through to the interior. In 1916, carferries brought 97,256 tons of hard coal and 262,568 of soft coal. Last year the record shows 64,047 tons of hard and 174,144 tons of soft coal.

Coal—Its Origin and Composition

By H. B. MILLER
Pittsburgh, Penn.

SYNOPSIS—*This article answers the oft-repeated questions: What is coal? How was it formed? How is the presence of partings, binders, sulphur, etc., accounted for? The various stages in the formation of coal from vegetable matter to its present form, and the conditions favoring development, are noted. The "earmarks" of coal beds are explained; the substances composing coal analyzed. The heat units spoken of in connection with coal are defined; and the method of determining the calorific or heating value of coal enlarged upon.*

IT IS generally conceded by geologists that coals of the various beds represent in varying stages of preservation accumulations of vegetable matter, also a small proportion of the remains of animal life; and that coal is transformed peat, which formation took place from plant remains in vast lowland or coastal swamps and deltas, and on a nearly horizontal surface at or near sea or lake level. During this formation there was an abundance and luxuriance of the vegetation, such as fern-like plants, numerous climbing ferns, as well as the number and size of lepidophytes and calamites.

The characteristics of climates during the coal-forming period were mildness of temperature, and in most cases tropical or subtropical; also during this time there was a uniformity of climatic conditions, high humidity and abundance of rainfall. This accounts for the great luxuriance in growth of plants and their much greater annual contributions of refuse delivered over the peat-forming area.

Length of Time to Form One Foot of Peat

As to the amount of peat growth per year, it differs according to opinion. It can be assumed, however, that 1 ft. of peat can be formed under a bog in 10 years, which would be known as surface peat; but this would be further reduced when compacting would take place and under bacterial action furthering the decomposition of the underlying peat. So it is figured that the rate of formation is 1 ft. per century at a depth of about 18 ft., and that it takes 3 ft. of well-compacted old peat deeply buried to produce 1 ft. of bituminous coal having the character of the Pittsburgh bed of Pennsylvania, or 300 years to produce 1 ft. of coal, or 1800 years for 6 feet.

The formation of a thick bed of coal is therefore seen to indicate in general the maintenance for a long period of an approximate balance between the rate of peat accumulations and the rise of the water, so as to maintain a depth of water favorable for the growth of the vegetation and its preservation as peat.

The transformation of fresh vegetable matter into coal was accomplished by two different processes known as the "biochemical" and "dynamochemical." During the biochemical process, under somewhat varying and yet restricted conditions attending the formation of peat, the accumulating vegetable matter became more or less disintegrated or decomposed and reduced, and many of the organic chemical compounds of the original material were more or less broken down and changed in ways controlled by those conditions. Therefore, the residual product of the biochemical process was a peat, or its equivalent, according to its process or advanced stage.

The dynamochemical process covered the chemical and physical alterations of the coal-forming matter (peat) induced and controlled by geodynamic influences. The first physical expression is seen in the densification of the peat under the load of superincumbent strata, and in consolidation of the residual substances. In this way the fuel mass, much reduced in volume, assumed its more typical geologic relation as a stratified mineral sediment or bed of coal. The various grades of coal, such as anthracite, bituminous, sub-bituminous, cannel coal and lignite were thus formed, according to the conditions and various stages passed through.

The Interval between Coal Beds

The interval between coal beds and existing stratigraphy of the present day was caused by subsidence and the deposition of varying thickness as of other materials, such as clays, sands and calcareous muds, which became solidified, thus giving the rock and shale stratas. Following this there was a slight uplift of the region and consequent withdrawal of most of the water, so that the level of the subaqueous deposits was so near to the surface of the water cover as again to favor swamp conditions and the formation of another bed of coal. Therefore, coal has been derived from plant life, or rather its most resistant components which make up its residue, of which resin, resin waxes, waxes, and higher fats, or the derivatives of the compounds composing these, are the most important.

The presence of binder in coal is due to the variations of water level that took place attending its formation; the withdrawals of the water cover were temporary irregular reductions, seasonal or perhaps less frequent. These periods of reduction and evaporation appear generally to have been attended by concentration of the hydrocarbon solutes resulting from the putrefaction process in the form of paste, which now constitutes the jet-like "binder" of the coal, or its sheeting by fragments of "mineral charcoal" ("mother of coal").

As coal was formed at or nearly sea or lake level, it is indicated that the sea did probably in some cases break over the coal—formation swamp at times—and caused an intercolation of overwashed muds, silts or sands, which later became solidified, forming partings such as slate or rock bands.

The substances usually considered in the composition of coal are moisture, or water, volatile combustible matter, fixed carbon, sulphur and ash. The amount of moisture in coal is variable and depends upon its nature and physical condition. However, as a constituent it has no value and is dug, handled, hauled and expelled

at the cost of fuel. Every per cent. of moisture present, means 20 lb. less fuel for each ton of coal.

Volatile combustible matter is that portion which may be driven off in a gaseous state by heat and is an important constituent in determining the quality of coal. The variance of the per cent. of volatile matter in coal is due to the work of the dynamochemical process during its formation or the transformation of the fuel from the peat stage, or primary rank of coal, to the more advanced ranks of coal—that is, the progressive reduction of the volatile matter of the fuel, or the "devolatilization" or "carbonization" of the coal, caused by pressure, thrust, expulsion of water, escape of gases, and additional changes in the chemical constituents. Volatile matter consists principally of water in the coal plus a portion of the sulphur combined (say, about one-half the total sulphur in the coal), plus the nitrogen and hydrocarbons of unknown and varying compositions. Nitrogen and combined water in the volatile matter have no heating value. If present in large amounts, the heating value of the combustible will be correspondingly lower.

Fixed carbon is usually the principal combustible of coal, and as its name indicates is mostly carbon, derived from plant life and one of the organic compound elements that go to make up coal. With an increase of fixed carbon there is a decrease in volatile matter, and vice versa.

The presence of sulphur in coal can be attributed to the submergence of the coal-forming peat deposits during the early stages of coal formation, and the immediate occupation of the area by animal life and the action of sulphur bacteria. In some basins the high sulphur content is caused from the erosion that occurred of some of the richly sulphide-bearing rocks in the drainage of the basin. In some cases it also has been caused by secondary enrichment, the sulphur being brought probably as sulphates from overlying strata and anticlines, and deposited as sulphides in the basin by the decomposing agency of circulating ground waters.

Some Data on Sulphur in Coal

Sulphur usually occurs in coal in the form of iron pyrite (FeS_2) and is present either in scattered masses or partings, and sometimes in such a finely divided form that the separate particles are too small to be recognized. When sulphur is combined with carbon, or carbon and hydrogen, it is known as "organic" sulphur. Sometimes sulphur occurs in coal in the form of free sulphur, but the relative amount of this is small. Sulphur when burned will develop heat and is not an inert substance, like moisture and ash; but its occurrence in coal as pyrite, as is usual, is objectionable on account of its forming clinkers and having corrosive features. Sulphur in coal cannot be removed by washing if its presence is organic, but it can be removed to a fair extent if its presence is in flakes or lumps of appreciable size, providing the coal is crushed sufficiently to allow the separation of a large part of the pyrite from the surrounding coal.

It has been conceded that beds of coal represent accumulations of vegetable matter in varying stages of preservation and as a rule but a very small proportion of the remains of animal life. Mingled with the organic substances are different inorganic mineral sediments, which, together with the mineral matter originally contained in the plants themselves, constitute the "ash" of coal. The high ash content of a coal may be due to the precipitation of colloids by the overflow of alkaline waters and the deposition of silica in the organic mass of the coal.

The term "ash" as ordinarily used means the mineral residue left after complete combustion or burning of the coal. It is an inert constituent which means 20 lb. of weight to be handled and 20 lb. loss per ton of coal for each per cent. present. The color of the ash gives an idea of the amount of iron contained in the fuel. In a proximate analysis of coal the moisture, volatile matter, fixed carbon and ash should total 100 per cent.

The Calorific or Heating Value of Coal

The most accurate method of determining the total heating value of coal is by direct determination in the bomb calorimeter (dry basis). A calorie is the quantity of heat required to raise the temperature of one kilogram of water 1 deg. C. at or about 4 deg. C. A pound-calorie is the quantity of heat necessary to raise the temperature of 1 lb. of water 1 deg. C.

A British thermal unit (B.t.u.) is the quantity of heat required to raise the temperature of 1 lb. of water 1 deg. F. at or near the temperature of maximum density, 39.1 deg. F., or the amount of heat required to raise the temperature of 1 lb. of water from 63 to 64 deg. F.

The amount of heat obtained in the burning of 1 lb. of coal under theoretically perfect conditions is called the B.t.u. of the coal. Each heat unit represents 778 foot-pounds of energy, the mechanical equivalent of one unit.

$$1\ B.t.u. = 0.252\ calorie$$

$$1\ pound\text{-}calorie = \tfrac{9}{5}\ B.t.u. = 0.4536\ calorie$$

Before the bomb calorimeter came into use the heating value of coal was frequently calculated from the ultimate analysis by either of Dulong's formulas following:

Calorific value in pound-calories per pound:

$$8080C + 34{,}460\left(H - \frac{O}{8}\right) + 2250S \qquad (1)$$

Calorific value in B.t.u. per pound:

$$14{,}544C + 62{,}028\left(H - \frac{O}{8}\right) + 4050S \qquad (2)$$

The agreement between the calorific values calculated by Dulong's formula and those determined by the calorimeter are fairly close, with a probable error not exceeding 2 per cent. by Dulong's formula.

The combustion of the heat-producing constituents of coal yield essentially the heat produced by the oxidation of the carbon plus the heat produced by the oxidation of the hydrogen not combined with oxygen, plus the oxidation of unoxidized forms of sulphur and iron.

The fusibility of the ash is dependent upon the chemical and physical condition of the minerals present. When sulphur is present as pyrite it may produce, by being united with other constituents of the ash, a fusible compound or clinker. Generally the most readily fusible mixtures are those approximating a uni-silicate. Some silicates up to a tri-silicate composition are fusible at temperatures between 1000 and 1200 deg. C. (1800 to 2200 deg. F.). Ash from coals high in pyrite is necessarily high in iron, and the ratio between the

bases and silica is often such that easily fusible compounds may be formed.

Phosphorus occurs in coal and rocks of various kinds and ages. Its name is derived from the Greek words *phos*, "light," and *phoros*, "bearing." Its presence like sulphur in coal, in large amount, makes a coal of that kind objectionable for the manufacture of iron and for metallurgical purposes generally.

In conclusion, from the foregoing it can be judged that coal has originated from plants of various kinds ranging all the way from algae and fungi to large trees (and a very small proportion of animal life) which finally took the form of peat under the biochemical agencies during the peat stages and then underwent the action of the dynamochemical agencies during the coal stages. Coal is therefore considered transformed peat.

The proportion of the products of the composition of coal has already been described and accounted for, but it can be stated that the analysis of a coal does not necessarily determine its value or the use to which it can be put. However, by comparison of various analyses certain standards may be adopted showing in a general way for what purpose it is best suited.

EXAMPLES OF THE VALUE of anthracite lands in the early days may be of interest. In 1792 large areas of land were leased to the Lehigh Coal Mine Co. for two ears of corn a year. The State of Pennsylvania patented between 1795 and 1816 large areas for $2 to $4 an acre. In the period 1840-60 as much as $50 was received for this coal land, and in the late '70s the value had risen to $500 an acre, while at the present time $3000 an acre for virgin coal land is not dear.

Coal Exports from New York

During the year 1917 there was exported from the Port of New York 134,253 tons of anthracite coal, 14,348 tons of bituminous and 21,908 tons of coke. For the year 1916 the exports were 204,327 tons of anthracite, 42,302 of bituminous and 18,872 tons of coke; showing a decrease in the amount of anthracite exported in 1917 of 70,074 tons; 27,954 tons of bituminous and an increase of 3036 tons of coke. The exports by months, as compared with 1916 follow:

Month	Anthracite		Bituminous		Coke	
	1916	1917	1916	1917	1916	1917
January	8,921	7,934	893	2,049	136	1,660
February	8,740	4,981	1,245	1,731	817	1,211
March	8,231	13,720	2,193	3,224	2,177	505
April	19,257	8,339	2,229	171	1,677	1,325
May	17,809	16,714	4,419	995	1,331	1,900
June	20,949	14,693	5,108	1,939	966	3,650
July	19,489	15,967	4,387	448	1,897	3,434
August	40,671	3,942	6,025	967	1,195	1,763
September	6,800	26,988	1,012	593	2,447	2,909
October	36,235	3,288	8,427	43	2,521	1,531
November	7,751	10,856	1,934	1,229	1,957	304
December	9,474	6,831	4,430	959	1,751	1,716
Total	204,327	134,253	42,302	14,348	18,872	21,908

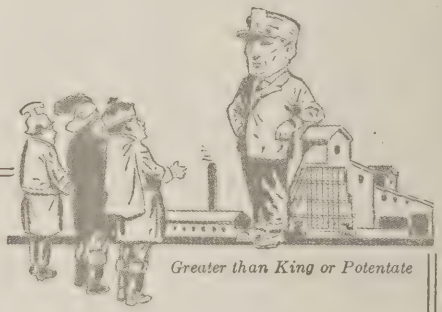
The reports show that of the anthracite exported from this port Canada received 98,402 tons; Newfoundland, 9445 tons; San Domingo, 11,738 tons; Brazil, 986 tons; while 1497 tons went to Chile.

Of the bituminous coal Brazil received 1999 tons; San Domingo, 755 tons; Canada, 30 tons; and Chile, 316 tons. Chile received 3475 tons of coke, Brazil 1115 tons and England 437 tons.

To France was sent during the 12 months 8571 tons of coke, 112 tons of anthracite and 54 tons of bituminous; while Italy received 200 tons of anthracite, 804 tons of coke and 125 tons of bituminous.

THE MINER

BY BERTON BRALEY

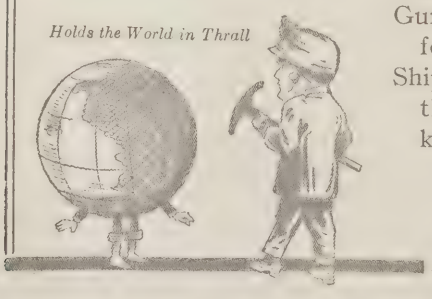


Greater than King or Potentate

GRIMY, and caked with dust of coal he stands,
Grasping his pick within his mighty hands;
The arbiter of destiny and fate,
Greater by far than king or potentate.

Shops may not run except at his behest,
At forge and blast his strength is manifest.
The rolls that rumble and the shears that scream
And all the million miracles of steam

Depend on him for fuel that will turn
The wheels that urge them and the belts that churn.
Guns that will shatter fortresses of steel,
Ships that will plow the waves on steady keel.



Holds the World in Thrall

BEARING munitions for an army's need
Must wait the miner's orders and take heed
That he who toils within the coal mine's murk
Gives them the coal with which they do their work.

Behind the men who battle in the trench
There stand the workmen at the lathe and bench,
But back of them and master of them all
The miner stands and holds the world in thrall.

Not soon again shall any man forget
How much the world is in the miner's debt,
For we shall read upon fame's honor roll
"He won the war—his labor gave us coal!"



[Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Union Trust Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 307, Union Trust Building, Washington, D. C., while at the capital.—Editor.]

State Administrators Granted More Power

An excellent opportunity to measure the caliber of state fuel administrators was presented on the occasion of the recent meeting of these officials called by Dr. Garfield. While there are some notable exceptions, the general opinion, formed by those who had an opportunity to estimate their ability, is that many unfortunate selections were made.

The state administrators were granted additional authority at this meeting in that they will hereafter determine from whom diverted coal is to be withheld. In order, however, to safeguard the exercise of this power, they have been asked to appoint an advisory committee of three men. It is specified that they must be familiar with the coal business in the state in which they are to serve. State administrators also have been asked to coöperate with the state councils of defense in the hope that diversions may be made so as to cause the least possible loss and inconvenience.

The Fuel Administration admits that the failure to specify from what consumer or area coal should be withheld, when it is diverted to meet an emergency, is apt to create new emergencies and therefore is generally unsatisfactory. It is feared very much that the inability of many of the state administrators to obtain a grasp of the situation is going to interfere seriously with the plans of J. D. A. Morrow, who is in charge of distribution.

Weekly Production Statistics

Production of anthracite coal continues far below the rate of that of a year ago. For the week ended Feb. 2, production totaled 9,423,000 tons. This was a decrease of 113,000 tons in the average per working day, as compared with average of the week preceding. The decline was shared by beehive coke. Production during the week ended Feb. 2 was 446,000 tons, or a drop to 74,000 tons per working day. There was a slight increase in anthracite shipments, which totaled 34,804 cars, in the week which ended Feb. 2. The figures given above are estimates made by C. E. Lesher, of the United States Geological Survey. The Survey receives weekly returns from such a large percentage of coal operators that their estimates rarely vary more than 1 per cent. from the final figures.

Coal-mining operations at bituminous mines throughout the country were conducted at 66.1 per cent. of full-time capacity during the week ended Jan. 26. Car shortage was responsible for 26.6 per cent. of this loss. Production increased decidedly in Illinois, where it reached 74.3 per cent. of full-time capacity. In Ohio, however, the showing during the week ended Jan. 26 was poor due largely to unfilled car orders. The mines in that state operated at 53.3 per cent. of capacity. Alabama made a good showing by operating at 87 per cent. of capacity. Southwestern Virginia attained 83.6 per cent. of full-time capacity.

A decided improvement was shown during the week of Jan. 26 at the byproduct coke ovens, where 70.6 per cent. of capacity was attained. Inability to secure coal was the only factor of importance limiting production.

Prices Increased in West Virginia

An increase in the President's schedule of coal prices has been allowed in the Kenova and Thacker fields of West Virginia. The new prices are: Run-of-mine, $2.40; prepared sizes, $2.65; screenings or slack, $2.15. This represents an advance of 40c. An additional 45c. may be added by those operators who have complied with the Washington wage agreement. The same price is to apply to all coal mined in Maryland and in Mineral, Grant, Tucker and Preston (in part) Counties of West Virginia.

More District Representatives Appointed

H. N. Taylor, of Kansas City, has been appointed district representative for the coal fields of Arkansas, Iowa, Kansas, Missouri, Oklahoma and Texas to serve as representative of all individual shippers and mines included in that area.

Mr. Taylor is directed to establish the necessary organization properly to conduct the activities of the office. He will arrange with each individual shipper and mine in his district to furnish notice of production, working time, free coal and shipments. He will compile reports of production, working time, car supply, shipments and

free coal and report such figures to Washington in totals at the end of each week.

The reports of District Representative Taylor, as well as those of the other district representatives heretofore appointed, are to be made to J. D. A. Morrow.

John C. Brydon, of Somerset, Penn., has been named the district representative of the Fuel Administration for the coal operations in Somerset County which are tributary to the Baltimore & Ohio.

G. B. Kilgore, of Norton, Va., will be the district representative for the counties of Dixon, Lee and Wise, in Virginia. He also will have charge of production in a portion of Russell County.

Coal fields in Arkansas, Iowa, Kansas, Missouri, Oklahoma and Texas are to be represented by H. N. Taylor, of Kansas City, who has been named district representative of the Fuel Administration. The district representatives collect from each mine data as to production, working time, free coal, shipments and car supply.

Coal fields in western Kentucky are to be represented on the Fuel Administration's staff by C. E. Reed, of Louisville. Mr. Reed is the eighteenth district representative to be appointed.

Our Coal Exports in 1917

Total exports of bituminous coal in 1917 amounted to 21,362,670 tons. This compares with 18,977,346 tons in 1916 and 16,764,857 tons in 1915. Anthracite exports in 1917 were 5,400,509 tons. In 1916 they were 4,165,652 tons and in 1915 they were 3,540,406 tons. Exports of coal to Italy fell from 1,735,072 tons in 1916 to 560,628 tons in 1917. The principal increase in coal exports was in those going to Canada, which country in 1917 took 16,256,006 tons of American coal. This compares with 11,839,447 tons in 1916. There was a slight increase in the coal sent to Panama; a decrease in the amount sent to Mexico; a slight increase in that going to Cuba; a slight decrease in exports for Brazil, while Argentina secured only one-third of the amount of coal which it has been accustomed to get from the United States.

What the "Closing-Down" Order Meant to the Country's Industries

An estimate of the losses caused by the closing-down order and the amount of fuel saved has been made by officials connected with the office of the Director General of Railroads. The estimate is as follows:

City	Fuel Saved	Wages Lost	Manufactures Lost
New York	$31,500,395	$357,498,000	$1,063,677,000
Chicago	27,486,908	213,757,000	381,535,000
Philadelphia	14,378,757	138,249,000	333,303,000
Detroit	5,446,475	69,447,000	178,099,000
Cleveland	10,903,284	67,351,000	153,925,000
Boston	3,845,540	49,444,000	134,234,000
Buffalo	6,824,615	34,818,000	89,520,000
Pittsburgh	10,470,576	45,066,000	96,779,000
Milwaukee	5,349,465	36,270,000	98,679,000
Baltimore	3,135,391	35,509,000	94,639,000
Cincinnati	2,198,284	33,159,000	96,735,000
Newark	3,424,436	36,647,000	97,163,000
Minneapolis	2,430,957	18,895,000	56,655,000
Jersey City	2,928,492	17,657,000	52,746,000
Perth Amboy	1,353,245	4,996,000	13,215,000
Rochester	1,569,614	26,600,000	82,167,000
Indianapolis	2,765,979	19,042,000	43,636,000
Akron	1,273,176	17,310,000	56,230,000
Totals	$137,285,589	$1,218,715,000	$3,122,937,000

Idle Monday Order Is Suspended

The order providing for heatless and workless Mondays until Mar. 25 was suspended on Feb. 13 by an official announcement from Fuel Administrator Garfield. The order was concurred in by Director General of Railroads McAdoo.

The only drastic regulation which still remains effective is that providing for a preference list to which coal will be shipped first, other industries and interests being forced to depend upon their supply from surplus coal.

The fuelless Mondays had been discontinued on Feb. 8 in North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Tennessee, as the needs for domestic requirements in those states are very much less than in the East, while the absence of congestion on the railroads in that section had made possible a general distribution of coal.

Mine Workers Favor Curtailment of Passenger Traffic

Curtailment of passenger service on all railroads of the country to allow the motive power thus engaged to aid in clearing up congested coal yards and switches, and to bring empties back to the mines, has been indorsed by two district executive boards of the Ohio Mine Workers.

These boards, representing subdistricts Nos. 1 and 2 of Ohio, indorsed the passenger-train reduction plan for 15,000 miners of seven Ohio counties in southern Ohio, who have worked less than 50 per cent. time in the past two months, because of the critical car situation.

"It's more motive power we need, and unless we get some action soon there is bound to be more serious want among the miners of this district," says George Cecil, of Wellston, president of subdistrict No. 2, which represents 3500 miners in Meigs, Vinton, Jackson and Lawrence Counties. This sentiment was also expressed by Sanford Snyder, of Athens, president of subdistrict No. 1, which represents 11,500 miners in Hocking, Athens and Perry Counties.

"Reduction of passenger-train service to give us more engines looks to me to be a way out of the present tie-up," was the expression of Conrad Weir, of Murray City, secretary of subdistrict No. 1.

An indorsement of the proposed passenger-train curtailment was given by nine coal operators in Jackson County, who have wired Director of Railroads McAdoo asking annulment of passenger-train service every other day, after the public receives due notice. Among the signers of this telegram is Jerry Morrow, for 52 years an operator in this district, who is president of the Jackson County Coal Club, an organization of 25 operators. "Such action would undoubtedly help a great deal and ought to be taken," says Morrow.

L. A. Snead, in charge of distribution for the Fuel Administrator, prior to the appointment of a representative of the coal-mining operators as manager of distribution has been assigned to the task of working out a method of equitable distribution of coal among domestic consumers. In this work he will visit a large number of localities throughout the country.

Minecdotes

Why Mine Mules Are Invariably White?

Some years ago, when mules were generally used for motive power in mine haulage, the operating officials of a large anthracite colliery received from the general office of the operating company a letter reading about as follows:

On Monday morning, Mr. ———, a representative of the "Philadelphia ————," will call on you. He is desirous of writing a description of an anthracite mine, and the methods employed in mining, for publication in his paper. Please show him through the mine and give him an opportunity to gather material for his proposed article.

The letter was signed by an executive official of the operating company, a gentleman not familiar with the details of mining.

The mine was a shaft mine, and a large producer. The principal workings were in the Mammoth seam, which had but slight inclination, and there were numerour gangways, headings, etc., in the neighborhood of the shaft bottom, through which several routes could be taken to walk from one side of the shaft to the other, without crossing the bottom of the shaft.

The operating officials were opposed to visitors entering the mine, unless they were mining engineers, or officials of other mines who came to see some specific operation, for such men could be relied upon not to interfere unduly with the hoisting of coal, as they would know how to keep out of the way of moving cars at and near the foot of the shaft.

The mine, being a large one, had besides the regular inside foreman two assistant foremen, one of whom was a young Welshman with a keen sense of humor and the ability to "put up a job" on a novice without cracking a smile.

When, on the particular Monday morning, the mine foreman told his assistants, with many imprecations and much grumbling, that the visitor would shortly arrive, and that he "hadn't any time to waste on him," the aforementioned assistant foreman, with twinkling eyes, said: "I'll take care of him, and when he comes out he'll be able to write a fine story." The foreman, knowing Tom's disposition, said "All right, Tom—here he comes now."

The newspaper man entered the office, introduced himself, and was informed that Tom would show him through the mine. Tom excused himself to arrange for an empty cage, and incidentally to see the hoisting engineer. The cage being ready, Tom and the reporter stepped on the cage, and the signal to lower was given. The engineer dropped the cage rapidly, and the visitor immediately sank to the floor and grasped one of the track rails, to keep the cage from dropping away from him. When the cage gently landed at the bottom, he was led, trembling in every nerve, off the cage, and was given a few minutes' time to partially recover and focus his eyes so that he could see to get around by the light of an ordinary miner's lamp.

Tom then took him on a long walk through gangways and headings around the shaft, repeatedly covering the same ground, showed him the pumproom and sump gangway, then through a passageway in which there was an old white mule used for numerous odd haulage jobs near the shaft bottom. As they approached the mule, and were about to pass his rear, or business end. his driver, a typical driver boy, yelled, "Look out fer that meule, he kicks!" Tom, of course, guided the visitor by the mule in safety, and then regaled him with many stories of the peculiar intelligence of mine mules. He told him that besides pulling the large mine cars, they pushed them, by "breasting"; that they knew to the minute starting time in the morning, when twelve noon arrived, starting time at one o'clock, and quitting time at night, etc., etc. He also told him many weird tales of the deviltry and visciousness of mine mules generally.

In the meantime, he managed, unknown to the visitor, to tell the driver boy to lead the mule around, so that as he walked the visitor repeatedly through the same passageways, they would frequently meet the mule. In due course, as Tom was careful to keep the visitor out of the way of moving trips, and he saw no other mules, he commented on the number of white mules in the mine, and of course Tom explained why white mules were used. Several times, either before or after they passed the mule, the driver would tease him and start him kicking.

Then, after Tom had taken the visitor into a productive part of the mine, and the sound of the firing of shots had given him an uncomfortable feeling, he was taken to the foot of the shaft and hoisted to the surface. With many expressions of thanks and protestations that "never again will you get me inside a coal mine," he left.

Two days afterward the Philadelphia ———— published a three-column article on "How Anthracite is Mined." Among many other statements that amused its readers in the coal regions, appeared the following:

Owing to the darkness in the mine, only white mules are used to haul the coal to the foot of the shaft, because they can be seen much more easily than those of other colors. These mules, while trained to a high degree of intelligence in their work, are invariably bad tempered and vicious. It is claimed that the inky darkness of the mine has a great effect in developing both the intelligence and visciousness of mine mules.

Cement Needed for Concrete

The following table, taken from "The Ransome Book," shows the amount of cement used in the making of concrete having various mixtures:

CEMENT USED PER CUBIC FOOT OF CONCRETE

Mixture	Sacks	Mixture	Sacks
1 : 1 : 1	0.5404	1 : 1 : 1	3.375
1 : 1½ : 3	0.2808	1 : 1½ : 3	1.895
1 : 2 : 4	0.2220	1 : 2 : 4	1.498
1 : 2½ : 5	0.1848	1 : 2½ : 5	1.247
1 : 3 : 6	0.1570	1 : 3 : 6	1.060

An electric machine has been installed in the Crescent mine, near Mineral, one of the largest mines in Cherokee County. Similar equipment has been contracted for at other of the larger mines. President Howat is now preparing to make a machine-coal scale at Osage City for the operations of the Jackson-Walker Coal and Mining Company.

THE LABOR SITUATION

General Labor Review

The mine workers are still deprived by the serious car shortage of a chance to make a good living, buy Liberty Bonds and War Savings Certificates. At the recent Indianapolis convention it was stated that in one field only four days' work were secured in an entire month. One of the delegates declared that he reported for work eight consecutive days and only got two hours' work in all that time. Of course, the Geological Survey's figures, which have a broader scope, do not show these extremely unfavorable conditions, because they are too local; but even in that report it is shown that the car shortage in the high-volatile coal field of southern West Virginia mounted to 70 per cent. in the week that ended Jan. 26.

The Southern coal fields, of course, showed the least evidence of a car shortage. The weather conditions practically determined the situation North and South. In the Arkansas semi-anthracite mines there was absolutely no shortage of cars in the week ending Jan. 19 and only 2.1 per cent. in the week following. But in this field mine disability rose during those two weeks to 70.7 and 10.4 per cent., an extremely bad showing. The districts which show less than 10 per cent. of car shortage in the two weeks were Iowa, Alabama, Arkansas (semi-anthracite), Montana and Wyoming, Colorado and New Mexico, Oklahoma and Arkansas (bituminous coal), also Kansas and Missouri.

Fairmont Region Hard Hit by Car Shortage

Not every region is short of equipment. It is said in a Kemmerer, Wyo., exchange that the Union Pacific R.R. at that place was so well supplied with transportation facilities that it purposed to lay off some of its freight-engine crews. Among the sections hard hit by the shortage is the Fairmont region with 62.5 and 52.1 per cent. car shortage in the two weeks considered. The Junior-Philippi field along the Tygarts Valley River, Barbour County, West Virginia, had a shortage of cars which decreased tonnage in the two weeks 56.4 and 43.7 per cent. respectively.

Just at present strikes are not numerous. The difficulties are of another kind. The companies are trying to get the utmost out of their men, especially where cars are plentiful, which is not, of course, a general condition. The Philadelphia & Reading Coal and Iron Co. finds its position precisely opposite to that obtaining in most of the bituminous mines of the country. As J. L. Lewis, the statistician of the union, has pointed out, the shortage in bituminous mines has been principally in the day men and not in miners. In order to help the day men and make their lot more pleasant they have been awarded the larger increases when scales had to be made. But at the Reading mines, at least at the Alaska colliery, at Mt. Carmel, the excess of force was in company hands, or day men, and not in miners. Sixteen men repairing tracks, opening ditches, building brattices and other light work were offered employment in the mining of coal. They refused to exchange their positions and were discharged, with a notification that they must drive gangways, chutes or breasts or apply for work elsewhere.

On Feb. 8, the operators in the Alabama district were notified by the Fuel Administration, Order No. 370, that they would not be allowed a 45c. increase in the price of coal. The contract made recently by the operators does not provide for an increase in wage, and consequently, though satisfactory to the Fuel Administration and approved by it, the contract is not a ground for any price increase.

There seems a probability that fine weather will soon remove all risk of a fuel shortage in Alabama. Dr. A. C. Williams, chairman of the state fuel committee, is doing much toward gaining pledges among the colored miners to do more and better work. Every mine village he has visited has given him a large and enthusiastic audience and he has aroused a greater interest among colored workmen than they have hitherto shown.

The anthracite region seems to have a few men who are disposed to strike and make trouble. In the issues of the last two weeks the trouble at Laflin with the Traders Coal Co. has been recorded. On Feb. 6 several more miners went to work, but the others still held out and the tonnage of the mine did not reach capacity. This week a strike must be recorded at Moosic, which is quite close to Laflin and one of the little group of disaffected towns. On Feb. 7, 200 employees of the Lehigh Valley Coal Co., employed at the Broadwell colliery at Moosic, went on strike for the second time in two weeks. On both occasions, the difficulties related to wage scales. The strike was called by the union grievance committee.

Going back a little in time but pursuing a steady course northward, reference should be made to a strike at Taylor. Taylor lies between the disaffected territory and Scranton. On Feb. 4 1100 men and boys at the Archbald colliery of the Delaware, Lackawanna & Western R.R., Coal Department, went on strike because of a grievance presented by eight foreign miners. The strike was called off on Feb. 7 after it had been agreed that the mine superintendent and members of a committee would visit every section of the mine and adjust the scale of wages for mining both on pitch and level. The men had been receiving $2.72 per car for coal mined on a pitch. When the men were moved to a level place they wanted not only the $1.30 the contract requires, but $2.72 per car.

Trouble at Henryetta, Okla., and Drumheller, Alta.

The next strike to record is far away from the anthracite region—Henryetta, Okla. The 200 men employed by the Victoria Coal Co., at Henryetta, went on strike, Jan. 21. They have recently returned to work. The men struck because of a dispute over the water furnished to the men in the company houses.

On Monday, Feb. 4, 2000 mine workers in the Drumheller field, Alberta, went on strike. The trouble started on Saturday, Feb. 2, 175 men walking out because, according to reports, the operators refused to run a closed shop. About 70 per cent. of the mine workers are aliens, 40 per cent. being alien enemies and only 30 per cent. Canadians.

In Illinois the Peabody Coal Co., recognizing that the men in its employ were aiding the Red Cross in their attendance at the Kinkaid Centennial celebration, has decided to refund the $3 fines it had assessed under the automatic penalty clause against the men employed at its No. 7 mine at Jerseyville and its No. 8 mine at Tovey for taking a day off to attend the celebration.

Miners Ask for Better Transportation

Mine workers in many places are seeking better transportation. Two hundred mine workers at the mine of the Devereux Coal Co., located 2½ miles northeast of Springfield, Ill., have filed a petition with the State Utilities Commission of Illinois asking that train service to and from the mine be supplied. The miners complain that a train runs to the Peabody mine near Sherman every day, but it will not stop at the Devereux plant to take men from there or permit them to get off the train. The train runs within 100 ft. of the plant and might just as well make the stop.

A petition has been prepared for submission to the Indiana Public Service Commission asking that a miners' train be run on working days on the Pennsylvania R.R. between Harmony and Glen Ayr mine. On this petition appear the names of 508 coal-mine workers. Operators having mines along the track have also signed a petition. Harmony is in the Brazil field of Clay County, which is gradually growing less productive. The Glen Ayr mine is near Terre Haute and like the other Vigo County mines comparatively new and active.

Four hundred O'Fallon and Lebanon miners refused to go to work at the St. Ellen, Nigger Hollow and Prairie mines one morning last week because the East St. Louis & Suburban Electric Railway Co. sent only two cars to transport them to the mines. The St. Ellen mine was closed entirely for the day and the other two were able to work at part force. The officials of the miners' unions say they will make a report on conditions to the Fuel Administrator.

The problem of transportation is a growing one. Old mines are closing up their activities. The miners who built homes adjacent to them are left without opportunity for labor and they are seeking rapid and cheap means of reaching new mines and returning at night to their homes. This fact and the disposition to work where the coal is thickest and conditions most favorable together with the growing desire for life in larger communities will make the mine worker a leading factor in the transportation problem and will cause him also to be a great advocate of shorter hours. A man cannot labor a full day who lives a long way from his work.

Severe Discipline at Mines

Recently a Russian miner employed at the Oak Hill mine, near Belleville, Ill., near St. Louis, Mo., was arrested for firing a shot, which he found in his room unexploded, when he returned to his place in the morning. All the men were in the mine when the shot was fired. Some fled to the shaft and others made an investigation. For one reason and another no one worked that day as a result of William Matthews' imprudent action. When the case came before the county judge the man pleaded guilty, and was offered his choice between a fine of $100 and costs and 30 days in jail, and $200 and costs. After a week's consideration the man decided to accept the higher fine and save the month in jail.

The action of the miner seems to have met with the general disapprobation of operators, mine workers and the public. The heinousness of his offense caused the judge to give him the maximum penalty. Some people have doubted whether laws against such offenses can be enforced, because witnesses are hard to obtain and juries are slow to convict. Here at least is an instance where witnesses were apparently not lacking. It is ill to assume that the public and the mine workers are not interested in safe mining, for in cases of negligence, the importance of which they understand and appreciate, there is little hesitation.

Another instance in which a mine worker was fined for an offense against the mining laws is that of Philip Lipnok, who was arrested at Farmington, near Fairmont, W. Va., charged with breaking open a safety lamp in a gaseous mine. However, Lipnok had extinguished the lamp before breaking it so he did not risk his life or that of his fellow workmen. However, he was fined $50 and costs.

Suit Against Mine Workers' Union

Depositions were taken in the United States Court at St. Louis, Mo., in the $600,000 damage suit of the Pennsylvania Mining Co. A violation of the Sherman antitrust law is alleged. The suit is the outgrowth of a strike in June, 1915, at the mines of the Pennsylvania Mining Co., a Scranton, Penn., corporation. The mines are located at Jamestown, near Clarksville, Johnson County, Arkansas.

The company alleges that the strikers were mobilized in a colony of 200 tents near the mine, that they intimidated employees, destroyed the pumping plant of the mine with dynamite and fired on employees in their homes. It is claimed that the strike was the culmination of a conspiracy of the union to hamper the output and interstate shipment of nonunion coal. Peter Hanraty, former president of the union for district 21, one of the defendants, testified that he placed two organizers in the mine who worked secretly to establish the group system. He said that the union from 1910 to 1915 spent $200,000 in propaganda in an effort to unionize the "Jimtown" mine and that the union determined on its unionization because the union mines were unable to sell coal in competition with the cheap coal produced in the nonunion operation.

Women Get Same Pay as Men

The United Mine Workers of America have opposed the employment of women, urging that the dilution of labor was entirely unnecessary, as there was plenty of men to do all the work needed. It was also said that women were to be hired because they would work for less pay than men.

It has been so clear that there is a scarcity of labor in the anthracite region that the labor leaders from the anthracite districts are not among those who contend that there is no labor shortage. They are quite ready to concede it. When women were employed as clerks, weighmasters and supply-house officials in the anthracite region an investigation was made. It was found that the girls and women were working, but that they were receiving the same pay as men, so no complaint has been entered. Five more young women have recently been employed by the Susquehanna Collieries Co. and more are to be added.

Lawson Repudiated in Colorado

John R. Lawson, the leader of the miners in the Colorado strike, has been defeated by George O. Johnson, of Chandler, as president of the United Mine Workers of America in district No. 15. Johnson got 377 votes majority.

Lawson, who was tried and convicted of murder in connection with the southern Colorado strike, has been getting more and more unpopular of late. This was shown at Indianapolis, where he was denounced as a labor agent of the Victor American Fuel Co. Someone alleged that when in jail he was secretly assisted by the agents of the coal companies.

It was alleged that he was fed with chicken twenty-one times a week, without, it may be added, developing any clerical leanings. Luke Brennan, of Colorado Springs, was chosen a member of the International Executive Board. None of the "Lawson ticket" was elected, the administration carried their candidates into every office.

Strike at Drumheller Continues

The 1500 mine workers at Drumheller, Manitoba, Canada, deny that their strike is for the closed shop. They say that all they desire is the privilege of organizing a union and that this has been denied them. There seems some probability of violence, but it is being met by the Royal Northwestern Mounted Police under Major Fitz-Horrigan who are quartered at the Rosedale mine. Warrants have been sworn out by union officials for Alfred and Kenneth Moody, of the Rosedale Mining and Clay Products Co., and for several other employees of the company. The union officials charge the company's officers with having threatened the union organizers. The warrants were served on Feb. 6.

As many of the men are foreigners, and as bootlegger whiskey is circulating there is some fear of trouble. F. E. Harrison has been sent by W. H. Armstrong, the coal commissioner of the district to investigate the situation. President Thomas Biggs, of District No. 18, which includes all western Canada accompanied him. The Saskatoon, Sask., city council, board of trade and the Fuel Dealers' Association of that city, have called on the government at Ottawa to interfere as Saskatoon is mainly dependent on the coal from the Drumheller field.

EDITORIALS

Effect of the War on Labor Problems

THE war affords an opportunity to consider labor problems without the bitterness that spoils the discussion during times of profound peace. The combativeness of labor and capital is sidetracked. It is venting itself on the enemies of both. Thus it is that capital is learning to respect the leaders of labor, and labor is learning to appreciate the genius and constructiveness of capital.

And when both labor and capital are surrendering to the national needs of the war; when labor is giving its blood, its leisure, its privileges, its comforts for a great, a supreme national purpose; when capital is giving blood and services to the same great cause, there cannot fail to be a common sentiment regarding those matters about which labor and capital have too long and too often quarreled.

It is surely well when the war is still going on and all are consecrated to a great common end; when all can talk, without the heat of controversy, that the great problems of labor and capital shall be solved; not for all time nor in their entirety (when was any matter, even of science, so settled?), but solved, at least, in part and in their main essentials.

It is a time of earnest thinking. Some are hoping that capitalism will come to an end. But there must always be capital, for it is the machinery of commerce. The pick of the miner, the needle, the tamping tool, his lamp, his home, his furniture are all capital wherewith he produces coal and earns his daily bread. The miner is hourly in need of these instruments of production, and to buy them he is compelled to put by something or he must consent to put by something later to pay for them. No one can keep all he produces. He must, like the farmer, hold back something for future seeding.

And there are other forms of capital essential to the economic production of the miner—the mine workings, the haulage roads, the tipple and its power house. These are the machinery of production. We cannot do without them. Either the state or the manual worker or the management must have them, for we cannot do without them. We must put something by or we will not have them. That something is capital.

Just now the railroads, deprived of capital necessary to enable them to advance with the rest of the country, have failed to do their duty, and hence there are shortages of fuel, idle days for miners, idle days for industry, lack of food and deprivation of comfort. The railroads are without equipment because they have spent all they earned and have not been accumulating capital. Labor is nothing without the support of the past product of labor. You cannot grow a crop without seed, or harvest it and beat it into food without using the product of past industry.

And something must be given to those who save and produce this capital, or no one will save it. Profit is the wage of capital. The capitalist is much like the working man, he will not work or let his capital work without a wage. Would the working man work if he knew he was not going to be paid?

But we say profits are too large. Perhaps we shall never be able to agree as to that matter. But surely if profits are kept down to a meager amount, and the capitalist is going to stand the losses of false calculation or unfortunate conditions, he is soon going to expend his whole capital. On this investment, perhaps, he loses and on that he wins. One year he has favorable balance and the next a loss. He will always have to cast up his earnings against his losses. Sometimes he builds an industry, such as is the Panama or the Erie canal, on which he loses, as the nation and the State of New York are losing in those enterprises.

So he must find another extremely fertile source of income or he will be a loser. And if all are losers, then the world is loser. There will be no wealth at all. There will be no capital if the produce of toil does not have a favorable balance.

Some are saying that the war will bring profit sharing of labor with capital. Capital might be willing to try it, but the working man does not want it. The mine workers have repeatedly repudiated it at their national conventions and by their leading spokesmen. They have asked instead a permanent wage increase as did the mine workers last year in central Pennsylvania, the same for all persons engaged, whether in profitable or unprofitable toil. They do not wish to expose their earnings to the uncertainties with which capital has to contend. Similarly, the mine workers in the anthracite region condemned the sliding scale. They wanted higher wages not profit sharing, and the copper miners will stand by the sliding scale only so long as it slides upward and not downward.

Nor does labor take kindly to the communistic idea. There have been mines operated on a coöperative basis in Illinois and elsewhere. But the men working in them have been put out of the union, because miners employed at these coöperative mines have been so anxious to work steadily in slack periods that they have operated the mines at a loss rather than lie idle, and made deductions from wages to cover that loss. As a result the price at which they sold their product was continually forced down to the general impoverishment of all the other workers in the coal industry.

In fact labor, as a whole, might look with favor on bonuses which became progressively larger, but it does not remain contented when bonuses shrink, are cut off, or are replaced by assessments on wages. Nor do union men favor national ownership which deprives them of liberty and puts them under an autocracy, not less but more inflexible than that of capital.

Labor, as a whole, is not opposed to capital, though it is true that it does seek to have all excessive profit cut off, especially such profit as is made out of tem-

porary necessities, and which bear with unreasonable hardship directly on the working man in the purchase of a livelihood. Rightly or inadvisedly, but certainly naturally, labor will endeavor to prevent inordinate profits even though thereby the law of supply and demand seems unduly interfered with. The workman will argue with some show of truth that a profit twice that which is usual will, eventually, if not immediately, work the readjustment called for without creating any unnecessary disturbance of living conditions.

It will allow those creating a certain necessary kind of product all the opportunity needed to thriftily expand and supply the field, and will bring in enough outside capital to serve the industrial need. In order to produce quiet during the war and even after the war, excessive profiteering may well be prohibited as the President's Mediation Commission has just suggested. But the miner will naturally want to know why profiteering in coal is wrong and profiteering in cotton, wool and all foods but wheat is permitted.

Conservative labor believes in capital and is working always to acquire some of it for itself. It is frugal and forward-looking, and it will always oppose itself to radical labor which is seeking to provide that the whole product of labor will be used up, destroyed and consumed as fast as it is produced. The differences existing are hardly between capital and labor so much as between conservative and radical labor—the labor that realizes that pay comes from product, and the labor that believes that by agitation each individual workingman can secure a competence far larger than that which labor produces.

An individual industry can arrange to secure for itself excessive payment. It can always make other industrial workers pay it excessive wages so long as those wage earners are willing to assist it in getting the exorbitant wage it desires. In the last analysis, it is the worker pays the worker, and it is the worker who is interested in opposing wages which are inequitably high.

Continuous Vernier

ON PAGE 329 of this issue of *Coal Age* is an interesting discussion of deflection angles and azimuth with special reference to coal-mine engineering. This matter ever has been a bone of contention among certain mining engineers and probably has been settled frequently by each man selecting the method that most appealed to him.

Transits in the anthracite field of Pennsylvania were, at one time, frequently graduated so as to give quadrant readings. This graduation was especially well adapted to continuous vernier work. The quadrant readings gave every alternate course direct, and the intermediate courses were exactly 180 deg. from the true bearing, as a little thought will readily disclose, and were set down in the notes in their correct quadrant. The telescope was not plunged.

The needle on the transit was released at each station set-up and read each time a B. S. or F. S. was taken, both as a check on the angle and also on the quadrant reading. The correctness of the quadrant readings as recorded were thus never for a moment in doubt. Local attraction often deflected the needle, but the B. S. and F. S. needle readings should show equal deflection from the vernier courses and serve as a valuable check nevertheless.

In mentioning checks, an old engineer once told his assistant: "You will often make mistakes; every engineer does, but do not let them get out of the office. Surround all your work by every practical check so as to discover mistakes before they do any harm."

In continuous vernier work, a word of caution might save annoyance at times. After the vernier is once set, clamp the plate and vernier screws sufficiently tight to prevent any possibility of their slipping; and also guard against anything rubbing on the tangent screws. In carrying the transit from station to station, or in setting up the instrument, it is very easy for the sleeve to brush against a tangent screw and give it at least a part turn. Guard against the possibility that something may touch the tangent screw between transit settings and thus cause the horizontal limb to move.

The United States Geological Survey fills in most of the topography by plane table, but continuous vernier is merely a modification of this method; if a transit is provided with stadia wires and a leveling rod is available, the two systems approach closely in efficiency as far as the ordinary requirements of coal-mining engineers are concerned.

Standards Rather Than Methods Are Desired

THE fuel administration in Luzerne and Lackawanna Counties in Pennsylvania has ordered the operators to prepare their coal in the customary way "by passing the same through a breaker or a washery, so as to properly size and remove the rock, slate, dirt and ashes (*sic*) from the coal." It is good news that this action has been taken. It has certainly not been instituted any too soon. There has been for some months too much impurity and undersize in the coal as delivered to market, but it must be remembered that washeries and breakers can be run in such a way that they will not exorcise the evil in the coal as it is delivered to them.

Screens and pickers can be regulated to give a minimum result. They can be arranged to permit pea to be sold as chestnut and chestnut to be sold as stove, while rock, slate and bone coal can be allowed to masquerade as a prepared product. The only solution is to be found in an inspection of every car with a report to the Government of its condition. While the requirements of peace times in regard to thermal units were in many cases somewhat excessive and their imposition burdensome to the industry and hence to the public, a reasonable inspection which casts out coal having excessive slate and sends it back to the washeries and breakers is grievously needed. With all the clamor for coal it is natural that some men who seek money rather than the national welfare will let steam-size coal run into the prepared-sizes chute, and purposely reduce the selective efficiency of the slate pickers.

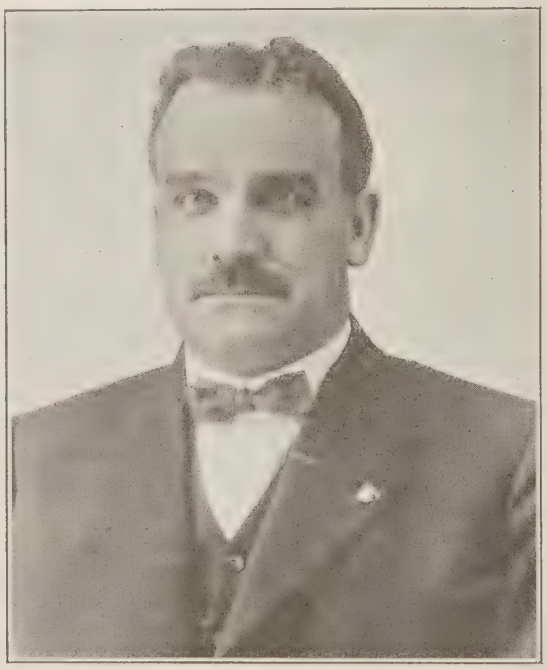
But we cannot believe that Campbell and Williams will be satisfied with a perfunctory compliance with their order. The days of the unscrupulous are, we feel sure, numbered. The conscience of the coal industry is aroused and in a few days the fuel administrators will put a crimp in the practice of shipping to market everything that looks like coal.

Who's Who In Coal Mining

Seward E. Button

To have risen from the humble place of day laborer to the highest position in the mining industry in Pennsylvania, to have controlled the operations of thousands of men in his 18 years' experience as mine foreman and superintendent without once undergoing a strike, even for a day; to have reclaimed one of the most gaseous mines in the region to a point of safe operation—these are a few of the high lights in the career of Seward E. Button that show that the field of opportunity is still open to the youth of ambition, perseverance and energy.

Seward Button, the new chief of the State Department of Mines of Pennsylvania, is an old-school miner, his



SEWARD E. BUTTON
Chief of State Department of Mines of Pennsylvania

ancestors having delved in the mines of England for generations back. He is a son of Owen Button, and was born in Somersetshire, England, on Oct. 5, 1875. His years of schooling were scanty, and at the age of 15 years he came to America, to the home of an older brother who had settled at Avoca, Penn. He went to work at once as a day laborer at the Hillside colliery of the Hillside Coal and Iron Co., and while he was yet a youth gained certification as a miner. He was employed for a number of years at Carbondale and again at Peckville, to return to Avoca, where, ten years from the time he began work as a day laborer, he became a mine foreman at the Hillside colliery, where he was engaged for four years. For five years he was foreman at the Erie colliery at Jermyn, and then went to the Temple Coal Co. to become superintendent of the Mt. Lookout colliery at Wyoming, where gas conditions had become particularly bad and had just been responsible for a serious tragedy, costing the lives of a number of men.

It is noteworthy that in the nine years Mr. Button has been superintendent of the Mt. Lookout there have been no disastrous gas explosions there, and it is now safe to work in this operation with a naked lamp. This achievement has gained for the new mine chief a distinct reputation as an authority on mine gases.

A pointed commentary on the personality and ability of Mr. Button is supplied by the fact that in his 18 years of authority as foreman and superintendent he has not been obliged to face a single strike.

Mr. Button has been a conscientious worker for the advancement of the mining industry and of his fellow workers. He has been active in the promotion of the Pittston Mining Institute and is its president. On various occasions he has lectured before the institute on mining problems. He is a member of the Engineers' Club of Northeastern Pennsylvania.

Although a sound Republican, Mr. Button has never taken an active part in the chaotic politics of the Keystone State. He has been doing his bit for his country since last June by serving as a member of the Second District Draft Exemption Board of Luzerne County.

Mr. Button went to Harrisburg on Feb. 12 and assumed his office. He will continue his residence at Wyoming.

The new mine chief is a married man with two sons. The older, 20 years of age, is a driver boss in the Mt. Lookout colliery. The younger, at 18, is an engineering student at Cornell University.

Shortage of Coal Increases Demand for Illuminating Gas

That the coal shortage has greatly increased the demand for gas is shown by the report of the Consolidated Gas Co., of New York, for the year 1917. This report shows that until December of last year the combined maximum day's output of that company and its affiliated companies had amounted to 125,148,000 cu.ft., but that on Dec. 15, due to the low temperature and the extraordinarily severe weather conditions, the output amounted to 129,959,000 cu.ft. On Dec. 28 the output was 137,310,000 cu.ft., and on the last day of the year it was 155,006,000 cu.ft. The output for the last three days of the year aggregated 460,613,000 cu.ft., an increase over the three corresponding days of 1916 of 134,297,000 cu.ft., or 41.16 per cent.

The price of boiler coal, used in generating electricity, increased 59.2 per cent., and of anthracite and bituminous coal used in gas manufacture 11.3 per cent.; the average increase in the price of all varieties of coal used amounted to 34.3 per cent. The increase in the price of gas oil was 66.2 per cent., and it has increased again this year 30 per cent.; the increase in the price of gas oil in 1917 over that of 1916 amounting to 116.6 per cent. The increase in the price of these items alone added $4,530,600 to the cost of manufacturing gas and generating electricity during the year 1917.

In 1916 the Consolidated Gas Co. and its subsidiaries operating in Manhattan and The Bronx used 119,238 tons of coal, coke and boiler fuel; 415,016 tons of coal and coke for generator fuel, and 352,611 tons of gas coal was carbonized, a total of 886,865 tons. The New York Edison Co. used 655,805 tons of coal, and the United Electric Light and Power Co. used 204,928 tons of coal during the same period.

Broken locomotives and bad weather caused the shortage of coal from which these Newark, N. J., people are suffering.

The miners of America are proud that THEY never failed to do their utmost to provide the needed fuel.



Courtesy of Newark Evening News

Line at coal yards of Lehigh Valley Coal Sales Co., Eighteenth Ave. and Lillie St., Newark, N. J.

The weather is better now and the miners, we hope, will have even a better chance to make scenes like this unnecessary.

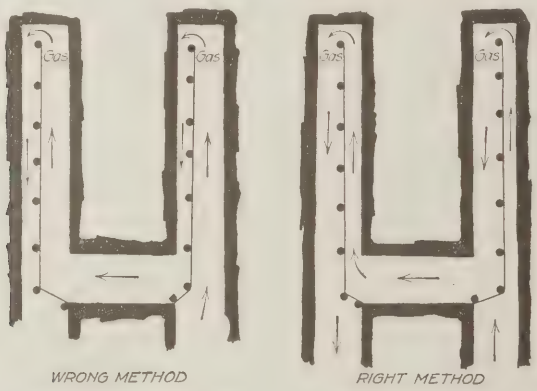
DISCUSSION BY READERS

Erecting a Line of Brattice

Letter No. 1—Having followed the discussion in *Coal Age*, regarding "Clearing a Heading of Gas," it has occurred to me that the difficulty experienced in removing gas from the face of a heading is often due to a wrong way of building the brattice. As this is a very serious matter, and one that should be thoroughly understood by all mine foremen and firebosses, it seems to me that a discussion along this line would prove of interest and value.

Without referring, further, to the suggestion of hanging a curtain 90 ft. back from the face, in the return airway, which would be a strange thing to do, let me explain my ideas in regard to the right and the wrong way of building a brattice to remove gas from the face of a pair of headings.

On the right of the accompanying figure, I have sketched the arrangement that experience has taught



REMOVING GAS FROM FACE OF HEADING

me is the most effective in removing gas. The wrong method, which is commonly used is shown on the left.

By way of explanation, let me assume that the main entries are driven due east and gas has accumulated at the faces of the 4 and 5-N headings driven off the main east, the 5-N being the intake and the 4-N the return for that section of the mine.

Proceeding up the intake or 5-N heading, a line of brattice should be started from the outby corner of the last crosscut on the west rib of this entry. From that point the canvas should be carried across the entry to within 2 or 3 ft. of the east rib and then carried along that rib toward the face of the heading. The aim is to make the air space on the intake side of the brattice much narrower than that on the return side.

After the brattice has been extended to the face of the 5-N, and the gas removed from that heading, another brattice should be started from the outby corner of the same crosscut, on the east rib of the 4-N. As shown in the figure, the brattice should be carried along the east rib toward the face, making the air space on the intake side, here also, smaller than that on the return side of the brattice. This arrangement gives the air greater force at the end of the brattice where it strikes the gas.

On the other hand, when a brattice is erected as shown on the left of the figure, and the intake side is made wider than the return side, the effect is to produce eddies in the air current at the head of the entry, which greatly interferes with the removal of the gas.

STEVE GOSNELL,
Hallidayboro, Ill. Mine Examiner.

Overlooking the Salaried Man

Letter No. 1—The reference to "Injustice to salaried employees" made in a letter signed "Equity," *Coal Age*, Dec. 22, p. 1068, calls to mind an excellent Foreword that was published in *Coal Age* more than a year ago. [Vol. 10, p. 375.] It was an open letter addressed to presidents, directors and managing executives of large concerns, and drew attention to the fact that the salaried employee is rated and paid on a different basis than that applied to day men and apprentices.

While it is true that the salaried class of employees is proportionately small and the number of applicants large—a fact which would tend to lower the rate of pay in that class—the chief reason for the difference between salaried men and those who perform day labor lies in the fact that the latter class is organized to drive wage bargains with its employers.

The question is a broad one and applies alike to all industries and professions. The law of supply and demand does not altogether remove our perplexity. There appears to be another factor operating to enlist the interests of employers of labor in favor of the one class, while the other class is seemingly overlooked or regarded as of less importance.

UNFAIR DISCRIMINATION IN CLASSES OF WORKERS

For illustration, compare the school teacher and the lawyer, or the minister and the doctor. The lawyer's services are generally more highly regarded and his reward greater than that of the school teacher, notwithstanding both are equally essential. Likewise, the services of the doctor are generally held in higher esteem, in respect to the amount paid for his services, than is the work of the minister; yet both supply what the race needs.

To the candid mind, the situation is one that should be remedied; but how? In the broadest sense all employees serving as clerks, bookkeepers, timekeepers and others holding official positions and paid a stated salary, are affected, and every community has many such men whose labors should be (but seldom are) rewarded according to their faithfulness.

Much could be done in communities through education and influence. Large corporations or companies holding controlling interests in local affairs can exert an influence for good, and the responsibility rests on

such more heavily than it does on the smaller companies, who can only lend their aid to a limited extent by serving on school boards, boards of trustees and executive committees.

In this connection I do not want to be understood as failing to appreciate the splendid work done by many large companies along welfare lines. That this work can be extended and made to apply to the salaried class of workers will not be denied. It should be extended to include school teachers and ministers serving the community. But, we are particularly interested, here, in the salaried men of the coal industry, to which the Foreword mentioned had particular reference. As bearing on this question, allow me to cite a single instance, which is but one of many, showing the need of giving more careful attention to and rewarding more justly the pay of salaried employees.

Injurious Effect of Favoring Certain Classes of Workers

A friend who works in a railroad shop recently told me that he began work in the shops as timekeeper. In order to increase his chances of promotion he studied shorthand, typewriting and bookkeeping in his spare hours. It was not long, however, before he realized that the time and effort he was putting forth would not pay in the end. The result was that he became an apprentice, and in five years was working for more money than he would have made in ten years of promotion on the office force. The same man mentioned others who had given up good positions in the office to become apprentices, because, from a financial standpoint, it paid.

There are thousands of ambitious men working as apprentices in our shops who would make good executives, engineers, electricians and inspectors, were these positions for which they are fitted made more attractive. It goes without saying that the companies are the losers in the end. It is called "good business" when a manager is able to secure a $75 man for a $100 position, and many an employer yields to the temptation to pay his men as little as will hold their services, rather than pay what the position is worth.

In closing, allow me to name a few of the qualifications of the faithful salaried man: He has ability and is always on the job; he systematizes his work, by which he accomplishes more at a reduced cost for helpers and assistance; he is reliable and meets conditions as they arise; he is trained for his particular work; he is loyal to the company interests, which he constantly strives to safeguard; he never threatens a strike, but labors day and night to accomplish the work in his charge. For this faithful service, let me ask if he should not be amply rewarded.

George N. Lantz.

New Straitsville, Ohio.

Helpless Helpers

Letter No. 1—Reading "The Story of the Helpless Helper" calls to mind an incident of my boyhood days that impressed itself so forcibly on me that memory often brings back the scene I then witnessed. It has taught me that when a man is seeking help or asking for information, to hear him out in what he has to say and then assist him in the best manner possible.

At the time of my story, I was working for the Broadway Coal Mining Co., at Simmons, Ky. My duties were those of a trackman. I was talking to the boss, who was resting himself, on the parting, when a boy came out of the mine and told the driver who was there and who hauled the coal from his room that, in switching the empty car in his place, it had run off the end of the track and he was unable to put it back again.

Overhearing the complaint, the foreman asked the boy if the car was loaded, and being told that it was not, replied, "Well, we don't put empty cars on the track; but when a loaded car is off the track, we are willing to help put it on again." The boy stood a while, studying over the matter, when an idea seemed to strike him and he went away. Knowing that it was impossible for him to get the car back onto the track, he decided to load it where it was.

Having finished the task, the boy again sought out the foreman, whom he found in the same place as before. Walking boldly up to him, he said: "Mr. Jones, that car is loaded now. Will you have a man help me put it on the track?" The boss was not slow to see that the joke was now on him, and, without further delay, he gave the driver orders to put the car back on the track.

The boss, in this case, was a "helpless helper," refusing to give the boy the assistance that he had asked and had a right to expect. Like others of his kind, the man did himself a greater harm and retarded his own work, or the work in his charge, more than he delayed the boy. It is a simple incident, but teaches a good lesson that foremen and others will do well to learn.

G. D. York.

Harrisburg, Ill.

Conservation of Mine Gas

Letter No. 3—I was glad to read the letter of my old friend, H. G. Davis, on the Conservation of Mine Gas, *Coal Age*, Jan. 26, p. 210. Like him, I have been "watching and waiting" for some of the big fellows who know all about gas to tell us how the waste gas of the mines is to be collected.

Candidly, it struck me that the previous letter of E. B. Wilson, to which Mr. Davis refers, was too pessimistic, in regard to the possibility of conserving the gas that is now wasted in such large quantities in the anthracite fields.

We all know this is a big job, but we should regard it in the same light that our honored governor has looked at it, which caused him to remark, "Watch some fellow do—the impossible." I am willing to admit that the proposition may be impossible of accomplishment by any one man; but I have great faith in what may be developed by a broad discussion of the subject in *Coal Age*, by practical mining men, if they will give it their attention. In the hope of assisting in a discussion that may develop some practical means of carrying out the project of saving the gas, let me suggest what might be called a "gas mine."

In this connection it has occurred to me that the large boundary pillars left between adjoining workings, in the anthracite mines, might be utilized by driving a heading into the center of such a pillar and then driving both ways on the center line and extending this central heading practically the length of the pillar.

When this has been done, the opening could be sealed off with a heavy concrete wall into which a pipe should be built, say 10 in. in diameter, for the purpose of piping the gas to the surface.

There are, of course, other ways of collecting large quantities of the gas in our coal seams. Boreholes have often been suggested for this purpose. It seems to me that, while this is a good suggestion, the flow of gas through these holes could be greatly accelerated by connecting them with a vacuum pump that would exhaust the gas from the mine. The subject is one that has greatly interested me, and I cannot but hope that some of these schemes will be tried out in a manner to determine their practical value. W. A. BARRETT.

Nanticoke, Penn.

[The scheme suggested by this correspondent, in respect to what he styles a "gas mine," will hardly be considered as a safe proposition in connection with a mine that is being operated. The driving of a heading into and through the center of a barrier pillar would hardly conform to the requirements of the state mining law, which requires a solid pillar of coal as a protection against water and gas proceeding from the abandoned workings of adjoining mines. We shall be glad to hear from any of our readers who may have some practical thoughts and ideas along the line of conserving waste mine gases, which we all admit is a valuable field for investigation.—Editor.]

Mine Cars

Letter No. 1—In his recent article reviewing the anthracite industry for the past year, *Coal Age*, Jan. 26, p. 191, H. M. Crankshaw discusses certain improvements that have been accomplished in the modernization of the industry during that time. Concerning mine cars, he suggests that it is the logical thing to replace cars having antiquated stiff bearings by cars with roller bearings of a good modern design.

Judging from the extensive research work and dynamometer tests made within recent years, the results of which have been widely published in mining literature, there cannot be the slightest doubt about the truth of such a statement, as well as regarding the considerable saving effected in the total cost of haulage resulting from the use of easy running roller-bearing cars. It is self-evident, that, in comparing costs, two mines of about the same size should be selected, one for each type of rolling stock. Each mine should be laid out to best suit the particular kind of running gear in use. When, however, Mr. Crankshaw states that "it does not pay to mix roller-bearing cars with other rolling stock," I must disagree with him.

Inasmuch as it has been proven that roller-bearing cars are the least expensive in the end, it seems to me to be in the interest of any coal operator to change over his present equipment as fast as they come through the repair shop, where they have been sent owing to breakdowns or natural deterioration. It goes without saying that, during this changing-over period, the two types of cars will become mixed, more or less, but this period will be limited to a few months or a few years depending on the size of the mine and the facilities for such work. Coal companies having several mines in operation are solving this problem by starting to equip one mine at a time, throughout, with roller-bearing cars using up the remaining rolling stock in their other mines. In short, I do not see why a coal company should penalize itself forever, on account of a temporary inconvenience due to mixed rolling stock.

In concluding, I want to mention that I have been, personally, in a number of anthracite mines using mixed rolling stock, and have found that the miners soon discover which cars are pushing easily and which do not. With the present and future difficulty to attract and keep labor in the mines, I would consider this another and quite as important a reason for the speedy weeding out of old-fashioned equipment. L. B. PAUL.

East Orange, N. J.

Coal Production and Booze

Letter No. 5—I was interested in reading the excellent letter of J. H. Tipton, *Coal Age*, Jan. 19, p. 156, regarding the effect of booze on the production of coal. Like him, I have wondered that this subject has not attracted more attention than it has, and that mining men in particular have not availed themselves of every opportunity to denounce what is quite generally admitted to be the greatest evil with which the coal-mining industry has to contend.

Many reasons might be given why the booze question has not aroused the efforts of coal-mine officials to action. It may be that they have had to contend so long with the effects of the drink habit among miners that they have become calloused to these conditions and strive to endure rather than to oppose them. My observation and reading, alike, convince me that the coal-mining industry has no greater enemy. I would say that the American people have not a greater enemy, even in the Kaiser and his allies.

No one will take me as having pro-German inclinations, however, when I say that my father and grandfather were both born in this country, which gives me a just claim to American citizenship. I have made the reference to the Kaiser merely to emphasize the fact that I believe the wide spread of the drink habit in this country is the blackest spot on American history, and no American who loves his country and is loyal will encourage the liquor traffic.

How Drink Affects Otherwise Good Workers

As an illustration of the effect of the drink habit on men, allow me to cite one instance of a fine fellow who worked for me, in the mine of which I had charge. He was a good worker; go into his place when you would you would always find him singing or whistling, and it was good music. But, when payday came, you could rest assured that he would not be in his place again as long as he had anything left with which to buy drink.

I recall one day he had a large pay coming, but did not show up at the mine in time to receive his check. He went directly to my house only to be told that I was then at another mine, paying off the men there. When he reached the place he was told that I had left a short time previous to take the train for the mines below. He hurried to the station and boarded the same train himself, but was forced to ride two miles down the track where I was waiting to take the train.

He received his check, but his troubles did not end there, as the bank refused to cash the check before it was O.K.'d by the paymaster; and to get this he was compelled to pay 25c. telephone charges. Notwithstanding he had been out two weeks before, the man did not show up again for three weeks more, making five weeks' lost time. During that period he could have mined and loaded 200 tons of coal, which shows the great loss to the country through the drink habit of one miner only in five weeks.

Observation compels me to think that one possible reason why the booze matter is not more steadily opposed by mine officials is that many of them are too anxious to indulge in the habit themselves. I wish this were not the case; but in more than one instance, I have seen men who hold responsible positions in the mine enter barrooms and drink with their men. It is unnecessary to say that this places the mine official in a very embarrassing position when men neglect their work by reason of boozing.

Effect on the Man Who Does Not Drink

The question is often asked, "Does it hurt the man who does not drink?" The answer is, Not directly, but indirectly. It destroys the social atmosphere of a place and not only makes it unfit for living but a dangerous place in which to bring up a family of children. Indirectly, it increases the cost of living, as many drinkers fail to pay their bills and the prices of goods, at the store, are forced upward to meet the deficiency.

Again, the man who works with a buddy who drinks must often lose a day when his drinking partner does not come to work. Then, for a day or so after he returns he is hardly a safe man. It is a frequent occurrence for daymen and miners, coming to the mine the day after payday, to find that the mine cannot run for lack of men. Much of the expense continues whether the mine runs or not, and the cost of production is increased. The country loses the coal and its cost to the consumer is increased. The town merchants lose, because the money that should come to them for goods goes to the saloon.

The question before us is, What can we do to rid the country of this curse and help the production of coal, which is so much needed at this time? If the coal administrator would consider this question and make some effort to cut off the supply of drink to coal-mining districts, he would accomplish a great task and one that would return him four-fold. His biggest job would then be to dispose of the coal that the mines would produce.

S. D. HAINLEY.

Osceola Mills, Penn.

Shaft vs. Slope Opening

Letter No. 4—It seems to me that the arguments advanced in Letter No. 2, *Coal Age*, Dec. 8, p. 989, and Letter No. 3, Dec. 29, p. 1110, favoring a shaft in place of a slope opening, are not convincing.

The writer of Letter No. 2 refers to the necessity of moving the pump as one objection to sinking a slope. But, the suction lift of a pump being dependent only on the vertical height of the pump above the water in the sump, disregarding the friction of the suction pipe as being nominal, it is unnecessary to move the pump in a slope oftener than in a shaft, and the difficulty of moving it is more imaginary than real.

In a shaft, the expense of providing cages, guides and other shaft equipment will nearly or quite offset the cost of rails, extra length of rope, and electric cables, pipe lines, etc., so that the difference is hardly worth considering. In regard to ventilation, if the sectional area of the slope is equal to that of the shaft, there is no appreciable difference, here also, between these two types of openings. In fact it seems to me that the various objections offered are hardly realized in actual practice.

Hoisting on Steep Slopes

The writer of Letter No. 3 objects to a slope having an inclination greater than 15 deg., or 27 per cent. grade. I would draw his attention to the fact that there are numerous slopes, in various parts of the country, having a grade of 30 deg. or more, and these are operated with perfect satisfaction. Simple devices are employed to prevent coal rolling off the cars in hoisting. These devices do not interfere with the loading or dumping of the cars. It is worthy of note that a slope can be sunk on a uniform grade, which will permit of a steady haul and reduce the tendency of coal to fall off the cars. My preference would be, in this case, to sink a 30-deg. slope whose length would be $118 \div \sin 30^\circ = 118 \div 0.5 =$ 236 ft., instead of the 437-ft. slope mentioned, having an inclination of 15 degrees.

Assuming, as suggested in this letter, there are from 18 to 29 ft., or double that amount of gravel, sand or other soft strata that must be passed through before the coal is reached, it is not clear to my mind why this would present any greater difficulty in the sinking of a slope than in sinking a shaft. When sinking a slope through such strata, forepoles can be used and good timber frames placed in position, until solid formation is reached. In the case of a shaft, there is more difficulty in keeping the alignment when passing through such strata than is found in sinking a slope.

It is true, however, that if the ground to be passed through is mostly bad, the upkeep of a slope will be more expensive than that of a shaft. Otherwise, I would favor a slope opening in the case mentioned, for the reason that the extra cost of timbering a shaft, constructing the headframe and supplying other equipment not needed in a slope will, I believe, more than offset the extra length of slope to be driven.

Comparison of Shaft and Slope Hoists

The following brief comparison between the capacity of a slope and a shaft, for hoisting coal, would seem to favor the former type of opening: For example, assuming a 30-deg. slope, where three 1½-ton cars are hoisted every two minutes, the output is 135 tons per hour, or 1080 tons in an eight-hour shift. This estimate makes a liberal allowance for the time of hoisting a single trip and returning the empties to the foot of the slope where a loaded trip is waiting to be hoisted. At the slope bottom, the track should be arranged so that the empties will run toward the mine while the loads gravitate toward the slope bottom.

When hoisting in a shaft, a motorman and a helper could handle a fair output and handle, say a 15-car trip on a half-mile haul in 20 min., running at a speed of 6 miles per hour and making due allowance for switch-

ing and starting and stopping each trip. This would represent an output of three trips, or 45 cars, making 67.5 tons per hour, or 540 tons in an eight-hour shift. To equal the capacity of the slope, in this case, it would be necessary to hoist two cars at a time in a shaft.

If rapid development is required, a single track slope can be sunk first; and this can be widened from the bottom up, as the mine is being developed, without interfering with the hoisting of coal. Surface arrangements, in either style of opening, must be largely governed by local conditions. One plan that has worked well in hoisting from a slope is to haul the loaded trip up an incline to a dumping floor above the mouth of the slope, where the entire trip is dumped in a single operation by means of a rotary dump. This plan cannot be used in a shaft opening.

Where the railroad runs close to the shaft, and the latter is equipped with self-dumping cages and coal conveyors, the shaft has much to recommend it, in respect to economy of handling coal at the surface. I agree with the suggestion made in this letter that the advice of a competent engineer should be sought in deciding these matters.

In considering a slope opening, it is important to provide against the slipping of the track down the slope. This must be avoided by anchoring the track by the use of long ties or cross-timbers at frequent intervals. These are hitched into the strata on each side of the track. To give rigidity to the track, 30- or 40-lb. iron must be used, fishplated and spiked well to the ties. When the track is well ballasted there is no reason why it should not last for years with little attention.

———, Wash. MINE BOSS.

Answering Examination Questions

Letter No. 2—Referring to the letter of Joseph A. Greaves, *Coal Age*, Jan. 19, p. 158, I want to say that his idea of arranging a key to the mining law, so as to fix in the memory all the requirements of the law in respect to different operations performed in the mine, is good. It is an effective, yet simple, method of memorizing what the mine boss should know and which he is apt to forget when attending to his many duties in the mine.

In general, it may be said that the state mining law covers practically every point relating to the health and safety of mine employees, and it is these points that are mostly emphasized and treated in the examination of candidates for mining positions.

EMPHASIZING IMPORTANT POINTS IN MINE LAW

I assume that Mr. Greaves has observed that there is much duplication in the several articles of the mining law to which he has referred, but this fact merely emphasizes the importance of those points and the repetition in the law is not a bad feature, since too much emphasis cannot be placed on the necessity of being thoroughly familiar with every requirement of the law, especially those on which the safety and efficiency of coal mining depends. It is well to remember, however, that the method of securing and retaining this information should not be so mechanical that it will tend to lessen the exercise of one's faculties for thinking and using his best judgment.

Therefore, while our answers to examination questions should conform to the requirements of the mining law, they should also partake of a practical nature that will show the examining board that a candidate has a practical knowledge of mining beyond what he has studied and read. Let me say, here, that the questions themselves should be such as to call forth a candidate's practical knowledge of the operation of the mine in respect to safety and economy.

IMPORTANCE OF PENALTY ENACTMENTS

There appears to be one point that Mr. Greaves has seemingly overlooked in his analysis of mining law. I refer to the penalties enacted for the violation of its requirements. It seems to me to be very important that a man should know what the penalty is for the violation of any section of the law. For example, there is a minimum and a maximum fine or imprisonment, or both, for the violation of any of the requirements in respect to blasting in coal mines.

A knowledge of these penalties would command more respect for the law and decrease the dangerous practices of miners that frequently exact such a tremendous toll on life and health. A hunter usually knows the penalty for violation of the game laws and, in the same manner, every miner should know the penalty for violation of the mining laws. W. H. NOONE.

Thomas, W. Va.

Clearing a Heading of Gas

Letter No. 7—I have been reading the letters on this subject, and the suggestion of hanging a canvas in the return airway 90 ft. back from the face reminds me of an attempt I once made to block the gas, at the face of a heading, and prevent its coming out into the airway, long enough to allow a machine to cut the coal in the last room.

For this purpose, I hung the canvas as close to the face of the heading as I could approach. After waiting some time, I found that the canvas did little good where it was, as the gas was still too strong to permit the machine to operate in the room. Therefore, I abandoned the idea and determined to clear out the gas in the usual manner, by extending a line of brattice from the last crosscut to the face, along the rib of the heading.

This had the desired effect and the gas was quickly moved, even before I had completed the extension of the brattice to the face, as it gave the air a straight shoot to the gas and swept it from the face.

Harrisburg, Ill. MINE EXAMINER.

Correction

Kindly permit me to call the attention of *Coal Age* to a misstatement in the article entitled "Illinois and Missouri Coal Fields," Jan. 12, p. 72. The last sentence in the second paragraph of this article should read as follows:

"But *below* that level, within the Illinois basin, about 1000 ft. of strata were *previously* deposited, which were entirely separated from and have no connection with the Missouri basin." GILBERT H. CADY

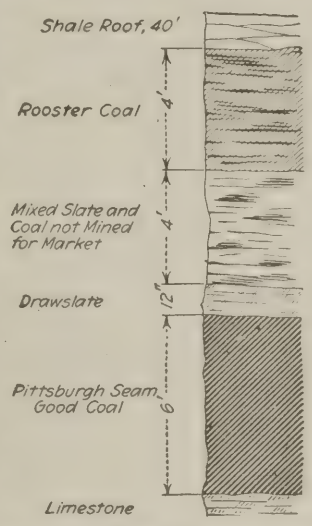
Urbana, Ill. State Geological Survey

INQUIRIES OF GENERAL INTEREST

"Rooster Coal," Pittsburgh No. 8 Seam

I am seeking information that I know many readers of *Coal Age* can give, in regard to working what is so widely known as the "rooster coal," which occurs in connection with and overlying the Pittsburgh No. 8 seam in many districts. What I desire, particularly, are the answers to certain questions, which I hope will be submitted through *Coal Age* to readers who have had practical experience in the working of this seam. The questions are as follows:

1. Is it practical to work the rooster coal with rooms 24 ft. wide?
2. If this is considered practicable, explain how the rooms should be ventilated.
3. What percentage of this seam is usually recovered, in the present system of mining?
4. What steps should be taken to insure safety and comply with the requirements of the Pennsylvania Mining Law, in the working of the rooster coal?



SECTION OF PITTSBURGH SEAM

The accompanying figure shows a section of the seam as it occurs in the locality that I have in mind. As here shown, the lower 6-ft. seam of coal, resting on a limestone bottom, is overlaid with 1 ft. of drawslate, above which is 4 ft. of mixed slate and coal, which is of too poor quality to be mined for market use, but makes a fair roof. Overlying this stratum is 4 ft. of rooster coal, with 40 ft. of good shale roof.

Any information regarding the most practical and economical method of working this seam will be greatly appreciated. MINE FOREMAN.

Cumberland, Md.

Coal Age gladly submits this proposition to its practical readers who have had experience in working the Pittsburgh seam, and hopes that they will furnish this correspondent with the answers to the questions asked, as may be suggested by their own experience.

In general, it may be stated that the rooster coal partakes of the nature of a high-grade bony coal that, under ordinary normal mining conditions, is not considered marketable. At the present time, however, when the demand for coal has so greatly exceeded the available supply, it is quite probable that much of this inferior coal will be marketed and used. We shall be glad if readers will give their opinions frankly, based on their experience in respect to the utility of rooster coal at the present time, and explain their methods of working the two seams shown in the accompanying section, assuming, for argument, that the seam is overlaid with, say 200 ft. of cover.

Answers to this inquiry should be accompanied with sketches showing the proposed plan of working. The order of working the two seams should be plainly stated and the difficulties to be encountered and overcome fully explained. These factors can only be correctly judged and provided for by those who have had experience under similar conditions and are familiar with the peculiar character of the Pittsburgh seam and the overlying formations.

Divining Coal Beneath the Surface

Kindly state whether it is possible, by any means, to detect the presence of underlying coal seams that do not outcrop on the surface, except by drilling or sinking prospect holes. I do not refer, now, to observing any physical conditions that might suggest the presence of coal seams because of a geological knowledge that discloses the coal formations; but I have understood that there is a device, the use of which will enable one to discover the presence of coal or other minerals lying beneath the ground. If there is such a device, I am interested in knowing where it can be procured.

Niagara Falls, N. Y. PROSPECTOR.

There is no such device as that referred to by this correspondent. The presence of underlying coal seams must be ascertained either by an intimate knowledge of the geological formations and a close study of the local conditions, or by sinking prospect holes or drilling.

This inquiry reminds one of the old "divining rod," which was formerly used to detect the presence of water beneath the surface, for the purpose of ascertaining the best location for sinking a well for water supply. The divining rod consisted of a simple hazel twig, which was held lightly in his hand, by the prospector, as he walked over the surface.

It was assumed that where the twig inclined downward water could be found beneath the ground, and many wells have been located and sunk for water depending on this belief. The method, however, did not always prove infallible, and the failures that occurred have caused faith in the hazel twig as a divining rod to wane, although some can still be found, in the western wilds, whose faith remains unshaken.

For the detection of some minerals, particularly iron, nickel, or other magnetic substances, the dipping needle is frequently used. This consists of a magnetic needle mounted in a vertical plane. The prospector holds the instrument in his hand, as he walks over the surface, and observes closely its deflection in certain localities where the ore may lie nearer to the surface.

EXAMINATION QUESTIONS

Alabama First-Class Examination, Birmingham, Jan. 21-24, 1918

(*Selected Questions*)

Ques.—If you had charge of a mine, with 10 in. of drawslate over the coal, what instructions would you give your men in regard to timbering?

Ans.—When mining coal under a 10-in. drawslate, posts should be set not more than 4 ft. apart, or less where the slate has a tendency to fall between the timbers. In driving rooms 7 or 8 yd. in width, the miner should be instructed to keep two rows of posts behind him, the rows to be not more than 4 ft. apart and the first row not more than 6 ft. from the face of the coal. The posts in the two rows should be staggered; that is to say, those in one row should not be set behind those in the preceding row, but halfway between them. As the face is advanced, the posts in the back row must be drawn and the slate allowed to fall. These posts are then reset nearer to the face of the coal. Where the coal is cut by machines, it may be necessary to draw and reset each post, at the face, in order to allow the machine to work.

Ques.—What is the rubbing surface in an airway 4 ft. high, 9 ft. wide and 1000 ft. long?

Ans.—The perimeter of this airway is $2(4 + 9) = 26$ ft. The rubbing surface is, therefore, $1000 \times 26 = 26{,}000$ square feet.

Ques.—What dangers arise from lack of judgment in placing shots?

Ans.—When a shot is improperly placed, the charge of powder is unable to perform the work expected, and either blows the tamping from the hole or cracks the coal without throwing it down. In either case, the force of the explosion is expended largely on the air. When a shot blows its tamping it is called a "blownout shot"; but if the shot merely cracks the coal without breaking it down, there results what is called a "windy shot." In either case, flame at a high temperature is projected from the hole or through the crevices made in the coal. Under these conditions, a large quantity of fine dust will be blown into the air by the force of the blast. This dust, acted upon by the flame of the explosion, is converted into gas so rapidly that a dust explosion is produced.

Ques.—What conditions would guide you in determining the width of headings and rooms?

Ans.—The width of headings is determined not only by the practical requirements of the mine in respect to haulage, drainage and ventilation; but, also, by the depth of cover, thickness and inclination of the seam, character of the roof, floor and coal, and the length of time the heading must be kept open.

The width of rooms is determined by the depth of cover, character of the roof, floor and coal, the system of mining employed, and the time the rooms must be kept open. The width of the room must also bear a fixed relation to the width of pillar, both being determined by the conditions just named.

Ques.—What percentage of relative humidity would you consider necessary in a dry and dusty mine?

Ans.—It would be difficult to maintain a constant percentage of moisture, in the mine air, where the mine is dry and dusty, since the relative humidity or percentage of moisture in the air depends not only on the weight of moisture contained in a cubic foot of air but, likewise, on the temperature of the air. The weight of moisture, per cubic foot of air carried into the mine, will depend on the degree of humidity and the intake temperature, both of which are variable.

Where artificial means are used to maintain the humidity of the air current, in a mine, better results are obtained; but the moisture is alternately deposited and absorbed, at intervals, in the passage of the current through the mines. Mine air is most healthful and work is less exhausting when the relative humidity is from 60 to 70 deg. On the other hand, it may be assumed that less danger will arise from the presence of dust when mine air is fully saturated. Such a condition, however, is rare, in a dry and dusty mine.

Ques.—What quantity of air will be necessary to ventilate a mine in which 200 men and 10 mules are employed?

Ans.—Sec. 40 of the Mining Law of Alabama requires the operator or superintendent of a coal mine to maintain "ample means of ventilation for the circulation of air . . . to an extent that will dilute, carry off and render harmless the noxious and explosive gases generated in the mine." The law requires not less than 100 cu.ft. per min. per man and 500 cu.ft. per mule or horse, which would mean, in this case, the circulation of $200 \times 100 + 10 \times 500 = 25{,}000$ cu.ft. of air per minute. As much more may be required as the condition of the mine with respect to gas may demand.

Ques.—What are the dangers due to shotfiring, in gaseous mines? What precautions are necessary to prevent the same?

Ans.—In the firing of shots, in gaseous mines, the danger always exists of the possible ignition of the gas accumulated at the face or issuing from the coal as a feeder. To avoid danger, in the former case, no shots should be fired before the place is examined for gas and found to be safe. Care should then be taken not to overcharge the hole, and good judgment should be used in placing and tamping the shot, to avoid a blownout or windy shot. All accumulations of dust must be removed from the working face and the place thoroughly sprinkled immediately before firing. Not more than one shot should be fired in a close place, at one time. As a further precaution, all holes should be examined, charged, tamped and fired by competent shotfirers authorized to refuse to fire any shots that, in their judgment, are unsafe.

COAL AND COKE NEWS

Harrisburg, Penn.

In response to a questionnaire sent out by Fuel Administrator H. A. Garfield, the fuel administrator for the Pittsburgh district has estimated the amount of coal saved by the five-day shutdown of industry and succeeding "heatless Mondays." About 500,000 tons of coal have been saved so far in the district.

The unprecedented congestion on the Reading Ry. system took into the hard-coal region President Dice, General Manager F. M. Falck, Vice President Ewing, and other high officials of the company. A thorough investigation of railroad conditions was made all along the road, with the result that the greatest shakeup in the history of the Reading Railway Co. came. Superintendents were ousted, trainmasters were changed from one place to another, and from out of the maze of shakeups came the placing of practical railroad men—men of the "old school," as railroaders put it—at the reins. The effect of this old blood thus injected was evident in every vein of Reading transportation service. Coal began to move with a regularity that made possible a more thorough and familiar delivery to collieries of empty cars and the prompt removal of loaded cars.

On one of the visits of the officials of the Reading Railway Co. thirty cars of coal were discovered snowbound at a siding of the Shamokin division. Inquiry revealed that these same thirty cars had been standing on the siding for almost a month, without any effort made to convey them to the main line for transportation to their scheduled destination. This was one of the conditions that brought about the change of railroad officials and the elevation of the old and experienced practical railroaders to places until recently occupied by civil engineers.

To combat the practice of operators who ship coal of such poor quality that, experience, shows, it cannot be burned, Mr. Potter issued orders to county fuel administrators in the state to authorize the railroads to stop furnishing cars to every mine owner who failed to live up to the ruling that only standard coal was to be shipped.

The first case reported of seizure of coal was made by Baird Halberstadt, fuel administrator of Schuylkill County, when John Conway, inspector for that district, on Feb. 8 seized a quantity of so-called coal being placed on cars at Pioneer Island for shipment to New York and Philadelphia ports. The stuff, it is alleged, consisted largely of yellow dirt, slate and slag with small percentage of anything combustible. Tons of the stuff that was already loaded were ordered to be unloaded. A number of concerns in this section who have, it is alleged, been imposing on the public will be accorded similar treatment.

To put a stop to the mixture of 75 per cent. of buckwheat with pea coal, and about the same proportion of pea with chestnut, Mr. Potter on Feb. 9 issued an order to all operators that coal must be standardized strictly according to prepared sizes before shipment, on the threat of being prosecuted under the Lever act, which provides a $5000 fine or jail sentence.

Governor Brumbaugh has written a letter to the President of the United States asking that he prohibit the delivery of coal to breweries. In his letter to President Wilson, the Governor says:

"Pennsylvania produces substantially half the coal of the nation. We are now in great distress because of the lack of fuel for the homes and industries and institutions of the people of this commonwealth. The closing of our industries on defined days has brought slight relief and continued distress. Our working people have not the fuel to keep themselves and their loved ones warm. Our great industries, so essential to the well-being of our people, are hampered and hindered in their operations. Even our miners are without fuel at their homes and are working only part time because sufficient cars are not delivered at the mines to receive the output. Our schools are in many places closed for the lack of heat. Many of our churches cannot be used for divine services because there is no available coal to heat them. The outlook is most disquieting. The people of Pennsylvania are loyal and steadfast to national purposes and have always been so.

"But, Mr. President, in the name of our people, I beg to suggest that fuel should not be furnished to agencies that tear down and denied to agencies that build up the substantial fabric of spiritual good of productive genius in Pennsylvania. May I, therefore, suggest that you would be generally commended were you to exercise your high powers by denying coal to breweries and like concerns, and thus providing more coal for our homes, our schools, our hospitals, our churches and our industries. I appeal to you in this crisis, in these days of distress, to give thought to this matter and take such action as to you is wise. The situation is acute. The relief is needed. The remedy is with you."

Baird Halberstadt, fuel administrator for Schuylkill County, has announced the appointment of John Conway as United States Coal inspector for the county. Conway has had long experience as mine foreman and superintendent and has been instructed that no discrimination is to be shown in favor of any corporation, large or small.

It is expected this appointment will do much to correct the abuse of flooding the market with improperly prepared coal. Conway will inspect shipments from breakers, washeries, river receiving plants and culm banks as well as stocks in coal yards.

Investigation of the quality of coal shipped by anthracite operators, big and little, has brought to light such conditions as to cause the Federal Fuel Administration, through A. C. Campbell and Tudor Williams, administrators in Luzerne and Lackawanna Counties, to take summary action.

An order was issued by Mr. Campbell on Feb. 5 in behalf of the Fuel Administration that puts up the bars against any further sale of inferior and impure coal. The order, effective at once, is as follows:

"The United States Fuel Administration feels that no anthracite coal should be sold unless it has been prepared properly the customary way—that is, as it was in the beginning of the year 1914. Pursuant to instructions received, the Fuel Committee directs that you hereafter do not ship or sell any coal unless it has been prepared in the customary way, to wit: by passing the same through a breaker or a washery, so as to properly size and remove the rock, slate, dirt, and ashes from the coal. We demand that you will immediately comply with this order and send us a letter to that effect."

PENNSYLVANIA

Anthracite

Nanticoke—Anthracite collieries are threatened with a famine, and lack of water pressure is seriously hampering the production of coal. Nos. 6 and 7 collieries of the Pennsylvania Coal Co. were closed the greater part of several days because of water shortage. Other operations had low pressure and the coal output was not up to normal. Officials of the water companies declare that the situation is acute.

Scranton—Daniel Young, general superintendent of the Scranton Coal Co., suffered a fractured hip and severe bruises about the body, when caught under a fall of rock in the Capouse mine.

Wilkes-Barre—Freight congestion has seriously interfered with the supply of mining powder for local mines, and resort has been had in several cases to transfer of powder from one mine to another and use of the wrong grade of powders because the right was not available.

Sunbury—The Northumberland County Grand Jury has recommended that the county commissioners direct the assessors to increase the valuations placed on coal culm banks for taxable purposes. At the last biennial assessment the valuation of anthracite property in the county was raised from $4,500,000 to $7,000,000, by a board of mining engineers, working in conjunction with Judge Mosier, who was a mining engineer before becoming a lawyer, and the county commissioners.

Hazelton—Women cannot work at collieries except in a clerical capacity, declared officials of the United Mine Workers. This apparently settles the question raised by some operators who thought they might relieve the labor shortage by hiring females to do outside work and thus release men for employment underground. The law was quoted which states that "women cannot work in or about the mines of this commonwealth."

Mauch Chunk—What may prove to be a disastrous fire has been discovered in the No. 11 colliery of the Lehigh Coal and Navigation Co. by one of the loaders who was drawing coal from a chute. The consensus of opinion seems to be that it is from the burning mines near-by. Everything possible is being done to head off serious trouble.

Bituminous

Johnstown—It is reported that many bituminous coal mines in Pennsylvania will suspend operations around Apr. 1, when most contracts expire, unless the Government price of $2.45 a ton at the mine is increased sufficiently to give the operators a "reasonable profit," or at least sufficient to permit them to break even.

Irwin—Four hundred miners employed at the Yough shaft of the Westmoreland Coal Co. were thrown out of employment by a fire in the boiler house.

Woodville—The fire in the coal mine at the county home, which has been burning since Jan. 27, is practically under control. The fire had been eating its way through a five-foot seam of Pittsburgh coal. The entrances to the mine had been sealed and then the workings were flooded. It will be necessary to open new entries and drain out the water.

WEST VIRGINIA

Quick—The first car of coal has been shipped from the mine here, which was recently opened by Lebow Brothers, of Charleston. The operation is located on the Kanawha & West Virginia Railway.

Wheeling—A new coal-mining concern, advertising as the "W-G" Co., (probably the Whitaker-Glessner Co., of Wheeling) is sinking a shaft for a coal mine on the property now occupied by a family by the name of Cage at Elm Grove. The work has been in progress for the past three weeks. If it proves to be the local concern, the new mine will undoubtedly be joined with the other mines of the concern, which extend to Wheeling Park (one mile from Elm Grove) from the company's offices.

KENTUCKY

Lexington—Work has been begun by the H. C. Frick Coke Co. on the development of coal fields in Harlan County. It is planned to spend $9,000,000. The maximum output is expected to be 2,000,000 tons of coal a year.

OHIO

McArthur—Stratton Brothers, who own the Ballard lands in Madison township, are preparing to open the coal on this land by stripping the surface over the coal.

Bellaire—The Star Coal Co., of which W. J. Watterson is president, has taken a lease on the mine of the Brooks Run Coal Co. and has already resumed charge.

Steubenville—Copper wire by the hundreds of pounds has been stolen from the coal mines of this vicinity during the past year, the last theft of this sort endangering the lives of nearly 100 miners at the Gilchrist No. 3 mine of the West Virginia Coal Co. On Saturday, Feb. 2, with about 100 men in the mine, the wire on the big fan which supplies air for the workings

was cut mysteriously. The theft was discovered in time to hastily repair the damage, and a tragedy was thus avoided. It is believed that the culprit has been caught.

INDIANA

Brazil—Franklin-Tandy-Lowish Coal Co., operating a large mine southwest of Staunton, have announced that a larger mine would be sunk on their land in the early spring. The offices of the company are in the Davis Trust Building.

Terre Haute—The tipple of Mine No. 5 of the Jackson Hill Coal and Coke Co. was burned on Feb. 12. The fire is declared by General Manager Kolsem to have been incendiary. Coal production will be cut down about 2000 tons a day until the mine can be reopened. This was the third mine tipple in this coal district destroyed by firebugs.

ILLINOIS

Benton—Twelve men were injured in the mine of the Benton Coal Co. recently, when the engineer of a cage which was being lowered into the mine lost control of his engine. Ten of the men were taken to the hospital at Ziegler.

Duquoin—Coal has been reached in both the main and air shafts of the new coal mine belonging to the Union Colliery Co., of St. Louis, Mo. The mine is located at Dowell, Ill., a new town near Duquoin. Coal was found in the air shaft at a depth of 220 ft. and in the main shaft at slightly more than that depth. The mine is said to be second to none in Illinois in capacity. A mine tipple and an office building will be erected, as well as a hotel, store, bank and houses for 1000 people.

Lincoln—The Lincoln Mining Co., operating one of the oldest established mines in central Illinois, has decided to close its mine and to discontinue the affairs of the company. The company has been unable to extinguish a fire which has been raging in the mine since Oct. 23, 1917, although six distinct attempts involving the expenditure of considerable money have been made to put out the fire. The company was organized in 1867 and began mining operations Dec. 15, 1869. Three seams of coal were passed through before the present 5-ft. seam was struck. The business was conducted for many years under the name of Harts & Frorer, but in 1905 was incorporated under the name of the Lincoln Mining Co. The company sustained destructive fires in 1883 and 1903.

Pana—Two hundred and fifty miners who refused to work in the Pana Coal Co.'s mine here for two weeks because the washhouse was not sufficiently warm for the changing of clothing have been fined $4 each by the Federal Fuel Administration. It is understood to be the first fine of its kind in the Illinois field.

Bush—The mine and washer here of the Western Coal and Mining Co., of St. Louis, has been entirely dismantled. The tipple and machinery have been removed to the Henderson-Wallace mine at Marion, where it will be used.

Zeigler—The Ziegler mine, which has been shut down for the last few months since the explosion, has been opened up, cleaned out and is now producing coal. This mine produced between 3000 and 4000 tons per day.

West Frankfort—For the first time in the history of southern Illinois the coal mines here have arranged with their men to work seven days a week, provided cars are available. The plan is to be worked out for a period of five weeks in an effort to increase local coal production. Six large mines are affected

Johnston City—Shaft No. 2 of the Johnston City Big Muddy Coal Co., controlled by P. H. Holland and others in Chicago, is now down to coal. It is expected that the mine will be on a producing basis some time in the early spring. It is located a mile and a half northwest of Johnston City.

Christopher—The old Moderwell mine here, which was shut down for several weeks, due to an explosion, has been opened up and is now producing.

Gillespie—A branch of the Northwestern R.R. is being built from here to the site of Mine No. 4 of the Superior Coal Co., which is to be the largest mine in the world, employing 2500 men and with a hoisting capacity of 8000 tons a day. The Superior company already has three mines here, one of which, No. 3, holds the world's record for hoisting 5550 tons in eight hours. The three mines employ 2500 men and the biweekly distribution of wages is about $125,000. The right of way for the Northwestern spur to the new mine was furnished by Gillespie business men.

Stonington—Following the gas explosion in the Stonington mine, which killed three miners, threats were made by friends of the victims that they would blow up the mine. The mine was idle one day because the men feared to go down, although half of them appeared at the shaft.

OKLAHOMA

Tulsa—Coal mines of Tulsa County, Oklahoma, are working at full capacity, both night and day, in an effort to meet emergency orders. The daily consumption of coal in and about Tulsa has been greatly increased within the last few weeks, due to the fact that many large industries that have been using natural gas for fuel are turning to coal because of the inadequacy of the gas supply in severe weather. The Cosden Oil Refinery, the largest plant of the kind in the world, has installed 110 large coal burners under its boilers and will consume 2500 tons of Dawson coal daily. New mines are being opened in Tulsa County, and it is said that the output of this county will be more than trebled in a few months. Practically all coal mined in Tulsa County is being used in Oklahoma.

Personals

S. A. Carson has sold his holdings in the Southern Connellsville Coal Co., of Uniontown, Penn., and has resigned as director and general manager. He will devote his time to other interests.

Frederick W. Bell, formerly superintendent of the Bessie mines, property of the Sloss-Sheffield Steel and Iron Co., of Birmingham, Ala., is now general manager of the Debordelaben Coal Co., of the same place.

Edmund Ewing, who for the past year has been safety mine inspector for the Alabama Coal Operators Association, has accepted a position with the Sloss-Sheffield Steel and Iron Co., of Birmingham, Ala., as superintendent of the Bessie mines.

John Rollo, who has been general manager of the Sunnyside Coal Co. at Herrin, Ill., for eighteen years, has resigned and is succeeded by John Goalby, former mine manager. The local union tendered the new superintendent a banquet and presented him with a diamond ring valued at $175.

C. H. Weiser has resigned as secretary of the St. Louis Fuel Committee as a result of criticism by State Administrator Crossley of Weiser's action in lifting the early-closing order the night before the time fixed by Crossley. Weiser's explanation was that it was done at the request of the Chamber of Commerce in compliment to visiting merchants. His successor has not been named.

A. H. Storrs, formerly a consulting engineer, of Scranton, Penn., has accepted the position of secretary of the War Committee of the Technical Societies of the Naval Consulting Board, his office being in Room 521, 15 Park Row, New York City. This war committee receives communications of inventors of war devices, sifts them and passes them on to subcommittees and committees of the various technical societies. When they are approved, they are reconsidered by the Naval Consulting Board.

John J. Shannon, for the past few years general superintendent of the Woodward Iron Co. furnaces at Birmingham, Ala., has been promoted to the position of general manager in charge of operations. For 42 years Mr. Shannon has been connected with furnace work in the Birmingham District, being first with the Tennessee Coal, Iron and Railroad Co., then the Sloss-Sheffield Steel and Iron Co. He was also connected with the Alabama Steel and Wire Co., at Gadsden, Ala., prior to his coming to the Woodward Iron Co.

Edward J. Newbaker, general superintendent of the Lehigh and Wilkes-Barre Coal Co. at Wilkes-Barre, has tendered his resignation to take effect Mar. 1, at which time he will enter the service of the Berwind-White Coal Mining Company, in the capacity of assistant general manager. He will be located at the headquarters of the company in the Commercial Trust Building, Philadelphia. Mr. Newbaker has been in the service of the Lehigh & Wilkes-Barre Coal Co. for the last 20 years, his first employment being on the engineering corps in the Honey Brook Division, from which position he was advanced to division engineer, and later to the position of division superintendent, which capacity he occupied until six years ago, when he was made superintendent of the company's operations.

Obituary

Daniel O'Hara, aged 85, a retired coal operator, died at his home in Washington, Penn., on Feb. 4.

Thomas M. Brewster, president of Brewster & Son, coal and lumber dealers of Ridgefield Park, N. J., died suddenly at Jacksonville, Fla., on Feb. 9.

Jenkin R. Daniels, mine foreman for the Consolidation Coal Co. at Hoffman, Md., died on Feb. 5 after an illness of one year. Mr. Daniels was born in Wales, coming to this country in his youth. He worked for a short period in the anthracite region at Scranton, Penn. He had been mine foreman at Hoffman for five years.

Foreign News

Vancouver, B. C.—Three hundred and fifty miners, said to have been mostly Germans, Austrians and Poles, attempted to wreck the Rosedale mine in the Calgary district on Feb. 2. To drive them off the police had to turn a machine gun on them. The mine is nonunion.

Sydney Mines, N. S. — On Feb. 2 the mayor and town council of Sydney mines petitioned the prime minister of Canada, the premier of Nova Scotia and the controller of Canada to compel the Nova Scotia Steel and Coal Co. and the Dominion Coal Co. to exchange submarine coal holdings on opposing sides of Sydney harbor, so that the operation of the mines of both concerns may be facilitated and the thicker seams in larger measures be available for operation.

Winnipeg, Manitoba, Can.—The chief inspector of coal mines in Alberta, John T. Stirling, on Feb. 4 advocated an embargo on United States coal for all points west of Winnipeg. He said that Alberta can easily furnish all the coal needed for that area. The preference for Pennsylvania coal he declares to be largely the outcome of habit.

Edmonton, Alta.—According to figures compiled by J. L. Sterling, of the Mines Branch of the Public Works Department, Alberta, the total output of coal for that province during 1917 was as follows: Lignite, 2,637,829 tons; bituminous, 2,206,868 tons; anthracite, 118,718 tons, and briquets, 93,818 tons. There were also 31,630 tons of coke burned. The figures for 1916 were lignite, 2,172,801 tons; bituminous, 2,335,259 tons; anthracite, 140,544 tons; briquets, 107,959 tons; coke, 41,950 tons. The total number of men employed in the coal mining industry was 9812 in 1917, as compared with 8599 in 1916.

Industrial News

Ironton, Ohio—The Ironton Engine Co. announces that F. C. Tomlinson has been elected as treasurer of the company. He assumed his duties on Dec. 1, 1917. H. A. Marting is president.

Wilton, Ky.—The Corum-Parker Coal Co., of Wilton, has filed notice of dissolution, stating that the corporation is winding up its existence. The notice is signed by J. L. Corum as president.

Pikeville, Ky.—The Keel Coal Co. has completed its organization plans, and will inaugurate operations at an early date for the development of 200 acres of coal lands recently acquired. J. L. Morgan is president and manager; D. T. Keel is vice president, and J. F. Pauly is secretary-treasurer.

Snyder, Tex.—A vein of good grade bituminous coal, 18 in. in thickness, was struck at a depth of 150 ft. in Scurry County, six miles west of here. A company is being organized and plans are being made for developing the property, for it is believed that a paying coal mine can be developed.

St. Louis, Mo.—Tabulations made by W. I. Jones, traffic manager of the St. Louis Fuel Committee, show that most of the coal delivered by the committee in the past five weeks to supply essential industries was taken from the railroads. The Missouri Pacific turned over 151 cars and the Frisco 111 cars in January.

Columbus, Ohio—At the annual stockholders' meeting of the Hocking Valley Products Co., operators and jobbers of coal, S. L. Chamberlaine, of New York, was reëlected president; Sidney S. Schuyler, vice president, and Frank J. Shaffner was elected secretary. Norbert Heinsheimer was elected assistant secretary-treasurer.

Columbus, Ohio—The Columbus Shippers Terminal Pool Association, which has now been in operation for about five weeks, is performing good service in the distribution of coal to the needy consumers. The pool has been handling on the average of about 80 cars daily. For the period covered from Jan. 5 to Jan. 31, the pool handled 535 cars of coal.

Columbus, Ohio—City Purchasing Agent Louis Guthke declared it seems practically impossible to buy coal for the Columbus municipal coal yard, recently created by council for relief of domestic consumers. Service Director Borden more than a week ago placed an order with Guthke for two car loads of lump coal, to be distributed in bushel lots from city firehouses, at cost, to consumers.

Columbus, Ohio—Governor Cox of Ohio called on Railroad Director General McAdoo last week in an effort to get more cars for Ohio mines. The governor was fortified with statistics secured from the Ohio Utilities Commission and from operators and miners. He had a pleasant talk with Mr. McAdoo and claims to have received some promises of a better car supply for Ohio mines.

Louisville, Ky.—Losses to river coal companies as a result of heavy running ice and gorges in the Ohio, Kentucky and other rivers of the state have been rather heavy, hundreds of tons of coal having been sunk, and many boats and barges. On the Kentucky River the flood carried away Lock No. 14, which has since resulted in stages too low for bringing coal out from the mines at Beattyville.

Columbus, Ohio—County Fuel Administrator Young has made an arrangement with several Hocking Valley operators to receive the output of several mines to supply the fuel needs of Columbus and Franklin county. As a result of this arrangement 72 cars of coal arrived within 24 hours after the plan was completed. Special attention will be given to the coal trains supplying Columbus.

Columbus, Ohio—The Maynard Coal Co. of this city, has purchased the coal docks at Duluth owned by the Hocking Valley R.R. and operated by the Boston Coal Dock and Wharf Co. The Maynard Company a few months ago purchased the Connors Point Dock at Superior, and will now be able to handle 1,000,000 tons of coal a year, to be supplied by Ohio, Kentucky and West Virginia mines.

Covington, Ky.—The grand jury reporting to the United States District Court here returned 61 indictments against coal operators in central and eastern Kentucky, charging violations of the executive order providing for prices of coal at the mines. The indictments resulted from investigations by special agents of the Fuel Administration, and these investigations are still under way, it is understood.

East Liverpool, Ohio—A model mining town is to be established at West Point, 11 miles north of here on the Youngstown & Ohio River R.R., by J. L. Francis, of this city, whose headquarters are at Salem. The company has over 1000 acres of coal, and is now producing at the rate of about 3,000 tons daily. This coal property is the largest that has ever been opened in this part of Columbiana County.

Sayreton, Ala.—The Roberts & Schaefer Co., engineers and contractors, Chicago, who are building the extensive fireproof tipple and coal washery for the Republic Iron and Steel Co. at Risco, Ala., have been awarded another contract by this company to rebuild the tipple and washery recently destroyed by fire at Sayreton. The new plant will be of fireproof construction and will cost approximately $200,000.

St. Louis, Mo.—The cost of the coal "input" is twice that of previous years. In former winters the universal price paid for putting the coal in the cellar was 1c. a bushel and the laborers kept it all. Now it is 2c. a bushel. Ten cents of the increase goes to the man who does the work and 15c. to the dealer. The dealers say the 15c. a ton covers the cost of bags, shovels, chutes and wheelbarrows furnished by them to the laborers.

Kansas City, Mo.—The Mayor and other city officials held a meeting here this week and appointed a delegation to go to Washington with Fuel Administrator Crossley of Missouri to protest to Fuel Administrator Garfield against the creating of zones that will prevent Kansas City and adjacent territory from getting Illinois coal. This privation, it is contended, will work a hardship that cannot be overcome by securing coal from other fields and the outlook is extremely grave.

Columbus, Ohio—Columbus coal men took a prominent part in the campaign in Columbus to secure $3,000,000 as a war chest to take care of all war relief work during the present year. A special soliciting team of coal men was named, of which G. A. Davis, of the Hitt-Davis Coal Co., is captain. Other members of the team are T. C. Collins, S. L. Comley, Paul Spence, George C. Weir, R. J. Framer, W. P. Plant, R. W. Rittenhouse, George F. Schwartz, C. M. Anderson and H. H. Leukhart.

Louisville, Ky.—The January Grand Jury in retiring recommended to the city that the latter purchase and operate its own coal mine for supplying city institutions with coal. The Board of Works announced later that under no consideration would the city own its own mine as it would cost too much to operate. J. M. Thompson, a mine operator of Central City, Ky., wrote the Board of Works, directly following the statement made by the Grand Jury, offering to sell a mine, but the offer was declined.

Murphysboro, Ill.—Railroad trainmen here complain that crews are needlessly delayed along the lines in what appears to them an effort on the part of the roads to break the prevailing eight-hour service law. A number of trainmen say that such delays are frequent and apparently without real cause. This is prevalent on the M. & O. in particular, and it is understood to prevail on nearly all roads in southern Illinois. This is one reason why coal has not been transported from the mines to the market.

Whitesburg, Ky.—It has been announced that the Garey Coal Co., of Lexington, Ky., recently organized, capital $50,000, will start developments of coal properties on the Louisville & Nashville branch into Perry County. The Elkhorn Block Coal Co., composed of Tennessee people, is at work on a coal development project below Jenkins, Ky., on the Baltimore & Ohio R.R., where the Reuben Anderson coal property is being developed. It is said that a new mining town will be built here and operations carried on at a large scale.

Columbus, Ohio—John H. Winders, as receiver for the Sunday Creek Coal Co., has filed a receipt in the common pleas court showing the claims against that company. The claims aggregate more than a half million dollars. The largest, $228,000, is held by the New York Coal Co., on royalty claims. Similar claims of $88,000 and $25,000 are held respectively by the Imperial Coal Co. and the estate of J. B. Tompkins. The Central Trust Company of New York holds a claim of $153,000 against collateral trust bonds. Practically all of these claims, except that of the trust company, are in dispute.

Columbus, Ohio—Bids will be opened Feb. 25 by George A. Borden, president of the board of purchase, and Louis K. Guthke for approximately 35,000 tons of coal for the various city departments. The advertisements contain the usual provisions such as deposits of 50 per cent. of the amount of the contract. The amounts of coal required are 5800 tons of mine-run or nut, pea and slack for the garbage-reduction plant; 12,500 tons of nut, pea and slack for the waterworks department; 15,000 tons of nut, pea and slack for the municipal light plant; 900 tons of lump for the workhouse and several smaller amounts.

Cincinnati, Ohio—In order to distribute coal to consumers in the congested districts of the city who were unable to secure ton lots, the city of Cincinnati has adopted the plan of placing coal at the fire-engine houses, where small consumers can secure bushel lots for emergency needs. This plan was resorted to in the severe weather during the early part of last week, and proved useful in getting to people who would otherwise have been compelled to go without. Several large retail dealers furnished trucks to haul the coal to the stations. Most of this coal was sold at 30c. a bushel, although some was distributed free of charge to needy families.

Cincinnati, Ohio—At a meeting held in Cincinnati on Feb. 4, attended by coal operators, rail officials and members of the Fuel Administration, plans for complete coöperation in forwarding and distributing coal, in order that essential needs might be supplied, were thoroughly discussed, and assurance was given that public utilities, at least, would be supplied with coal, in order to avert threatened widespread distress. The meeting secured immediate touch with the Fuel Administration's Washington headquarters by telephone, and was assured that Cincinnati would be supplied with as much coal as was necessary to meet pressing needs.

Youngstown, Ohio—The Republic Iron and Steel Co. has confirmed the purchase of the Bessemer Coal and Coke Co.'s coal properties in Pennslyvania, consisting of about 3000 acres of coking coal, with two shaft openings and a capacity of about 2000 tons a day, and has been operating them since Jan. 1 through the Woodside Coke Co., a subsidiary company. J. W. Deetrick, vice president of the Republic company, in charge of its fuel operations, is handling the business. The properties are located in Allegheny County, Pennsylvania, and constitute about one-third of the company's coal production, which, at full capacity, give it all of the 6000 tons a day required in its extensive steel operations.

Louisville, Ky.—A special Federal grand jury at Covington, Ky., on Feb. 2 returned indictments against 60 coal operators, a majority of whom are operating in eastern Kentucky sections, charging these operators with violation of the orders of the Fuel Administration, in that they are charging prices in excess of those set by the administration. Leading coal operators of Kentucky have stated that most of these indictments have been returned against the small wagon mines, which never recognize a market price at any time, and who are always a source of great trouble. Some of the larger operators are in hopes that such operators will be dealt with harshly and feel that it should be done under existing conditions.

Charleston, W. Va.—A new scale of demurrage charges has been placed in effect, beginning Feb. 10, by the West Virginia Public Service Commission, cancelling the schedule of demurrage rates placed in effect Jan. 21, and providing for 48 hours' free time for loading or unloading, and 24 hours on cars held for any other purpose permitted by the tariff. New demurrage charges on all cars after the expiration of free time will be $3 for each of the first four days, $6 for each of the next three days, and $10 for each succeeding day. The Commission intends the new charges to expedite the movement of cars and to relieve, to that extent, the shortage of cars which continues to hamper the output of the mines.

St. Louis, Mo.—The Union Electric Light and Power Co. will hereafter operate its own coal mine under the name of the Union Colliery Co. The company has 420 acres a few miles south of Duquoin, where a main shaft and air shaft have been sunk to a thick coal vein at the depth of 225 feet. Development work is being rushed. Office buildings and tipple are being erected and contracts are let for a hotel, bank and store buildings and dwellings. The town is to be called Dowell. Between 1200 and 1500 men are to be employed. The maximum output will be 5f tons a day. It will be operated by electricity under a contract with the Central Illinois Public Service Co. The capital stock is $250,000, all held by the Union Electric. A total expenditure of $800,000 is contemplated.

Cincinnati, Ohio—An interesting development of the coal shortage in Cincinnati is a special mission sent by the Hamilton County Fuel Administration to the coal fields of the Jackson and Wellston district, in Ohio, to secure the shipment of fuel to Cincinnati, if possible, although under normal conditions little of this coal comes to the river, most of it going north, while Cincinnati is supplied from West Virginia and eastern Kentucky. The Fuel Administration is prepared to buy for cash from Ohio operators who are in a position to forward coal to Cincinnati, and hopes to be able to secure some fuel by this means. Display advertisements in newspapers in the Ohio coal fields were used to call the attention of miners and operators alike to the distress existing in Cincinnati, and urging them to assist in relieving it by forwarding coal.

MARKET DEPARTMENT

Weekly Review

TIRED of playing the villain, the weather man early last week evidently came to the conclusion that he would essay the rôle of all-round good fellow. The result was sunshine and warmer weather. The new guise proved more than acceptable to shivering humanity, and the nation began to sit up and smile. However, it is far too soon to begin to crow, for it will be well along in the early spring before conditions in the industry will assume any semblance of stability.

The let-up in the urgent demand for domestic fuel has enabled a partial increase in the filling of industrial requirements in some quarters, though conditions in New England are far from favorable. There is still a great scarcity of steam grades, and cities in the interior are in a bad way for fuel, principally anthracite.

The use of bituminous coal has been advocated in many quarters where formerly anthracite had been burned. Some municipalities have practically suspended their smoke ordinances for the time being, the authorities evidently taking the broad viewpoint that it is better to have a little smoke and some heat rather than compel their industries to shut down and their citizens to freeze.

The effects of the recent blizzard are still being felt by the railroads, and reports from all over the country seem to emphasize the fact that transportation—or rather the lack of motive power—is still a factor which exerts a demoralizing effect on coal production. Scores of locomotives are laid up in the repair shops, and hundreds of switches which are frozen tight require attention. The work in the railroad shops should be speeded up to the highest possible pitch.

The rise in temperature has also brought to Uncle Sam's railroads the menace of floods. In many regions tracks were washed out and severe damage was done by the torrents from melting snow. Quite a few mines were flooded. With the thaw many collieries that suspended because of zero weather are now running.

The general freight situation is showing signs of improvement, and another cause for congratulation is that there are not many supply ships being delayed in New York harbor for lack of fuel.

Inadequate car supply, as ever, is the one bugaboo that the operators do not seem to be able to overcome. The United States Geological Survey shows that during the week of Jan. 26 production for the country as a whole amounted to 66.1 per cent. of capacity; and the one dominant factor limiting production is car supply. To this cause were ascribed losses amounting to 26.6 per cent. of full-time capacity, as against 7.3 per cent. for all other causes combined.

Mine workers' locals in two Ohio districts have indorsed resolutions petitioning Director General of Railroads McAdoo to suspend the operation of passenger trains one or two days each week, and to use the engines thus released for the hauling of empties to the mines.

Such a course is worth a trial. Business houses could be informed, for instance, that passenger trains would not operate on Tuesdays and Fridays of every week, and traveling men could adjust their schedules accordingly. In the event that Government officials found it necessary to reach certain points on these days, coaches could be attached to the rear end of mail trains. If sufficient warning of such a plan were given, it would meet with much less opposition than did the Fuel Administration's workless-days order.

Speaking of this order, now a thing of the past, it is universally acknowledged that though it saved little fuel, it helped considerably to relieve freight congestion. No less a person than Secretary McAdoo was against a continuance of the measure, as he feared that to adhere to the plan would seriously affect the taking up of the next Liberty Loan.

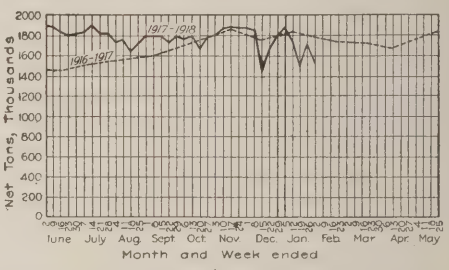
Dr. Garfield states that there will be no necessity for the shutting down of industry in the future, as he believes it possible henceforth to rely upon embargoes and the preference in the movement of food and fuel.

Operators in Washington are up in the air as regards the policy of the Fuel Administration. If that body would come out with a definite statement of its attitude on contracts, its feelings toward jobbers, and its intentions regarding prices, it would go far toward clearing up a great deal of uncertainty. Many operators are marking time insofar as the purchases of machinery and equipment are concerned, for they have no means of knowing if the new price schedule would justify any considerable investment in extensions to plant.

The few days of warm weather have brought a general feeling of optimism, a feeling it was impossible to experience with the thermometer reading zero and no fuel in sight.

COAL PRODUCTION

For the third time in two months the rate of production fell below 1,600,000 tons per working day, a drop of more than 200,000 tons as compared with the normal. The total production of bituminous coal during the week ended Feb. 2, including lignite and coal made into coke, is estimated at 9,423,000 tons. The output of



beehive coke continued to decline. Production for the week is estimated at only 446,000 tons, or 74,000 tons per working day. Shipments of anthracite were reported as 34,804 cars, as compared with 33,406 during the preceding week.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

	Jan. 12	Jan. 19	Jan. 26	Feb. 2
Bituminous shipments, 121 roads	180,411	150,865*	181,471*	170,131†
Anthracite shipments, 9 roads	36,178	31,861	33,406*	34,804†
Beehive coke shipments, 4 roads	11,560	10,826	10,408*	9,161†

*Revised from last report. † Subject to revision.

Atlantic Seaboard

BOSTON

New England situation progressively worse, although less strenuous weather gives a hopeful turn. Railroads and domestic consumers have priority over manufacturers in distribution through the Fuel Administration. Cargoes of "Storrow coal" arriving are parcelled out only to consumers high on the preferred list. Hampton Roads loading improves somewhat. Several important utilities were on point of shutting down when coal arrived. Rail movement slightly easier. Anthracite extremely scarce and bituminous much sought for domestic use.

Bituminous—Throughout New England there are cases of extreme distress through lack of coal. In a city near Boston the local fuel committee asked for authority to pull down unoccupied wooden houses, there being not a ton either of anthracite or bituminous in the yard of any dealer in the place. Supplies for water and sewerage pumping stations, hospitals and other vital needs have had to be rushed out from meager emergency piles at Boston, such as the reserve supply belonging to the Navy Department. The railroads, too, have responded handsomely. The Maine Central has been kept running by fuel taken from the New Haven, and the Boston & Albany has lent coal to the Central Vermont to tide it over until boats could arrive at New London, Conn., its southern terminus.

Under the circumstances, from what limited supplies are at its disposal, the New England Fuel Administration can only furnish weekly supplies to the priorities named in Schedule A of the Garfield order of Jan. 17, to the exclusion of manufacturers of every kind. The situation of industrials is rapidly getting to an extremely acute stage, for unless fuel is forthcoming in greater volume soon, some important plants will have to close their doors.

The extreme cold of Feb. 4 and 5 again slowed up the movement of boats. Ice conditions in Nantucket Sound were unusually severe, even for this winter, and none but steamers following the outside route were

able to make Boston. Besides coal for the Navy the arrivals have only been enough to keep running the largest utilities; others have managed to scrape along by means either of emergency shipments rushed from neighboring places or through the use of buckwheat, silt and screenings. They are making their slender stocks go as far as possible.

One fortunate happening gave Boston a real thrill this week. A British collier was reported in the offing, sent here with Welsh coal for British warships when it had appeared the supply for bunkering at various ports was at least doubtful. The diversion of the ship to Boston was accomplished through the British embassy.

It still remains a remarkable fact that while there are constant reports that large plants are about to close down the number of actual shutdowns of that kind is relatively small. Of course, the pass to which things have come has roused every manufacturer to make his representation to the Fuel Administration in order to get his share of the emergency coal that is being distributed. Several instances have come to light where industrial plants are in full operation with more or less reserve supply of fuel, and in the same town there are retail dealers without a pound of coal of any kind to distribute to people for their homes. The New England Fuel Administration issued orders on Feb. 7 that local fuel committees should see to it that retailers get fuel for delivery in small lots, if necessary, by asking the state administrator to commandeer coal arriving for manufacturers in the same town.

All the receipts of bituminous for delivery to retail dealers are pooled and then distributed through orders made out by a central agency. Likewise a committee of shippers has been formed to serve in an advisory way, and generally assist in the fair distribution of what coal arrives, whether through the administration or through ordinary channels. Shippers are now consulting the fuel authorities before they attempt to distribute cargoes, and the result of this coöperation is a general improvement not only in means and methods but in the fairness of distribution.

The 300 cars Mr. Storrow was authorized to divert at the New England gateways on Jan. 31 have now practically all come through, except via Mechanicville, where movement is preëminently slow. The diversions were accomplished from consignees other than retailers, utilities, and plants working 100 per cent. on Government orders. Much confusion arises over the latter classification, since there is hardly enough fuel to keep them all running more than part time. The pressure brought to bear in favor of certain of these plants is something tremendous.

Loading conditions have improved somewhat at Hampton Roads, dumping being easier, but the delayed unloading of cars is already having its effect on the volume of coal available. The improvement in dispatch is therefore likely only to be temporary, until something like an equilibrium can be established.

Anthracite—Although the movement of domestic sizes is improving slightly via Maybrook and Harlem River, the volume of coal in the hands of retail dealers throughout New England is very small. In a large number of towns and in some cities domestic consumers are forced to rely upon what meager supplies of bituminous are placed at their disposal. Practically everywhere, and especially at points near tidewater, the price of soft coal is on the same basis with anthracite, and the demand for it for domestic use is increasingly insistent.

Nearly 30 per cent. of the "anthracite" shipments coming through the rail gateways recently was culm, silt or other steam size. This is a commentary on the statistics so frequently quoted as showing the excess of shipments into New England compared with a year ago.

NEW YORK

Anthracite situation is slightly relieved owing to milder temperatures, but conditions are still serious. Bituminous released for household purposes. Fuel Administrator sends warning to business organizations. Ask that Delaware & Hudson Canal be surveyed. Vessels being supplied and situation is much easier. Car supply bad and transportation slow.

Anthracite—There has been some relief in the situation due to seasonable temperatures and the breaking up of the ice in the rivers and bay, causing a better delivery of supplies. Early this week, owing to the severe storm in the mining regions (the twenty-ninth snowstorm of this season), which tied up transportation and resulted in a falling off in production, it was possible to move coal at the Tidewater docks so as to keep ahead of receipts. However, there was not much headway gained and the situation continues to be serious, but the hope is expressed by tradesmen that unless this section of the country is again hit by a heavy snowstorm and unseasonably low temperatures, the shortage will not be so severe as it was a few weeks ago.

Reports received here the first part of this week show there was a good movement of coal toward Tidewater and that the mines have resumed work to their full capacity. More attention, it was said, would be devoted to preparation as a result of numerous complaints made to the Washington authorities. Inspectors are now at work at the breakers supervising the work of preparation and to carry out the orders of the Fuel Administration officials.

State Fuel Administrator Wiggin has written to the presidents of the Chamber of Commerce of the State of New York and the president of the Merchants' Association of the City of New York, citing defects and difficulties of the coal supply situation at this port. These, he says, call for study and thought looking toward future relief. Mr. Wiggin says the four main difficulties here are insufficient unloading facilities at the docks; inadequate storage facilities in Manhattan and Brooklyn; insufficient supply of tugs, many of which have been commandeered by the Federal Government, and insufficient coal-carrying barges to bring coal from the docks to Manhattan Island. This latter, he states, has not been an important defect this year because of the small quantity of coal, but with a normal supply will become a great factor.

The Chamber of Commerce has adopted a resolution recommending that the necessary legislation be passed authorizing a preliminary examination and survey by United States Army Engineers, for determining the advisability of restoring the Delaware & Hudson Canal, saying that it would be an important factor in relieving railroad congestion and in providing cheaper transportation rates for coal to the industrial centers of New York, New Jersey, the New England states and other points.

During the past ten days the New York market had gone through the most critical period of the entire winter. Only a moderation of weather conditions prevented a real coal famine which would have caused untold suffering and an almost general closing down of industries. Temperatures were nearly as low as in the middle of December, while heavy ice floes went far toward bringing river transportation to a standstill. Loaded barges and tugs were icebound and many remained in that condition for several days, some destined for Long Island points not being released until Monday of this week. The scarcity of anthracite became so serious that the Fuel Administrators released bituminous to private houses, apartments and hotels, ignoring the local ordinances which prohibit its use unless under proper conditions.

The situation in Manhattan and The Bronx remains serious. The dealers have no supplies but are able to keep their large customers supplied with the aid of the new zone system. Conditions in The Bronx are more acute, the receipts of coal there having been prevented by heavy ice blocking the canals and creeks. In Brooklyn conditions have improved. The breaking of the ice in the Gowanus Canal and Newtown Creek released many thousand tons of coal. In Queens there has been a decided improvement, many cars of coal having been sent through the Pennsylvania tubes.

A committee of aldermen has been appointed to conduct "any investigation that may be deemed necessary on the subject of the method of storing, distributing and retailing coal," and to "inquire into all matters of concern relating thereto insofar as said subject is of concern to the city or its inhabitants."

The shortage of anthracite steam sizes is not so acute, but there is no surplus.

Current quotations, per gross tons, f.o.b. Tidewater, at the lower ports, are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buck Wheat	4.30@5.00	5.50@5.80
Rice	3.75@3.95	4.50@4.80
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	..

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—The heavy demand for bunker supplies and the curtailment of receipts because of the heavy snow storms and bad rail transportation caused a decided shortage of coal at this market. There is a big shortage of coal in the Metropolitan district, the demand from cities and towns in other parts of the state being just as heavy.

The work of clearing the harbor of vessels held up because of the lack of bunker fuel is progressing rapidly.

The new price fixed for Maryland coal and in mines along the Western Maryland road in West Virginia affects from 30 to 40 companies, many of which have New York offices.

The situation in the manufacturing district of New Jersey close to the waterfront opposite New York is extremely serious, it being feared that many factories will have to suspend unless supplies are received shortly. It was also stated that several up-state gas plants are in bad shape because of the lack of fuel.

Operations at the mines have been bad, some mines not averaging more than three days a week. Car supply is poor, mines along the Pennsylvania receiving about 5 per cent. of their requirements, while those along the New York Central have been getting close to 40 per cent. of their quota. It was said that some of the mines along the Pennsylvania received about 13 per cent. of their normal supply of cars in January.

Many tradesmen are concerned over conditions that may exist after Mar. 31, when a majority of their contracts, many of them made on a basis of from $3 to $4, will expire. No word has come thus far from the railroads or big companies as to the course they will take.

The local situation shows a slight improvement, although supplies at the piers are about as low as they have been in some time. New England continues to get its share of the local receipts.

PHILADELPHIA

Anthracite shipments helped by milder weather. Suffering still acute. Use of bituminous increases. Coal stealing serious. Poor preparation causes action to be taken. Distribution plans for next season under way. Culm causing trouble. Steam coals sold up. Bituminous shipments aided by open weather, but critical conditions continue. Domestic confiscation felt. Question of price of seized coal. Contract rumors. Zoning delayed.

Anthracite—Milder weather conditions for a week have now afforded some relief, but only to the extent of making the suffering less acute. The shortage of fuel continues unabated. This week Chairman Lewis of the City Fuel Committee announced that his investigations show there are 10,000 families in the city without coal. This shows that the progress toward improving conditions has not been satisfactory.

Early in the week another severe cold spell, with the thermometer below zero, again upset calculations, causing idleness at the mines and greatly interfering with railroad deliveries. The operators reported the temperature as being from 20 to 25 degrees below zero at the collieries and that unusual snows had also prevailed. As a result the collieries lost at least two full working days and the trade here is just beginning to feel the effect of the lack of production on those days. The retail delivery system was also badly crippled by drivers and yardmen failing to report for work.

Much of the soft coal recently commandeered from industrial to domestic use has been gas coal. While the retail dealers show some indifference as to handling it, no one has refused to accept any such consignments ordered by the fuel authorities. While first reports from the consumers were somewhat unfavorable, later reports are that it is meeting with satisfaction. The fuel committee has been so impressed by the results of their experiment that they expect to make further heavy seizures, and in one day recently they diverted 103 cars of bituminous coal to the anthracite retailers. However, by an arrangement with the dealers who have been handling anthracite buckwheat for their steam trade, the bituminous coal is being used to replace buckwheat and this latter size turned over to domestic users. Often also a mixture of both is sold to the family trade.

A new departure was made this week when Chairman Lewis ordered the seizure of domestic sizes of coal which had been stored in retailers' yards by manufacturing plants. In one case 50 tons of egg coal owned and stored by a large baking company was confiscated and the dealer instructed to make deliveries to 50 different homes. Later State Administrator Potter prohibited a dealer from delivering buckwheat from a stock of 1000 tons owned by a large printing establishment and authorized its sale to domestic consumers. Last resort measures are being taken to protect the people in their homes from cold, no

matter how much business may suffer. The alarming number of pneumonia cases, with numerous deaths, as reported by the Health Department, is no doubt having its effect.

A conference to discuss ways and means for relieving the acute domestic shortage was called by State Fuel Administrator Potter after a hurried trip to Washington, where he had conferred with the National Fuel Administration. Attorneys were present to discuss the legal phase of the diversion of coal from original consignees, a practice that is rapidly increasing.

The dealers have been informed by the authorities that they are determined to hold them absolutely to the "householder first" rule, and any ignoring this priority order in the future will be dealt with by the District Attorney. The dealers have been told that so long as there is a single home without fuel none shall be delivered to other consumers. The people have been called upon to report any case of domestic coal being delivered to buildings not occupied as dwellings, while agents of the administration will keep up a vigorous scouting for offenders. Householders who are able to use steam sizes and bituminous mixed are to be given the preference over all other consumers. The committee this week also inaugurated the plan of requiring the dealers to call at the office of the administration and explain just what disposition they have made of their stocks.

The practice of stealing coal from cars after their arrival in the city continues to give much concern. There is hardly a car that does not show the loss of a ton or two. A shortage of 50 per cent. is common, and this week several cars had their entire contents stolen. On his return from Washington State Administrator Potter stated that this city enjoys the unenviable reputation of being the only city in the country where the robbery of cars has got beyond the local authorities, and he has once more appealed to the Director of Public Safety to give better protection to the shipments.

The complaints as to poor preparation of coal has now culminated in an investigation being started by the fuel authorities. An investigation of the quality of coal shipped by anthracite operators, big and little, was certainly in order, more particularly as to the steam sizes. While some shipping companies have said all along that they do not sell culm, inspection of shipments of rice coal lately would indicate that they are no longer taking out the culm. The chief complaint as to the domestic coal is as to size, and numerous complaints have been received by the committee of buckwheat coal being charged for as pea.

Fuel administrators in Luzerne and Lackawanna Counties report that "everything black" is being shipped. A change is now looked for. It has been directed that the standard of preparation as adopted in 1914 must be strictly adhered to. The order will necessitate an inspection at the mines of every car, but even at that should poorly prepared coal come out we cannot imagine a consignee refusing it on this account.

It is understood that some action is on foot to change the entire system of distribution of coal beginning with Apr. 1. This week a meeting of the special committee appointed by the General Committee of Anthracite Operators was held and plans for distribution formulated. This committee, consisting of W. J. Richards, president of the Philadelphia & Reading Coal and Iron Co.; S. D. Warriner, president of the Lehigh Coal and Navigation Co., and Joseph B. Dickson, of New York, recommended that everything be done to increase production, to take measures to maintain the standard of preparation, prevent use of anthracite domestic sizes in manufacturing, list the war requirements for fuel, apportion the output by cities and towns, and lastly to route anthracite from points of production by traffic lines that will afford distribution on the quickest and most economic basis. It is understood that this plan has been presented to the National Fuel Administration and probably has the approval of Chairman Potter, by whom it is rumored it was presented to Dr. Garfield.

With the continuance of the present mild weather all connected with the trade are much encouraged, as the thaw has been general throughout the mining region. Collieries that had suspended are now working again to their full capacity and the car movement is becoming better than for several weeks past. Because of this milder weather locomotives are able to haul nearly full tonnage. Because they claim the "backbone" of winter is broken, many dealers are more optimistic than they have been for months. The operators, however, are still much concerned and fear the possibility of flooded mines hampering operations.

Most shippers continue to disregard the request of dealers to ship certain sizes. They contend that a "car of coal is a car of coal" regardless of size or grade. In fact, most orders read: Any kind, any size and any car.

There continues to be little change in the steam coal market. Everybody is closely sold up and some houses even claim to be filled up with orders for culm. There has been much criticism recently about this latter size, due to the wide publicity given a complaint by a large manufacturer who received some worthless material and made a report to the Washington authorities asking that such shipments be prohibited. The prices for such coals as individuals have to offer are buckwheat, $4.15, rice $3.35, barley $2.35 and clum $1.50.

The prices per gross ton f.o.b. cars at mines for line shipments and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buck	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—As was to be expected, the softening of the weather had a favorable effect on conditions, but only to the extent that it prevented what many predicted would be a complete collapse of the fuel supply. There can be no gainsaying that if the severe weather had continued for another week the results would have been appalling. This is proved by the critical state in which the situation still remains. Coal has probably been received in greater volume than the preceding week, but the former period was the worst so far experienced.

Then again, the manufacturing industry, which is mostly dependent upon bituminous coal, has been hard hit by the heavy confiscation of coal for domestic use. With the easing of the weather conditions the problem of railway motive power takes the forefront as being the chief factor retarding the fuel supply. Even after the mines have received cars they frequently remain for long periods loaded on the sidings waiting to be moved from the collieries.

The amount of coal consigned on strictly commercial orders remains at a low ebb, and even when consignments are made on such orders the chances are much against their ever reaching the original consignee, owing to the many chances of confiscation encountered en route.

There continues to be quite a little discussion as to the price to be paid for coal which has been commandeered by fuel committees in this city and other sections. While it is generally understood that the fixed Government price will apply on many shipments, yet there is still a large proportion of coal being sent out on contracts with higher prices still in effect. So far as we have been able to learn the authorities have been careful in this respect and we do not believe that any shipper will suffer on account of the price received for his coal on this account.

Many plants in this territory continue to be idle for lack of fuel. While the public utilities in this vicinity have not as yet been compelled to suspend, several have been perilously near it and have only been able to keep going by curtailing their hours of operation, even after being helped out with coal seized by the fuel authorities. In this connection the state administrator has made a ruling that before any coal may be commandeered and delivered to an electric power plant, the committee must be assured that all nonessential customers have been cut off. Churches even have been put in this category.

We have recently heard of the willingness on the part of some shippers to enter into contract relations with certain essential plants on the basis of the Government figure. While this gives no particular present advantage to the producer, yet with higher priced contracts expiring they are placed in the position of being compelled to market their coal at the $2.45 figure anyway, and it seems to be a good policy to tie up to some good concerns who will develop into desirable customers when normal conditions arrive.

BALTIMORE

Warmer weather brings improved railroad movement and a better coal supply, although the situation is still acute. Anthracite receipts far below requirements. Industries short.

Bituminous—Although the railroads benefited materially in movement through the milder weather conditions of this week, the deliveries of soft coal here are still far short of requirements. Many industries are desperately short of fuel, and only by skimping and cutting down production in many cases were they able to continue operation.

Over Sunday the fuel administrator was able to report the unloading of 114 cars of bituminous and 79 cars of anthracite for local use, but as much of this went to public service corporations and for domestic call, there was not much relief for hard-pressed industries. At times the number of bituminous-laden cars unloaded in 24 hours drops back to 40 or 50. Industries with Government contracts were in several instances forced to cut down work.

President Willard of the Baltimore & Ohio spent the past week upon his line to speed up coal movement. The congestion at many points remained serious, however. Lack of motive power to move laden cars or empties is the greatest drawback. Industries here, spurred on by demurrage charges or appeals to patriotism for quick unloading, have frequently seen the empty cars remain on their sidings for days before being hauled away. Conditions at many mining centers remain unsatisfactory, as there have been numbers of days lost through inability to get cars to load. The recent increases in price allowed in Washington are expected to be reflected here, although at present no one worries much about price.

Anthracite—The little anthracite received here is quickly gobbled up. The domestic trade is using much soft coal now, or has given up hope of any coal at all and is relying on oil or gas heaters. Thousands of homes are still without fuel. Many dealers, with uncertain supplies, have been forced to cut down in regard to equipment. It is a serious matter to have many wagons and men with no coal to deliver for days at a time. The result has been that when coal came through in many cases there was no means of delivering it promptly. Consumers are frequently told that they can get coal if they will arrange to have it hauled.

Lake Markets

PITTSBURGH

Pittsburgh zone defined. Practical operation being arranged. Four lower pools of Monongahela open. Car supplies better with milder weather.

R. W. Gardiner, zone distributor for the Pittsburgh district, was in conference with the Fuel Administration at Washington the last two days of last week and is now taking the first active steps toward putting the new system of distribution into operation for the Pittsburgh district. The zone to be served by the Pittsburgh district is roughly the triangle made by running lines from Pittsburgh to Lorain, Ohio, and Rochester, N. Y., respectively. This triangle practically includes in their entirety all the roads that haul coal north from the Pittsburgh district as well as the mines north of Pittsburgh, as follows: The three divisions of the Pennsylvania Lines West, reaching Cleveland, Ashtabula and Erie respectively; the Pittsburgh & Lake Erie of the New York Central system, with connection at Youngstown with the Erie R.R.; the Bessemer railroad, reaching Conneaut Harbor; the Buffalo, Rochester & Pittsburgh and finally the Allegheny Valley division of the Pennsylvania. A meeting of coal operators will probably be held about the beginning of next week to adjust various matters in connection with operating the zone system.

At the beginning of this week the Monongahela River began to fall, without the gorges at Brownsville or Morgantown having broken, so that the fifth and higher pools are closed, while mines in the fourth and lower pools are resuming. After a practically complete cessation of river coal movement for more than five weeks, more than half the river mines upon which various Pittsburgh consumers depend are in line for full operation, except that a few tipples have been destroyed.

Car supplies at the rail mines have been improving, there having been mild weather beginning Wednesday of last week. Pittsburgh observed heatless Monday this week, but believes weather conditions are such that the Fuel Administration's order in this matter will be rescinded before next Monday.

Ordinary open market transactions in coal amount to practically nothing, but technically there is a large turnover of coal at the set prices, caused by the various orders of the Fuel Administration. The market remains quotable at the set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. additional permitted to be charged in the case of sales by brokers.

TORONTO

Coal very scarce. Shipments altogether inadequate to increased demand. Many dealers' offices closed. Three heatless days ordered by government.

The coal situation is worse than ever, and many cases of suffering are reported. About 225 cars of coal arrived here on Feb. 3, but the supply was altogether inadequate for the demand and since then comparatively little has come in. Some of the large dealers had to close their offices, being unable even to fill small orders. Conditions have been aggravated by the fact that many consumers who had laid in stocks to carry them over the winter have found their supplies insufficient owing to the extreme cold, and are now buying from hand to mouth. Many of the smaller dealers, finding themselves entirely unable to get supplies, have gone out of business. At some yards orders are only being filled for those who could undertake the delivery themselves. The civic authorities, churches and charitable organizations are endeavoring to relieve cases of extreme necessity.

The government has ordered three heatless days, Feb. 9 to 11, on which manufacturing plants and business places heated by coal must close down. This is expected to improve conditions considerably.

Nominal quotations for best grades per short ton are as follows: Retail anthracite: Egg, stove, nut and grate, $9.85; pea, $8.85; bituminous—steam, $9; slack, $8 to $8.50; domestic lump, $10; cannel $11. Wholesale, f.o.b. cars at destination, three-quarters lump, $7 to $7.50; slack, $6.85 to $7.

DETROIT

Moderating weather conditions avert suffering for those without coal and permit freer movement of shipments. Public schools are closed.

Bituminous—Rising temperatures, for the present, have saved Detroit from what threatened to be a most serious situation for both domestic consumers and users of steam coal. With shipments cut off by reoccurring snowstorms and zero temperatures, residents of the city were confronting almost certain hardship and suffering, when a change in weather conditions brought restoration of hope.

Though coal supply has not improved and all public schools of the city are closed, the fact that more moderate temperatures prevail is a comforting condition. Through the aid of Federal Government agencies relief has been afforded the Detroit City Gas Co., on which many homes were wholly dependent for heat. Shipments of gas oil are reported on the way from Chicago and arrangements have been made by the local representatives of the state fuel administration to assure the company's coal supply.

Anthracite—Little anthracite is coming into Detroit. Household consumers in most cases find it impossible to get their needs supplied as few of the retail yards have been able to get anthracite. Shipments of wood from the interior of the state have been arriving in small volume, but wood fails as a substitute for anthracite. The wood, cut to 16-in. lengths, sells around $8 a cord delivered, which makes its use rather costly in the opinion of consumers. Coke is almost unobtainable at present and brings hard-coal prices when it is to be had.

COLUMBUS

With warmer weather, operations at Ohio mines have been improved. There is still a serious shortage in both domestic and steam grades.

The coal trade in Ohio has been bettered to a marked degree by the breaking of the severe winter weather and the fact that the snow and ice are melting gradually. This means reduction in the supply of fuel necessary for domestic consumption and the helping of transportation. With less cold weather, it is believed that the worst of the situation is now passed.

The condition of the domestic trade still remains a feature. Efforts of county and state administrators have been devoted almost exclusively toward supplying the needs of householders. Rush orders were made for the shipment of coal to certain points where the scarcity was acute, and the Federal Fuel Administration was called upon frequently to make certain rulings. As a result of these efforts central Ohio was fairly well supplied. Considerable suffering, however, was reported from western and northwestern Ohio, where the coal shortage was extremely severe. Dealers were still controlled as to the amount to be delivered to each customer. Reserve stocks in the hands of dealers have been low, and in many cases they were entirely exhausted. Prices have been firm at the levels fixed by the county committee. Pocahontas is quite scarce, and there is also a scarcity of West Virginia splints. Anthracite is now almost entirely out of the market.

The steam business has been strenuous in every way. Large users have been compelled to stand aside while coal they have on the way has been diverted to private users. The county committees, working in conjunction with the state administration, have succeeded in keeping most public utilities going.

The production in Ohio fields showed an increase toward the latter part of the week. This is especially true in the Hocking Valley field, where the output is estimated at 55 to 60 per cent. of the average. In eastern Ohio shortage of cars and motive power are still holding up production. Massillon and Crooksville are credited with about 45 per cent. of normal.

Prices on short tons, f.o.b. mines, are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.70	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

More moderate weather and the receipt of coal by rail have enabled the relief of domestic consumers, but the industrial supply is limited. Flood stage in the river adds to complications.

A sudden change from below-zero weather to temperatures above freezing helped to relieve distress among domestic consumers in Cincinnati, while the receipt of 100 carloads of coal from the concentration yards at DeCoursey, Ky., served to give retailers a supply of coal to distribute to their patrons. Many dealers had been entirely without coal for their trade, so this served to relieve a situation which was becoming serious. The shortage of fuel was complicated early this week and during the latter part of last week by the high flood stage of the Ohio River, brought about by ice gorges that dammed the stream completely and forced it to back up higher than is usual even in severe spring floods. The river has been gradually receding, however, so that river-front coal yards can now operate. The principle difficulty is still that of supplying manufacturers with fuel for their plants, many having been forced to shut down due to lack of coal. Others have been operating on a narrow margin. The railroads have been unable to reach normal operating schedules on account of the ice on their tracks, coupled with the severe cold. It is hoped that the worst of the winter weather is over, and that conditions will improve steadily from now on.

LOUISVILLE

Moderating weather has reduced demand and given dealers and carriers a chance. Flood waters in mining districts have subsided, and production is expected to increase. Conditions show material improvement.

Production of coal in the eastern Kentucky fields was reduced to a minimum during a period extending from Jan. 23 to Feb. 2, as a result of the high water experienced throughout the coal district because of melting snow. Few mines were flooded, as most of the operations are high in the hills.

The high water meant a still further shortage of cars, and this combination of circumstances resulted in a light production for the district. However, now that the water has gone down and the railroads are getting back into shape, it is expected that with moderate weather there will be an improvement in conditions.

An interesting feature of the week has been the movement of mine-run coal from the western Kentucky mines into Louisville in box cars, it being handled much in the same way as coke has been handled in such cars in the past. There is a shortage of open cars and some miners are willing to accept any kind of equipment. The small dealers and some small car-lot consumers are glad to accept such coal, but the larger dealers claim that it involves too much labor in handling and are opposed to accepting it.

BIRMINGHAM

Shortage of both steam and domestic coal continues acute, though warm weather is relieving the situation to some extent. Demand for both grades brisk, as domestic dealers endeavor to accumulate stocks, and the steam trade hustles for current needs. Production slightly better than last week.

While the demand from the householders for domestic coal has assumed a normal status, the retail dealers are endeavoring to accumulate sufficient stocks to tide them over future cold snaps. While weather conditions have not been severe in three weeks, spring temperatures prevailing most of that time, not a yard in the eastern section of the city has any coal on hand.

Alabama, along with the other Southern states, has experienced its last "heatless" Monday, and normal industrial operations were observed and business was conducted as usual last Monday. There has been no diminution noted in steam-coal requirements—inquiries being strong and urgent. The priority clause in the Fuel Administrator's order remains in force, and preferential industries and public utilities will continue to receive their fuel supply, if need be, at the expense of operations not considered of vital import to the welfare of the nation.

Production at the mines was somewhat better than the previous week, though far from normal, as yet. Operations are not suffering materially for lack of cars, the supply being satisfactory in most cases.

Coke

CONNELLSVILLE

Car supplies improving. No prospects of river shipments in near future. Byproduct ovens doing better.

Car supplies have been improving since zero weather disappeared Tuesday of last week, but the recovery of the railroads, even with the mild weather of the past few days, has been very slow. The smallest shipments of any week since early in 1915 occurred week before last, representing only a trifle more than half the coke requirements of the blast furnaces depending on the region. Last week's shipments were only a trifle better, on the whole, while this week promises to show a material improvement. During January a considerable part of the accumulation of coke between ovens and furnaces was moved, but this did not seem to afford the furnaces much relief, and furnace operations have been very light, only an occasional furnace having been able to resume in the past few days.

River shipments of coke stopped the first week in the year by ice in the Monongahela River are not likely to be resumed in the near future. The ice gorge at Brownsville, in the fifth pool, is holding, with the river now falling, and this shuts off all coke movement.

The byproduct ovens are gradually increasing their operations, being better supplied with coal, and are this week operating at a trifle above 75 per cent. of capacity.

The market remains quotable at the set prices: Furnace, $6; 72-hour foundry, selected, $7; crushed, over 1 in., $7.30, per net ton at ovens. The Fuel Administration has not made the recently expected ruling to allow a brokerage on coke as is allowed on coal, and it is quite doubtful now whether any action will be taken.

The Connellsville "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 2 at 214,658 tons, a decrease of 7077 tons, and shipments at 228,539 tons, a decrease of 38,882 tons.

Birmingham—Coke producers report a brisk inquiry from a wide range of territory but admit inability to provide for more than their usual line of customers, deliveries on contracts in many cases being far behind. However, the car supply has shown considerable improvement and restricted routing eliminated to such an extent as to enable producers to make more liberal shipments to Texas and Pacific Coast territory. When deliveries are caught up with on this business it is expected that there will be some free tonnage for the spot trade. The fuel administrator has allowed an advance in the oven price on beehive coke, Big Seam furnace coke being increased from $6 to $6.75, Yolande and Brookwood foundry from $7 to $8, and Empire from $7 to $8.25 per net ton ovens. Under present market conditions the increased figures will not affect inquiries in the least.

Middle Western

GENERAL REVIEW

Warm weather helps solve the panicky market conditions.

The first two days of last week found the market generally without fuel. Zero to 15 deg. below prevailed throughout the Middle Western section, and this temperature came at a time when the railroads were paralyzed and dealers and industrial plants were without coal. Since Wednesday warmer weather has prevailed, however, thereby greatly relieving the distress and affording the railroads an opportunity to move some of the badly needed coal.

Coal cars are still scarce, however. If present weather conditions continue, no doubt there will be more cars available, and a little fuel will be accumulated at points where relief is the most needed. Mine operation has not been above 65 per cent. in any locality, and in most fields it fell far below this figure. The movement of coal in both Indiana and Illinois has been confined largely to these respective states, which is in accord with the instructions of the state fuel administrators, that localities producing coal should be served first.

Northern Illinois has always been a large user of Indiana coal, but the withdrawal of Indiana from this market has put a heavier burden on the Illinois operators and has created a new trade relationship.

Warm weather has caused the snow to disappear in southern Illinois and Indiana, enabling the refilling of ponds and reservoirs with a sufficient supply of water. The lack of water has long been a source of delay and expense to many mine operators, as water cars could not always be moved when needed, due to insufficient motive power of the railroads.

CHICAGO

Chicago is still short of fuel, due to inadequate transportation facilities.

At the instance of Fuel Administrator Raymond E. Durham, Chicago was divided into 12 districts, and dealers undertook to supply fuel to those most urgently in need of it. District 12 was found to contain about 10 tons of anthracite and 75 tons of bituminous. Other districts were found to be in little better shape. At the time the survey was made it was claimed that at least 500,000 tons of fuel was tied up in various yards in and near Chicago and en route, this being held up or delayed because of insufficient motive power. This state of affairs clearly indicates that transportation and not production has been causing so much trouble.

This market has been independent practically of Western coal for some time, and the fact that Indiana coal has been held out of Chicago for several days has increased the demand made on Illinois operators and the railroads serving their mines.

Anthracite and eastern bituminous coals are indeed scarce in this market, and only an occasional car of Kentucky coal is arriving here.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	
Washed egg	2.65@2.80				2.65@2.80	3.35@3.50
Washed stove	2.65@2.80				2.65@2.80	3.35@3.50
Washed nut	2.65@2.80				2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.46@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30				2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West Va. Splint
				Smokeless			
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.40@2.55	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Supply of hard coal is exhausted. Coke manufacturers return all orders to dealers, because of inability to catch up with the demand. Interior cities in a bad way, because of lack of fuel.

Milwaukee coal companies have announced that the supply of hard coal is exhausted and that nothing but the bituminous varieties can be furnished in future. Thousands of families employing stoves and heaters which are not adapted to the use of soft coal are hit hard by the famine, but dealers and the fuel administrators can offer them no relief. Coke producers have returned all orders to retailers and will do their best to meet the demands upon them without priority obligation. There has been no change in the price schedule.

W. N. Fitzgerald, state fuel administrator, says there is plenty of coal at Wisconsin lake ports, but that the weather and rail situation hampers the movement of it so that it is impossible to get coal to interior points as fast as it is needed. This is the chief problem which faces the fuel administration. At present it is impossible to average more than 15 carloads per day. A few days of warm weather during the past week made things look a little brighter, but a sleet storm which followed upset all optimistic calculations.

Demands for coal from interior cities become more urgent every day, and at many places the schools have been closed because of a lack of fuel. Southern counties of the state are seriously affected by the holding up in Indiana and Illinois of coal in transit. No coal has been received from these states in weeks. The matter has been taken up with the Federal Fuel Administration and it is expected that a drastic order to Indiana and Illinois administrators will be the result. A former order in this regard has been ignored by the latter.

County fuel administrators are trying to get in touch with owners of summer resorts and homes which have been closed for the winter, in order to take advantage of fuel lying in the bins.

The canvass by the State Council of Defense to obtain estimates of the amount of coal which will be needed next year is progressing, and reports have already been received from many cities of the state. The plan is to move all coal to central lake ports next season and then to distribute it as far as possible pro rata to all points within the coal consuming area.

ST. LOUIS

Weather conditions good, and this has helped the fuel situation. Mines working one and two days per week on account of transportation facilities. Tonnage very light from all fields and moving generally to outside markets where need is greatest. Local situation satisfactory.

The conditions at the present time in St. Louis are especially good, considering the plight of other centers. There is no surplus of any kind of coal in the market. As a matter of fact, St. Louis is short; but it is so much better taken care of than any other city that places that are suffering are being supplied with coal from the St. Louis requirements.

The railroads have curtailed production in the Illinois field the past week. The Illinois Central is giving some mines only one and two days' work per week, and sometimes it bunches the cars so that the mines cannot load them. Again it fails to pull loads for fully a week's time. The other roads seem to be holding up far better, and conditions in general show improvement, except as noted above.

Complaint has been made that the railroads are not using their men and equipment so as to get the best efficiency. This complaint comes from the railroad men themselves.

In St. Louis the Terminal, which is supposed to be a unified terminal, continues to use embargoes against different parts of itself as well as against the trunk lines. These embargoes continue to be used in defiance of instructions from the Fuel Administration that embargoes are not legal and not enforceable. These practices continue to cause congestion at East St. Louis and confusion in general in coal trade circles.

In the Carterville field, comprising the Williamson and Franklin County districts, working time still continues poor and the railroads and Government seem to be getting the bulk of the output. It developed the past week that about 80 per cent. of the domestic business in Chicago formerly consisted of Eastern coal, and that it has come to a point where but 20 per cent. is now coming in, the other 60 per cent. being made up from the Illinois and Indiana fields. This has drawn all the coal from the Carterville district, and Chicago still continues to be short. The same conditions exist to some extent in the DuQuoin field. The Rutledge and Taylor Coal Co. there seized the opportunity to cancel all its contracts, claiming that Fuel Administrator Garfield's priority order invalidated contracts.

In the Mt. Olive field the bulk of this coal still goes for railroad purposes, and there is still a shortage of this coal for domestic uses in the St. Louis market.

Railroad facilities in the Standard field have kept the production down, and railroad requirements seem to keep a large percentage of the domestic tonnage out of its usual channels. However, the St. Louis territory is getting its share of this coal and in sufficient quantities to prevent any suffering or factories from shutting down.

Trunk lines other than the Illinois Central are making good time from the mines to East St. Louis with coal, but the trouble is with the Terminals.

There have been some receipts in the past week of anthracite coal, some 25 to 30 cars having come in. There has been nothing from Arkansas nor any West Virginia smokeless.

Fuel Administrator Crossley has removed all local restrictions with regard to fuel conservation, and only those of the Federal Fuel Administrator Garfield are now in effect.

The prevailing market per net ton f.o.b. mines is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson and Franklin County rate is 87½c. Other fields, 72½c.

General Statistics

NORFOLK & WESTERN RAILWAY

The following tabulation shows the shipments of coal and coke over the Norfolk & Western Railway Co.'s lines during the month of December, 1917, and for the twelve months ending Dec. 31, 1917, as compared with corresponding periods of the previous year. The figures are in net tons.

	December 1916	December 1917	Twelve Months 1916	Twelve Months 1917
Coal:				
Tidewater:				
Foreign	153,483	93,021	3,307,443	2,280,914
Coa'w'se	227,741	199,229	3,373,072	3,149,992
Domestic	2,124,096	1,591,278	27,680,401	26,993,496
Coke:				
Foreign	1,993	584	48,634	18,453
Domestic	171,755	313,215	1,999,680	2,529,627
Total	2,679,068	2,197,327	36,409,230	34,972,482

The following table gives the coal tonnage from mines on the Norfolk & Western Ry., and from other railroads, for the month of December, 1917:

From	Net Tons
Pocahontas field	987,382
Tug river field	228,311
Thacker field	197,032
Kenova field	89,038
Clinch Valley field	112,922
Other northern and western territory	14,405
Total northern and western fields	1,629,090
Williamson & Pond Creek Railroad Co.	96,220
Tug River & Kentucky Railroad Co.	42,702
All other railroads	81,921
Total	1,849,933

COAL AGE

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Shotfirers and the Alien Enemy Miner

RECENTLY, sticks of dynamite have been found mixed with coal in several coal cars. Investigation has shown that the explosives were placed in the cars at the mines, and certain Austrian miners are suspected of having committed this crime in an attempt to wreck coal transportation.

Perhaps these acts of vandalism were not perpetrated primarily to aid the enemy. Instances are on record where such things have happened accidentally. Then there are cases where revenge has been the sole motive. Nevertheless, such acts may not only interrupt railway transportation, but may result in an explosion that will wreck a building or sink a transport.

Crimes of this kind may be largely prevented through the compulsory requirement of shotfirers in all mines. Safety engineers and mine inspectors have frequently advocated such a measure. Some states already require duly authorized shotfirers; other states require shotfirers under certain conditions. In gaseous mines particularly, the hazards from improper loading, tamping and firing are great. However, the mining industry is not unanimous in the belief that specially appointed shotfirers are necessary as a safety measure in all mines under all conditions.

IN ADDITION to the increased safety that results from having all holes fired by specially appointed men, there is now the further incentive to comply with the Explosives Regulation Act—a law designed to prevent explosives getting into the hands of alien enemies. This act requires the licensing of all users of explosives; yet, as at present enforced, practically all miners can get explosives and the law furnishes but little protection.

The inclusion of high explosives in cars of coal today makes it advisable that the coal industry as a whole seriously considers the adoption of some compulsory shotfiring measure. Mine operators have here an opportunity to coöperate with the Government for the protection of its war-making efforts, as well as for the protection of life and property. Careful discussion will determine whether it is best for the state mining department to exercise power to make such requirements compulsory; or whether it is necessary for state legislators to enact additional legislation; or whether Government officials acting under authority of the Federal explosives regulation should correct the evil.

ONE thing is certain—this is not a time for halfway measures. such as the appointment of shotfirers who merely ignite shots loaded by miners. No plan can prove really effective unless it embodies the designation of specially qualified individuals, who will have sole charge of the custody, storage, transportation, loading, tamping and firing of all explosives. In small mines it is not necessary to appoint some man who has no other duties than shotfiring. In these small operations a reliable company man, the foreman or the superintendent, can perform such duties.

With the universal adoption of shotfirers there will come a material reduction in the accident ratio in coal mines. Fewer men will be injured through the careless handling of explosives and by flying particles of coal. There will also be a reduction in the number of those greater catastrophes caused by blownout shots, and finally such action will eliminate the serious dangers that arise from explosives being mixed with shipments of coal.

This matter is worth discussing right now, and *Coal Age* will appreciate an expression of opinion from the industry at large.

IDEAS AND SUGGESTIONS

Storage-Battery Charging Panel

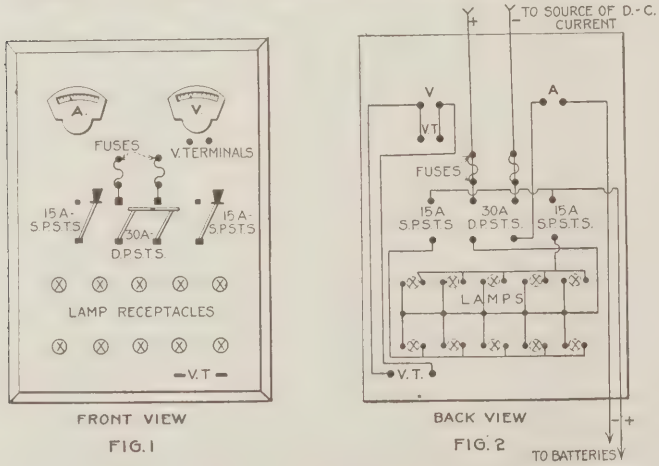
BY FRANK HUSKINSON
Lafayette, Colo.

Having a number of small portable storage batteries, also a few storage batteries used in automobile lighting and starting, to keep in shape and charged, I made up the satisfactory and serviceable charging panel shown in Figs. 1 and 2.

Fig. 1 shows a front view of the panel. *A* is a Weston direct-current, 15-amp., back-connected, small-size switchboard ammeter. *V* is a Weston direct-current 15-volt, back-connected, small-size switchboard voltmeter. The direct current for charging is taken from the direct-current busbars behind the circuit breakers, at the substation, so as to have an uninterrupted source of current for the charging of the batteries.

The direct-current lines come to the fuses, and a 30-amp., double-pole, single-throw switch. One line then goes to the ammeter and thence to the batteries. The other line goes to one side of all the lamp receptacles. the two 15-amp., single-pole, single-throw switches are each connected to one-half of the lamp receptacles, and then to the batteries. This arrangement allows each switch to connect one-half of the lamps in series with the ammeter and the batteries. For a finer adjustment of the load, the lamps can be turned on or off in the receptacles.

The voltmeter is arranged with two sets of terminals; the upper set is for connecting a portable cord and testing the voltage on any desired batteries. The lower



FIGS. 1 AND 2. FRONT AND REAR OF CHARGING PANEL

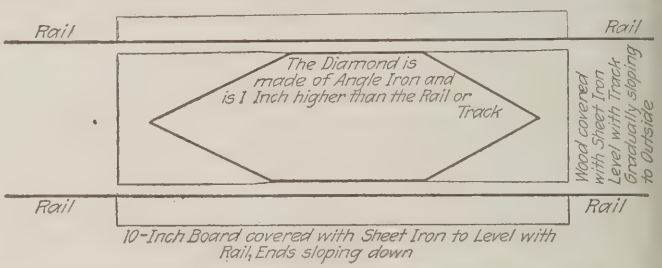
set of terminals, marked *VT*, are two pieces of strip copper fixed to the panel board, and so spaced that in testing the small size portable storage batteries, the battery terminals are brought in contact with the two copper pieces and the voltage then read on the voltmeter.

The size of lamps to be used in the receptacles is determined by the amount of current needed and the number of batteries on charge. The lamps can be replaced with resistance units if desired.

The Diamond Rerailer

BY JOHN HITTMEIER
Mt. Olive, Ill.

A rerailer that has been in actual service for a year and is still in good order is shown in the accompanying illustration. This is placed permanently between the



CARS QUICKLY RERAILED WITH THIS DEVICE

rails at any point where pit cars get off the track along the motor haulage. If cars become derailed while moving in either direction, or on either side of the track, they will rerail or get on the track without lifting or even stopping the trip.

Generator Polarity Reversed

BY JOHN J. NOLAN
Linton, Ind.

Some few months ago the electrician at one of the Vandalia mines reported to me that the arc lamps used for headlights on a certain locomotive could not be made to give sufficient light compared to lamps used on other locomotives in this mine.

After discussing the various causes of this difficulty, he stated that on idle days the lamps burned brightly; so I investigated and found that the generator supplying this side of the mine was reversed, making the rail the positive side of the circuit.

The two generators were not connected in parallel, but had separate positive lines supplying their respective sides of the mine. The two locomotives, however, came in to the bottom over the same rails. Also the machines on both sides of the mine fed off the trolley and used the rail for a return. The reason for having better light on idle days was that the generator which was not reversed supplied the whole mine on these days.

The reversal was not caused by either of these two generators, but by another plant supplying the machines and gathering locomotives from a water shaft about a mile away, and a switch so arranged that this plant could furnish power at nights for pumps, motors, fans, etc., over the whole mine. This switch had probably been put in before the main plant had been cut out.

This occurrence might seem strange, but the same thing happened twice afterward; and each time this same generator had been reversed and the arc lamps would indicate the trouble.

A Plea for Conservation

By E. H. Coxe
General Superintendent, United Coal Corporation, Pittsburgh, Penn.

In visiting our mines, I have noticed a lamentable lack of interest in, and compliance with, the numerous orders and requests of the various Government administrators, looking toward the conservation of articles essential to the winning of the war. I cannot think that our men are less patriotic or thoughtful than others, and am led to believe that this condition prevails generally throughout the coal fields of the country.

I notice a lack of observance of meatless and wheatless days; carelessness in allowing lights to burn unnecessarily in the day time, and the use of an excessive number of lights at all times where they are furnished free or on a flat rate.

On mentioning this lack of observance of these rules or orders, the reply in some cases was, in effect, "What difference will the little I can save make?" If each individual will consider that there are 100,000,000 people in this country, and if his saving is multiplied by that number, he will readily see that the total saving would be considerable. If every person figured that his or her individual saving was not enough to count, there would be no conservation and we would have no more show to win the war than has the oft-mentioned snowball in Hades.

Another thing I have noticed is the amount of good coal going over the slate dump. In cleaning roads and falls, a large amount of coal is loaded in slate cars that could be separated and saved, instead of being wasted on the dump.

The failure to recover spikes and ties, now expensive and hard to get; the careless tearing up or repairing of tracks; the throwing of scrap in the gob instead of on the scrap pile; the haphazard handling of small supplies; the lack of care of tools and machinery; all these cause loss to our employers and waste of material which could be used in making ammunition for use at the front.

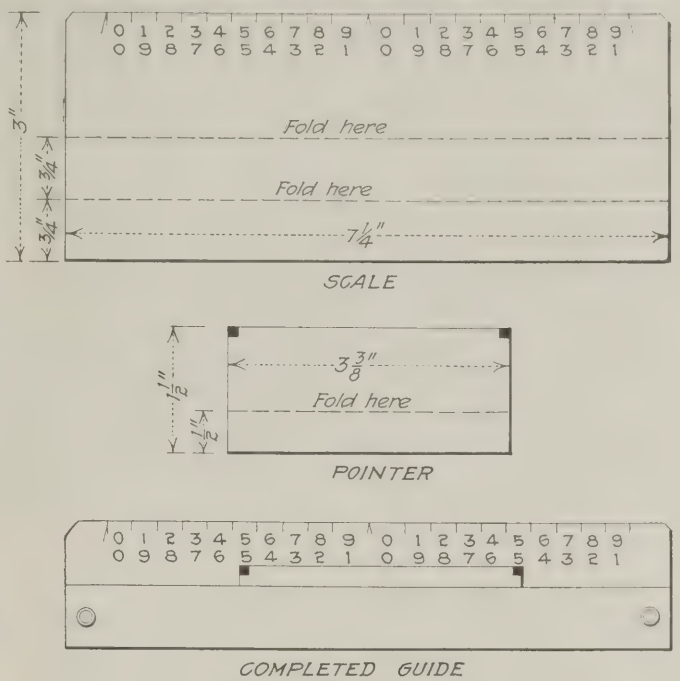
As has often been said, the winning of the war depends just as much on the men behind the men behind the guns, as on the men behind the guns, so it is up to us here at home to economize. Let not people of other occupations point to us at the mines as slackers, but let us all put our shoulders to the wheel and practice conservation and economy in those things and materials necessary for victory.

Guide for Use with Traverse Tables

By Philip A. Arnold
St. Marys, Penn.

In taking figures from traverse tables, a guide of some sort is almost a necessity if one wishes to avoid mistakes. Many are the devices used for this work, from the slip of paper with two pencil marks the proper distance apart to elaborate arrangements with dials and arrow points. I have worked with a number of different styles of guides, but the one that has given me best results and that I have used for some time is shown in the accompanying illustration. This guide is simple to make and can be operated with quickness and ease.

To construct, take a piece of medium weight drawing paper and cut a scale and pointer to the dimensions shown. Make graduations on scale to correspond with the vertical ruling on pages of the traverse book and place two rows of numbers as shown—the upper row being used for angles up to 45 deg. and the lower row for angles from 45 to 90 deg. Fold the scale and pointer on the indicated lines and place the flap of the pointer under the flap of the scale; then fasten an eyelet close to each end of the scale. The guide is



SIMPLY MADE GUIDE TO ENABLE CORRECT READING OF TRAVERSE TABLES

now ready for use, as the pointer is securely held in place but can easily be moved along the scale to the desired point.

The guide shown in the accompanying illustration is constructed for use with "Gurden's Traverse Tables"—four decimal places. In order to make a guide for use with other tables it is, of course, only necessary to change the length and graduations of the scale and the length of the pointer to correspond with the columns of the book.

To Compute the Area of a Circle

B. B. Gordon, of Greenville, Mass., in the *Engineering News-Record* gives the following method for calculating the area of a circle. The general rule is to multiply the square of the diameter by 0.7854, but engineers usually rather hesitate to make the calculation in that manner. Mr. Gordon's method, which he says may not be new, substitutes a somewhat easy series of multiples which calculated can be added together. For the purpose of this example the diameter is taken as 4. Then

If D = 4	$D^2 = 16$
	0.7
D^2 Multiplied by 0.7 =	11.2
D^2 Multiplied by 0.07 =	1.12
D^2 Multiplied by 0.014 or (0.007 × 2) =	0.224
D^2 Multiplied by 0.0014 =	0.0224
D^2 Multiplied by 0.7854 =	12.5664

Modern Rectangular Coke-Oven Plant

BY DEVER C. ASHMEAD
Tarrytown, N. Y.

SYNOPSIS — *With scarcity of labor coke men turn to improved types of ovens susceptible of operation by mechanical appliances. A thoroughly modern rectangular coke-oven plant is here described, with details of the mechanical coal leveler, the coke quencher and the coke loader. The construction of this new type of oven is fully covered and illustrated. An interesting comparison is made of the labor necessary to operate the 200 rectangular ovens and the same number of beehive ovens at this plant.*

AT SYKESVILLE, Clearfield County, Pennsylvania, the Cascade Coal and Coke Co. has a plant of 400 coke ovens, 200 of which are rectangular, the other 200 being of the beehive type. These ovens are supplied with coal from the Cascade mine, which is owned and operated by the same company. The coke ovens and most of the surface plant are shown in the general panoramic view, Fig. 1.

The whole surface plant is in every way thoroughly modern, up to date, and comparatively new, part of it having been installed in the last three years. The recent construction includes the new boiler house and the low-pressure turbine building; the rectangular coke ovens were completed about five years ago, the rest of the plant being older.

There are two separate boiler houses for the production of steam. One is shown at the right in Fig. 2 and contains four 300-hp. Babcock & Wilcox boilers. The second boiler house is shown in the foreground of Fig 3; it occupies the right half of the building and contains two 300-hp. Babcock & Wilcox boilers. Both of these boiler houses are fireproof, being built of brick and steel. A 150-ft. brick chimney is provided for each set of boilers.

There are two engine houses; one is in the right-hand end of the building shown in Fig. 2, at the right of the illustration. This engine house contains the hoisting engine which raises the coal from the mine, 183 ft. below the surface; also it contains four two-stage Ingersoll-Rand compressors, which furnish compressed air for the punchers that undercut the coal in the mine.

The exterior of the second engine room is shown in Fig. 3, at the left-hand end of the building, in the foreground. This engine room contains two thoroughly modern, low-pressure Ridgway-Rateau-Smoot turbo-generator outfits, built by the Ridgway Dynamo Co. These outfits are 375 kv.-a., 94.3-ampere, 2300-volt, 60-cycle, three-phase units. The steam used in the two turbines is the exhaust from the air compressors, the hoisting engine and other small engines. As the pressure of this steam is quite variable, it is sent through a Rateau regenerator, which equalizes the pressure before the steam goes to the turbines. The capacity of the regenerator is such that it will hold sufficient steam to run the turbines for 2 min. after the plant is shut down. It is also arranged that steam, from the boiler plant in the same building, can be supplied to the regenerator for the operation of the turbines in case there is not sufficient exhaust steam to operate them. The interior of this low pressure turbo-generator room is shown in Fig. 4. In the immediate foreground can be seen the top of the condenser.

The headhouse (center of Fig. 2) is built of steel and is covered with corrugated sheet iron painted black. The cages are self-dumping and the coal goes directly into a weigh basket. As the coal seam in the Cascade mine is particularly free from impurities, it is unnecessary to give the coal a careful cleaning. Therefore, from the weigh basket the coal is dumped into a 60-ton bin, whence it is carried by a 42-in. belt conveyor into another part of the headhouse where the coal is broken to 1-in. size in a Link-Belt crusher. Afterward it goes by chute to a Williams crusher, operating at 1800 r.p.m., in which the coal is crushed to pea and smaller; thence to a pit from which it is picked up by 24-in. rubber belt conveyors, 250 ft. center to center, and taken to the two large 1000-ton coal bins, shown at the left in Fig. 2. The frame of the bins is of steel; the bin proper is lined



FIG. 1. PANORAMIC VIEW OF COKE OVEN PLANT OF THE CASCADE



FIG. 2. VIEW OF PLANT SHOWING BOILER AND POWER HOUSE, HEADHOUSE, STORAGE BINS AND LARRY TRACK

with wood, which is covered with sheet steel. Coal is loaded direct from the bins into larries, from which the ovens are charged.

The oven layout is shown in the panoramic view (Fig. 1); each of the three parallel rows of ovens is approximately 1600 ft. long. The single bank of beehive ovens is in the foreground; in the middle are the block, or double row of beehive ovens; and immediately in the rear are the rectangular ovens, which were under construction at the time the picture was taken. The larry tracks from the bins to these three rows of ovens are plainly shown in Fig. 1.

Coke is loaded from the ovens into cars on tracks located between the rows of ovens. The grades of the railroad tracks favor the loaded cars, which are dropped in the direction of the bins and headhouse, where they are made up into trains.

The rectangular coke ovens are a particularly interesting feature of this plant and are well illustrated in the accompanying views. These ovens are 5½ ft. wide by 32 ft. deep and have the charging hole in the center of the top (see Fig. 12). This charging hole is also the vent for the escape of gas. The general construction of the oven is well shown in Figs. 6, 10, 11 and 12. Fig. 11 shows the details of construction of the front of the oven as well as the interior wall. The front of the oven is built of cut stone and the interior side walls as well as the top and bottom are of firebrick. The top of the oven rises from each end to the center and is arched as shown. The form for constructing the top of the oven is illustrated in Fig. 9 and it is shown in place in Fig. 6. The firebrick on the sides has given only a very short life, not over two years. The top of the ovens has lasted fairly well. In fact, during the five years they have been operating they have not yet burned out.

While the ovens were under construction, the portable roadway, shown in Fig. 10, was built so that the teams could readily deliver the earth for covering the ovens.



COAL AND COKE CO., SYKESVILLE, CLEARFIELD COUNTY, PENNSYLVANIA



FIG. 3. EXTERIOR VIEW OF POWER PLANT



FIG. 4. INTERIOR OF TURBO-GENERATOR ROOM

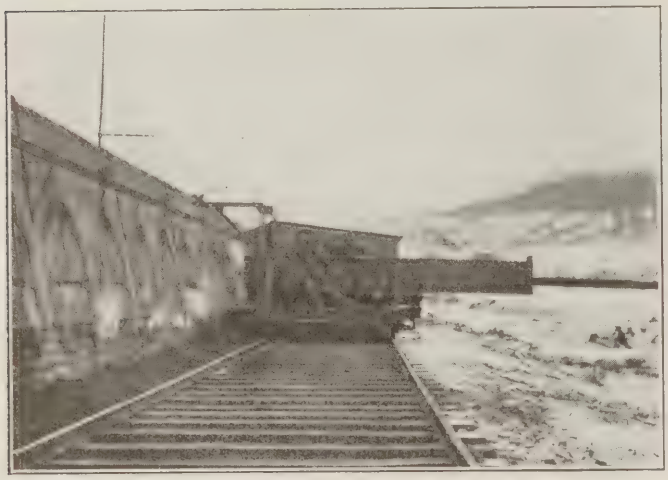


FIG. 5. LEVELER FOLLOWED BY DAUBING CAR

This saved considerable extra handling, facilitating the delivery of the material at the proper point.

The coal bins are connected to the coke ovens by a steel trestle about 500 ft. long, on which the larries run. Fig. 8 shows the larries as well as the steel construction of the trestle. The plate girders in this illustration are over the trolley tracks on the county road below. The larries are run in batteries of three, with one motorman in charge, and are so arranged that they will charge every other oven.

The larries have a maximum capacity of 10 tons each, but they only carry the amount of coal that is necessary to charge an oven. This amount depends on the time the ovens are to burn. At this plant they are using two burning periods of 48 and 72 hours respectively. As mainly furnace or 48-hour coke is made at this plant, when it is desired to use the longer burning time (72



FIG. 6. VIEW OF THE OVEN DURING PROCESS OF CONSTRUCTION

hours), it is necessary to use a larger charge—therefore, the two size charges, one of 7 tons for the 48-hour period and one of 10 tons for the 72-hour period. As previously mentioned, the larries are so arranged that three ovens can be charged at the same time.

When the coal from the larries is charged into the ovens, it forms a pile in the center and it is necessary to level the coal evenly in the oven. Fig. 5 is an illustration of the leveler. The machine runs under its own power on the track shown. When it is necessary to level the coal, the leveler is run directly in front of the oven, and the lower part of the doors on each end of the coke ovens are swung into place (see Fig. 14). The leveler is provided with a long arm with a scraper on the end that has an over-all reach of 35 ft., which is operated by an electric motor, moving the arm backward and forward. One man operates the leveler, which was manufactured by the Connellsville Manufacturing and Machine Supply Company.

Immediately following the leveler is the daubing car, shown in Fig. 7. This car moves on the same track as the leveler, and is also propelled by its own motor.

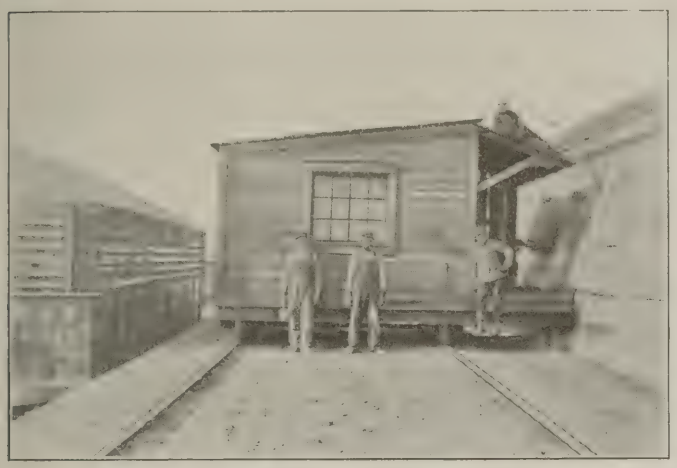
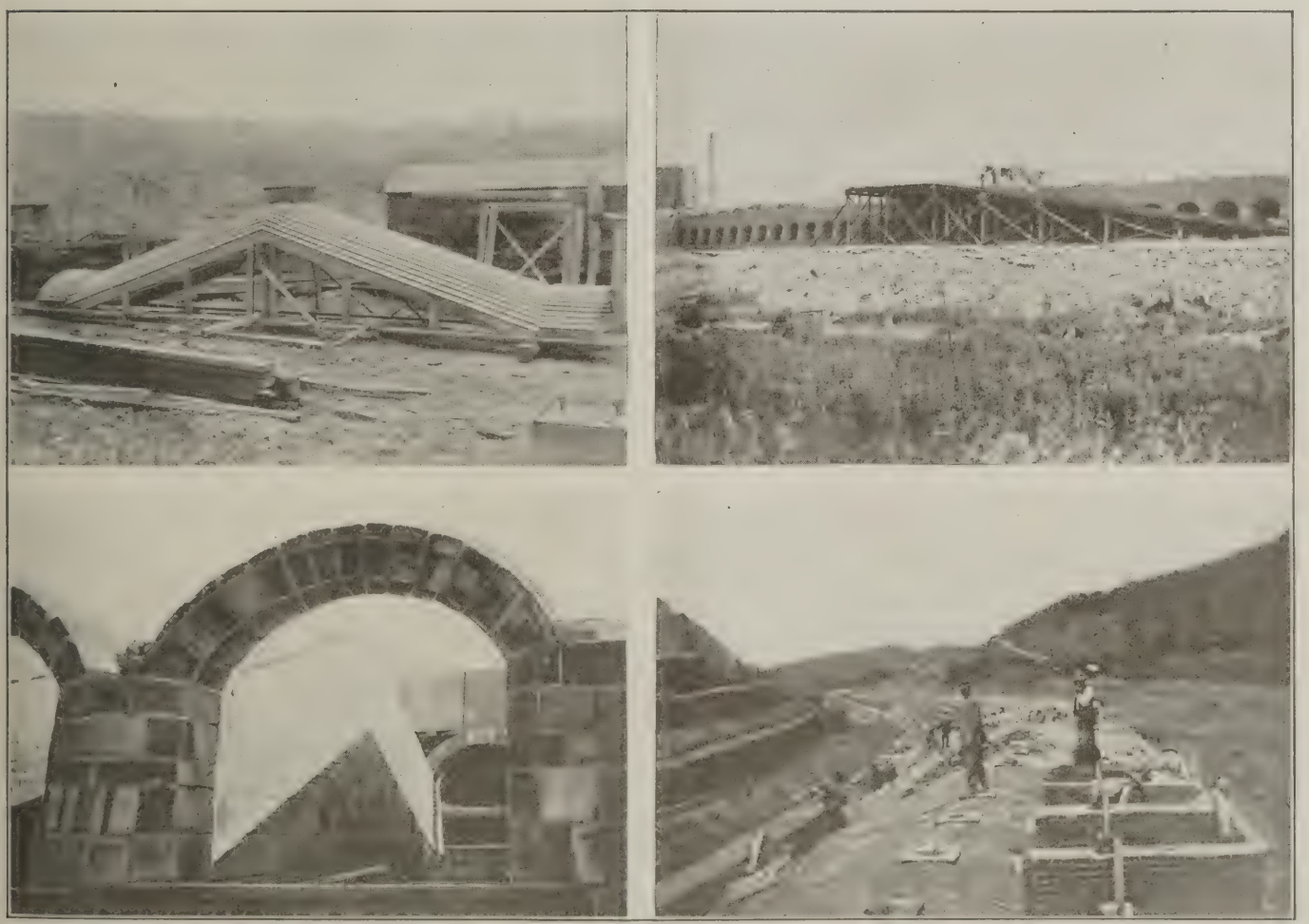


FIG. 7. VIEW OF THE DAUBING CAR



FIG. 8. TRAIN OF LARRIES ON WAY TO OVEN



FIGS. 9, 10, 11 AND 12. GENERAL VIEWS OF THE OVENS DURING CONSTRUCTION

Upper Left—Form for constructing top of oven. Upper Right—Knockdown roadway for taking earth to top of ovens. Lower Left—Oven before top was put in place. Lower Right—Top of oven before covering.

As there are doors on each end of the oven that have to be daubed it is necessary to have two of these daubing cars, one on each side of the bank of ovens. As soon as the leveling machine finishes with an oven, the daubing car moves up and takes its place. The men on the daubing car then swing the top section of the oven door into place, closing the oven. Then all the cracks and holes in the door and between the door and the oven are daubed with clay, in this way sealing out the air.

After the coal has been burned for either the 48- or the 72-hour period, depending on whether the 7- or the 10-ton charge has been used, the doors on both ends of the coke ovens are swung out of the way. Then the watering or coke quenching machine, built by the Wellman-Seaver-Morgan Co. (see Fig. 15) is run into place in front of the oven. An arm with a nozzle on the end is extended into the oven, and moved back and forth to allow water to spray over the hot coke to quench it. As

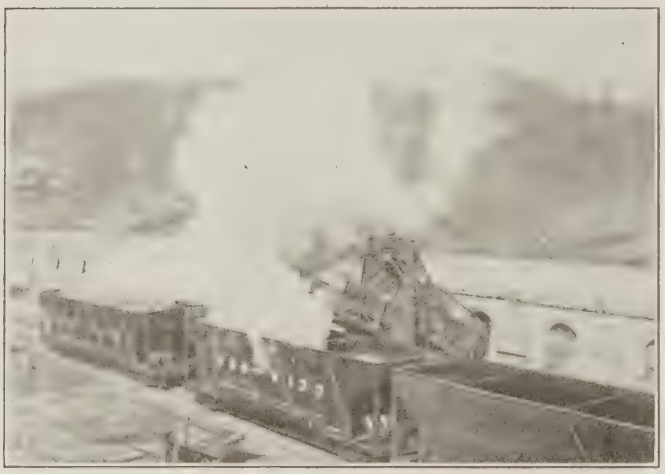


FIG. 13. VIEW OF LOADER IN OPERATION

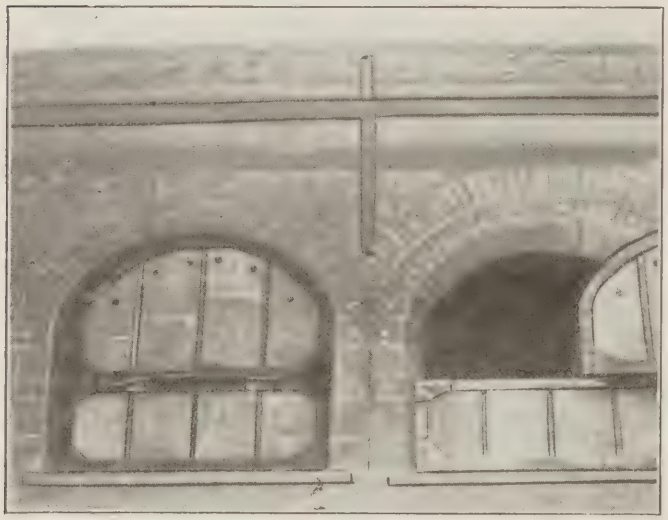


FIG. 14. OVEN DOOR AT RIGHT READY FOR LEVELING MACHINE—UPPER HALF OPEN



FIG. 15. WATERING MACHINE USED TO QUENCH COKE

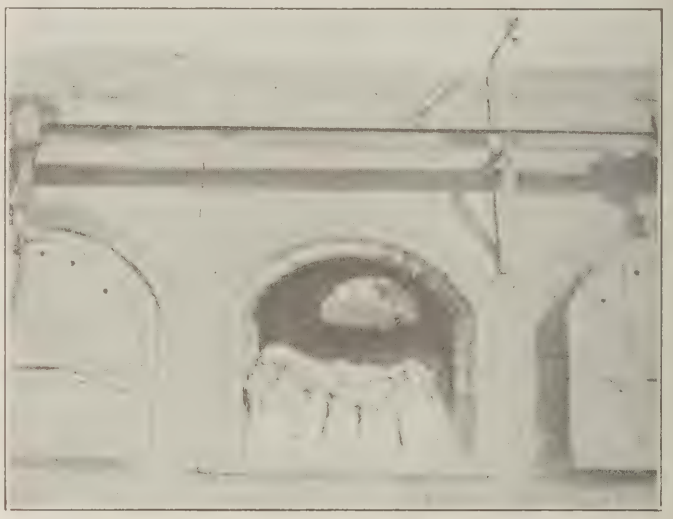


FIG. 16. COKE IN OVENS AFTER QUENCHING AND BEFORE BEING PUSHED OUT



FIG. 18. SIDE ELEVATION OF LOADER



FIG. 19. MACHINE USED TO PUSH COKE OUT OF OVENS

these arms are only 15 ft. long, it is necessary to use two of these machines, one on either end of the oven; the one on the side with the leveler is always two ovens in advance of the one on the opposite or coke-loading side. Fig. 16 shows the coke in the oven after it has been watered down.

About six ovens back of the watering machine is the coke pushing machine, built by the Connellsville Manufacturing Machine Supply Co. This machine, which is operated by electricity, is shown in Fig. 19. It is placed directly in front of the oven, and a pusher arm provided with a large head shoves the coke out of the oven. The coke falls onto a loading machine (see Fig. 18) manufactured by the Scottdale Foundry and Machine Company.

The coke loader consists of a motor-driven apron conveyor, which receives the coke as it emerges from the oven, carrying it to a bar screen. As the coke is passed over this screen, the breeze is removed and the marketable coke is carried to another apron conveyor, which dumps it into the railroad car on the loading track immediately below the end of the loading machine. Fig. 13 shows this coke loader in the operation of handling the coke from an oven, which takes about 3 min., and loading it into a railroad car.

One of the great savings that is made in the use of the rectangular type of coke oven is in the number of men employed. For the operation of the 200 rectangular coke ovens at this plant the labor is distributed as follows: One man each for the larries, leveler, pusher and loader; 4 men on watering machines; 4 men on daubing machines; 5 men cleaning up coke breeze after the loading machine; 2 men placing oven doors in position; 2 men shift railroad cars; 1 man cleans up railroad track; 2 men attend to ashes; and 2 masons are required on the plant.

This makes a total of 26 men required to operate the 200 rectangular ovens, but as some of these men also spend part of their time on the beehive ovens, it is estimated that 25½ men handle the rectangular ovens while 48 men are required to run the same number of beehive ovens.

Efficient Division of Work in Coal Mining

By Ralph W. Mayer
Connellsville, Penn.

The H. C. Frick Coke Co., which operates about 70 mines in the Connellsville field, has the labor at the working face divided in such a way as to make specialists of the different kinds of workmen. Doing one kind of work all the time, these men become more proficient at their particular job. After the loaders have loaded all the coal out of their working places they go off shift, and the night shift goes to work.

First come the machinemen, who undercut the coal by pick machines. One man operates the machine; another, called the "scraper" in the Connellsville field, keeps the cut clean, scraping out of the cut and shoveling back the "bug dust." Both these men work together in moving the machine from room to room and in setting it up preparatory to making a cut. The machine is loaded on a specially constructed car and hauled from place to place by a mule.

After the machinemen have undercut a room they are followed by the drillers, who bore the shotholes with power drills. The cut and holes are usually about 6 ft. deep; the rooms are 10 or 12 ft. wide. Having the track up to the working face makes the coal handy to load, bringing it almost against the car.

Three shotholes are usually drilled in a room of the size mentioned; one in the middle of the room and halfway between the floor and the roof, the other two holes being rib shots, one on each side, with the back end of the hole nearly touching the roof. The powder distributor follows after the drillers and leaves the powder for each shot; he uses his judgment as to the quantity of powder required, but two sticks to the hole is the amount usually needed.

The shotfirer, who follows next, loads the holes and fires the shots. Clay tamping alone is used. This tamping is prepared by the loader before he quits work. The damp clay is kneaded into cartridges, or "dummies," approximately the size of the drillhole and about 6 in. long. These dummies are placed in a shallow box, convenient for the shotfirer to get at them. One box of tamping is at each working place. Electric detonators and batteries are used to fire the charges of powder. All these men do only their one particular job, and then their shift is finished. The machine men and their helpers, as well as the loaders, get paid according to the cars of coal loaded from their working places.

In the morning, three hours before the mine starts work, the firebosses make an examination of the mine. The sections are small enough so that the firebosses can make several rounds through the places while the loaders are working. The firebosses start at four o'clock in the morning and quit at twelve o'clock noon. During the afternoon the assistant foreman makes several rounds through the working places, after the firebosses have left the mine.

The assistant foreman also may make examinations of the places during the morning, independently of the fireboss, to see if the fireboss is attending to his work. Each section has a fireboss, also an assistant foreman who starts work at seven and quits at three, or when the coal is cleaned out of the rooms, which may be later than three o'clock.

The loader shovels the coal into the mine cars and trims up the ribs and face so that no loose coal is left to fall down on the machinemen. He also sets one prop in the center of the room, after he loads out one car of coal, thus making room for placing the prop.

After the loader has cleaned up the coal in a working place, the timbermen come around and timber up the place. Props and cap pieces are usually sufficient, although tunnel sets and lagging are sometimes necessary. The firebosses and foremen always examine the roof on making their rounds. They also look out for other dangers. If the roof is dangerous, they send timbermen to fix it. With this division of labor and the close oversight exercised, the loader does not necessarily need to be a skilled miner.

In Leisenring No. 1 mine of the H. C. Frick Coke Co., safety lamps are used exclusively. Compressed air, mule and man furnish all the power used in the mine. The pick machines for mining the coal and the drills for boring the shotholes are run by compressed air, the air pipes running up into the rooms.

Dry Process of Thawing Coal

SYNOPSIS — *The fuel, in the plant described, is not dried by steam lances thrust into the coal, but by placing the car in an insulated building in which hot air is circulated. The coal is dried rather than made wetter by the process and so is less likely to freeze solid again as soon as it is removed to the barge or wagon. The cost of thawing is less than 1½c. per ton and the process takes less than 2 hours.*

THE concurrence of the coal shortage and the unprecedented cold wave of the first week in January brought to the attention of the coal-using public around the tidewater ports their dependence upon some method of thawing out the coal so as to permit its being unloaded, says Scott W. Linn in the *Engineering News-Record.* Car after car reached the New Jersey-New York harbor ports with contents so hard as to resist almost any manual effort to release them. To meet such conditions where mechanical car dumpers are used, large thawing plants have been installed at a number of terminals. These are inclosed houses in which cars or trains of cars are run, there to be heated by one means or another to a temperature which will thaw the frozen coal and permit its easy dumping from the dumper along the same track. A number of such plants has been installed by the Walter S. Newhall Co., of Cleveland, Ohio, in the past few years, culminating in one of precast reinforced concrete at South Amboy, N. J., for the Eastern Coal Dump Company.

In the first thawing plant built for this company in 1910 a live-steam point system was used. A boiler plant of adequate capacity was provided, and an underground main steam line laid from the boilers to intersecting steam lines parallel to and between railroad tracks. At intervals of about 20 ft. manifolds were used, to which several lines of rubber hose were connected. The other end of each piece of hose was attached to a malleable-iron casting on the end of a piece of 1-in. pipe about 10 ft. long. The opposite end of this pipe was pointed and perforated near the pointed end. These pipes were drilled or driven into the frozen coal and live steam admitted to the coal through the perforations.

A winter's use of this thawing system proved that it was not a success, especially in thawing bituminous coal. It was not economical in the use of steam and the handling of the points and hose was dangerous to operators. When a point was driven into the body of frozen coal instead of the steam being distributed through the coal for any distance, the tendency was for it to thaw out a cylinder around the pipe, allowing the steam to escape to the top of the coal. This was particularly true in the case of bituminous coal or finely divided anthracite.

This action of the steam made it necessary to drive in the points a considerable number of times in each car. When the coal was finally thawed the moisture from the condensed steam rendered it very wet. The coal was also in a heated condition and on cool days a visible vapor arose from it for a considerable time after a boat was loaded. This gave rise to a fear among shippers that spontaneous combustion was imminent.

As a result of the various difficulties encountered in the point system a study was made of other proposed systems of thawing in which the trouble mentioned might not appear. Several methods of combining and applying heat to cars were considered, in all of which it was thought to be economical to provide an inclosed building with insulated walls. Construction difficulties, cost of maintenance and other objections led to the abandonment of most of the schemes. The plan that finally appeared to be most practical from the construction and operating standpoints was the hot-air system used in the latest plants.

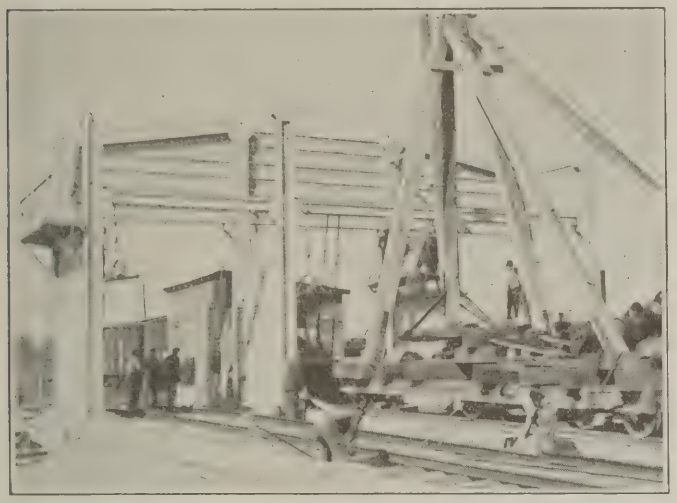
Early plants of this type were built of wood frames with insulated walls and roof, and a later one at another site was of steel and concrete with insulated walls. Finally, in 1916, the latest plant at South Amboy was built of precast concrete members under a structural system developed by C. D. Watson, of the Precast Concrete Co., Cleveland, Ohio.

The building for the thawing plant is 570-ft. long and



ON THE LEFT THE OLD TWO-TRACK THAWING PLANT AT SOUTH AMBOY, ON THE RIGHT THE NEW THREE-TRACK PLANT

48-ft. wide. It spans three tracks and has a capacity of forty-two 40-ft. cars. It is an inclosed shed with four longitudinal rows of columns, and walls making a separate room for each of the three tracks and carrying a roof sloping both ways from a central longitudinal ridge and an intermediate ceiling, the space between being utilized for the air ducts. In the middle of the length is a higher section 50-ft. long, in the upper part



ERECTING THE PRECAST MEMBERS FOR A COAL-THAWING SHED

of which is located the blower. Structurally all the members are of precast reinforced concrete joined together.

Boilers furnishing steam for the thawing plant are situated about 400 ft. from the apparatus rooms. The boiler plant was installed several years ago for the purpose of supplying steam for the live-steam point system. It was later used for the first hot-air plant. It has been enlarged to accommodate both hot-air plants.

The building is divided longitudinally into three rooms. As each room covers one track and can be used as an independent unit with or without the two other rooms, three complete apparatus units are used. These units are duplicates in detail and arrangement, and a description of one is applicable to all.

Each unit consists of one blower, one engine and two sets of heating coils. The engine is of the vertical inclosed type, and is direct-connected to the blower at a sufficient distance away to provide clearance for free return of air to the blower wheel. The blower is of the multi-vane double-discharge type and furnishes air in large enough quantity to give frequent complete change of air in the thawing rooms. Each unit has two sets of heater coils arranged one on each side of the blower and carrying sufficient pipe to insure delivery of the desired volume of air at the required temperature. The heater coils are provided with valves and other accessories necessary to divide them into groups for further regulation of operation when the full capacity of the plant is not required.

Usually from one to two hours will thaw the ice in the coal so that it will dump freely when the car is turned over on the dumper. Under this system coal was thawed at an average of approximately 1.4c. per ton with the price of fuel coal obtainable up to the fall of 1916.

Anthracite Shipments in January

The shipments of anthracite in January, 1918, as reported to the Anthracite Bureau of Information at Philadelphia, Penn., amounted to 5,638,383 tons. This total constitutes a fine showing for the industry considering the handicap with which the operators had to contend, and is but 60,562 tons less than the December figures. January was the coldest month of a generation in the anthracite fields. The mining companies were forced to suspend operations at many mines for intervals of several days at a time, and the weather conditions made it impossible for many other operations to reach the high average monthly figures of the past year.

The total shipments for the first ten months of the coal year, which commenced on Apr. 1, 1917 (almost coincident with the declaration of war against the German Government), amounted to 64,663,456 tons, an increase of 9,054,374 tons, or more than 16 per cent., over the shipments of the corresponding period of the preceding coal year, when the United States was still at peace.

Distributed by carrier companies the shipments during January, 1918, were as follows:

	January, 1918	January, 1917	Coal Year, 1917-1918	Coal Year 1916-1917
P. & R. R. W.	932,146	1,150,147	12,351,463	10,574,453
L. V. R.R.	983,964	985,830	11,823,066	10,024,566
C. R.R. of N. J.	612,979	618,188	6,960,199	5,949,713
D. L. & W. R.R.	1,029,977	1,000,383	10,375,386	8,875,516
D. & H. Co.	636,875	667,035	7,292,061	6,035,595
Penna. R.R.	458,408	458,896	4,664,424	4,573,286
Erie R.R.	632,332	683,047	7,361,401	6,292,728
N. Y. O. & W. R. W.	171,667	164,675	1,688,509	1,595,831
L. & N. E. R.R.	268,364	284,021	3,384,414	2,309,235
	5,726,712	6,012,222	65,900,923	56,230,923
*Deduction	*88,329	*71,497	*1,237,467	*621,841
	5,638,383	5,940,725	64,663,456	55,609,082

* Deduction: Tonnage reported by both C. R.R. of N. J. & L. & N. E. R.R.

Change in Bunker Regulations

The War Trade Board announces that the rules governing the issuance of licenses for bunker fuel and ships' stores have been amended so that American vessels not requisitioned by the Shipping Board are brought within the regulations prescribed for neutral vessels in paragraphs IV and V of the "General Rules No. 1," which were published on Jan. 19 to go into effect Feb. 1, 1918. Paragraphs IV and V as amended read as follows:

IV. No application for "bunkers" by any neutral vessel *or by any vessel of American registry not requisitioned by the United States Shipping Board* shall be approved unless the person or persons managing, owning, chartering or controlling such vessels shall have reported to and filed, in duplicate, with the War Trade Board, the names of all the vessels and masters, and any changes that may from time to time have occurred respecting said vessels and masters, managed, owned, chartered, or controlled by him or them.

V. No application for "bunkers" by any neutral ship *or by any vessel of American registry not requisitioned by the United States Shipping Board* shall be approved unless the person or persons owning, managing, chartering or controlling such vessel shall enter into an agreement in a form to be approved by the War Trade Board, agreeing to comply with and be bound by each and all of the following regulations. Failure to comply with any of these regulations in the case of any one vessel may involve the refusal of "bunkers" to all of the vessels of the particular person, firm or corporation managing, owning, chartering or controlling the vessel in question.

Supporting the Roof in Coal Mines—I

By R. D. BROWN
Harrisburg, Ill.

SYNOPSIS—*Various types of roof and complications met with in coal mines; artificial and natural methods of supporting top. Adequate barrier and chain coal pillars reward intelligent laying out of mine in better recovery of coal and more economical working of a property. Discussion of temporary and permanent wood supports in this issue.*

ROADWAYS in mines are timbered for the purpose of protecting the lives of workingmen and for the prevention of an accumulation of obstructions which would hinder the economic operation of the haulage system. To accomplish this purpose, it must first be decided which is the most suitable policy—permanent roof protection and support or systematic continuous maintenance. Local conditions may alter a proposed plan of maintaining the roadways at any particular mine. Consider the roof and bottom, the strength of pillars, the system of mining and the life of the mine.

If possible, no timbering should be permitted on haulage roads; but in many cases this will be found to be impracticable on account of safety and cost. Nevertheless some of the most modern mines permit no timbering on roadways. The method of maintaining the roadway without roof protection not only depends on the nature of the roof but also on the relative location of aircourses. Generally the haulage road should not be located in an air-course, on account of the resulting action of the air on the roof; and in gaseous mines, on account of the danger of igniting gas not sufficiently diluted in a return airway. This difficulty may be overcome by the adoption of some form of multiple-entry system to suit the local conditions. If gas is not present, the roadways may conveniently be established on a return airway; and in case gasoline locomotives are used it is essential that this be done to provide sufficient aid to dilute the noxious gases given off.

Roof Conditions Requiring Timbering

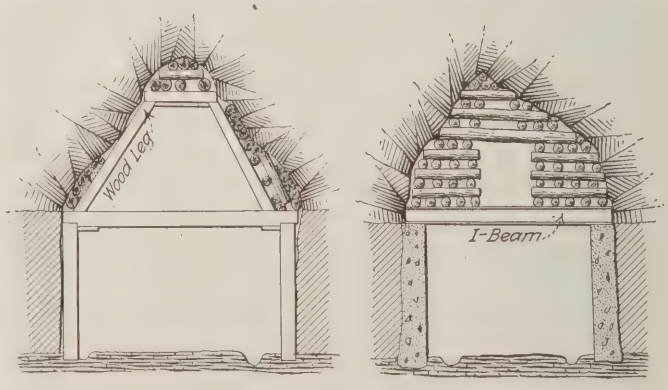
Roof conditions requiring timbering may be divided into four classes: (1) Swelling ground and moving or creeping strata; (2) tender roof; (3) faulted roof; (4) good roof which may become bad.

Swelling ground is a term applied to strata or filled ground which expands with oxidation. This condition is not common in coal mines, but is often encountered in metal mines. Moving or creeping strata is a condition resulting from robbing pillars or from a slip in the strata along the line of a fault. The movement may be slow and confined chiefly to a gradual heave in the bottom with a slight bending of the roof, which is known as a "creep"; or it may develop more quickly with immediate roof fracture and crushing of pillars, which is known as a "squeeze." If the robbing is done systematically, either advancing or retreating, heavy weight must be provided for along the haulage roads if they are to be kept open.

Timbering may check local roof movements, but it is almost useless in case great weight is to be supported. If the bottom heaves gradually, and may easily be removed, it may be possible to support local shattered portions of the roof by packwalls, timber cribs or cogs, or by closely spaced timber sets. The moving strata may not extend to the surface, and proper support in addition to the pillars may help preserve a possible haulage road; but if all pillars are removed, as in longwall mining, considerable difficulty may be experienced in maintaining an open roadway. Summing up, we may say that although timbering may help to overcome difficulties resulting from moving strata, it is more practical to anticipate and prevent roof movements by the use of barrier pillars or other mining methods.

"Tender roof" is a classification given to roof which has not sufficient coherence and strength to withstand either the separate or combined action of superincumbent weight, or stresses due to blasting or the disintegrating action of the mine air. Soapstones, shales, clod and some slates when found immediately above the coal are difficult to hold in place. If the tender strata are thin, and durable strata such as limestone or sandstone are found just above, it will usually be worth while to take down the soft strata, as shown in Figs. 1 and 2. All limestones and sandstones, however, are not sufficiently durable and chemically stable to resist the action of the air. Slate which contains a high percentage of lime may also be similarly affected.

Blasting will injure tender roof, especially if the shots are heavy—for example, those used in shooting coal off the solid. Blasting may greatly weaken roof which would be good otherwise, owing to the opening up of cracks which allow air to penetrate deeply into the rock



FIGS. 1 AND 2. EXAMPLES OF TENDER ROOF

and thus hasten its complete disintegration, as in Fig. 3. As a rule machine mining protects the roof from heavy stresses due to blasting, and in case the coal is cut at or near the top the roof is only slightly affected by the process of the removal of the coal.

Inherent structural strength of the rock does not always afford complete evidence of safety from falls. Geological disturbances may have fractured the overlying strata, leaving loose ends and unsupported rocks which must either be taken down or supported by some form of timbering. Sometimes it is not possible to de-

tect the location or extent of the seam or slip in the rock, and timbering must be done to insure safety. (These conditions are shown in Figs. 4, 5 and 6.) In other cases it would be impracticable to remove the loose rock, which may be partly held in place, because more extensive timbering would be required to support overlying strata which would then be affected.

If the roof will stand without timbering and only occasional well-defined faulty places are evident, the timbering will be local and easily constructed and main-

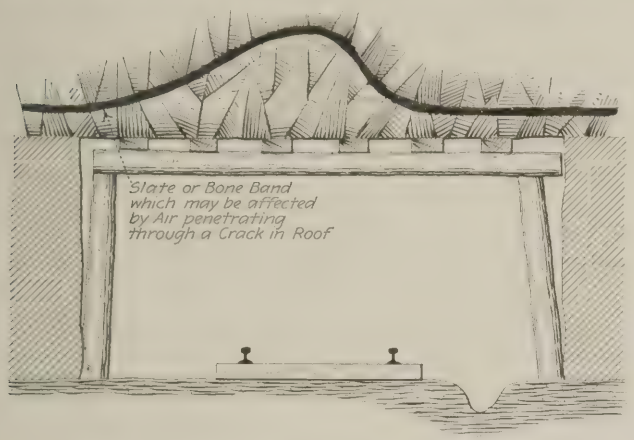


FIG. 3. EXAMPLE OF ROOF REQUIRING TIMBER

tained. In general an unprotected faulted roof is dangerous and requires constant attention, for it is not always possible to ascertain exactly its weakness, which may develop suddenly at some unsuspected point. Falls of rock can only be prevented by adequate timbering.

A large percentage of accidents caused by falls of rock are the result of carelessly trusting the integrity of roof supposed to be safe. Careful daily examination will partly eliminate the cause for such accidents on traveling ways. If the top is over 12 to 15 ft. high, a thorough examination is practically impossible and timbering may be necessary to insure safety. There is a certain hazard connected with mining which cannot be overcome practically as long as the human element exists; and it is useless, therefore, to attempt abnormal expenditures to decrease liability below a definite limit if the resulting burden from that expenditure would hopelessly cripple the industry.

Barrier Pillars

All main and secondary entries driven for development contain the haulage roads. These must be permanently maintained, and they should therefore be protected by barrier pillars the width of which will be dependent upon the nature and depth of the strata, the thickness and inclination of the seam and the method of mining. Since there are so many variables to be considered, it is not practical to derive a fixed rule; consequently, the proper width will be determined according to the best judgment of an engineer thoroughly acquainted with the limiting natural conditions and the proposed method of mining.

As a protection to roadways in the panel room-and-pillar system of mining, the recommendations of Table I will be found to be within the limits of safe operation for seams lying nearly level.

An important purpose of the barrier pillar is to protect the roof over entries from being affected by the mining of coal from adjacent panels. If robbing takes place and the overbearing strata are shattered over insufficient pillars, many local falls may occur in the entries in spite of the fact that intervening pillars remain uncrushed. Coal left in barrier pillars may be worked out when retreating after the stub entries have been abandoned; little coal is lost and the mining of substantial pillars might decrease the cost of production at a time when other expenses have reached a maximum.

The size of the chain pillar between entries must also be adjusted to fit properly the determining natural conditions. For example, a combination of great weight, small pillars, soft bottom and a strong roof may cause a heave. As the state laws usually regulate the distance between crosscuts, it is necessary to increase the width of the chain pillar where the bottom consists of soft fireclay or rocks of equal consistency. When the depth to the coal is more than 200 ft. it is not advisable to limit the width of the chain pillar to less than 20 ft., re-

TABLE I. WIDTH OF BARRIER PILLARS

Depth of Strata, Ft.	Thickness of Seam, Ft.	Width of Barrier Pillar, Ft.
50 to 100	3 to 5	75
50 to 100	5 to 12	100
100 to 200	3 to 5	100
100 to 200	5 to 12	125
200 to 400	3 to 5	125
200 to 400	5 to 12	150
400 to 600	3 to 5	150
400 to 600	5 to 12	175
600 to 800	3 to 5	175
600 to 800	5 to 12	200

NOTE—For depths over 800 ft., the barrier pillar may be assumed to be one-third the depth of the seam. When the roof is faulted it is usually advisable to increase the width of the barrier pillar, according to conditions encountered.

gardless of the fact that a switch might be necessary to load out the coal from the crosscut. Wide roomnecks on stub entries may also weaken the roof. In order to avoid wide openings breakthroughs should never be placed opposite roomnecks. If the roof is bad and timbering is required, a narrow location for a turnout from the roadway should always be provided. The yardage cost for driving a narrow place will be offset entirely by the reduced cost of maintaining the roadway.

The type of timbering used in coal mining should depend on its utility. By utility is meant the nature and length of service. Along main haulage roads the con-

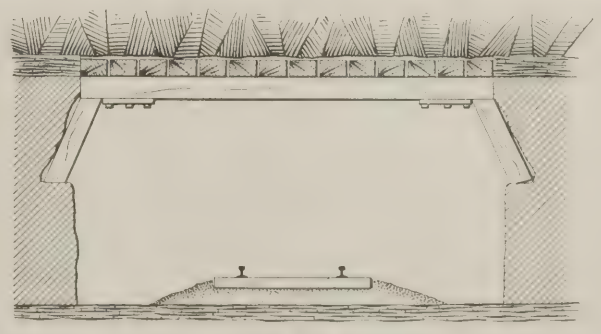


FIG. 4. EXAMPLE OF FAULTED ROOF

struction must be substantial and permanent. In rooms and stub entries the usefulness of the timbering is temporary, and the type of construction is dependent on the ultimate cost. Practically, therefore, we consider temporary construction as timbering with props and permanent construction as timbering by means of sets and masonry.

Roof protection in rooms and in short stub entries has a limited period of usefulness. Unless the roof is unusually tender, crossbars and lagging will not be necessary and props, the simplest form of timbering, syste-

matically set will serve the purpose adequately. Systematic placing of props according to a regular pre-arranged plan eliminates the chance of the faulty judgment or neglect of the average miner. Primarily the plan is adopted for the purpose of protecting the employee, and eventually it proves to be economical.

With ordinary conditions, rows of props set from 4½- to 6-ft. centers on each side of the roadway, but never closer than 2½ ft. from the rail, will give adequate protection from local falls of slate. Successive rows will

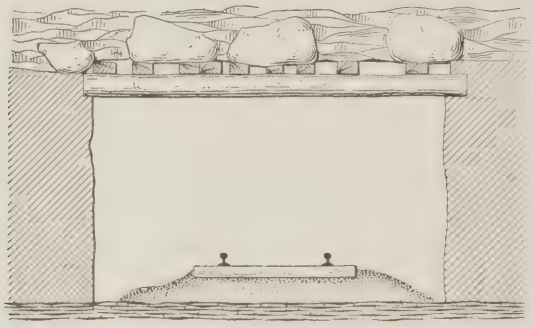


FIG. 5. EXAMPLE OF BOULDER TOP

depend on the width of the place, the nature of the roof and the method of working, and all succeeding rows should be staggered to be thoroughly effective.

If props are used to prevent local falls where the strata are moving, the great weight will crush the solidly set prop; and provision must therefore be made to prevent this early failure. The most effective method of doing this is to sharpen one end of the prop, thus causing an earlier partial failure but not a later ultimate failure. In Europe a telescoping prop has been introduced to be used where great weight is encountered and the top and bottom are both hard. This prop is made of a steel cylinder, partly filled with sand, cinder or refuse, into which is fitted a wooden plunger. Weight forces the plunger deeper into the cylinder, gradually compacting the filling. If desirable, the height of the prop may be adjusted after the weight is on by removing a part of the filling through holes in the cylinder, which are otherwise covered by a steel band. A similar result may be obtained by using a hollow round prop of steel or iron with a thick, soft wood cap which will crush under an increasing weight.

The diameter or sectional dimensions of any prop depend on the length, the weight to be supported and the material from which the prop is made. If wood props are used, as is almost universally the case, the kind of wood will be quite a factor not only on account of the structural strength but also on account of the resistance to decay. A prop is nothing more than a simple column, and the mechanical principles of structural design apply accordingly. Practical experience has shown that a column the length of which is greater than 15 times its least diameter is subjected to bending stresses additional to and resulting from the direct compressive stresses. Therefore, no prop should be longer than 15 times its least diameter. On account of the unreliability of small pieces of timber, no prop should be less than 4 in. in diameter. Since the diameter of the prop bears a definite relation to the length and to its structural strength, depending on the kind of wood from which it was made, Table II has been prepared, showing these relations.

The spacing of props may be increased by increasing the length of the cap pieces placed over the top of the prop. The immediate service of a cap piece is to adjust the length and to protect the prop from early failure by splitting; but by using a cap piece of considerable length a greater area of roof will be supported safely, by means of the cantilever action developed. Along the roadway the cap pieces should be placed perpendicularly to the line of track, as the cantilever ends thus span a part of the necessarily wide space between the rows of props on each side of the track.

When the life of the roadway is greater than five years, timbering, if necessary, must be substantially permanent. Adequate protection will require standard

TABLE II. LENGTH AND LEAST DIAMETER OF PROPS OF VARIOUS KINDS OF WOOD

Kind of Wood	Length of Prop in Feet: 5	5½	6	6½	7	7½	8	8½	9	9½	10
	Diameter of Prop in Inches										
Hickory, White oak, Locust, Yellow pine, long leaf	4	4	4	4	4½	4½	5	5	5½	6	6
Red oak, Black oak, White ash, Yellow pine, short leaf	4	4	4	4½	4½	5	5	5½	6	6	6½
Norway pine, Douglas fir, Spruce, Hard maple, Ash	4	4	4	4½	5	5	5½	6	6½	7	7½
Elm, Chestnut, Beech, Redwood, White pine, Cedar	4	4	4½	5	5	5½	6	6½	7	7½	8
Hemlock, Soft maple, Gum, Cypress	4	4½	5	5½	6	6½	7	..	..	..	..

cross-bars, or caps, and lagging. In order to increase the period of usefulness of timber sets only the most durable woods available should be used. Hard woods are more resistant to destructive agencies than soft

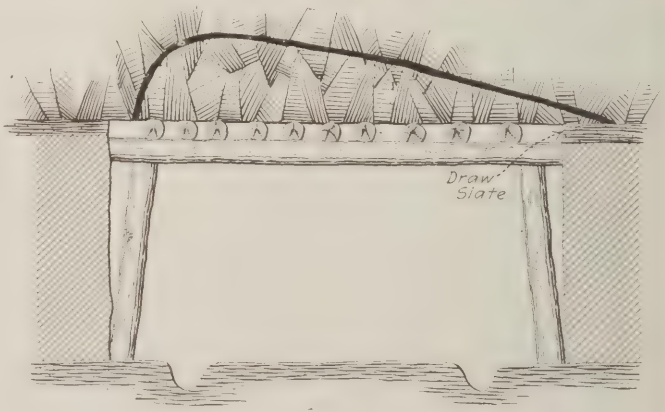


FIG. 6. SLIP IN ROOF DIFFICULT TO DETECT

woods and are therefore preferable if the cost is not excessive.

All mine timbers should be cut in the winter months, when the sap is out of the wood, and allowed to season properly before being taken underground. Seasoned wood not only has greater strength but is also more resistant to decay. Peeling the bark from green timber before seasoning will also add to its life from 10 to 50 per cent., according to local conditions.

The factors which cause a variation in the life of wood mine timbers are: (1) Humidity, temperature and

quantity of air in circulation; (2) the amount and chemical content of the mine water present; (3) condition of the timbers when placed. Fresh dry air adds to the life of timber properly exposed to the ventilating current; but moist, stagnant air furnishes an ideal condition for the growth of wood-destroying fungi. These fungi develop under favorable conditions from spores which are carried from infected timber by the air currents. Replacement with untreated wood should therefore not be intermittent, and scattering but whole sections should be renewed at one time.

Mine water when present in quantities sufficient to keep the timber continuously wet will preserve such timber for several years, but condensation from a warm, humid atmosphere may cause an early decay. Green timber has only approximately two-thirds the strength of well seasoned timber and it is also more subject to decay, due to the presence of sap in the wood. Experience has proved that green posts have a comparatively short life when placed in the mine immediately after being cut.

(*To be continued*)

Clean and Otherwise Acceptable Coal

By H. A. Turner
Birmingham, Ala.

Clean coal will always be demanded by the coal market. That operator who produces the cleanest fuel will, under normal conditions, receive a better price for his output than his less-careful competitor, and during a dull market will run full time while the other fellow who produces an inferior product will suspend operations for lack of orders.

Over this question of clean-coal production there has always been a struggle between the mine management and the miner. It is human nature, or it is certainly the human inclination to follow the lines of least resistance—that is, to pursue the easiest way or the way which appears most profitable.

In the absence of a deterring hand the miner breaks down his coal in the most effective manner as to quantity, loads coal and rock together, and receives the coal compensation for the combined weight. This is his natural inclination, because less effort is required and the results, to him, appear more profitable. On the other hand it is easier for the operator to dispose of a product properly prepared; and in case of coal free from impurities his returns are greater, hence the struggle which has gone on for so many years.

In the days of the skilled coal digger, when practically all the coal was pick-mined and wedged down, clean coal was produced with little effort on the part of the mine manager.

When explosives were introduced for breaking down the coal these same skilled miners were inclined to use them sparingly, and with judgment, finding it difficult to depart from their habits of loading an acceptable product. But the elimination of the manual labor brought about by the explosives had its effect, in a limited way, and the coal began to come out with a little slate mixed with it.

Production of coal increased rapidly, undercutting machines were perfected, and explosives came into universal use. Production was so rapid that the old-time coal miners were insufficient in number to handle the situation and new ones ceased to be trained in their methods, preferring the short cut of shooting on the solid and the operating of a coal-cutting machine.

With the advent of the general use of explosives, mining machines, and the rapid increase in coal production, came a class of miners, quite different in training from the old pick miner, and with ideals far removed from those of the latter. Under the new conditions coal-washing plants began to appear, picking belts were installed here and there, friction between miner and manager arose, and various forms of preventive measures were formulated by mine owners with the hope of checking the growing inclination of their men to load out everything in sight, without regard to its fitness for market. Thus another step in the deterioration of the miner's habits and methods is recorded.

Picking belts, screens, coal washers, etc., have been made necessary by the conditions described above, the coal consumers demanding a product reasonably free from foreign matter. The mine owners, continually harassed by the consumers, have endeavored to control the miner by penalizing him in various ways. In many cases the penalties have been severe, in some unjust, and in nearly all an unfortunate feeling of antagonism has sprung up between miner and manager which detracts from the efficiency of the mine organization.

These things being true, it would appear logical to seek until found some method and device that will create an incentive for the miner to perform his work well. Such an incentive should be stronger than that for shooting coal to pieces on the solid because it is easier broken down in this manner, and one that is stronger than the inclination to load everything in sight because this is less trouble than picking out the rock. A step in this direction would be to establish bonuses as a reward for good work and as an offset to the fixing of any just penalties that may be required.

Again, as a result of a nagging coal-consuming public, penalties have been enforced which were too severe. Why not modify these to the extent that the punishment will be in keeping with the dereliction and no more?

My observation of the different methods by which the output of individual miners is tested for rock is that the tests are imperfect in that the average of the miner's work is represented only by accident; that guilty miners escape "dockage" when deserving it; that innocent ones are punished; and that the operator does not discover his real loss until customers reject shipments of coal, or in the case of a washery, railroad weights of the prepared product are in hand.

It would seem wise, then, to work out some mechanical device (which can be done) that would truly sample the daily work of each individual miner and then make a separation which would clearly indicate the average amount of rock being loaded out by each.

A sheet form could be got out and posted in a public place, at the tipple or company's office, showing the record of each miner for each day.

It will be found by those trying this plan that the impurities in the coal will, in many cases, be reduced by one half; that the manifest fairness of the tests has a most wholesome effect on the men; that in a short time a pride will spring up among the miners in im-

proving their publicly posted record; and that the rivalry between them will yield the mine owner results to be attained in no other manner. This condition will replace years of friction and ill feeling between miner and mine manager, as well as the disorganization and other ills growing out of the old, ill-considered "dockage" system.

The plan mentioned here for improving and practically eliminating a most troublesome and expensive condition of affairs is not an unreeled theory of a remedy which every operator would like to see successfully applied, but is a true description of what has been accomplished at the Banner mine, Alabama, property of the Pratt Consolidated Coal Co. The mechanical device for sampling the coal and separating it is the work of Erskine Ramsay, vice president and chief engineer of the company. It is fully described in Patent No. 1,191,227, issued July 18, 1916. A description of this device together with some of the results attained was printed in *Coal Age* for Apr. 7, 1917.

The growing evil arising from the improper loading of coal by miners, discussed in the early part of this article, has been highly intensified since the country entered the war. As illustrating the point in question, Van H. Manning, director of the Bureau of Mines, Department of the Interior, states that coal which ran from 6 to 8 per cent. of ash in normal times is running from 12 to 18 per cent. of ash in these abnormal times.

General installation of the device in operation at the Banner mine or a similar mechanical sampler, and the adoption of the methods used in connection with it would, in my judgment, be of great national benefit at the present time.

New York City Coal Requirements for the Coming Year

The various branches of the New York City government will consume at least 532,590 tons of anthracite and bituminous coal during 1918, according to a report submitted by Francis P. Bent, Director of the Bureau of Contract Supervision, to Mayor Hylan and the members of the Mayor's Coal Committee headed by City Chamberlain Alfred J. Johnson. The report shows that the budget allowance for coal for the 36 departments and institutions provides for the actual consumption of 516,280 tons of coal at a cost of $3,346,079.29. The difference between the budget allowance and the estimated needs for the year is due to the continual changes taking place in the various institutions and departments, to allowances made in the budget for projected buildings not yet in operation, and in some instances to money spent for coal out of the corporate funds of endowed enterprises such as the New York Public Library and the Metropolitan Museum of Art.

Of the tonnage provided for by the budget, less than one-quarter, or 122,631 tons, will be domestic sizes of anthracite; the remainder, 409,959 tons, will be steam coals. Of the entire amount, 460,345 tons will be anthracite; 63,495 tons will be semi-bituminous, and 8750 tons will be a mixture of buckwheat No. 3 and semi-bituminous. The points of delivery number 1700, located in 20 zones into which the Greater City has been divided.

The estimated needs and the budget allowances of the several kinds of coal used are as follows:

Anthracite Coal	Estimated Needs	Budget Allowance	Budget Estimated Cost
Broken	48,812.0	47,655	$447,557.75
Egg	26,377.1	25,945	219,005.85
Stove	11,391.0	11,747	99,908.25
Pea	34,899.0	31,311	235,782.00
Chestnut	1,152.0	581	5,091.95
Buckwheat No. 1	74,029.0	60,557	428,854.25
Buckwheat No. 2	116,652.0	116,330	652,337.50
Buckwheat No. 3	147,033.0	153,563	780,013.74
Soft coal, semi-bituminous	63,495.0	68,591	477,528.00
Semi-bituminous and anthracite coals mixed	8,750.0	.....	.....
	532,590.1	516,280	$3,346,079.29

The report quotes from a statement of the Federal Bureau of Mines to show what the use of inferior coal means in the operation of the boiler room, stating that the preparation has not been so good as in times past and that repeated cases have been brought to the attention of the Bureau of Mines where coal which would run from 6 to 8 per cent. ash in normal times is running from 12 to 18 per cent. at present.

The report further says that the estimated needs, 532,590 tons, will cost about $3,461,835 and that if the government does not make adequate provisions for controlling the quality of the coal sold, and in the production and use of steam in city institutions, the city will have to make provisions for an increase of approximately 15 per cent. over the figures given, which is estimated to be 79,888 tons of coal at a cost of $519,272.

Legal Department

NEW YORK WORKMEN'S COMPENSATION ACT—Although it is doubtful that an employee injured while shoveling coal from a freight car into a wagon, through his slipping and coal falling upon him, was entitled to an award under the New York Workmen's Compensation Act, on a theory that he was engaged in handling coal "on any dock, platform or place, or in any warehouse or place of storage," or that he was engaged in the "operation of wagons or vehicles," occupations declared by the Act to be hazardous, still his employer, having entered into an agreement for a settlement and that agreement having been approved by the State Industrial Commission, neither the employer nor an insurance carrier is entitled to have the agreement set aside on the ground that the injury was not compensable under the law. (New York State Industrial Commission's "Bulletin," January, 1918; Hassen vs. Elm Coal Co.)

ASSESSMENT OF UTAH COAL LANDS—In a suit brought by the state auditor of Utah against a county auditor to compel correction of an erroneous assessment of coal lands whereby lands purchased from the United States and from the state were assessed at a flat rate of $50 an acre, although the Federal lands were purchased at prices ranging from $10 to $350 an acre and the state lands at from $50 to $10,000, the Utah Supreme Court sustains the right of the state auditor, in a proper case, to maintain a mandamus suit to compel a proper assessment, but holds that such suit does not lie where the assessor's functions have ended by completion of the assessment, equalization of taxes, establishment of the tax rate, apportionment of funds, and by the passing of the assessment roll beyond his control. For the guidance of assessors, however, in the future the court points out that assessment of coal lands at a flat rate is improper under the constitutional and statutory provisions in force in the state, requiring coal lands purchased from the United States to be assessed at the price paid the Government therefor, and other property, including coal lands not purchased from the United States, at actual value. (Ririe vs. Randolph, 169 Pacific Reporter, 941.)

Developments in Byproduct Coking

THE subject of a paper by George Blake Walker before the December meeting of the Institution of Civil Engineers (London, England) was "Recent Developments in Byproduct Coking." He showed that in the present century a revolution has taken place in the system of coking, and now large numbers of plants of ovens of the retort type with recovery of byproducts are in existence, and are being constantly added to. The principles of external heating of the retort oven, as originally introduced by Evenee Coppée, remain the same, but considerable modifications in detail have been introduced as the result of experience. The object of these modifications has been chiefly to increase the rapidity of the coking process by the application of more intense heat, and by the heating of the air for combustion, convenience and economy in operation having also received a good deal of attention. The recovery of byproducts has been greatly developed and in particular many experiments with more or less success have been made for achieving the "direct" recovery of sulphate of ammonia. One of the most important developments has been the utilization of the surplus gases in internal-combustion engines, and for town illumination, metallurgical furnaces and other manufacturing purposes.

Results Sought in Latest-Type Ovens

Mr. Walker says the objects aimed at in all recent ovens are: (1) More intense and better equalization of heat in all parts of the oven walls, in order to burn off the charge more quickly and uniformly. (2) Equalization of the pressure of the gas between the ovens and the heating flues. (3) Reduction in the time of coking, whereby a larger output of surplus gas, coke and byproducts is obtained from a given number of ovens, and reduction in the cost of coke making, etc. (4) Good means of inspection of the heating flues. (5) Facility of regulation. (6) Increased yield of ammonia and benzol. (7) Reduction of quantity of gas required for heating the ovens by the use of regenerators.

The retort coking systems may be divided into two classes—namely, that in which byproducts are not recovered, and that in which they are. In the first method the gases of distillation are conducted, without the separation of the tar and ammonia, into the oven flues where they are utilized for burning the charge contained in the oven, and afterward to fire boilers or heat furnaces. In the second method the ovens may be either of the waste-heat or of the regenerator type, the tar and ammonia being separated and the purified gases used for other purposes. In waste-heat ovens upward of 80 per cent. of the gas is burned in the oven flues. In the regenerator type 40 to 50 per cent. of the gas driven off during the burning of the charge of coal is used for heating the oven flues, and the balance is available either for heating boilers, or for supplying gas to gas engines or for town lighting, etc.

The author described the principal features of half a dozen of the most successful types of oven in use and the recovery plants associated with them, and cited figures showing the economies obtained by the "direct" recovery of sulphate of ammonia. He also compared the relative value of the surplus gases used in producing steam (utilized through turbines) and in internal-combustion engines, to the advantage of the latter. He summarized the advantages of the plant described thus: (1) The recovery of the sulphate of ammonia is performed without the use of condensers, coolers or scrubbers. (2) The results obtained are equally good in summer and in winter, as they do not depend on the cooling and scrubbing of the gas, and no loss of ammonia can occur. (3) No cooling water for condensers is required. (4) No noxious effluent whatever is produced, whether or not benzol be recovered. (5) The labor and supervision involved in the working of the plant are less than with the scrubber process. (6) The plant is simple in design and no more expensive to maintain than the scrubber process.

Mr. Walker says the use of coke-oven gas for power purposes at collieries is certain to make rapid progress. Up to the present time colliery managers have scarcely realized that a considerable supply of power from byproduct coke ovens was available. In some cases there is a disposition to build waste-heat ovens and use the whole of the gases, after they have heated the ovens, under boilers. There is, perhaps naturally, a very great reluctance on the part of most colliery managers to scrap existing steam plant which is serviceable, although it may be far from economical, and the tendency seems to be in favor of introducing steam turbines to generate electricity, especially where exhaust steam can be utilized.

Better to Gasify Poor Material

"Mixed-pressure" turbines, running on exhaust steam during the day and on live steam at night, have been introduced at collieries in large numbers. From the point of view of actual heat efficiency the author says the advantage is clearly in favor of the gas engine and the regenerator type of oven; but the varying circumstances of collieries modify this conclusion to some extent, inasmuch as at most pits there is a quantity of unsalable fuel available. There can, however, be no doubt that such inferior material could be gasified in gas producers with results far more advantageous than if it were burned under boilers.

Comparing the amount of power which can be obtained by raising steam with waste heat from nonregenerator ovens and using it in steam engines, and by using the surplus gases from regenerator ovens in internal-combustion engines, Mr. Walker says a coal containing 30 per cent. of volatile constituents and yielding not less than 10,000 cu.ft. of gas per ton may be taken as representative.

In a battery of 50 modern byproduct ovens, each having a capacity of 10 tons of damp coal, and burning off in 30 hours—say 5½ charges burned per week—2750 tons of coal per week would be carbonized. If these are "waste-heat" ovens without regenerators, there will be sufficient waste heat at about 800 deg. C. to fire six Lancashire boilers (say 30 x 8 ft.), which would evaporate (say) 500 gal. of water per hour, and produce steam in noncondensing engines to the extent

of about 250 hp. each or 1200 hp. in all. In addition to this there would probably be some, but not very much, surplus gas. This, of course, could be used in gas engines.

If the ovens were of the regenerator type the heat would be absorbed from the waste gases in passing through the regenerators, and would be of little value for steam raising. The highly heated air for combustion in the heating flues of the ovens effects a great economy in the quantity of gas required for carbonization, and leaves a considerable surplus for use in internal-combustion engines. As much as 60 per cent. of the scrubbed gas is sometimes available, but 40 per cent. is a very moderate proportion; 2750 tons of coal at 10,000 cu.ft. per ton give 27,500,000 cu.ft. of gas, 40 per cent. of which is about 11,000,000 cu.ft. Reckoning 30 ft. of gas per horsepower-hour in gas engines $\frac{11,000,000}{30 \times 168} = 2182$ hp., or more than double the amount obtained by steam raising.

Of course, the author adds, these figures are exceedingly rough, but they are fairly representative of results obtained in actual practice. If the gas was used in gas engines whose consumption was only 20 cu.ft. of gas per horsepower-hour the advantage over steam would be 50 per cent. more, and probably such a consumption as 20 cu.ft. per horsepower-hour will soon be common practice.

The Untruthful Magnetic Needle

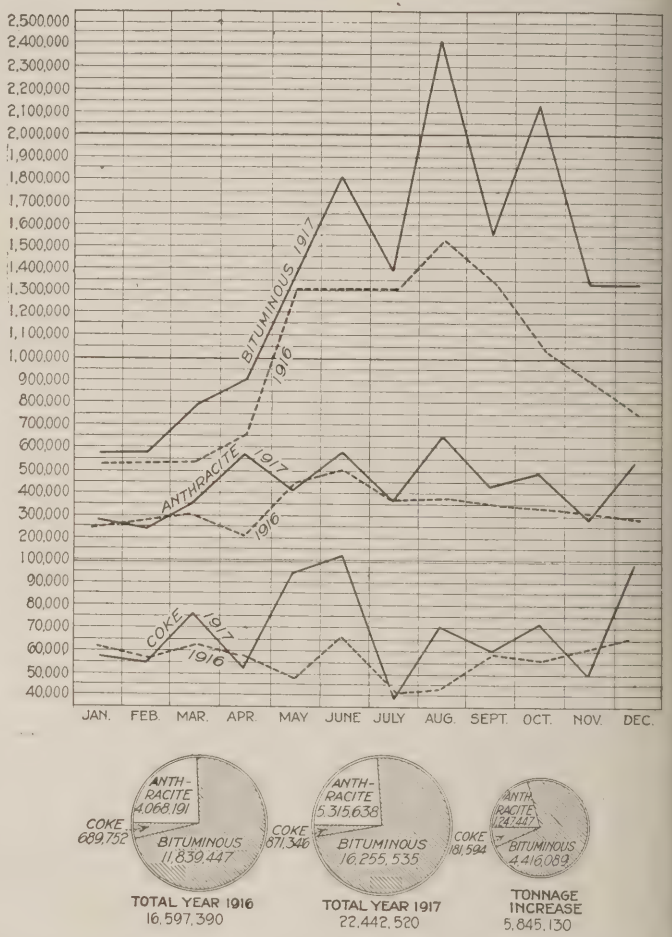
Writing to the *Engineering News-Record*, A. M. Strong, of Veuve & Strong, consulting engineers, remarks that one instrument with which he has worked has always shown a variation about one degree greater than other instruments on the same work.

"It is also found that in certain places the same needle will give differing results at different times. The best illustration of this fact coming under my notice was as follows: The instrument was set up on a high rocky point and a true north line laid off, the needle being set at zero and left free. In a short time it was noticed that the needle was pointing about 30 min. off, but there had been no change in the line of sight. The instrument was in this position for several hours, during which the needle varied several times. The day was partly cloudy, and it was found that the pointing of the needle varied with sunshine or shadow on the rocks, the variation being due undoubtedly to the varying quantity of static electricity.

"There should always be a constant but slight increase in variation as one goes north, but I found one district where there was a distinct jump of half a degree in crossing a strip a few hundred yards wide, while the variation remained the same for miles on each side of this point."

Our Coal Exports to Canada During 1916 and 1917

Various misstatements have been published with regard to the amount of coal which was sent to Canada in 1917. The exact figures with regard to the exportation of American coal to Canada have been set forth clearly by the Federal Trade Commission and are given in the table below. The curves prepared in the office of the Commission to show graphically the relationship of the exports during 1917 and 1916 are reproduced in the diagram shown above.



RELATIONSHIP OF COAL EXPORTS TO CANADA DURING 1916 AND 1917

EXPORTS TO CANADA DURING 1916 AND 1917

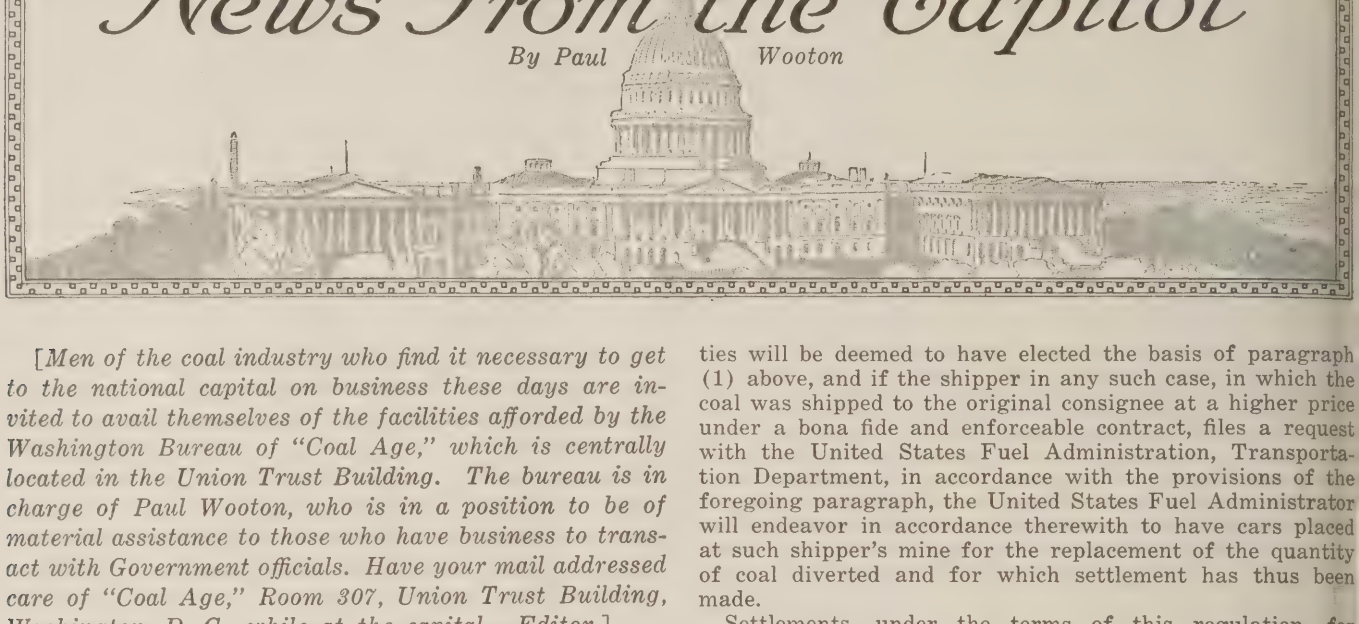
Compiled by the Federal Trade Commission from information received from the Department of Commerce (does not include bunker coal)

Kind	January	February	March	April	May	June	July	August	September	October	November	December	Total
						1916							
Anthracite	257,608	289,502	301,620	211,867	442,508	506,932	386,049	384,267	349,887	334,433	311,654	291,764	4,068,191
Bituminous	536,264	540,789	546,107	661,486	1,310,026	1,318,262	1,301,184	1,525,622	1,356,741	1,067,966	914,218	760,782	11,839,447
Coke	63,925	58,468	63,444	58,354	49,376	67,384	41,706	44,457	58,018	56,690	61,244	66,691	689,752
						1917							
Anthracite	288,667	250,768	357,726	575,377	420,873	595,854	388,943	665,644	438,264	496,793	288,915	547,814	5,315,638
Bituminous	584,241	576,793	789,730	912,653	1,401,158	1,801,776	1,389,261	2,423,896	1,553,196	2,136,437	1,343,557	1,342,536	16,255,536
Coke	58,268	51,090	79,959	53,724	96,875	112,300	39,967	70,304	61,450	82,005	49,935	115,469	871,346

	Total Year 1916	Total Year 1917	Tonnage Increase	Per Cent. Increase	
Anthracite,	4,068,191	5,315,638	1,247,447	30.66	
Bituminous,	11,839,447	16,255,536	4,416,089	37.30	
Coke.	689,752	871,346	181,594	26.32	
Grand total,	16,597,390	22,442,520	5,845,130	35.21	*Average*



Knock another War-Saving Certificate off the Face
Whenever there are Railroad Cars to fill.



[Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Union Trust Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 307, Union Trust Building, Washington, D. C., while at the capital.—Editor.]

How Settlement Will Be Made for Coal Diverted by Fuel Administrators

Settlement for coal which was diverted from the original consignee by order of fuel administrators, is to be handled as follows, an order from the Fuel Administrator states:

Bituminous coal shipped from the mines prior to Jan. 15, 1918, and diverted in transit on orders of or by authority of the United States Fuel Administrator, so that it was not received by its original consignee, shall be paid for by the party receiving the coal to the owner thereof (either shipper, jobber or original consignee as the case may be) by agreement between the parties in interest on either of the following bases as they may elect, and if they are unable to agree then on that one of the following bases which the party who was the legal owner of the coal at the time of such diversion may elect:

1. At the going Government price at the time and place of shipment, and in addition thereto the jobber's commission, if a jobber was the owner, or if the owner purchased through a jobber the coal so diverted and has paid or is legally liable to pay the jobber's commission thereon; or

2. At the contract price at which the coal so diverted was shipped or sold under a bona fide contract enforceable at law, and in addition thereto the jobber's commission, if a jobber was the owner, or if the owner purchased through a jobber the coal so diverted and has paid or is legally liable to pay the jobber's commission thereon.

Upon receipt by the United States Fuel Administration (Transportation Department) prior to Mar. 1, 1918, of a written request therefor, showing that settlement between the shipper or jobber of the coal so diverted, and the party to whom such coal was diverted, has been made on the basis of paragraph numbered (1) hereof, instead of on a higher contract price under paragraph numbered (2) hereof, conditioned upon replacement by the shipper to the original consignee of an equal number of cars of coal at the contract price, and that the original consignee has assented to such settlement, the United States Fuel Administrator will arrange to have supplied to the original shipper prior to Apr. 1, 1918, if practicable, cars for the purpose of enabling the shipper to make such replacement in addition to his mines' distributive share of available cars.

In any case where settlement has already been made at the going Government price for any diverted coal, the parties will be deemed to have elected the basis of paragraph (1) above, and if the shipper in any such case, in which the coal was shipped to the original consignee at a higher price under a bona fide and enforceable contract, files a request with the United States Fuel Administration, Transportation Department, in accordance with the provisions of the foregoing paragraph, the United States Fuel Administrator will endeavor in accordance therewith to have cars placed at such shipper's mine for the replacement of the quantity of coal diverted and for which settlement has thus been made.

Settlements, under the terms of this regulation, for diverted coal may be made only as full settlement of all liability in connection with such diversion as between all parties, including the Government.

New Coal Price Regulations at Three Illinois Mines

New prices have been allowed three mines in Illinois, as follows: Moweaqua Coal Mining and Manufacturing Co., Moweaqua, Christian County, run-of-mine, $2.40 prepared sizes, $2.65; slack or screenings, $2.15. Assumption Coal Mining Co., Assumption, Christian County, run-of-mine, $3; prepared sizes, $4.55; slack or screenings, $2.15. Spoon River Colliery Co., Ellisville, run-of-mine, $2.65; prepared sizes, $2.90; slack or screenings, $2.40.

Increase Granted in Central Pennsylvania

After long negotiations, central Pennsylvania has been granted an increase in price. Sixty cents has been added to the President's schedule, which for run-of-mine in that district was $2. By permitting an increase to $2.60, Dr. Garfield stated that nothing could occur that would be a more cogent argument in favor of the reduction of the new prices than for him to learn that the operators to whom these prices have been granted are not constantly increasing the productivity of their mines by proper development, or to learn that the amount of production from this district is not constantly on the increase, or that the coal shipped from the district is not kept free from impurity.

In addition to the 60c., five mills per ton may be added in order to provide funds to meet the expenses of pools and other arrangements made by the operators to facilitate the movement and distribution of coal. An operators' committee is to be named later to handle the funds which thus will be created.

The central Pennsylvania district is described by the Fuel Administration as consisting of the counties of Tioga, Lacoming, Clinton, Center, Huntington, Bedford,

Cameron, Elk, Clearfield, Cambria, Blair, Somerset, Jefferson, Indiana, Clarion, Armstrong, Butler, Mercer, Lawrence and Beaver; Allegheny, from the lower end of Tarentum Borough north to county line; in Westmoreland County from a point opposite the lower end of Tarentum Borough north along the Allegheny River, and along the Kiskiminitas River eastward to the Conemaugh River and continuing along the Conemaugh River to the county line of Cambria County.

Weekly Production Statistics

Coal production for the week ended Feb. 9 was 10,215,000 tons. Beehive coke production for that week totaled 505,000 tons. Anthracite shipments were 32,011 cars. These figures are based on returns made by practically all producers to the Geological Survey.

The rate of production for the week ended Feb. 9 reflects the improvement in weather conditions and is the highest attained since the week ended Jan. 5. With better supplies of coal, the beehive ovens were able to show an increase of 75,000 tons over the week preceding. The anthracite forwardings, however, are 2500 cars under shipments of the week ended Feb. 2.

During the week ended Feb. 2, byproduct coke plants, representing 99 per cent. of production, were operated at 70.8 per cent. of capacity. They produced 517,184 tons of coke.

New Maximum Prices for Beehive Coke

Maximum prices for beehive coke in certain districts were fixed last week by the United States Fuel Administration. For coke produced in the New River district the maximum price fixed was $8. The price for the Big Seam district in Alabama was fixed at $6.75, except the coke made by the Newcastle Coal Co., which is permitted to charge $7.50. In the Black Creek, Brookwood and Blue Creek districts in Alabama an $8 price was fixed. An exception from this latter is a price of $8.25 allowed the Empire Coal Co. at Empire, Ala. The highest price that may be charged by the United States Cast Iron and Foundry Co. at Bessemer, Ala., is $8.50. The McCurtain Coke Co., at McCurtain, Okla., will be permitted to charge $10.75 for smelting coke and $11.75 for selected 72-hour foundry coke. Any grade of coke made in Walker County, Georgia, is to be sold at a maximum price of $8.75.

Jobbers' Margin To Be Eliminated

A general increase in the President's coal price schedule will be made before Apr. 1, so as to allow coal operators to pay the jobber for his service. At the same time the existing jobbers' margin will be eliminated. This action, the Fuel Administration announces, makes possible a reduction in retail prices of both anthracite and bituminous coal. This is a return to the system in vogue before the Government assumed control of the industry. The change was made necessary by certain abuses of the plan, whereby the jobber received a guaranteed commission, as well as by the fact that the jobbers' commission could be reduced by the return to the old method.

Retail Dealers Asked To Report on Receipts and Storage of Soft Coal

In the effort to obtain an equitable distribution of coal among the essential industries and users, the Fuel Administration has requested *Coal Age* to reproduce the blank shown below. Retail dealers supplying coal for heating have, of course, very necessary requirements, and in the effort that these needs may be promptly and surely met during the coming year, J. D. A. Morrow, Manager of Distribution of the Fuel Administration, is sending these blanks to all dealers of whom he has record.

UNITED STATES FUEL ADMINISTRATION

Department of Distribution, Washington, D. C., February, 1918.
Return to Room 4205, Interior Bldg., in enclosed envelope that requires no postage.
Report on Receipts and Storage of Bituminous Coal by Retail Dealers.

State .....
County .....
(Name) .....
Town .....
Approximate population .....

1. Receipts of all soft coal (in tons of 2000 pounds) by months, in 1917.

January	February	March	April	May	June
July	August	September	October	November	December

2. Yard storage capacity in bins and on the ground ..... tons.

3 Tons sold in calendar year, 1917, to householders, hotels, restaurants, hospitals, schools, charitable institution, office buildings, stores, churches, theaters, municipal buildings (do not include water works or pumping stations; or public utilities such as gas companies and street railways) ..... tons.

4. Tons sold in calendar year, 1917, to all other users ..... tons.

5. Was coal received by rail or water? .....

6. From whom did you purchase your coal in 1917?

Name	Address	Total tons purchased

In order that provisions may be made by the United States Fuel Administration for coal to all domestic consumers next year, it is necessary that you fill out and return this blank by March 4th. Failure to completely and promptly supply these figures may result in your not receiving a full supply of coal.

Date signed. Name of person signing.

If these blanks are generally answered, the information supplied will be tabulated by localities, and thus furnish the Fuel Administration with the desired data. Any retailer who has not received such a schedule should make a copy of it and send in to Mr. Morrow at the earliest possible date the information requested.

Smithing coal must now be sold at the going Government price for prepared sizes from the mine producing the coal, according to a recent order.

Every effort is being made by the Secretary of the Interior to arouse interest in the coal fields of Alaska. He points out that the Matanuska field in 1917 produced 50,000 tons of bituminous coal and predicts that it will double that output in 1918. He is calling attention to the opportunities which are offered to file applications for leases in the Nenana field. These applications may be filed up to Mar. 1 or during the period of advertisement of the applications filed up to that date, which will be for a period of thirty days, beginning Mar. 4.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

When will we get discipline behind the military lines as well as in them and settle our differences without strikes? This week's record is bad—a little strike in the anthracite region and a big strike in Alabama. It is to be hoped that the parties at fault, whoever they may be, will receive the strongest public censure. But in any event the mine workers should not strike. Right or wrong, the situation is too tense for this crude and dangerous method of adjustment.

At the Enterprise colliery at Excelsior, Northumberland County, Pennsylvania, 500 men and boys struck on Feb. 16 because the operators, W. L. Connell & Co., had failed to adjust wage differences to suit their personal wishes.

A conference between officials and the colliery grievance committee failed, the men demanding that company miners, who had been reduced to consideration miners—that is, from day labor to piece labor—be reëstablished in their former places and given the higher scale of wages paid to company men under the new wage contract. The company reserved its undoubted right to change men from one class of labor to another, and the strike is the result.

The strike in Alabama is quite serious. There, several mines are closed down. The company's opposition to the union is the cause of the trouble. Dr. Garfield has ordered the operators to recognize pit committees, which is tantamount to a recognition of the union. The operators having strikes are said to refuse to accord this recognition. They do not oppose the 8-hour day, but they do think that Dr. Garfield is unjustified in demanding the other provision.

The supply of cars is mending considerably in some places. In the Central Illinois district the men are working more steadily than for a long time. The car supply is better than it has been for months, and the mines of the members of the Central Illinois Operators' Association are producing almost their normal output of more than 60,000 tons a day.

In Ohio the condition is less satisfactory. Five locals at Murray City, Carbon Hill, Corning and Jacksonville, have sent a protest to William G. McAdoo, the Director of Railroads, saying that the mines are working less than half time while others are working less than 25 per cent. of full time. They say they believe that there is not such a severe shortage of cars as of motive power, and they petition Mr. McAdoo "to reduce the number of passenger trains to a minimum on all the railroads of the country, whether they be trunk lines or coal roads."

In the anthracite region the Lehigh Coal and Navigation is being quite active in bringing in men. The president of the Carbon County Exemption Board No. 1, ex-Sheriff Michael Hartneady, has received orders from the War Department to ship to Camp Meade men who have been using their mine service as justifying exemption while failing to perform their duties steadily at the mines. The men will be treated as slackers and given the full penalty. Eight of them were taken from the Lansford jail on Feb. 9, and committed to the county jail. Others are under arrest and surveillance at Lansford and Summit Hill.

The mine workers in West Virginia have had the laugh on the slacker law in that state. Every man has to work 36 hours a week or he is liable to land in jail. Lately the men have had hard time securing a day's work a week and they gather round the posted notices requiring 36 hours' work asking why they do not get it. No one begrudges them their little joke, and most of them are well enough versed to know that neither the operators nor the state officials are in any way to blame for the failure of the plan to get 100 per cent. efficiency out of the labor of the state.

In Kentucky the mine operators are expecting that the labor situation will become somewhat worse in the spring, and especially following the next draft call. The opening of the farming season is expected to call out much labor which has been employed in the mines during the winter, and the timber interests will also become more active, as some big development work is being planned in eastern Kentucky by timber operators. However, the mine operators have been paying high wages; in fact, wages that can not be touched by the timber people and farmers. It must be recalled, however, that the mine operators can not promise full employment unless the car supply shows improvement, and therefore it is expected that with the opening of spring the labor supply for the mines of the state will be low.

Operators of Fulton County, Illinois, are confronted by a shortage of miners, due to the large number of unnaturalized Austrians in that county who will not be permitted to work in the mines. The operators are trying to get miners from other parts of the state, but there is a shortage everywhere and they are not meeting with much success.

In another column we call attention to the proposed work of the Shiloh mine workers on behalf of the Community War Camp Recreation Fund. It is interesting to note the personnel of the union committee which put that patriotic resolution up to the management of the Southern Coal Co. The names were Ed Reegan, president of the local union; Gottlieb Luetcher, Bill Arey and Mr. Petre. Sometimes it is to be feared that we criticize too freely the failures of Uncle Sam in naturalization.

Foreigners are apt to comment rather favorably on the wonderful regenerative powers of our national melting pot. However, we never seem to scan anything but the horrible examples of our failures. After all we have not gone very far wrong, as many a Gottlieb and many a Giovanni will testify. The United States, like Great Britain, appears to be a horrible mistake, but a tree is justified by its fruit whether it be good or evil.

Alabama Miners Begin Strike

On Feb. 14 a strike commenced at the mines of the Tennessee Coal, Iron and Railroad Co., and the following day there were said to be 2000 men idle. The strike has since spread further, one report saying that 5000 men were out.

On Feb. 15, mines Nos. 1, 2, 3, 7 and 10 in the Pratt division and mines 7, 9 and 10 in the Blocton division had ceased to work. The mine workers of the Republic Iron and Steel Co. at Sayreton soon followed them.

The men allege that the companies affected have failed to comply with the Garfield decision and a complaint was filed with the fuel administrator. J. R. Kennamer, the president of the district, No. 20, declares that when "we [the United Mine Workers of Alabama] accepted the agreement, we understood that all the corporations in the Birmingham district had done likewise, and if we had known that this was not the case, we, ourselves, would not have acted."

It is understood that the companies having trouble with their mine workers are observing that part of the agreement which has reference to the 8-hour day, but it is said that the companies are refusing to recognize pit committees, as also provided under the agreement, prepared by Rembrandt Peale on behalf of Dr. H. A. Garfield, accepted by the mine workers, but only granted partially by the mine operators on the imperative demand of the Fuel Administration.

Dr. Garfield has asked for information of G. B. McCormack, president of the Alabama Coal Operators' Association, and will take action as soon as the information he

desires is received. President Kennamer says that his men will comply with the agreement, and the union will not give any assistance to any man who does not obey strictly the terms of that contract.

Though domestic consumption is being greatly reduced by the advent of warmer weather, the need for coal for industrial purposes is still urgent. Coal production was quite active until the strike occurred.

Loyalty in Illinois Mines

The loyal Illinois mine workers—and they are many—are determined to clean up the reputation of their members in Illinois. They are weary of the action of those who are collecting money, not for the war or the Red Cross, but for the defense of certain miserable Industrial Workers of the World under charges of disloyalty.

On Tuesday, Feb. 12, two men adjudged disloyal by the mine workers, were tarred and feathered at Stanton, Ill., and 100 men known or suspected of being disloyal were rounded up, compelled to kiss the United States flag and sign an oath of allegiance.

The demonstration arose from the following cause: Severine Oberdan, an Industrial Worker of the World, of Nokomis, Ill., was placed for his disloyal actions under two indictments for violation of the espionage act. He was let out on a $2000 bond. Certain parties endeavored to raise a defense fund for Aberdan, and the Stanton miners' union voted a donation of $100 for that purpose.

The check, however, was held up by the president, Frank Schaefer. A meeting was called to censure the president, and at this the American element, who, though strong, had let the union drift into the hands of the disloyal element, now took a hand in the dispute. As a result there was a fight. Members of the American Defense Society, deputized by the mayor, arrested several of the fighters, including Oberdan and his lawyer, John H. Metzen, of Chicago.

Oberdan and Metzen were permitted to escape the deputies, but they were seized by other men, taken to the edge of the town, tarred and feathered and driven out of town in different directions. The crowd then visited the homes of disloyalists and compelled them to kiss the flag and sign an oath of allegiance drawn up by the Staunton Branch of the American Defense Society.

Another evidence of the depth of feeling regarding the war is furnished by the action of the Shiloh mine workers. Shiloh is near Belleville, St. Clair County, Illinois, not a great way from St. Louis, Mo. A committee was appointed to meet Assistant Superintendent Fred Boettcher of the Shiloh mine and authorized to make an arrangement with him to work one day without pay if the Southern Coal Co., the owner of the Shiloh mine, would turn over all that was received for the coal so shipped and donate it to the Community War Camp Recreation Fund. The mine workers resent being regarded as disloyal and are determined by this effort to lift the imputation from their shoulders.

Agreement of Dominion Company

The Dominion Coal Co.'s agreement with its men, made Feb. 4, is as follows:

1. All men being paid less than $3 per day to receive 10c. per day plus 15 per cent. All datal men receiving more than $3 and not more than $3.75 per day, who are not eligible to benefit by the steady work bonus, to receive 15 per cent. All datal men over $3.75 to be increased 12½ per cent.

2. Steady-work bonus to be extended to 10 per cent. instead of 5 per cent. as at present.

3. All contract rates to be increased 12½ per cent.

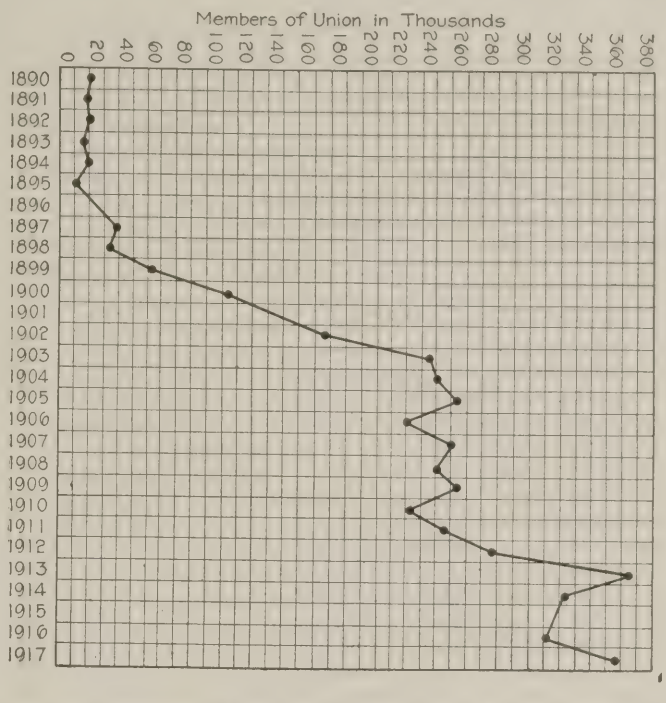
4. In the event of any perceptible change occurring in the cost of living the parties to this agreement to be willing to adjust the wage scale to conform with existing conditions, on July 1, 1918, and at the end of each six months period thereafter, upon thirty days' notice.

Note.—Where the adjustment mentioned in paragraph 1 provided an increase of 10c. per day for machine helpers the company agrees to absorb the 10c. thus paid.

The words "datal men" mean the same as "day men," the word "dataller" or "datal man" being quite generally used in England in that connection.

Growth of Unionism in Coal Mines

The chart of union membership on this page shows how markedly union affiliation has developed since 1890. From that year till 1895 the tendency was rather downward than upward. Then came a remarkable advance which continued till 1905. Then there was a period of shakiness which lasted till 1910. Then came a second period of progress, reaching a temporary summit, or peak, in 1913. Since



then the decreases have been large, but the increases recently have been so enormous that unionism seems more prosperous today than even in 1913.

Fortunately, never has the union man been more generally possessed with the idea that a good unionist should be a good citizen. As we approach the 100 per cent. union, the organization is getting large drafts of solid, conservative men who may be relied upon to see that unionism does no harm to industry or the nation.

Grafton Scale To Be Settled

A correspondent under date of Feb. 16 informs us that the Grafton Coal Operators' Association, composed of operators near Grafton, W. Va., will hold a special meeting at the Fort Cumberland Hotel, Cumberland, Md., to ratify an agreement made between the scale committee of the association and the district officers of the United Mine Workers of America.

The 15 per cent. increase in yardage and deadwork provided in the Washington agreement, which was made in October, was held by the mine workers to apply to the differential between narrow and wide work, this differential being paid instead of yardage. The controversy has lasted several months without causing a strike.

It now seems to be settled finally. The agreement provides that instead of disturbing the differential by increasing it 15 per cent, 10 per cent. of the differential shall be applied to all pick and machine mining rates, thus giving the miners the advantage of the increase without disturbing the differential that has existed for years.

The United Mine Workers of Lansford in the Panther Creek Valley have lodged a protest against the food administrator's "fifty-fifty" proposition on wheat bread. They say they are hard workers and require muscle-building food, bread being their chief diet.

EDITORIALS

What Is Labor Unrest?

THE human mind is the most complex piece of mechanism in the world. It is the master mechanism. How it works nobody knows. What it will do individually and collectively under any given conditions nobody knows—not even its owner.

The man who digs your ditches has depths you cannot plumb. You see him come and go every day and his coming and going become a part of your daily habit of thought, like the coming of your morning newspaper. Some day he doesn't blend with the scenery as you are accustomed to viewing it. Unknown to you there has been some crisis in his life; his mental depths are in turmoil; age-old questions come to the surface. Placidity becomes turbulence and you are annoyed—unless you have become similarly turbulent yourself, in which event you are not annoyed. You understand.

Your ditch digger has thousands of years of his ancestors' life and thoughts and yearnings slumbering in his soul and speaking when he is roused. He has not always been a ditch digger. Some centuries past in Asia Minor, in Greece, in Italy, along the whole line of civilization's push upward, he has been oppressor and oppressed, just as you have been—mostly oppressed, for the oppressed have always been in the majority.

One life begins and ends; but the blood-flow is continuous from generation to generation. The thousands of years behind us speak in us and to us and through us every day. The greatest thinkers, ancient and modern, affirm this.

There has been more stirring of the human depths since August, 1914, than there had been in the whole period since our Civil War. All of our accustomed grooves have been upset. In our social bearings we lack a sureness of direction. The guide posts have become weathervanes. Our placid gray matter has been set seething. The former smooth surface of our minds which reflected the current weather, the passing clouds and the orderly seasons, is turbulent; the sediment of the centuries is bubbling to the surface from the depths.

We get into channels. Channels are comfortable. They fix direction. Where you are going doesn't worry you. It suffices that you are comfortably on your way. Then something happens and destroys the channel. You and your ditch digger face each other with the eternal question of your mutual relationship in your eyes. The thousands of years back of each of you is compacted in the look. *And you couldn't phrase the question in words if you tried.* You don't try, either of you. Instinctively you know it, but to save your souls neither of you could say it.

If you tried to say it, you would both use the words you used in the channel—wages, open shop, cost of living. Especially the ditch digger would. He couldn't phrase the concentrated protest of ten thousand years in a moment of crisis any more than he could think it logically in a year in the channel. It is too big, too overwhelming, too much a rising of his whole being. So when you ask him what he is turbulent about, don't quibble about the lack of a clear-cut answer. It can't be made; you couldn't make it yourself. But if you want his answer, get it in his reactions. Hear him give approval to war against the Kaiser; note the set of his features when the war profiteer is mentioned; watch him as he listens by the hour to the man you would call an agitator; catch his constant sanction to the opportunities open alike to everybody and his equally constant suspicion of opportunities not possible for *his* children. The public schools are never afraid to go direct to the people for money; the universities are.

Business based on the idea of maximum cash returns to the owner, at any cost to competitors, to labor, to the social order, to the Government, was bound to be a boomerang.

The labor unrest is the instinctive protest of ten thousand years against all this.

Securing Clean Coal

FOR more than a year the demand for coal has been heavy. The country, normally busy, is now working at a speed never before attained. The consumption of industrial fuel is decidedly abnormal, with the result that tonnage is what has been turned out of the mines. The consumer has been begging for coal—"Any grade, any size, any car"—and bulk, not quality, is what he has received.

For months many mines have neglected preparation as never before. As a result the ash content of the coal shipped to market has increased in many instances as much as 10 per cent. or even more. Nor is the mine operator always entirely to blame for this increase. The logical and proper place to clean coal, to separate it from the slate, bone, rash and other impurities that accompany it in the coal bed, is within the mine. There is no good or adequate reason for moving large amounts of these impurities any appreciable distance from the working face. Even where coal is carefully picked by hand at the tipple it is cheaper to deposit the slate on the gob pile than on the slate dump.

Various means and methods have been tried in the past to induce the miner to load clean coal. These have varied all the way from a more or less casual inspection by the "sulphur boss" stationed on the railroad car, to various methods of random hand-sampling of the pit-car contents and a "dockage" system more or less drastic. It would appear, however, that none of the systems ordinarily employed, as stated in the article by H. A. Turner, printed on page 373, is equitable. Any good results that dockage may have secured would seem to have been largely nullified by almost endless friction, misunderstanding and enmity between mine managers and their men.

It is a well-recognized trait of human nature that men may be much more easily led than driven. The promise of adequate reward is a more powerful incentive to good work than the possibility of punishment. Dockage drives; a bonus beckons.

The chief obstacle in the path of any or all of the various means heretofore generally employed for determining the quality of any man's individual output has been the difficulty involved in truly sampling his product. The common method of selecting mine cars at random and carefully hand-picking their contents was manifestly expensive and unjust. Also, in a measure, it fostered the all too prevalent custom of the miners of loading material of known inferior quality and taking the chance of its escaping detection.

As mentioned in the article above referred to, the solution of this problem lies in mechanical sampling of a large number of pit cars each day and an equitable dockage-bonus system founded upon the results of the samples taken. The Ramsay sampler appears to have solved the first part of this difficulty; the second presents no great obstacles.

It never has been, and certainly is not now, the policy or intention of *Coal Age* through ulterior motives or in the quest of pelf to "whoop it up" for any man, any invention or the product of any manufacturer. When, however, a vital question affecting the coal industry arises and a solution for the difficulty is found, *Coal Age* would fall far short of its mission and ideals did it fail to call that solution to the attention of the coal industry. The Ramsay sampler has accomplished good results where it has been installed, reducing by somewhat over half the amount of refuse sent to the dump from the tipple.

In the stress of present circumstances clean coal only should be loaded out, for several reasons. These, as set forth by the committee on clean coal of the National Coal Association, are: Fewer cars and locomotives will be required in fuel transportation; greater efficiency of railroad locomotives, already overburdened; greater efficiency in stationary power plants; less manpower will be required to shovel coal and remove ashes.

Clean coal means fewer boilers, thus releasing part of the country's boiler-making capacity to build equipment needed for new ships; faster movement of ships, thus enabling them to be of greater service; better coke, consequently better pig iron, consequently better guns; clean coal means faster (and thus safer) passage of our transports through the danger zones.

Of course, it may be said that because dirty coal is loaded on the mine car is no excuse for dirty coal finding its way to the railroad car. It is in all respects, however, cheaper and more satisfactory to keep the impurities within the mine and never allow them to see the light of day. In other words, the gob not the dump is the place whereon to put the bone and slate.

The question of adequate mine-cleaning has always been a bone of contention. If the taking of adequate samples from a large number of mine cars will tend to reduce this friction and insure a cleaner product for shipment, apparatus for taking such samples should by all means be installed.

While it is possible that means other than the Ramsay sampler may be employed, this device has afforded satisfaction where it has been given a trial. With a public spirit that is highly commendable, Mr. Ramsay has informed *Coal Age* that he will gladly allow any coal operator who so desires the free and unrestricted use of his invention throughout the duration of the war. When the struggle is ended, when the present stress has relaxed and conditions shall have again assumed at least a semblance of normal, he will of course expect some kind of just remuneration for the further use of his equipment.

Cleaner Coal

THAT our Foreword of last week on "Enemies Within" was warranted, and that it, with the complaints from all sides, has led to definite action, is indicated by the following request issued within the past week by the Lackawanna County Fuel Committee of the Federal Fuel Administration for Pennsylvania to the anthracite coal operators of its district.

Consistent with the policy of the United States Fuel Administration, that the quality of coal will be improved, which policy has been indorsed by a majority of the anthracite coal operators, I am instructed to make the following request, with which it is assumed you will willingly and immediately comply.

Neither ship nor sell any coal unless it is prepared in breakers or washeries in accordance with former well established standards. The standards upon which inspection will be made are based upon the standards governing quality and size embodied in the old 65 per cent. contracts.

In addition to eliminating impurities, we would especially draw your attention to the practice of permitting a mixture of sizes, concerning which there has been much complaint. Although you may have received no complaints from your customers, still, since the President has fixed definite prices for certain sizes, you will agree with us that as an illustration, if pea coal is mixed with chestnut and sold as chestnut, you are selling pea coal at a higher price than that fixed for the same.

Out of a spirit of coöperation and desire on your part to make the purpose of this request effective, it is further requested that you immediately acknowledge this letter and indicate your willingness to comply at once.

Although the foregoing letter has gone out to the coal producers as a request, it is in such form that it practically must be considered as an order; and we believe it will result in the correction of the two evils—improper quality and mixing of sizes—to which we have before directed attention. The standards "upon which inspection will be made" being those embodied in the old 65 per cent. coal purchase contracts, if insisted upon will put the anthracite product back to the quite satisfactory quality that was maintained before war opportunities led some operators to deviate quite largely from these standards.

From the operator who has been living up to past trade customs there will come no complaint regarding the reasonableness of the Fuel Administration's request; and the murmurings or even howlings that may arise from the producers who have been profiteering, either because of improper quality or mixing of sizes, may be entirely ignored.

THE ANNUAL SUCCESS NUMBER of *Coal Age* will be issued April 13. We want articles on success in the coal-mining industry—successful installations, successful management, successful devices, successful men. Diagrams and photographs should accompany manuscript where possible. Write your story now.

DISCUSSION BY READERS

Rotary Dump at Shaft Bottom

Letter No. 2—Although a little late, the following brief description of an installation of a rotary dump at the foot of a hoisting shaft may be of interest in connection with the inquiry that appeared in *Coal Age*, Nov. 3, p. 779. Since then, as far as I have observed, there has been published in *Coal Age* but one account of a similar installation, which was contained in a letter by Carl Scholz, Nov. 24, p. 900.

The installation that I am permitted to describe was made by the Dominion Coal Co., at their No. 2 colliery, which is regarded as one of the largest, if not the largest, colliery in the world. Two seams are being worked in this shaft at the present time, the "Harbor seam," lying at a depth of 410 ft., and the "Phalen seam," at a depth of 867 ft. below the surface.

These seams are reached by a single large five-compartment hoisting shaft 11 x 37 ft. over all. Two of the four hoistways in this shaft serve the Harbor seam and two the Phalen seam, while the remaining compartment is used for pipes, cables, etc. There are, besides, two escape shafts for hoisting men and material.

Sinking was begun in October, 1899, and the regular hoisting of coal commenced in 1902, when the equipment was practically complete. Since that time the Phalen seam has produced 3½ million tons of coal. The daily output of this seam is upward of 3000 tons, while the largest daily tonnage of the two seams was 5100 tons. The air compressor plant at this colliery has a capacity of 16,000 cu.ft. per minute.

Fig. 1 shows a view of the surface plant, including the steel tower 120 ft. in height, a steel-frame compressor house having walls of concrete of expanded metal, and a large central electric plant where power is generated for pumping purposes, colliery lighting and for operating screens and other machinery used in the plant. Power is also furnished for driving the machinery in the central shops at Glace Bay.

Arrangements at Shaft Bottom Phalen Seam

Fig. 2 shows a plan and elevation of the shaft bottom in the Phalen seam. As here shown, the cars coming from the mine pass over the scales, where they are weighed before entering the rotary dump or tipple, two of which are shown immediately opposite the hoisting shaft. Only the hoisting compartments for hoisting coal from the Phalen seam are shown in the figure. Each mine car has a capacity of 2 tons. The tipples dump the coal into two storage chutes equipped with doors that permit the coal from either tipple to pass into either chute, as desired.

In Fig. 3 is shown a vertical section through the shaft and the two tipples. The chute has an inclination of 50 deg. and holds from 7 to 8 tons when full. As shown in the figure, there is a swinging door at the foot of the chute. This is kept closed by a spring latch except when coal is being loaded into the hoisting tank,



FIG. 1. STEEL TOWER AND SURFACE PLANT, DOMINION COAL CO., NO. 2 COLLIERY, GLACE BAY, N. S.

which is shown in position at the foot of the shaft. This tank also has a capacity of from 7 to 8 tons; but the normal load is 6 tons, or the contents of three cars.

The entire operation is automatic, from the time the coal leaves the scales until it is dumped onto the

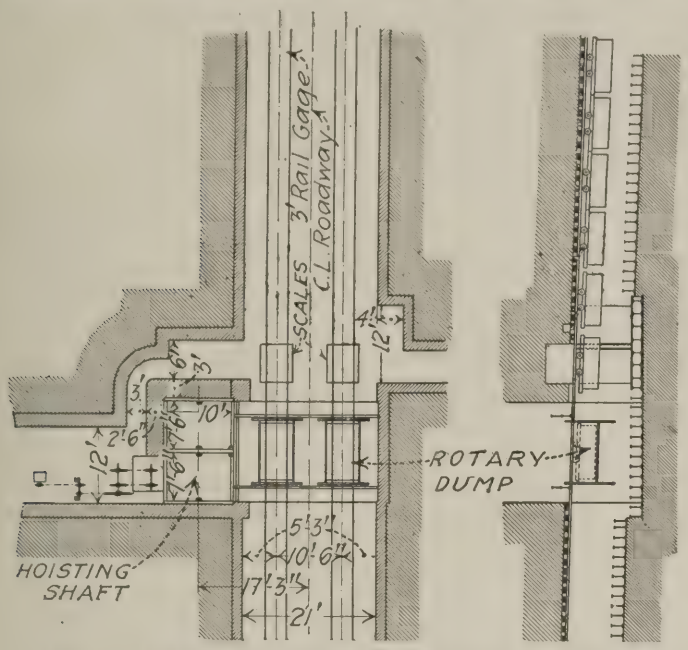


FIG. 2. PLAN AND ELEVATION, SHAFT BOTTOM, PHALEN SEAM

screens at the surface. The descending cage, striking a lever, releases the spring latch that secures the door of the chute. This door is counterbalanced and kept closed by a weight suspended from a chain, which passes over a pulley and is drawn tight across the shaft bottom, in a position where the falling cage, striking it, pulls the door down, allowing the coal to slide into the hoisting tank. As the tank again ascends the shaft, the door is released and closed by the counterweight, while the spring lock holds it fast until the next tank strikes the lever, in its fall in the shaft, and the operation is repeated.

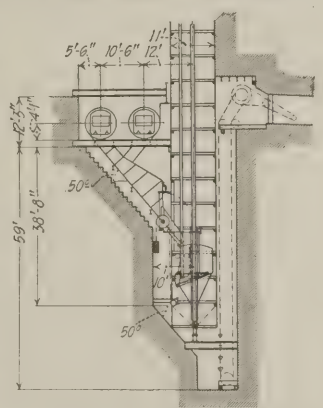


FIG. 3. SECTION THROUGH SHAFT AND TIPPLE

Each hoisting tank is mounted on a pivot very much as a self-dumping cage. As shown in the figure, it has an inclined floor, which permits of the easy discharge of the coal at the surface when the latch-lock is released. The combined tank and frame in which it is held weighs about 10 tons, making the entire load on the rope, in hoisting, about 18 tons. In loading the tank at the foot of the shaft a little coal is apt to fall outside of the tank, but this amounts to less than 4 tons a day. It is caught in a hopper and raised to the level of the shaft bottom by the conveyor shown in Fig. 3. The entire equipment is operated by compressed air and makes it possible to handle a very much larger daily tonnage than would be possible by any other means that would be both practicable and economical.

J. W. GRAY,
Sydney, N. S., Canada. Dominion Coal Co., Ltd.

Requirements in Mining Law

Letter No. 1—The new mining law, which went into effect in the State of Washington, June 7, 1917, and to which reference has been made in *Coal Age*, requires the certification, by examination, of the following mine officials: State mine inspectors, mine foremen, assistant mine foremen and firebosses.

The first examination for mine inspector's certificate was held this year in Seattle, the examining board being composed of one mining engineer, one mine manager and one practical coal miner, as the law requires. The law provides for the granting of certificates to candidates who make an average of 75 per cent., and specifies that practical experience, worthiness and general fitness shall be credited with 40 points; the written examination, 40 points; and the oral examination, 20 points.

CERTIFICATION LAW IN THE STATE OF WASHINGTON

The law further requires that the candidate must make affidavit that he is a citizen of the United States and of the State of Washington; is 30 years of age and has had at least five years' practical experience in mines in the United States, including three years in the State of Washington. He must also present the affidavit of two citizens of the state, testifying to his good character and temperate habits.

These requirements and that of the candidate being in good physical condition would seem to cover the case completely; but the real practical test lies in the power given to the examining board of passing arbitrarily on the fitness and experience of the candidate. The allowance of 40 points to cover this feature of the candidate's qualifications places in the hands of the examining board the means of arbitrarily disqualifying any candidate they may choose and who, perhaps, has passed an otherwise excellent examination in respect to his knowledge of practical mining, including as much of the theory and principles of coal mining as the board sees fit to require.

WEAK POINTS IN THE STATE MINING LAW

Without casting any reflections on the present examining board, in this respect, it can be said that human nature is much the same everywhere and arbitrary power based on individual judgment, which is often apt to err, may result in doing an injustice to a worthy candidate. This may occur through prejudice or a biased judgment.

The law, in this respect, would be less open to criticism if it specified a given number of points per month or per year and a minimum length of time that the candidate must have been employed or had charge of certain work. This would enable an examining board to give each candidate a fair rating and relieve the board of the exercise of arbitrary judgment, which is a variable factor at the best.

The same board, with the addition of the state mine inspector, is authorized to hold the examinations for mine foremen's and firebosses' certificates. Candidates for these positions are likewise required to make an average of 75 per cent. in order to secure a certificate.

In the case of mine foremen, 40 points are allowed for practical experience, worthiness and general fitness,

while 40 points are credited to the oral and 20 points to the written examination. In the fireboss examination, 50 points are allowed for practical experience, worthiness and general fitness, while 30 points are allowed for the oral and 20 points for the written examination. Here again, the law would seem to be not sufficiently specific.

It may properly be asked, Why would it not be more just and fair to allow a credit of 10 points for each year of practical experience and require a minimum of, say five years of such experience in the case of candidates for the position of fireboss and four years for that of mine foreman? This would give every candidate his proper rating, in respect to practical experience, worthiness and fitness. RALPH W. MAYER.

Roslyn, Wash.

Seasonal Freight Rates

Letter No. 2—Kindly allow me to correct a misstatement in my previous letter on this subject, *Coal Age*, Jan. 26, p. 209, which was probably a stenographic error. The production of hard and soft coal was given as 600,000, instead of 600,000,000 tons.

At the same time, in this connection, allow me to make a specific recommendation of seasonal rating, in the transportation of coal, that I believe would result profitably to all concerned. I would suggest the following:

March to June, inclusive, rates to be 20 per cent. less than the present tariff.

July to October, inclusive, the present tariff to be enforced.

November to February, inclusive, rates to be 20 per cent. higher than the present tariff.

In my opinion, the adoption of these rates would give the railroads more net revenue from the transportation of coal, while it would justify large storage piles at steam plants and enable dealers to store winter supplies at points near to large consuming centers, from which deliveries could be made by mail or motor truck as required. R. T. MCKEEN.

Chicago, Ill.

Surveying and Mapping

Letter No. 3—I certainly have enjoyed reading the articles by W. L. Owens, *Coal Age*, Dec. 8, p. 960, and the letter of P. A. Arnold, Dec. 29, p. 1109, on the subject of "Surveying and Mapping." The points brought out by these writers are interesting, although I find that each of the systems they suggest differs from my own method. The latter appeals to me as being better adapted to my particular requirements, which are clearly different from those described by these correspondents.

Mr. Owens has drawn attention to the fact that there are many little details of surveying and mapping, which are used by different engineers in their practice and which would prove helpful to others if they were discussed. In the hope that there may be something of interest in my own system, I will describe it briefly.

It is true that conditions in different mining localities must largely determine the methods employed by engineers, in surveying mine workings. The mines with which I have been associated, in recent years, are worked on the well-known panel system, or some modification of that system. All entries and rooms are driven on sights given by the engineer.

My practice has been to designate every station either by a number or a letter. Letters are used only when a station is located in a room, which is rare. All entry stations, as far as possible, are located on the true course of the entry, which is not permitted to deviate from that course, except in rare instances. Stations on the main entry are numbered continuously, in the usual manner.

Each pair of room entries has its own set of numbers starting from 1, odd numbers being used on the first entry of each pair, while the even numbers are used on the second entry. This makes the station numbers, as being odd or even, correspond to the number of the entry, in the same respect. For example, while stations on the first, third or fifth north are numbered 1, 3, 5, etc., those on the second, fourth, or sixth north, are numbered 2, 4, 6, etc.

Another peculiarity of this system is that, on room entries, a station is located opposite the mouth of each room to be turned later. Thus, by the station number it is possible to tell the number of rooms turned on the entry, up to that point. I realize, of course, that this system could not be used to advantage where the coal is not regular, as it is generally in this district. When it is necessary to locate a station midway between two rooms, such station takes the number of the last preceding station with the suffix ½ added.

It is obvious from the foregoing that the continuous numbering system could not be used in my method, in view of the fact that too high numbers would result, owing to the multiplicity of stations. The system that I have described, however, has advantages that are worthy of note.

Since all the stations are located on the true course of an entry, there is no difficulty in obtaining a backsight should any one of these stations be lost. Rooms are necked by the roomboss, at regular distances apart on the rib, which makes it possible for the engineer to locate the stations in a convenient position to give sights in the rooms when these are turned. The station at the last roomneck on an entry becomes the outby spad for a pair of entry sights.

OBJECTIONS TO USE OF CONTINUOUS NUMBERS

It occurs to me that one disadvantage, in the use of continuous numbers, is the possible failure of the transitman to make a note of the last number used in a survey. I have frequently hunted through transit books to find the highest number recorded, before starting a new survey. The use of distances to designate station numbers, while possessing certain advantages, is open to the objection that the station number cannot be recorded until the distance is measured, and it is impossible to refer to such station in the side notes.

When reading Mr. Arnold's reference to the inconvenience of station numbers not indicating distances to such stations, I wondered if it would not have been possible, in the case he cited, to have scaled the distance from the mine map, for the purpose intended. I have never experienced the slightest trouble growing out of the repetition of numbers on different entries.

Before closing, let me say that the carrying of a paint pot for numbering stations on the rib, or marking them on the roof, seems to me an unnecessary waste of time and material. At least, it would be such in my system. The proper referencing of stations on main entries, in the notes, should be sufficient to locate the same without delay, if they are still in place.

In respect to the use of free-hand or ruled lines, in mapping, it is my belief that there is more realism in free-hand work, although ruled lines, where not too broken, may present a more artistic appearance. I use but a single color on maps and designate the extension of the workings each fiscal year by circumscribing them with a fine dark-green line.

A separate tracing is then made showing only the depletion with dotted lines for the entries. Figures showing the yearly and total depletion are inscribed within their proper areas. Elevations taken every 50 ft. on the entries are entered on the map in their proper location. I would like to inquire why so many engineers adopt the method of closing the ends of rooms and entries that are still working, which makes it impossible to distinguish such live workings from those that have been abandoned.

W. E. Buss,
Vincennes, Ind. Mining Engineer.

Relative Size of Intake and Return Airways

Letter No. 5—Referring to the question that has been raised as to whether the intake or return airway of a mine should have the larger sectional area, I want to say that the correct answer to this question is the one given in *Coal Age*, Dec. 15, p. 1033.

In my opinion the main haulage road of a mine should never be made the main airway, either intake or return; but separate entries or air-courses should be provided for this purpose. When the main haulage road is made the intake airway for the mine much trouble is bound to result from ice in the winter time, and it will often be necessary to delay hoisting operations, in the shaft or slope, in order to cut away the ice to allow the passage of the cages or cars.

To free a shaft or slope of ice may cause a delay of from 30 minutes to an hour, in the morning. Moreover, another objection is the fact that motormen and drivers are compelled to work in a strong draft of air when the haulage road is made the main intake for the mine. This is a particularly bad feature when the thermometer registers zero or below.

When Hauling on the Return Air

There is also equal objection to making the haulage road the main return airway for the mine. In a gaseous mine, of course, haulage cannot be performed with safety on the return air current. In any event, however, there are always noxious gases produced in the mine, in greater or less volume; and when the return current becomes charged with these gases it is not only unhealthful for the drivers whose duties compel them to work there, but much difficulty is experienced by them in holding a light when hauling against such a current.

Also, it must be remembered that a large mine, circulating a great volume of air, would require a high velocity of the air current on the main airways leading in and out of the mine, and this would frequently be in excess of the limit specified in the mining law, unless a separate air-course was provided.

In my judgment the better plan is to provide one main intake airway of ample size and two main return airways, one for each side of the mine, in addition to the haulage road, especially if the mine is gaseous. An overcast should then be built at the mouth of each pair of cross-entries, as early as their development will permit, to conduct the air over the haulage road and return airway on each side of the mine, and provide each section with a separate air split. Sufficient air can be supplied to the haulage roads through regulators, so as to comply with the requirements of the Pennsylvania mining law, which states that haulage by electric locomotives must be performed on the intake air.

Bolivar, Penn. W. H. Clark.

Letter No. 6—There is no doubt in my mind that a trip of cars moving in an airway will have an appreciable effect on the resistance that the airway offers to the circulation. The amount of resistance offered will depend on the relative size of the cars and the airway in which they are moving.

Where large cars are used in comparatively small airways the effect would be considerable. However, this is only for a comparatively short period of time while the cars are passing. Where a good clearance is provided at the side of the track, as has been suggested as one of the requirements for safety, the effect of the moving cars on the resistance of the mine would be much less.

I recall one instance where the miners, in a particular section of the mine where the circulation was restricted by cars standing on the entry, refused to work until these cars were removed and the entry left unobstructed.

Return Airway Should Be the Larger

It has been shown, already, that the volume of the return air current is generally greater than that of the intake, owing to its higher temperature and the presence of gases generated in the mine. In addition to this, let me say there is a further slight increase in volume, because of the decreased pressure in the return airway. Since air always moves from a point of higher pressure to a point of lower pressure, it follows that the pressure on the intake airway is always greater than that on the return.

Taking all of these facts into consideration, it is my belief that the circulation in a mine will be greatly improved by making the area of the return airway greater than that of the intake, even allowing that the latter is the haulage road. The larger area of the return airway will reduce the velocity of the passing air and decrease the resistance, and less power will be required to produce the circulation. This, of course, does not affect the resistance offered by a trip of cars, but lessens the entire mine resistance. There is no question but all will agree that in a mine where haulage is performed on the return airway the latter should have the larger sectional area.

In his letter on this subject, *Coal Age*, Jan. 19, p. 160, W. H. Noone raises the question of whether mine

haulage should be performed on the intake or on the return airway. This question has often been asked; and, while opinions differ, I believe the general belief is that the haulage road of a gaseous mine should be made the intake airway for the mine. But, as Mr. Noone has pointed out, this necessitates the use of an exhaust fan to avoid having doors on the main haulage road.

While the exhaust fan possesses the advantage that the foul gases of the mine do not pass out by the haulage road, what is of greater importance is the fact that the mine is ventilated under a pressure less than that of the atmosphere, so that if the fan should stop, the increase of pressure in the mine would hold back the gases for a time. There is, however, the disadvantage that work on the haulage road is made very uncomfortable for the drivers or motormen, and there is frequently much trouble from ice that forms in the hoisting shaft in winter.

The force fan is especially adapted to nongaseous mines and possesses the advantage that work on the landing or shaft bottom is far more comfortable; the shaft is kept free from ice; there is less liability of falls occurring on the haulage road, and less moisture is absorbed by the return current on that road.

Bluefield, W. Va. D. H. PERDUE.

Clearing a Heading of Gas

Letter No. 8—The suggestion made by "Fireboss" *Coal Age*, Nov. 10, p. 823, in reference to handling a body of gas accumulated at the face of a heading by hanging a canvas on the return entry 90 ft. back from the face is hardly worthy of consideration.

If the idea was that, by choking the air current there would be sufficient carbon dioxide formed to render the gas inexplosive and make the place safe to enter, that is wholly out of the question. It is up to the fireboss to clean out the gas.

The only practicable plan to accomplish this is to extend a line of brattice from the last crosscut toward the face. My experience has taught me that to move the gas from the head of an entry it is often necessary to increase the pressure of the air current where it bears upon the gas.

This may have been in the mind of the fireboss who hung a curtain in the return airway; but if so let me say that he began at the wrong end. As suggested by "Gas Inspector" in his letter Jan. 19, p. 159, it is often necessary to extend the canvas at the end of the brattice so as to deflect the air against the gas.

My plan when a body of gas is not easily moved from the face of a heading is to gradually widen the air space behind the brattice as it approaches the face. This is done by carrying the line of brattice over toward the intake side.

By so doing, the air passing around the end of the canvas is given a greater velocity at the very point where it is needed to drive out the gas. At the same time, the resistance to the passage of the air is not materially increased. This plan has worked successfully in a number of instances, and is one that I always advise following in such cases. R. W. LIGHTBURN.

West Leisenring, Penn.

[This letter will close the discussion of "Clearing a Heading of Gas."—Editor.]

Shaft vs. Slope Opening

Letter No. 5—I was glad to find, in reading Letter No. 3 by "Ajax," *Coal Age*, Dec. 29, p. 1110, that the favored a shaft opening, under the conditions described by Thomas Harris, Sept. 29, p. 551. Being interested to ascertain more particularly the character of the overlying strata, in this case, I wrote Mr. Harris and received from him the following information:

Starting from the surface there is 28 ft. of surface clay underlaid with 30 ft. of hard fireclay, beneath which is 60 ft. of sandstone. This makes the total depth of overburden, as stated, 118 ft. in thickness. I regret that Mr. Harris did not state, in his letter, the thickness of the coal seam, which I will assume is 6 ft. In connection with this inquiry, permit me to present the following estimate of the required size of shaft, which may be of interest.

ESTIMATING THE SIZE OF SHAFT REQUIRED

I will base my calculations on a total output of 1200 tons of bituminous coal, in an 8-hr. working day. Allowing 5 per cent. for unavoidable delays in haulage and hoisting, the actual time of hoisting is $0.95(8 \times 60) = 456$ min., which gives an average rate of $(1200 \times 2000) \div 456 =$ say 5260 lb. of coal delivered each minute. For this depth of shaft, the speed of hoisting may be taken as 12 ft. per sec., and the time of making a single hoist is then $118 \div 12 =$ say 10 sec. Allowing 10 sec. more for caging each hoist, gives for the total time per hoist 20 sec., which is three hoists per min. The weight of coal hoisted at one time is, therefore, $5260 \div 3 =$ say 1750 lb.

Taking the average specific gravity of bituminous coal as 1.3, its weight in the solid is $62.5 \times 1.3 = 81.25$ lb. per cu.ft. When this coal is broken, it will occupy, practically, two-thirds more space than in the solid form. That is to say, 3 cu.ft. of solid coal will make 5 cu.ft. when broken. The weight of broken coal is, then, $81.25 \times \frac{3}{5} =$ say 48 lb. per cu.ft. When hoisting one car at a time, this will require a capacity of $1750 \div 48 =$ say 36.5 cu.ft.

Now, taking the inside width of the car as 2 ft. and the depth of the coal, including topping, 30 in., or $2\frac{1}{2}$ ft., the area of the cross-section through the coal would be $2 \times 2\frac{1}{2} = 5$ sq.ft. The length of the car must then be $36.5 \div 5 = 7.3$ ft., or 7 ft. 4 in. Adding to this length 4 in. for the two ends of the car and allowing 6 in. at each end for the bumpers, gives a total length out-to-out of bumpers of 8 ft. 8 in.

To ascertain the width of the shaft in the clear, it will be necessary to allow 8 in. of clearance on each end of the car, which makes the total width of the shaft in the clear 10 ft. In estimating the length of the shaft, allowance should be made for four 4-in. guides, a manway or pumpway 4 ft. wide, and two hoistways of the same width, in the clear, between the guides and buntons or partition, making the total length of the shaft 14 ft. in the clear.

In laying out the shaft, allowance must be made for the thickness of the curbing in calculating the necessary size of the excavation. If the shaft is to be lined with concrete walls 12 in. in thickness, the size of the excavation, in this case, will be 12×16 ft.

Rawdon, Quebec, Canada. C. MCMANIMAN.

INQUIRIES OF GENERAL INTEREST

Mining a Thick Inclined Seam

The following question was submitted to candidates in a recent mine foreman's examination, held at Price, Utah. As it is an exceedingly practical and, at the same time, difficult question, calling for experience, knowledge and good judgment, may I ask that it be submitted for discussion in the columns of *Coal Age*.

Ques.—Describe your method of extracting the pillars in the following seam of coal: The seam is 28 ft. thick and pitches about 12 per cent. The room entries are driven across the pitch and the rooms turned at an angle of 45 deg. off the entry. The rooms are driven 20 ft. wide with a 70-ft. pillar between them. The lower half of this seam, 14 ft. in thickness, is worked advancing, the remaining 14 ft. being left for a roof, in the first working. In places, there is a hard sandrock on top of the coal, while in other places there is from 10 to 20 in. of rather brittle shale. There are no partings in the seam, and the coal is rather hard. A barrier crosscut is made across the top of the rooms, 350 ft. from the entry.

The question has since provoked much discussion here and a variety of opinions have been advanced. The discussion in *Coal Age* will be read with interest.

————, Utah. STUDENT.

In order to secure the greatest safety of the men and the largest percentage of extraction of the coal, *Coal Age* would suggest that this seam might be worked on the retreating method, say in four benches, each 7 ft. in thickness. It would seem to be a difficult matter to secure even a reasonable percentage of extraction by the plan outlined in the question. Briefly explained, the following plan might be expected to give good results:

Assuming that the mine has been opened by a shaft or slope and headings driven to the right and left in the lower bench of the seam, butt headings are now turned to the rise, say 100 yd. apart and driven up the pitch about the same distance. These headings are then connected by driving crosscuts at the face. All of the work, thus far, is done in the lower bench of the coal. The work of retreating is then started by taking skips along the face of the 300 ft. pillar, and when this has advanced, say 10 or 15 yd., extraction should begin in the next upper bench of coal, the workmen standing on the refuse or broken coal of the lower bench. In this manner, the work is carried back to the gangway in successive stopes or benches. We shall be glad to have the question fully discussed by our readers, with sketches.

A Simple Question in Haulage

The following question was presented at one of our recent meetings and has since attracted considerable attention, as its solution seems to require considerable mathematics with which most of us are unfamiliar. The question is an everyday practical question in mine haulage. It is as follows:

A trip of 25 cars drawn by a locomotive was just starting from the bottom of a shaft. It had gained a uniform rate of speed, when the mine foreman in the rear car of the trip handed a coupler boy a note, telling him to run ahead and give it to the motorman.

Now, assuming uniform rates of speed for the trip and the boy, the question is, What distance would the boy have to run if, on handing the note to the motorman, he turned back at once and ran at the same speed till he reached the rear car again, at the moment that car arrived at the point where the locomotive was when the boy started to run forward with the note? In other words, while the boy was running forward and back, the trip had advanced its full length.

Perhaps *Coal Age* can give us a simple solution of this question, in arithmetic. The old saying is that "All work and no play makes Jack a dull boy," and I believe that an example of this kind will be of interest to mining students. STUDENT.

Townley, Ala.

Although many would be tempted to use formulas in the solution of such a question, it is capable of a more simple solution by arithmetic. It is necessary, in doing so, however, to give concrete values to the length of the trip and the speed of the locomotive and that of the boy.

For example, taking the length of the trip of 25 cars and locomotive as, say 200 ft., and assuming that this trip is hauled at a speed of 8 ft. per sec., while the boy runs at a speed of 14 ft. per sec., it is evident that the trip, will move through a distance equal to its length in $200 \div 8 = 25$ sec.; and, in that time, the boy will run $25 \times 14 = 350$ feet.

By the use of formulas, the solution is as follows: Let l equal length of trip, x the distance the locomotive has advanced at the moment when the boy hands the note to the motorman and call the speed of the trip v_1 and that of the boy v_2.

Then, since the trip advances a distance l equal to its entire length, while the boy runs the full length of the trip and twice the distance x, or $l + 2x$, it is evident that the time taken can be calculated by dividing the length of the trip by its speed, or the distance the boy runs by his speed of running. And, since the time is equal, in either case, we have

$$\frac{l}{v_1} = \frac{l + 2x}{v_2}$$

$$x = \frac{l(v_2 - v_1)}{2v_1}$$

Finally, substituting the values $l = 200$ ft.; $v_1 = 8$ ft. per sec.; $v_2 = 14$ ft. per sec., we have, for the distance the locomotive has advanced when the boy hands the note to the motorman,

$$x = \frac{200(14 - 8)}{2 \times 8} = \frac{200 \times 6}{16} = 75 \text{ ft.}$$

In that case, it is evident that the boy runs a distance of $200 + 2 \times 75 = 350$ ft.

EXAMINATION QUESTIONS

Utah Mine Foremen's Examination, Held at Price, Nov. 7, 8, 1917

(*Selected Questions*)

Ques.—Why is a current of fresh air necessary in a coal mine?

Ans.—In order to keep the passageways and working places in a mine healthy and in a safe condition for work, it is necessary to maintain a circulation of fresh air that will dilute, render harmless and sweep away the noxious gases produced by the breathing of men and animals, burning of lamps, combustion of powder, fine coal and slack and the decay of timber and other organic matter. Not only is the oxygen of the air constantly consumed, in the operations performed in the mine, but a portion is also absorbed by the freshly exposed faces of coal, which makes a new supply necessary in order to sustain life and insure the health of the miners.

Ques.—What is the principle of the safety lamp; or, in other words, what makes the so-called safety lamp safe?

Ans.—The principle on which the safety of the lamp depends is the cooling effect exerted by the wire gauze on the gas burning within the lamp chimney. When a safety lamp is introduced into an atmosphere of inflammable or explosive gases, the gas-charged air enters the combustion chamber of the lamp and is ignited and burned, but the flame of the burning gases is prevented from passing out through the mesh of the gauze, because the tiny streamlets of gas passing through the mesh are cooled below the temperature of ignition, and the flame is extinguished.

The upper portion of the lamp chimney where the greatest danger exists is further protected by the extinctive atmosphere of burnt gases there confined. The former principle, depending on the cooling effect of wire gauze was discovered by Sir Humphry Davy, in 1815, while the latter relating to restricting the outflow of the burnt gases at the top of the chimney was the characteristic feature of the Stephenson lamp, which antedated the Davy lamp a few months only.

Ques.—When does a safety lamp become unsafe?

Ans.—A safety lamp is unsafe when improperly handled, its parts improperly assembled, or any part is omitted or defective. A safety lamp should never be exposed to too strong a current of air containing gas. The lamp should be carried in an upright position and never tilted so that the wick flame strikes the gauze. A safety lamp should not be exposed to an explosive mixture longer than is necessary to detect the presence of the gas. The lamp is further unsafe when it is not properly cleaned or the gauze has become clogged with dirt and grease.

Ques.—How many wires are there in 1 sq.in. of gauze, in a safety lamp?

Ans.—What is known as the "standard wire gauze," recommended by Davy and used in Great Britain and this country, contains 28 wires to the inch, which makes $28^2 = 784$ openings to the square inch.

Ques.—(a) What is the difference between a "squeeze" and a "cave"? (b) To what cause or causes can squeezes in mines be traced?

Ans.—(a) When a cave takes place in a mine, the roof is broken and falls in larger or smaller masses, depending on the character of the material. On the other hand, a squeeze is a gradual settlement of the roof or a heaving of the floor, as the case may be, while the supporting pillars of coal are crushed by the weight of the overlying mass.

(b) Squeezes are caused by leaving too small pillar supports when taking out the coal, or attempting to maintain too large a standing area instead of drawing the timber from abandoned places and allowing the roof to fall. A squeeze may be started by reason of the failure to maintain a regular breaking line when drawing back the pillars in a section of the mine.

Ques.—A haulage road is 100 yd. long, with a semicircular roof. The road is 9 ft. wide at the bottom and the sides rise perpendicularly to the height of 3 ft. where the semicircle begins. How many cubic yards of material have been taken out?

Ans.—The area of the rectangular portion of this roadway is $9 \times 3 = 27$ sq.ft. The area of a semicircle whose diameter is 9 ft. is $\frac{1}{2}(3.1416 \times 9) = 31.8$ sq.ft. The total sectional area of the airway is therefore 58.8 sq.ft., and its cubic contents, $3 \times 100 \times 58.8 = 17{,}640$ cu.ft.; or, $17{,}640 \div 27 = 653+$ cu.yd.

Ques.—A piece of iron measures 14 in. long by 7 in. wide by 5 in. thick. Find the length of a bar having the same contents and 1 sq.in. in section.

Ans.—The cubic contents of the iron is $14 \times 7 \times 5 = 490$ cu.in. The length of a bar 1 sq.in., in cross-section, and having the same contents is, therefore, $490 \div 12 = 40$ ft. 10 in.

Ques.—An airway 60 yd. long, 6 ft. high and 8 ft. wide is full of methane. What quantity of air must be added (a) to render it explosive; (b) to bring it to the highest explosive point; (c) to so dilute it as to render it nonexplosive?

Ans.—The volume of the gas filling this airway is $3 \times 60 \times 6 \times 8 = 8640$ cu.ft. (a) Pure methane first becomes explosive, by the addition of air, when the volume of air to gas is 1:5; hence, to render this volume of the gas explosive will require $5 \times 8640 = 43{,}200$ cu.ft. of air.

(b) The maximum explosive point of pure methane is reached when the proportion of gas to air is 1:9.57; and the quantity of air that must be added to produce this result is, therefore, $9.57 \times 8640 = 82{,}684+$ cu.ft.

(c) To so dilute this gas as to render the mixture of gas and air nonexplosive requires that the proportion of gas to air shall be 1:13; and the quantity of air required to produce this result is, therefore, $13 \times 8640 = 112{,}320$ cu.ft. of air.

COAL AND COKE NEWS

Harrisburg, Penn.

A. C. Campbell, county fuel chairman of Luzerne County, and who is also chairman of the committee to investigate impurities in anthracite coal, has made a statement, explaining and justifying the comparative tardiness and necessary slowness of these measures. He points out that he was neither provided by the administration at Washington with funds for the making of thoroughgoing inspection, nor clothed with sufficient power until recently to make absolute a prohibition of the alleged adulteration. The investigations have therefore been made by voluntary aides, and he has been authorized by Dr. Garfield to employ executive authority to make binding the request for a cessation of the practice.

An important ruling, affecting two mine-accident cases and reversing a decision of the Workmen's Compensation Board, was handed down by Judge Strauss (Luzerne) on Feb. 15, in which the court held that a negligent act by an employee in the course of his employment could not defeat the right of compensation.

The cases are those of Julia Gurski and Mary Sanjeski, of Nanticoke, against the Susquehanna Collieries Co., a claim under the compensation act for the deaths of their husbands, Frank Gurski and his laborer, who were suffocated by entering an abandoned section of defendant's mine on Oct. 19, 1916, to secure their mining tools.

The referee found that the defendants died as the result of violence sustained by an accident in the course of their employment upon the defendant's premises and that their presence was required in the mine at the time. The referee concluded that the plaintiffs were entitled to compensation.

An appeal was taken by the defendant company to the Workmen's Compensation Board, which held in substance that the two men were warned not to enter the portion of the mine where the accident occurred; that they were not engaged in duties nor furthering any business of their employer when they went to the place where the accident occurred, and that they entered the danger despite warnings to secure their own tools.

Judge Strauss, however, takes a different view of the law and the facts, and in the Gurski case says in part: "Had this employee while on his way to work on Oct. 19 gone to a hardware store, not on the employer's premises, to purchase a mining machine, the employee would have been simply furthering his own business and convenience and his act would not have been in pursuance of his employment. But after the employee had reported for work at 6:10 that morning, entered upon the premises by going down into the mine which was under the control of the employer, his right to compensation was not limited to the moments of his actual labor or when he was in some way directly furthering the business of the employer, though not within the special lines of his employment.

"He was entitled to compensation though not so engaged, the sole statutory requirement being that his injury shall result from the condition of premises under the control of the employer or upon which the employer's business or affairs are being carried on while the employee is there in consequence of his employment. The employee shall be entitled to compensation 'without regard to negligence' when he brings himself within the terms of that section.

"This employee by going into a dangerous part of the mine was negligent, but the very purpose of the Workmen's Compensation Act was to transfer to the industry the risk of employment; and among risks of employment the fact is to be considered, well known from general experience, that almost every employee will be negligent at some time and will take some chances, especially so in a hazardous business. Probably in the great majority of cases the chances taken do not result injuriously; but when they do the policy of the law as expressed by this statute, having regard for human imperfections, no more in evidence among employees than among employers, is to compensate the employee and throw the burden of financial loss upon the business."

Judge Strauss concludes his lengthy and interesting opinion by saying: "Junkin vs. Lehigh Valley Coal Co., 3 Dept., Rep. 2903, is very closely analogous to the case now at bar, where it was held that the employees who were specially directed to go to chamber No. 36, and who after they had performed their work there went into chamber No. 27 where an explosion occurred. 'If it be that they went into room 27 against orders fully understood and appreciated by them, this would be but a negligent act on their part, which of itself could not defeat the right to compensation if at the time of the accident they were in the course of their employment on the premises of the defendant.'

"So was Gurski 'in the course of his employment on the premises of the defendant at the time of the accident.' He had reported for work as already stated, at 6:10, and had gone into the mine and was on his way to work in the mine, diverting only to get a tool in another portion of the mine. 'Though his orders not to go (into the blocked off portion of the mine) may have been fully understood and appreciated by him, this would be but a negligent act on his part.'

"Now, Feb. 15, 1918, the judgment of the Workmen's Compensation Board is hereby reversed and judgment is directed to be entered in favor of the plaintiff according to the recommendation of the referee."

The case of the laborer involves exactly the same points.

PENNSYLVANIA

Lansford—The Lehigh Coal and Navigation Co. is tearing down its old No. 11 breaker, preparatory to erecting a much larger and modern one.

Hazleton—More than 1000 samples of coal sold through the Lehigh region have been taken by Max Friedlander, local fuel administrator, and analyzed to learn what proportion of slate they contain. It is charged that much of the fuel sold here has been mixed with a big proportion of waste, which passed muster in the great rush to relieve the coal shortage.

Coaldale—By an explosion of gas at the Lehigh Coal and Navigation Coal Co.'s colliery, on Feb. 12, four miners were so badly burned that they were taken to the state hospital.

Mauch Chunk—Orders have been received from the war department by Sheriff Michael Hartneady, president of the Carbon County exemption board No. 1, to ship the slackers employed at the mines in the Panther Creek Valley to Camp Meade. The men will be treated as slackers and given the full penalty of their crime. Several of them are now under surveillance at Lansford and Summit Hill.

Upper Lehigh—The M. S. Kemmerer Coal Co., which operates the Sandy Run mine, on Feb. 13 announced that it has one man digging coal who earned $3100 to 1917. As he is a married man, he must pay income taxes on $1000. Many miners, railroaders, carpenters and machinists here are included in the provisions of the income tax law, as their wages have increased considerable in the last few months of war-time demands on labor.

Scranton—For more than four hours a team of horses was buried in a mine cave in the 1900 Block, Cedar Ave., close to the National colliery of the Delaware, Lackawanna and Western R.R., Coal Department. The driver was going to the breaker when the earth gave way beneath the horses, both animals being carried down many feet. Men employed at the colliery were sent to get the horses out. Both animals were badly scratched but not seriously injured.

Inkerman—Upon the filing of a bill in equity a preliminary injunction was granted in the suit of Charles P. Holden against George J. Llewellyn and Frank Carlucci, contractors of Scranton, to restrain the defendants from interfering with or entering upon lands of the prosecutor, which contains a culm bank and mine drifts, and to require the defendants to account for the coal and material removed. The plaintiff in his bill alleges that he has been in possession of the culm bank for many years, and that the defendants have entered upon the tracts and removed about 1000 tons of coal and culm.

Bituminous

Huntingdon—Owing to the growing scarcity of coal, workmen have begun tearing down more than 100 coke ovens at the Derry plant of the H. C. Frick Coke Co. They will be taken to Saxton, Bedford County, which is in the heart of the Broad Top bituminous district.

WEST VIRGINIA

New Martinsville—A company of local men have recently secured about 500 acres of coal in this vicinity along with the old mine on the Anthony estate. The new company will be known as the Mountain Coal Co. and will be incorporated in this state. A modern tipple will be erected as soon as the work can be done and good rail facilities will enable the company to expand its business and equip a modern mine.

OHIO

Jobs—A new mine, under lease from the Buckeye Coal and Railway Co., was opened last week on the Hocking Valley R.R., a short distance from the large Jobs mine of the Buckeye company. The 200 acres included in the property is under lease to the Douglass company. The new mine has been christened "Liberty," in honor of the war being fought for democracy. The output will be about 250 tons daily.

Athens—The Jewell Coal Co. has started loading from its new mine, located on Bailey Run, where No. 7 seam is being worked. The Jewell Coal Co. has 300 acres under lease from the Buckeye Coal and Railway Co. The daily output will be about 700 tons.

Bridgeport—The Provident mine No. 2 at Fairpoint has been working steadily during the recent congestion of coal cars. The mine officials, when unable to obtain their daily supply of empties, followed the plan inaugurated by the Valley Camp Coal Co. and dumped their surplus output in a nearby field. The men at the mine, by the plan being put into operation, were able to get an average of five days' work per week.

INDIANA

Terre Haute—A report was to the effect that mine tipple at Mine No. 5 of the Jackson Hill Coal Co. was burned on Feb. 12, the loss being about $20,000. Production will be cut down about 2000 tons a day. J. C. Kolsom, general manager, is of the opinion that the fire was of incendiary origin, it being the third this winter in the district.

ILLINOIS

Pana—For three days last week the three Pana coal companies, Penwell, Pana and Smith-Lohr, shipped their entire output to railroads, domestic consumers, public utilities, byproduct coke plants, manufacturers of perishable food or foods necessary for immediate consumption, and municipal, county and state government, under orders of Fuel Administrator Williams.

Mechanicsburg—Arrangements are under way for the reopening of the Mechanicsburg mine, half a mile north of town, which has been closed several years. It is to be pumped out as soon as possible and the tipple and office buildings erected. It is expected that the mine will employ several hundred men. A Mr. Hans, of Springfield, will be the mine superintendent.

Lincoln—After repeated ineffectual attempts to extinguish the fire which started Oct. 23, 1917, in the mine of the Lincoln Mining Co., the owners have decided to abandon it and the work of dismantling

it has begun. The equipment is to be offered for sale. The mine was originally opened Sept. 15, 1869. The present owners are the Frank Frorer estate, David H. Harts, Mr. and Mrs. Walter Puterbaugh, of Chicago, and D. H. Harts, Jr., of Lincoln. A 5-ft. vein at a depth of 271 ft. has been worked for years. The output has been about 1000 tons a day. The number of men employed was 175. The capital stock of the company is $100,000.

Belleville—The Pittsburg, West End and Abend mines, with a daily capacity of 600 tons, were endangered by the breaking of a dike on Richland Creek north of here, which had been built to protect the mines. Water poured into the Pittsburg mine and caused a shutdown. The miners were put to work repairing the dike. There was danger that the other two mines would be flooded.

Beardstown—Strip mining methods were employed to salvage 32 carloads of coal which were dumped near here when a Chicago, Burlington & Quincy train went into the ditch. A steam shovel was brought into use and with the help of a crew of men the coal was scooped up and reloaded in three days.

Carlinville—A trolley line, it is understood, is to be constructed to connect the new town of Schoper with Carlinville. At Schoper development work is to be done by the Standard Oil Co. It is also understood that large smelters or an oil refinery will be established at Schoper in connection with the mines.

Virginia—Plans are being made to reopen the mine here, abandoned several years ago, or sink a new shaft to tap the 7-ft. vein, which was operated until competition drove the local company out of business. Charles Wilson, who was a member of the old company, is taking the initiative and will help to finance the new concern.

Gillespie—The ranking mine of Illinois in the production of coal in 1917 was Mine No. 3 of the Superior Coal Co., at Gillespie, Ill. This mine employed an average of 690 men, who worked 260 days during the year. The output was 1,158,796 tons, a daily average of 4457 tons. Mine No. 2 at Gillespie stood third, employing 709 men, who worked 249 days and produced 1,071,283 tons. The three Gillespie mines produced an average of 249 carloads a day. These mines, with nine others in Macoupin County, produced 6,578,883 tons and employed 5362 men and gave Macoupin County second place in the state. Williamson County, with 35 mines, working 8241 men and producing 9,634,680 tons, stood first. The gain in Williamson County over the preceding year was 1,754,421 tons. The gain in Macoupin County over the preceding year was 1,327,025 tons. It is expected that when Mine No. 4 of the Superior Company at Gillespie is completed, the county, with only 13 mines, will produce more than any other county in the state.

KENTUCKY

Somerset—After being closed down for several days as a result of water getting into the Barren Fork Mines, Manager C. I. Ross again has things going in good shape, although it took several days to get rid of the water.

ARIZONA

Globe—Four miners were killed in a premature explosion in the Vivian shaft of the Iron Cap mine here on Feb. 14. The charge set in the shaft to tear down a wall of ore exploded before the men could escape. Several other miners were injured.

Personals

J. E. Taylor has been appointed general manager of the Bon Jellico Coal Co., of Bon Jellico, Ky., his father, E. B. Taylor, having resigned that position.

R. E. Butler has been appointed superintendent of the operations of the Benoit Coal Co., Benoit, Ala., having resigned his position as chief engineer of the coal-mining department of the Republic Iron and Steel Co. to assume his new duties.

F. E. Zerbey, vice president and general manager of the Kingston Coal Co., which recently pledged that its employees would take $50,000 worth of war savings stamps, has just been appointed special chairman of the war savings campaign among the coal companies in the anthracite region.

Thomas Hammond, formerly assistant superintendent and mine foreman for the Park Coal Co., at Vandergrift, Penn., has been promoted to chief safety inspector of all the mines, under the management of L. W. Hicks. Mr. Hammond starts his new position Mar. 1.

J. W. McQueen was elected president of the Sloss-Sheffield Steel and Iron Co., at a recent meeting of the directors held in New York recently, to succeed Waddill Catchings who has resigned. Mr. McQueen has been connected with the Sloss-Sheffield company in various capacities since 1891. In 1902 he became vice president. His executive duties have made him a decided factor in the rise of the company to its present position.

Earl E. Eby, who was manager of the Pittsburgh office of the Hyatt Roller Bearing Co., industrial bearings division, for the past two years, has been appointed assistant sales manager and will be located in the Metropolitan Tower, New York. Mr. Eby is a graduate engineer from the Ohio State University and previous to his connection with the Hyatt company he spent four years in the engineering department of the Westinghouse company at East Pittsburgh.

Charles H. Krauss, formerly superintendent of the Weir Frog Co., has resigned to accept a position as general superintendent of the Louisville Frog and Switch Co. (successor to the W. M. Mitchell Co., Inc.), Louisville, Ky., a newly organized company with a capital stock of $200,000. Mr. Krauss is an expert frog and switch man, having been connected with the Lorain Steel Co., Johnstown, Penn., and with the Kilby Frog and Switch Co., Birmingham, Ala., for many years, in the capacity of superintendent.

Tudor Aston, of Carbondale, Penn., who has been superintendent of the Northwest colliery of the Temple Coal Co. for the past few years, has been transferred to the Mount Lookout Coal Co. at Wyoming, one of the companies controlled by the Temple Corporation, to succeed Seward E. Button, who was recently appointed Chief of the Department of Mines of Pennsylvania to succeed the late James E. Roderick. **Bruce Weir**, who has been a mine foreman at the Forty Fort colliery of the company, succeeds Mr. Aston at the Northwest colliery. The changes became effective Feb. 18.

Obituary

Robert Galloway, founder of the Galloway Coal Co., of Memphis, Tenn., and for the past 27 years its president, died at his home on Jan. 11.

Industrial News

Harlan, Ky.—The High Point Coal Co. has increased its capital from $12,000 to $35,000.

Hazard, Ky.—The Yerkes Coal Co. and the Willard Coal Co. have increased their capital from $4000 to $8000.

Barbourville, Ky. — The Hi-Land Blue Gem Coal Co. has been incorporated with a capital of $2000. The incorporators are S. H. Jones, J. R. Jones and Charles Jones.

Hazard, Ky.—The Clean Coal Co. has been incorporated with a capital of $200. The incorporators are David Y. Wooten, Lou Ann Edwards and William B. Wooten.

Barbourville, Ky.—The Huron Coal Co. has been incorporated with a capital of $2000. R. H. Newitt, Henry Branstutter and Thomas D. Tinsley are the incorporators.

Gorman, Md.—The Hamill Coal and Coke Co., Kitzmiller, has acquired the mining rights on 921 acres of local coal lands, and is planning for immediate development work.

Pittsburgh, Penn.—The H. C. Frick Coke Co. has purchased a Reo three-quarter ton truck from the Central Motor Co. The truck will be used at the company's Leisenring No. 1 mine.

Hopkinsville, Ky.—The American Minerals Co. has been incorporated with a capital stock of $30,000. The incorporators are M. V. Armstrong, of Crittenden County, and M. G. Moore, of this city.

Philadelphia, Penn.—The Porter Coal Co. has filed articles of incorporation with a capital of $25,000 to engage in a general coal-mining business. Harry E. Bird, Philadelphia, is the principal incorporator.

Knoxville, Tenn. — The Federal Grand Jury, on Feb. 14, returned 23 indictments against 47 defendants, including coal operators, coal dealers and coal brokers of the east Tennessee field, charging violation of the fuel control bill.

Bethlehem, Penn.—The Dodson Bituminous Coal Corporation, 26 South New St., is planning for the early development of about 3350 acres of coal lands near Wilson, Md., to have a daily output of approximately 3000 tons.

Beaverbrook, Penn. — The Beaverbrook colliery is having plans prepared for the construction of a new steel and concrete machine shop at its plant, about 40 x 100 ft. George Welsh, Coal Exchange Building, Wilkes-Barre, Penn., is architect.

Pittsburgh, Penn.—The Asbestos Protected Metal Co., of Pittsburgh, announces the removal of its Boston office to the State Mutual Building, to be in charge of William H. Cummings. The telephone number, Fort Hill 3688, remains unchanged.

Morgantown, W. Va.—The Berry Coal Co. has been incorporated with a capital of $25,000 to operate mines in Cass district, Monongalia County. The incorporators are Everhard Bierer, Joseph Bierer, Lee R. Shriver, Frank C. Shriver and William E. Glasscock.

Charleston, W. Va.—The Grady Creek Coal and Coke Co., of Princeton, with chief works at Duffy, Lewis County, has been incorporated with a capital of $50,000. The incorporators are J. H. Davidson, T. B. Beckwith, H. C. Hadden, M. A. Lowe and T. M. Fry, of Princeton.

Beckley, W. Va.—The Rogers Coal Co. has been incorporated with a capital of $25,000 to operate mines in Town district, Raleigh County. The incorporators are G. H. Boien, C. M. Rogers, P. L. Blackenship, G. C. Hedrick, all of Beckley, and John R. Griffith, of Ghent.

Shrewsbury, W. Va.—The Franklin Coal Co. has been incorporated with a capital of $5000 to operate mines in Kanawha County. The incorporators are H. J. Lane, B. F. Watson, W. F. Wolf, W. L. Lane, of Mammoth, W. Va., and V. L. Black, of Charleston.

Irwin, Penn. — A coal deal, involving $180,000, has been consummated in which two completely equipped coal mines and 60 acres of coal have been purchased by W. E. Rice, Logan Rush and Thomas Love. The operations of the mines will be continued by the new owners.

Morgantown, W. Va.—The Granville Coal Co. has been incorporated with a capital of $10,000 to operate mines in Grant district, Monongalia County. The incorporators are Everhard Bierer, Joseph Bierer, E. H. Wingrove, Ida M. Wingrove and William E. Glasscock, all of Morgantown.

St. Louis, Mo.—The Illinois Traction Co. (McKinley system), has placed an order for 16 powerful electric locomotives to be used for coal and other freight trains exclusively. They are of a new type and far heavier and more powerful than the old ones, which draw from 20 to 30 cars.

Tioga, W. Va.—The Bear Run Coal Co., Tioga, has been incorporated with a capital stock of $5000 to operate mines in Nicholas County. The incorporators are H. G. Carskadon, Ethel Carskadon, G. R. O'Connor of Richwood, W. Va., W. S. McQueen and F. W. Collins of Tioga.

Milburn, W. Va.—The Milburn By-Products Coal Co., Milburn, has been incorporated with a capital stock of $100,000 to operate mines in Fayette County. The incorporators are E. W. Knight, Angus W. McDonald, L. G. Summerfield, V. L. Black and George S. Couch, all of Charleston.

Williamsport, Penn. — The Bennett Branch Coal Co., 12 West Fourth St., has had plans prepared for the construction of a new two-story club house, about 35 x 65 ft., to be located at Wilmere, for the benefit of its employees. T. J. Litzelman, 129 West Fourth St., Williamsport, is the architect.

Pittsburgh, Penn.—The Madigan-Johnson Coal Co., of Clarksburg, has been incorporated with a capital of $25,000 to operate mines in Harrison County. The incorporators are J. W. Madigan, Florence E. Madigan, Aloysius Coll, of Clarksburg; T. J. Johnson and Amelia Johnson, of Meadowbrook, W. Va.

Charleston, W. Va. — The Pocahontas Coal Land Co., with chief works in Jumping Branch district, Mercer County, has been incorporated with a capital of $25,000. The incorporators are J. B. Earwood, George W. Warren and Ashton File, of Beckley; William Prince, of Prince, and W. O. Abney, of Charleston.

Rising Fawn, Ga.—The Georgia Iron and Coal Co. is planning for the immediate development of about 45,000 acres of coal, iron and manganese lands in Bartow, Cherokee and Dade Counties. Plans for the early installation of mining machinery are now under consideration. Joel Hurt, Hurt Building, Atlanta, is president.

Connellsville, Penn.—The Thompson-Connellsville Coke Co. on Feb. 13 paid its

initial dividend of 15 per cent. following the bankruptcy of J. V. Thompson. The concern went on the rocks at the time of the Thompson failure, but it has now got back on its feet. The paying of a dividend came as a happy surprise to most of the stockholders.

Reynoldsville, W. Va.—The Alpha Portland Cement Co. is arranging for the installation of a series of plants to develop its local coal lands for the production of fuel for its manufacturing plants. Plans are now in progress for a second opening, which, it is anticipated, will be a shaft mine. The company will install electrical equipment for operation.

Paducah, Ky.—The West Kentucky Coal Co. suffered a heavy loss on Feb. 8, when an ice gorge went out at Caseyville, Ky., taking 22 loaded boats and barges, five empty flats, three pump boats and other equipment. Practically all of this equipment was sunk in the ice jam and will result in almost a total loss, estimated at $100,000 by the president of the company, C. F. Richardson.

Marion, Ind—The Marion Machine, Foundry and Supply Co. has taken over the entire business, good will, patterns, patents and drawings of the Planet Steam Specialty Co., which has specialized in the manufacture of soot blowers for all types of water-tube boilers. Gordon C. Bennett, inventor and secretary of the Planet company, will have charge of the engineering department to develop the manufacture of a complete line of water-tube soot blowers.

Charleroi, Penn.—During 1917 a total of 214,673,000 bushels of coal passed through Lock No. 4 on the Monongahela River, an increase of 20,362,000 bushels over 1916. The shortage of railroad cars also brought about the transportation of coke by water, and commencing in March, 4,433,000 bushels of coke were locked through No. 4. No coke was transported by water in 1916 or in any previous year of which there is a record.

Kansas City, Mo.—C. J. Ritter, a coal jobber of Centerville, Iowa, is under detention at the request of the local fuel administration, pending the filing of charges of violating the Lever Act. Ritter, it is alleged, accepted a bonus of $200 in addition to the fixed price for ten cars of coal purchased by I. Pelzman, a Kansas City retail dealer. Ritter says he merely accepted the money as an advance payment on coal to be delivered.

Columbus, Ohio—The warmer weather has aided in railroads resuming almost normal traffic conditions and coal is now coming into Columbus and other points in larger quantities. The Hocking Valley Ry. moved 1247 cars into Columbus during a 48-hour period and the Toledo & Ohio Central moved 1056 cars into the Buckeye capital during the same period. The movement north of Columbus toward the Toledo gateway was also active in every respect.

New York, N. Y.—The annual beefsteak dinner of the Coal Merchants Association of New York was held at Murray's, in West 42nd street, Saturday evening, Feb. 16, and was attended by about 200 coal men. Addresses were made by County Fuel Administrator Reeve Schley as well as by the Deputy Fuel Administrators from State Administrator Wiggin's office, Harry T. Peters, chairman of the State Fuel Conservation Committee, Commissioner Arthur F. Rice and others.

Charleston, W. Va.—Twenty-five men were killed in West Virginia mines during the month of January, according to the report issued by Earl Henry, chief of the department. McDowell County led in the list of fatalities again, having six. Ten counties reported deaths as follows: Barbour County, 1; Braxton, 1; Fayette, 1; Harrison, 1; Kanawha, 4; Logan, 2; Marion, 3; Mason, 1; Ohio, 1. Of the 25 killed, 20 lost their lives inside the mines and five outside.

Columbus, Ohio—Upon the return of Prof. Frank A. Ray, coal expert to Columbus, the Buckeye Coal and Railway Co. will start development work in No. 6 seam in the Bailey Run section of the Hocking Valley field. This seam will have to be reached by shafts which will be sunk to the depth of 80 ft. The Buckeye Coal and Railway Co. will make leases to operating companies to work this seam, retaining the right to sell the product. The mines in No. 6 seam will be large operations.

Wellston, Ohio—Jackson County coal operators were summoned to Columbus to confer with J. B. Dugan, of the Ohio Public Utilities Commission, to improve the car-supply situation in the Jackson district, particularly as to the Cornelia branch of the Detroit, Toledo & Ironton R.R. The operators asked that a connection be made with the Baltimore & Ohio and the Hocking Valley systems so that cars may be delivered to its line without being hauled many miles from other points.

Jefferson City, Mo.—The State of Missouri has no money in its fuel appropriation to pay its January coal bill, and the St. Clair Coal and Mining Co., of St. Louis, will have to wait for its money. When the January bill was presented it was found that the state lacked $835 of having enough to pay it. The $15,000 appropriation for this year and next year has been exhausted. It has not been determined whence the money is to come if more coal is needed.

Louisville, Ky.—Senator Brock has introduced a bill before the State Legislature calling for an individual department for the inspection of mines, the appointment of a chief mine inspector, and three assistant inspectors, and providing that the Chief Inspector give all of his time to the work. The present inspector of mines has charge of the engineering department of the State University. This bill creates the "Department of Mines," and gives the Governor the right to appoint the chief executive.

Scottdale, Penn.—As the result of an investigation into electric power conditions in the Connellsville coke region by agents of the Council of National Defense, there is a possibility that a curtailment in the use of power by industries less essential than the mining of coal and the making of coke will be made. At any rate, the data secured by the investigators will be used as a check against the consumption as shown by the reports and records of the West Penn Power Co., which supplies the region.

Charleston, W. Va.—Max T. Price, of Charleston, secretary of the Kanawha Valley Coal Operators' Association, has been appointed temporary manager of the Chesapeake & Ohio forwarding bureau, of Russell, Ky. Feb. 25 has been set as the date for the beginning of operations of the pool. All coal mined from operations along the Chesapeake & Ohio lines in the Guyan, Kanawha, New River and Big Sandy fields will be billed directly to the forwarding bureau from where it will be distributed to consumers, at the discretion of the manager of the exchange.

Danville, Ky.—A total of 1600 cars of coal were recently being held in the local yards on account of congestion, but with the improvement in transportation most of this coal as well as the additional shipments from the mines has been moving forward, 500 cars having been shipped into Indiana within a few days. The transportation situation has shown great improvement. Various commodities are now moving eastward and northward, some commodities being barred from the East—that is, past the Buffalo-Pittsburgh line, this list including lumber.

Chattanooga, Tenn.—An interesting suit, involving the Dayton Coal and Iron Co., and reading "the Equitable Trust Co. vs. the Stockholders of the Dayton Coal and Iron Co.," has been filed, this suit involving about $300,000. The suit is to recover this amount, it being claimed that the corporation was organized in Scotland, and was never domesticated, and therefore the stockholders were acting as partners and liable for all debts that had been incurred. A long list of prominent attorneys have been retained by the plaintiffs, while defendants are represented by Siser, Chambliss & Chambliss.

Columbus, Ohio—Governor Cox has secured from Director General McAdoo a promise that the latter will appoint an Ohio representative to look after transportation in the state, with headquarters at Columbus. In all probability the appointee will be one connected with the State Public Utilities Commission. Governor Cox had a long and satisfactory conference with McAdoo. He submitted a list of specific recommendations bearing upon the Ohio Transportation situation. Chief among these was one that long hauls be abolished as far as possible and that something be done to improve the motive power of the railroads, which is deteriorating rapidly.

Marion, Ohio—Speaking to business men, E. D. Leach, assistant state fuel administrator of Ohio, declared that it is the present plan of the fuel administration to limit the amount of coal domestic consumers can have during the summer. He declared the idea many entertain that they will lay in big supplies in warm weather in anticipation of needs next winter, are to be rudely shaken. In the course of his remarks he said that indications are now that this winter's experience is but a "taste" of what can be expected next winter, and expressed the view that only suspension of industries to take that much burden off the coal-hauling railroads will bring relief.

St. Louis, Mo.—Missouri Fuel Administrator Crossley announces that arrangements satisfactory to him have been ordered by Federal Administrator Garfield for St. Louis to receive its fuel supply from the Fifth and Ninth Illinois districts. A deputy Federal administrator acceptable to Crossley will be appointed by Illinois Administrator Williams. Requisition will be made by Crossley and the St. Louis Fuel Committee on the deputy administrator for St. Louis' needs. The plan agreed upon is a compromise, he says, but under it all the coal needed for St. Louis will be requisitioned. An agreement has also been made for Kansas City to get its steam coal from the Springfield, Ill., district and western Missouri its domestic coal from the same district.

Louisville, Ky.—The final breaking of the last ice gorges on the upper Ohio River resulted in much damage to equipment belonging to river coal companies. On Feb. 13 barges which had broken loose at various points above Louisville started coming down, it being said that considerably more than 100 coal boats and barges, a number of wharf boats, pump boats, and other equipment were going down stream with the ice. Some of this equipment bumped the bridge piers in passing Louisville, but with a current of only six to eight miles an hour the damage was not great. The harbor is now wide open and practically all ice has run out. Towboats on the lower Ohio are endeavoring to catch the runaways. It is expected that some river coal will start moving down within the next few days on the present high water.

Louisville, Ky.—Coal operators are watching with much interest legislative developments in connection with some eight-hour bills which have been introduced before the General Assembly at Frankfort House Bill No. 172, introduced by Representative Bays, was ordered printed and referred to the Committee on Immigration and Labor. This bill is entitled "An Act fixing eight hours as a working day in all contracts between employers and employees, and providing for payment of extra time, and penalties for violation of this act." This bill is aimed especially at the mines and railroads, and provides a penalty of $100 for all violations of the act. The coal men feel confident that the Government under existing conditions will not allow any such state laws to interfere with the production of coal, although there is some strong opposition being pushed by individuals against these measures.

St. Louis, Mo.—A survey of St. Louis factories and industries to determine what industries could be classified as nonessential and closed down in case of necessity, has been completed by E. J. Troy, secretary of the Manufacturers' Association, for the St. Louis Fuel Committee. Troy received replies to his questionnaire from 864 firms, whose aggregate average fuel requirements are 57,000 to 58,000 tons, or 1450 cars a week. Industries considered essential because they manufacture foodstuffs or have war contracts number 243, using 12,863 tons of coal a week. Firms claiming they were essential industries numbered 227, using 40,550 tons a week. Their claims will be passed on by the fuel committee. There were 193 claiming to be essential industries but listed as doubtful by Troy. They use 1760 tons a week. Manufacturers of nonessential goods numbered 138, using 894 tons a week. Firms listed as nonessential by Troy numbered 36, using 105 tons a week.

St. Louis, Mo.—A new campaign for the removal of the 20c. a ton arbitrary on coal, charged by the Terminal Railway Association for hauling it across the bridge from East St. Louis, has been started by former Governor Joseph W. Folk, who resigned as chief counsel of the Interstate Commerce Commission to become chief counsel of the Chamber of Commerce. In an address to the Chamber of Commerce at the Planters Hotel, he expressed full confidence that the Interstate Commerce Commission, in harmony with recent decisions and with the present trend of thought on the subject, would rule that the arbitrary is unjust and order it abated. His confidence is based mainly on rulings of the commission that St. Louis and East St. Louis are to be considered as one destination on shipments of cattle from the West, and that New York and Jersey City are to be considered as one destination. In the new campaign it will be urged that St. Louis and East St. Louis are one destination on coal shipments.

MARKET DEPARTMENT

Weekly Review

Coal Moving Forward from Mines, Though Motive Power Is Still Source of Worry—Domestic Situation Improved—Industrial Market Unable To Meet Demand—Jobbers Dismayed by New Ruling To Abolish Commissions

FOR the first time in many weeks shipments from the mines are moving with moderate regularity. Reports from all sections, with the exception of the New England States, indicate that the coal crisis is over. However, this does not mean that the danger of a recurring scarcity is entirely removed, but that with a continuation of good weather distressing periods such as the country has just experienced are improbable.

The chief trouble still is lack of motive power, and many loaded cars yet remain on sidings on this account. A report by Government investigators shows that thousands of cars in poor condition clog the terminals and impede delivery. Railroad companies state they are unable to get sufficient men to keep up repairs. An appeal to mining companies for the transfer of men with mechanical ability has met with some success.

The general public expressed much satisfaction at the demise of "heatless Monday." Some industrial plants are working on close margins of fuel supply. Anthracite is still scarce, though the mines are shipping large quantities to tidewater. The resumption of water-borne traffic will also aid in the movement of coal and take some pressure off the railroads.

Radical changes in distribution routes are in prospect. So great is the demand from the East that a plan of coal distribution, approved by the Fuel Administration, proposes that Eastern seaboard states shall have first choice on the cutput of anthracite. This means that after Apr. 1 states in the West and Northwest will not be permitted to receive hard coal. This will be true also of Canada and the South. The mines of the Middle West will thus have their natural markets pretty much to themselves.

The committee in charge of the zoning plan seems to be making but little progress. It has been found to be a more difficult proposition than at first contemplated. Theoretically the arrangement seems ideal, but so many difficulties have beset the practical application that it looks as if the plan will not be ready for operation for some time.

Domestic demand is considerably lighter, and dealers are rapidly catching up with their orders. The industrial market is not so fortunate, however, a brisk demand for steam coals being in evidence, with the possibility that Eastern industrial plants of all kinds will be forced to burn bituminous only in the future.

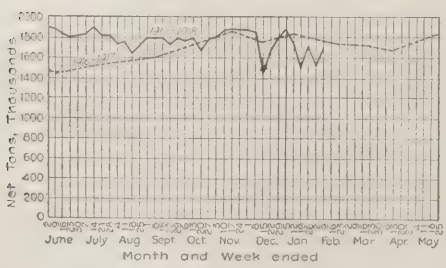
Little contracting is reported for future requirements, and activity in this direction is not expected to develop to any extent until conditions become more favorable. Operating companies are now busy preparing new contract forms, as in order to conform to the Government regulations it has been necessary to make changes in the present blanks. All contracts made must be submitted to the Fuel Administration for approval. In this way the national authorities will be able to keep a check on the sizes of coal that are being used for steam consumption.

The announcement that the 15 to 30c. commission which jobbers are now permitted to add to the mine price will be done away with after Apr. 1 has been received with consternation by many middlemen. It cannot be denied, however, that the order will tend to eliminate a great deal of profiteering on the part of some operators who established subsidiary companies for the express purpose of selling coal, thereby absorbing this commission. Under the new ruling retail dealers will obtain coal at the same price, whether they purchase it from the mine or through a middleman.

Production will doubtless be greatly stimulated by the order of the Fuel Administrator granting an increase of 60c. a ton for coal mined in the central Pennsylvania district. This will go far toward encouraging the investment of further capital in development work.

COAL PRODUCTION

With the return of milder weather the production of coal again began to approach normal, although the severe congestion of transportation caused by the cold weather of mid-January had not been entirely overcome by Feb. 9. The total production of bituminous coal, including lignite and coal made into coke, is estimated at 10,215,000 net tons during the week of Feb. 9. The



rate of production was the highest attained since the five-day week of Jan. 5. Beehive coke shared in the recovery reported by the bituminous industry as a whole. The week's production is estimated at 505,000 net tons, an average per working day of 84,000 tons. Shipments of anthracite, however, declined from 34,482 cars to 32,011 cars.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

	Jan. 19	Jan. 26	Feb. 2	Feb. 9
Bituminous shipments, 121 roads.	150,865	181,471*	170,552*	183,783†
Anthracite shipments, 9 roads....	31,861	33,406	34,482*	32,011†
Beehive coke shipments, 4 roads....	10,826	10,408*	9,655*	10,365†

*Revised from last report. † Subject to revision.

Atlantic Seaboard

BOSTON

Small reserves dwindle in cities. Receipts still far behind actual consumption, although mild weather leads public to think conditions better. New prices and trade already look ahead to next season. A few "contracts" placed, but question of bottoms looms up. Railroads unable to increase tonnage hauled. Loading improves at Hampton Roads, but still not enough coal available for New England.

Bituminous—While a few days of mild weather gave rise to some optimism over the fuel situation, those in touch with it saw reason only for continued apprehension. Another Panama R.R. collier diverted to New England, the "Ulysses," helps somewhat in meeting the smaller emergencies like pumping stations and power plants, hospitals, etc., all over New England, and it is just such deliveries spread over a large area that save the situation. Except in a relatively few instances, the fuel authorities are not interfering with the flow of coal on contract, whether all-rail or at tide, but what shipments are at their disposal are still being strictly confined to immediate needs in "Class A." A few exceptions have been made in cases where a small mill is practically the sole dependence of a community and a few cars are sent in order to forestall real distress. During the last week the situation got so serious that a full cargo for a group of woolen mills was practically halved to give the Bangor & Maine R.R. a small supply for the Boston end of the system. The Maine Central is in straits for coal, and every few days a steamer has to be diverted.

The Boston retail market ordinarily absorbs 8000 tons or so daily of bituminous, but under the conservation rules in force the consumption is now being held down to about 3500 tons. Only a few of the public schools are in session, and only by the closest calculation can the Fuel Administration assure a continuous supply of this quantity for more than one or two days a week. The rest, if it comes, will have to come through the usual channels and the prospect for the current week is not encouraging. Receipts have shown a steady falling off, and unless shipments by water are in some way increased there will be acute suffering should the weather turn cold.

Ice conditions in Long Island and Vineyard Sound are still a menace and the number of losses last week was even larger than was feared. Much has been expected from the "thaw," but the watersheds have not yet loosened up to any extent that would help. The flow of streams like the Connecticut is away below normal, and power stations are still dependent on the maximum efficiency of steam auxiliaries.

The mild temperature at Hampton Roads, however, has had a marked effect. Dumping is fast becoming normal, although as to arrivals and receipts it is now a close race between coal and boats. Instead of accumulating, the latter are now in scarcely sufficient number to take the coal as fast as it arrives, and it will soon be up to the authorities to supply bottoms from somewhere; that is, if New England industries are to be kept in operation.

Some relief is expected from the recent order placing an embargo for three days against westbound coal on the three Virginia roads, but it is still felt that the Federal authorities underestimate the actual needs of New England. The railroads are powerless to handle any material increase in the tonnage they hauled in 1917, and the rest must come either by water or not at all.

On the New England order of Jan. 3 calling for 500 cars daily, all-rail, the average during February has so far been only 91, including a quota for the railroads. It is now necessary to increase the proportion for certain of the roads and to decrease others. The larger systems use for engine supply in the aggregate about 16,400 tons daily, and this must all be available at necessary points in order to keep coal rolling into New England.

On Feb. 16 the trade was delighted to hear of the 60c. advance in central Pennsylvania following the 40c. granted the Piedmont region ten days or so earlier. There is a feeling that with such an advance a large number of operations can "resume business," and it will be interesting to observe the effect of the recent order. The question of contracts is now to the fore, and while at this writing it is too soon after the price announcement to report any developments in New England, the week is sure to be a stirring one. The "zone plan" is also coming in for liberal discussion, along with the new ruling of the Fuel Administration affecting "jobbers." Comment on the latter seems generally favorable, although middle houses here are in some trepidation over the attitude of some of the producers who may feel themselves in position this year to dispense with such "useful service" as jobbers have rendered in the past.

A few tidewater "contracts" have been placed by Boston distributors who apparently rely upon their lightering facilities to justify the alongside prices named. It would seem more like speculation than selling coal.

Large manufacturing centers like Lowell and Lawrence, Mass., have been on the verge of general shutdown two or three times the past fortnight. Only by emergency supplies coming either through the Fuel Administration or on sufferance have these plants been in position to run, after borrowing from one another and using wood and anthracite screenings and culm to a larger extent than would have been thought possible.

NEW YORK

Anthracite situation shows improvement, but conservation is urged. Jobbers fight elimination as result of Garfield order cutting off commission. Local fuel administrators reject badly prepared coal. Bituminous supplies scarce and car supply continues poor. New England is promised larger shipments.

Anthracite—While the situation in this market has been greatly relieved by several days of mild weather, the local trade is not satisfied that danger has passed. Receipts have been steadily increasing, and although the heatless Mondays are a thing of the past, the coal coming to the dealers is being rapidly absorbed. More coal has been received during the past week than for several weeks, but it has been far short of the normal requirements. The Fuel Administration officials and dealers are constantly warning consumers to go slow on consumption.

The decree of Dr. Garfield eliminating jobbers' commissions was not a surprise to the local trade. In fact, the order which at that time had not been promulgated, but had come to the knowledge of the officers of the Wholesale Coal Trade Association, was the reason for the calling together of the trade at the Whitehall Club on Feb. 13.

The Garfield decree is considered in various ways by the local trade. Some view it with alarm, while others, more conservative, do not think that it will result in the elimination of the jobber. The latter believe that the operator, who according to the order, is to be allowed an advance in the price of coal to cover the selling costs, will dispose of his product through the middleman as at present instead of establishing his own selling force. The other jobber believes the new order means the ultimate wiping out of the jobber, who has for many years been the means of disposing to the trade a large part of the output of the mines.

About 150 jobbers or middlemen are doing business in this market. Many of these have small mine connections, while others have sufficient mine connections, some through ownership, to furnish them with the full tonnage requirements. No matter what the outcome of the decree may be ultimately, the majority of the dealers are of the opinion that it means a fight if they are to retain their business.

Efforts to compel anthracite operators to send well-prepared coal to this market are being pursued by the State Fuel Administration officials. A statement issued by Deputy State Administrator Robertson says that the office has rejected two cargoes which analysis shows contained 69 per cent. of rock and slate, and 31 per cent. of coal. The consignee of the coal was requested to refuse shipment and to notify the shipper to return his prepaid payment. The railroad company carrying the coal notified the producers that no more coal would be furnished to them.

While consumption has not been so heavy as for the past several weeks, the demand continues strong, due in most part to the desire of consumers to replenish their stocks sufficiently to carry them into warm weather. The improvement in receipts is noticeable in the large number of vehicles carrying coal seen in the streets.

The situation is better in all the boroughs of the Greater City, but is particularly good in The Bronx. The dealers there, according to reports, have more coal in their yards than the dealers in the other boroughs. In Brooklyn there has been a decided change for the better. Dealers are impressing into service any kind of vehicle to make deliveries, and consumers are willing to take as a substitute for the coal ordered any other size sent them.

Another investigation into the local coal trade is promised by the Board of Aldermen as the result of a resolution introduced into that body. The Mayor's Coal Committee, which asked for $50,000 to purchase coal for the very poor of the city, has received about $17,000, and in addition about 1000 tons of coal.

The anthracite steam sizes continue to be scarce with the demand strong, particularly for rice and barley. Considerable culm or dust is being sent here, which is mixed with bituminous.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports, are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buckwheat	4.30@5.00	5.50@5.80
Rice	3.75@3.95	4.50@4.80
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—The situation here continues serious despite the let-up in heavy consumption. Many industrial plants continue to be without supplies, while in New Jersey several hundred persons were idle because of the lack of coal.

The one bright spot in the situation was the fixing of a price for coal from the thin vein district of Pennsylvania at 60c. above the former figure. An advance had been expected for several weeks. The order which provides for the one price for all the coal, instead of separate prices for run-of-mine, prepared sizes and slack, also provides that in order to provide funds to meet the expenses of pools and other arrangements made by the operators to facilitate the movement and distribution of coal 5 mills per ton is to be added to the new price and the money is to be placed in a fund, which fund is to be distributed by an operators' committee to be named later.

An order was also issued making all smithing coal subject to the Government price for bituminous coal. This repeals the order of Oct. 1, providing that coal specially prepared for use in smithing may be sold at the market price prevailing at the time of sale.

Local tradesmen are now anxious as to the additional advance in price that Dr. Garfield will decide upon to cover the cost of selling expenses and which will practically eliminate the jobber from the situation unless the latter can secure his commission from the operator.

The assurance given at Washington to the New England fuel administrators that they will receive at least one million tons of coal a month to relieve the situation is expected to divert some coal from this market, but not a large amount, since more than half the amount will go by water, most of it from the Southern ports.

There is nothing new in the contract situation. While it was not expected that there would be many renewals at the former Government price, the new price may result in some renewals.

There is considerable bituminous being used in apartments and hotels, most of it being mixed with the smaller anthracite coals.

Requests have been made on local houses by the New England fuel officials for increased shipments of coal for railroad use, but it was pointed out that this was impossible because of the poor car supply. Cars are running badly, one operator instead of receiving nearly 30 cars so far this month having received less than five.

PHILADELPHIA

Anthracite domestic trade helped by mild days. Believe worst past. Planning for next winter. Rule covering spring deliveries. Entire production for East. Pea coal situation interesting. New contracts. Bituminous price increased to $3.05. Increased production expected. Mild weather helps situation, but supply still short. Drastic brokerage ruling. Crippled cars and lack of motive power hold back deliveries.

Anthracite—There is a general improvement in conditions. As anticipated, the mild weather proved the salvation of an unbearable situation. The worst of the city's coal troubles are virtually over for the balance of the winter, at least this is the opinion given out by the fuel administration. For a week the consumption of coal has been much lighter than for months and the railroads have made heavy deliveries. Some of the big companies really made such large deliveries that a few dealers were actually compelled to hold their orders until they could unload coal that had arrived.

Chairman Lewis of the city fuel committee has some ideas that he hopes to put into effect if they are supported by the state fuel administrator. In the first place, he believes that there are about twenty times too many yards here. Instead of 230, the present number, Mr. Lewis would favor about one dozen yards.

On account of the number of dealers at present, territories overlap and it is not unusual for a dealer in an extreme section of the city to make deliveries to the other end. He acknowledges that any plan to eliminate about 95 per cent. of the coal yards would not be successful, and he would refuse to try to force any of them out of business; nor would he want to aid the larger concerns in creating a monopoly of the business. His plans embrace a zoning system so that dealers can only deliver coal in their particular district. Mr. Lewis is also anxious to prohibit the sale of domestic sizes, including pea coal, to any manufacturing plant, business house, office building or hotel. His idea is to conserve the entire production of this coal for dwelling houses. Where the former are not equipped to burn steam sizes or bituminous, he hopes to force a change in the heating systems.

That the coming summer will be an extremely active one was forecasted at a meeting in the state administrator's offices Friday of last week. At this meeting were assembled the various county administrators, and the national administration for the first time announced its plan of wholesale distribution. The plan was outlined by L. A. Snead, Dr. Garfield's representative, who imparted the information that the entire production of anthracite was to be confined to the Atlantic seaboard and that the states in the West and Northwest, which had formerly depended upon anthracite for their fuel must depend upon the bituminous mines located nearest to them. This is also to include the shipments formerly made into Canada. It is understood that the plan is to go into effect on Apr. 1, and all consumers of anthracite will be encouraged to lay in their winter's supply during the spring and summer.

The order cutting out a direct commission to the jobber came as a great surprise. While this has long been advocated by that portion of the press not thoroughly

acquainted with the coal trade, it was not really expected that such a rule would be made at this time. As a matter of fact, there is but a small tonnage of anthracite sold in this city through middle houses, as following the lead of the largest company some 10 or 12 years ago, the system had been almost entirely eliminated.

Owing to the plan worked out by the National Administration to allow an increase in the mines prices in order to cover the jobber's commission, it would seem that the continuance of this feature of the trade is entirely in the hands of the operating companies now. This suggestion of increased mines price now brings to the front the question of what the new April figures will be. It will be recalled it was positively stated when the President approved the increase of 35c. on Dec. 1 last that the usual April reduction of 50c. would be insisted upon. So far as the dealers are concerned, they are opposed to an April reduction this year, as last year they were flooded with so many orders at the spring prices that they were unable to fill them at the reduced prices and were compelled to fill them later in the year at a loss. From this it would seem that it is the Government's intention to increase the present basic or winter price by about 15c. and then order the usual April reduction of 50c. With the information at hand, no other deduction seems plausible.

Another matter of great interest to the retailers is what will be the status of pea coal after Apr. 1. There is already a ruling of the National Administration against the sale of this size of coal for steaming purposes, and for this reason it looks as if a great quantity of pea coal will be thrown upon the retail market. It will be recalled that around the first of last year many of the big producing companies closed extensive contracts with manufacturing plants for big tonnages of pea coal, one company selling 400,000 tons to a single concern. With all this tonnage being turned over to the domestic trade, it would seem as if there will be enough of this size to go around this summer. It is possible also that the dealers will be able to accumulate stocks of this size, as was the case in normal times. Much, of course, depends upon how well the consuming public keeps its resolution not to be caught short of fuel another winter. If the warm weather should dispel some of these good intentions, even the operating companies may accumulate some stocks in their storage yards. The entire subject is a most interesting one and is causing much conjecture.

At this time all of the operating companies are busy preparing their contract forms. Most of the anthracite contracts expire at this time, and in order to conform to the Government regulations it has been necessary to make changes in the present blanks. All contracts that are made must also be submitted to the Fuel Administration for approval, and in this way the national authorities will be able to keep a check on the sizes of coal that are being used for steam consumption.

Despite the progress made during the past week there are still many homes in the city without coal, but present plans will no doubt bring prompt relief.

Dealers are disturbed lest their gross margin of profit be reduced from $2.50 by the city fuel committee. It will be recalled that when this basis was decided upon there was a strong protest from press and public, and it was announced at that time that the ruling was not to be considered permanent. A statement late in the week from Chairman Lewis that the margin would not be lowered for the present, but would probably be taken up later, is not at all comforting to the dealers.

All sizes of steam coal are still held at the figures prevailing for the past six weeks, from culm at $1.50 to $2 up to $4.15 for buckwheat on spot shipments from individual shippers, although the demand for culm fell off quite considerably this week in anticipation of an increased supply of bituminous coal.

The prices per gross ton, f.o.b. cars at mines for line delivery and f.o.b. Port Richmond for tide, are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buck	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—The trade was greatly encouraged by the order of the Fuel Administration granting an increase of 60c. a ton for coal mined in the central Pennsylvania district. While the increase was not altogether unexpected, yet it had been so long delayed after many almost authentic rumors had heralded its coming that the operators had almost lost hope.

Another interesting feature of this latest ruling is that the administration authorizes an additional increase of 5 mills per ton to cover the cost of pools and other arrangements to facilitate the movement of coal. This fund will be handled by an operators' committee to be named in the near future.

With the continuance of mild weather there has been a slight improvement in the receipts of fuel here lately, but despite this the situation continues most serious and many plants continue to remain closed for the lack of fuel. Even concerns working on war material have been idle, and it is these concerns which are receiving the earnest attention of the fuel committee. Owing to the improvement in the anthracite trade, the drain from that source has ceased and no soft coal has been commandeered for family use this past week.

Lighting and power plants in adjacent towns have been sorely pressed for coal and have only been kept going by the commission taking coal in transit consigned to less important industries. In many of the suburban towns the lighting has been curtailed as much as 50 per cent. on this account. The chief trouble remains one of motive power and many loaded cars are reported to have been on sidings for weeks on this account.

The announcement by the National Fuel Administration of the abrogation of the commission allowed brokerage houses, effective Apr. 1, has caused intense discussion. While Dr. Garfield has stated that he believes the broker is necessary, he feels that because of the abuses that have crept in whereby a very large percentage of all coal has been sold with the brokerage charged, it has become necessary to find a remedy.

As indicated last week, there is just the least little contract activity, but this is not expected to develop to any great extent until conditions become more favorable. The Government is encouraging the closing of contracts, but even this is not sufficient to induce a general closing of this kind of business.

Lately there has been a cleaning up of the coal at the piers, following a period when much coal had been loaded into bunkers by priority orders. However, there is much coal on the way, and as soon as the congestion is relieved there will be a heavy tonnage of coal going forward. The new regulations as to declarations by shipmasters as to the tonnage taken and used is meeting general approval and working out satisfactorily. It is thought by some that the taking control of foreign trade by the Government will have a tendency to curtail the bunkering, depending upon the ports from which the commandeered ships will sail.

The receipts of soft coal here are also likely to be affected earlier than usual by the expected advance opening of the Lake trade, owing to the prospects of an early clearing of the Lakes of ice.

BALTIMORE

Fuel supplies are still far short of requirements. Confiscations of coal almost at destination cause confusion. Plants traveling from hand to mouth.

Bituminous—In the midst of other worries over the drastic changes planned for their business by the Government after Apr. 1, the coal men here were still being deluged with demands for industrial coal. Only a few of the plants can be satisfied to the degree they demand. Under requests from the fuel administrator the jobbers have worked heroically to distribute the coal in their grasp to the most urgent cases. Plants having Government work were among those still short of coal. The milder weather prevented additional diversions of soft coal from industrial to domestic use, but this was a mere touch of aid after all, and colder days between increased the domestic call from time to time. The mining sections are still complaining that they can not get the coal cars needed to move the production they otherwise could put out. The railroad congestion continues marked, and few mines are working at capacity. Most of the industries here have given up hope of getting a sufficient supply of fuel for some time to come, as they are convinced that the railroad situation is to blame and is impossible of early remedy.

Anthracite—The hard coal dealers have received a little better supply recently, but it has been insufficient to meet even emergency calls, and these have in many cases been satisfied temporarily with bituminous delivery. Dealers are complaining that they never know when they are to get coal, as after being notified of a car or so on the road for their account they find it has been seized by some fuel administrator and diverted to other uses. The result is that dealers for the most part have stopped promising customers coal. Many of them have cut off their home telephones to prevent being aroused even in their slumbers by insistent customers. And all this trouble and worry for a business that is sadly out in profits because coal can not be had to sell when everybody wants to buy.

Lake Markets

PITTSBURGH

Zone distribution plan being perfected. Heavier receipts of coal, with slightly improved supply of empties at mines. River coal movement largely resumed.

Some progress has been made in the adoption of plans for putting the zone system into effect, as regards the Pittsburgh district. R. W. Gardiner, distributor for the zone, has had to spend considerable time in Washington for conferences with the National Administration and the settlement of various questions that arose at the outset.

Tuesday of this week completed a full fortnight of favorable railroad weather in the central west. The railroads are believed to have made good use of the time in clearing congestion at various points, but the practical results of the movement have been in freight that was congested en route reaching destination, rather than in empty cars being furnished in larger numbers to shippers. This is expected to follow in due course, but thus far the improvement in car supply has been only a very moderate one.

Much of the ice in the Allegheny River ran out last week, filling the Ohio River, while the Monongahela was clear. Mills in Pittsburgh received considerable river coal last week and this week it is possible to ship to mills on the Ohio as well. Only the four lower pools of the Monongahela are open. The local fuel situation is now a comfortable one, but rail points beyond are still suffering somewhat. The movement of byproduct coal has been improving steadily and the byproduct coke ovens are now nearly fully supplied.

Free coal has not yet appeared in the open market in any volume. The market remains quotable at the set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. permitted to be added in the case of sales by jobbers to consumers.

BUFFALO

Bituminous plenty, but still hard to get. A better state of things looked for if the crippled cars are fixed up. Enough coal mined. Anthracite coming slowly.

Bituminous—The supply is better, though the motive power of the railroads is so deficient that cars stranded at junctions and way stations are slow to reach destination. With prompt delivery there would be a supply sufficient to meet every need. As it is, the reports of congestion at many points continue, not only in the near-by Canadian yards, but on this side of the line. The move to repair the crippled cars will do much toward easing up the situation in time.

The recent thaw went a little too far, but it did no damage in this territory. The return of cold weather after ten mild days has probably shut out the later spring floods, besides putting the railroads in a better physical condition. Jobbers of bituminous are afraid that the zoning system, if it ever gets into operation, will substitute the government official for them, and that they will have to whistle for business; but that is conjecture, for no move has been made yet to set up that system here. Factories are uneasy yet, but they are not doing badly.

As time goes on it becomes more and more difficult to quote a bituminous price. The new order increasing the price of coal produced in thin-veined sections of Pennsylvania 15c. a ton now makes it necessary to add that amount to the following table, all per net ton, f.o.b. Buffalo, where it applies:

	Slack	Lump
Pittsburgh	$3.75	$4.25
Bessemer	3.70	4.20
Allegheny Valley	3.60	4.10

Anthracite—The city distributors complain that with the coming of the mild weather the mines have cut down the supply, apparently sending the surplus eastward, so that the situation is not so much improved here as it should be. Consumption has dropped off more than half. Colder

weather has returned, but nobody looks now for anything like the low temperatures of the late cold spell.

The demand of many anthracite consumers for next winter's coal sets the shippers to studying the possibilities of a year hence. One shipper advocates no reduction in price this spring and the making of an extra effort to supply the outlying districts before winter, so that the sections near the mines can be supplied readily and at least expense to the roads. If the price should be lowered these near-by points would complain that they were deprived of the privilege of buying at the reduction.

Neighboring towns appear to be as short of anthracite as ever, though it is impossible to make sure. Many consumers do not scruple to say the coal is entirely out even when the shippers contradict the reports. Within the last few days the supply has been more general and the consumption has gone down fast, especially as low "war fires" are resorted to during work hours by some households.

DETROIT

Continued moderate temperatures ease coal situation and aid in lessening freight congestion. Coal pool considers dissolution.

Bituminous — Noticeable relaxation of tension has taken place in Detroit within the last week, owing to continuance of moderate temperature. The improvement in weather conditions has aided the coal situation locally, not only by diminishing pressure of demand from household consumers but by facilitating partial clearing away of freight congestion on tracks south and southeast of Toledo, permitting freer movement of coal from the mines.

Detroit consumers, however, are not yet "out of the woods." Though somewhat increased in volume, the quantity of coal coming into the city is still below consumption requirements and the situation continues to be one of a hand to mouth supply both as regards consumers of steam coal and users of domestic stock.

Anthracite—Supplies of anthracite are still insufficient for current needs. Shipments are reaching the city in small volume, and the coal is more than offset by unfilled pending orders before it is unloaded. Few of the retail yards have any stock and are dependent on inbound shipments to meet needs of their customers, many of whom are still obliged to do the best they can with bituminous coal in heating plants designed for use of anthracite.

Efforts to increase the available fuel supply by bringing wood into the city have not been highly successful. With cost of freight and delivery added, consumers in some instances are asked to pay $18 to $20 for a cord of 128 cu.ft., or $6.50 to $7 for 16-in. wood, equal to one-third of a cord.

Dissolution of the Detroit terminal pool association is under consideration. The organization arouses complaint of some retailers, who assert its operation delays delivery of their consignments. Complaint is made also by some of the steam coal users, on the ground that coal of superior quality consigned to them is diverted to other consumers and an inferior grade of stock substituted. The local fuel administration indorses the pool.

COLUMBUS

A better supply for both domestic and steam users is now reported from all parts of the state. Warmer weather had aided transportation.

The coal trade in Ohio has been in much better shape during the past week owing to warmer weather, which has both aided transportation and reduced the supply necessary for domestic consumption.

Domestic trade is still one of the important features of the industry. Retail stocks are better but dealers are still compelled to apportion their available supply to various householders. In other words, none of the consumers is allowed all he wants in case his order is for more than three or four tons. Investigations are made by the county committee when large orders are placed with dealers. As a result of this method hoarding is out of the question. Retail prices are unchanged from the previous week. There is a strong demand for Pocahontas and a little is coming in. The same is true of West Virginia splints. Anthracite is quite scarce.

Steam business is also active to the extreme. Manufacturing plants which were compelled to suspend because of lack of fuel are now being operated. Public utilities have been able to accumulate a small surplus and there is no immediate danger of suspension. With the countermanding of the fuelless Mondays by Administrator Garfield, general industry is now resumed. Schools which were closed in many sections are in session and there is little to show that the fuel shortage several weeks ago was acute.

Production has been increased largely during the past week. This is especially true of the Hocking Valley and Pomeroy Bend fields. In both fields the car supply was from 80 to 90 per cent. High waters incidental to the breaking up of the snow and ice caused several mines to suspend operations. Floods also interfered with operations in the Pomeroy Bend field. On the whole, the output has been about 85 per cent. of normal with the exception of eastern Ohio, where it was about 65 per cent.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.70	2.45
Screenings	2.20	2.45	2.20

LOUISVILLE

Weather improvement, coupled with great improvement in transportation facilities and a slightly better supply of labor, has resulted in quicker movement of coal. Retail demand somewhat lighter, and dealers are rapidly catching up with their orders, now being able to make immediate delivery.

Due to clear streets and the letup in the demand for coal, retailers are now catching up on deliveries and are enabled to take orders for immediate delivery. Deliveries have been greatly simplified, and as a result the Fuel Administration on Feb. 16 reduced the 50c. additional delivery charge which was allowed the retailers during the period of snow and ice. This will leave the gross margin of profit at $1.95 a ton, bringing retail prices in Louisville down to $5.43 for western Kentucky mine-run, and $5.94 for Jellico mine-run. The new range of prices on anthracite is: Stove, $11.06; chestnut, $11.15; egg, $10.80, delivered.

A considerable quantity of western Kentucky mine-run is now moving into Louisville, most of this coal being from Vein No. 9. The retail demand has been checked by warmer weather, but there is a fair wholesale demand. The reduction in retail prices is expected to stimulate retail deliveries during the week. The mines in western Kentucky are managing to run fairly well, as the supply of cars is much better and transportation has shown big improvement on the lines of the Louisville & Nashville and Illinois Central, the two big coal carriers.

In the eastern Kentucky fields an improvement has been seen since the flood waters went down. Labor is in better supply again, while the car supply is better and transportation has improved with the rebuilding of washed-out tracks, trams and railroads. However, the eastern Kentucky mines are not getting more than a three to four day supply of cars each week, and this is holding back production considerably. The Harlan fields have been producing a considerable quantity of coal that has been moving to the South Atlantic seaboard for export to Europe through Jacksonville and Savannah, and for coaling vessels. The Harlan Coal Co. has been especially active in obtaining this business, which has been made possible through the movement to utilize Southern ports to a greater extent than formerly, and which has been featured by the work of Fairfax Harrison, of the Southern Railroad.

BIRMINGHAM

Domestic stocks in local yards much better than last period, and receipts improving. Steam demand continues strenuous, with little free coal to be had. Labor disturbances hindering production.

During the past week all local retail yards have received sufficient coal to take care of orders in hand and accumulate small stocks to meet future requirements, an inventory taken by the fuel board at the close of the week showing 4218 tons on hand as against 2500 tons Feb. 1, with about 2500 tons in transit. No severe weather conditions have prevailed for several weeks, and it appears that the domestic coal crisis has passed for this season.

Coal men report little change in steam trade channels. There is a steady and strong demand for far more coal than can be furnished from the district under present operating conditions, and essential industries and public utilities are priority consignees, other users taking the residue of the supply.

Coal production is suffering to some extent by the perturbed conditions following the placing in effect of the Garfield agreement, which has been adopted by all operators in the district. However, misunderstandings as to the proper interpretation of certain of its provisions have developed and the miners have gone out on strike at several collieries in the district, and it is not unlikely that the trouble will assume more serious proportions. Operators aver that they are complying strictly with the letter and the spirit of the agreement.

Coke

CONNELLSVILLE

Car supplies increasing only slowly. Reduction of congestion produces heavy receipts at many blast furnaces.

Car supplies on the Monongahela R.R. last week averaged about 41 per cent. of ratings, starting the week with 70 per cent. and ending with 30 per cent. The P. & L. E. had larger supplies, approaching 100 per cent., but this did not help a great deal. Supplies on the Pennsylvania continued light.

Receipts of coke have made a different showing altogether. When favorable railroad weather appeared Feb. 6, a fortnight ago, the railroads applied their greatest effort to relieving congestion at the various points, this being of loaded cars, not empties, and the result was heavy receipt of coke by the majority of blast furnaces, coke that in many cases had been en route for several weeks. A number of furnaces received much more coke than currently needed, and more than could be unloaded and stocked. There was a sharp increase in blast furnace operations, many furnaces that were banked being able to resume, while others that were running slow increased the blast to normal.

No free coke is yet to be found in the open market, although occasional sales are made as an accommodation. The market remains quotable at the set prices: Furnace, $6; 72-hour selected foundry, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The Connellsville "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 9 at 224,145 tons, an increase of 9487 tons, and shipments at 275,907 tons, an increase of 47,368 tons. The excess of shipments over production in the later week did not represent the taking up of stock coke, but the weighing of coke that had been loaded previously, but on account of congestion did not reach the railroad scales.

Buffalo—As a smelting proposition the coke supply keeps up well, though consumers are obliged to look closely to its movement. These consumers are so often connected with the supply of munitions that they get the preference when there is any to be given. Manufacturers of gas and other by-product coke are no more able to keep a supply on hand than can the sellers of coal, for if the consumers have no regular way of using it they will mix it with their coal. Therefore the market is always stiff and the seller unable to control either stock or prices.

Birmingham—The local coke market continues to evince great strength and inquiries are largely in excess of the supply available. The first export order of any magnitude reported for some time calls for 3000 tons for shipment to Carizal, Chili, through Pensacola, the entire lot to move within the next few weeks. This coke goes to smeltering interests in that country. Coke is moving much easier now than for some months past, the securing of equipment being less difficult and unnecessary restrictions as to destination have been removed. The output is not what it should be, and capacity production is not being obtained.

Middle Western

GENERAL REVIEW

Domestic market relieved; industries still very short.

The domestic trade has been greatly relieved by the warm weather that has prevailed in the Middle West for the past several days. While there has been but little excessive production over the former week, consumption has been so reduced that it has been possible to obtain enough coal to keep people warm and get a little tonnage in the dealers' bins from the coal arriving.

Railroads are still short of equipment, the supply at no time for the week past in any mining section having reached 65

per cent. Some operations report that they have not received in excess of a 30 per cent. supply during the week just past. In Williamson, Franklin and Saline Counties the car supply has ranged from 40 to 55 per cent. In Indiana this percentage has been considerably better, because of the confining of the state's production to and within the borders of Indiana, which gives the railroads a shorter haul and permits the prompt return to the mines of cars after they are released.

The Ziegler mine, located in Franklin County, has resumed operation, although the tonnage is much reduced. It is thought that little time will be required to boost the tonnage back to where it was before the explosion.

CHICAGO

Snowstorm last Friday night and Saturday increases demand and delays transportation.

Operators, dealers and industrial firms had about reached the conclusion that the crisis was over, when Chicago was again visited by a heavy snowstorm, which continued for 24 hours, turning what was hoped to be a brighter situation into another dangerous market.

One of the mistakes of the Fuel Administration is the continued insistence of the operators to apply every pound of coal possible to the domestic trade, temporarily disregarding the other classes of coal users. This has had the effect of putting into route on various railroads a large volume of prepared coal for dealers, to the neglect of steam plants. If this situation is not remedied immediately, many plants will have to suspend operation. Had trade relationship not been disorganized by the interference of local and state fuel administrators, all classes of trade would have been provided for in turn, with little or no hardship.

Coal from the Eastern fields is still scarce in this market. Some coal that was started from West Virginia two weeks ago arrived in Chicago the latter part of this week, but the larger part of the shipment encountered delays in transit. It will no doubt reach here some time in March, therefore the market is still almost without Eastern bituminous and short of anthracite.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	.....
Washed egg	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	.....	.....	.....	2.15@2.30	2.85@3.00

	Smokeless					
	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.60@2.75	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.60@2.75	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Warmer weather relieves coal situation at interior points in Wisconsin. Illinois holding back coal from Milwaukee and other places. No new price edicts.

Warmer weather has brought about a let-up in the clamor for coal, and the incidental improvement in the railway situation has meant relief for cities and villages in the interior which were suffering a serious shortage of fuel. Some anthracite has been received by rail and additional consignments are expected if there is no relapse in the favorable weather conditions. Illinois coal seems hard to get, and complaint has been made to State Fuel Administrator Fitzgerald that it is being withheld from the state by shippers at the mines since the order restraining the seizure of coal on track bound for Wisconsin. The matter is being investigated. Milwaukee uses thousands of tons of Illinois coal and the southern part of the state is practically dependent upon that source for fuel.

On Feb. 1, Lake Michigan docks held 98,632 tons of hard coal and 747,769 tons of soft. Of these amounts Milwaukee held 82,933 tons of the former and 515,104 tons of the latter. Since that date, however, the draft upon fuel stocks has been heavy, particularly on anthracite coal, which was pronounced exhausted by dealers a week since. There is still some on hand, however, but the small sizes are scarce. Dealers are now holding anthracite for consumers who are positively unable to burn soft coal.

ST. LOUIS

Mild weather has eased general conditions. Transportation improved and car supply better, with increased tonnage from all local fields. Domestic demand easy and more ample needs for steam in evidence. Country sections continue short.

A more normal condition is prevalent here in local fuels than has existed for many months past, circumstances considered. The weather has had more to do with this than all other factors combined. With an easing up in domestic demand, steam business was in line for more consideration, especially plants far down on the priority list.

Steam conditions have improved, and there is a gradual accumulation of storage in some plants, in anticipation of adverse conditions later. The country sections are not so fortunate, except in isolated cases; but there is no acute need except in southeast Missouri and eastern Arkansas, where the high water is threatening railroads and which sections have been short of coal all winter, more so than other southwestern points.

Railroads continue to draw heavily from all fields and do not seem to be able to get any great surplus ahead.

In the Carterville field of Williamson and Franklin Counties somewhat better working conditions continue to show improvement in tonnage. Car supply temporarily is better, and yet the domestic tonnage is light. Rail and Government orders seem to continue heavy and very little of this coal is coming into the west of the river region south of Iowa.

Similar conditions prevail in the DuQuoin field, but car supply here on the Illinois Central fails to show the improvement that is evident on other lines. The movement is also bad.

Mt. Olive field is one that does not change much. From the early part of the season it has been much the same. Railroad tonnage is heavy, car supply not good, but the St. Louis market gets its share, if not more, from the field; much better than from others in comparison with prewar figures. The short line roads show exceptional service in quick deliveries.

The Standard field is the uncertain one—sometimes with an encouraging future but generally the reverse. There has been an increased tonnage here this week that has helped the local situation wonderfully. Car supply while not good is much better on most roads than for some time past. Even on the Illinois Central there is some slight improvement, but on this road it is motive power that is felt worse.

Some anthracite continues to move in, about 1000 tons or a little better the past week. No smokeless or Arkansas to mention.

The entire trade here is upset by the Garfield order, effective Apr. 1, abolishing the jobbers' margin. This is a jobbers' territory, and both steam and domestic trade is in danger of a shortage resulting from the lack of distributing knowledge, which is in possession of the jobbers only.

The prices for St. Louis market per net ton f.o.b. mine are:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. sergs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin Co. rate is....87½c.
Other fields .....72½c.

Foreign Markets

GREAT BRITAIN

Reported by Hull, Blyth & Co., of London and Cardiff.

Jan. 17—Coal—The market continues dull. There is still plenty of free coal, exporters being unable to take advantage of the situation owing to continued scarcity of tonnage.

	New Regulation Prices
Best Welsh steam coal	$8.62
Best seconds	8.27
Seconds	8.08
Best dry coal	7.89
Best Monmouthshires	7.89
Seconds	7.65
Best Cardiff smalls	6.19
Cargo smalls	5.47

The prices for Cardiff Coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—The tonnage situation remains unaltered.

Gibraltar	$24.30	Port Said	$48.60
Marseilles	21.75	Las Palmas	20.04
Genoa	24.60	St. Vincent	20.65
Alexandria	42.60	River Plate	29.16
Naples	23.87		

Ocean Shipping

OCEAN FREIGHTS

Tonnage is becoming more and more scarce each day and chartering for export coal more and more difficult, but notwithstanding this a few additional steamers have been chartered for coals to Cuban and West Indian ports. A few additional sailing vessels have also been chartered for South American coals at the Chartering Committee's maximum rates. Freight rates, by steamer, are as follows:

South America	Feb. 11
Santos	[1]19.00
Rio de Janeiro	[1]19.00
Chile (good port)	16.50 about
West Indies:	
Havana	7.50 about
Cardenas or Sagua	9.00@9.50
Cienfuegos	9.50 about
Port of Spain, Trinidad	12.00 about
St. Lucia	12.00 about
St. Thomas	10.50 about
Barbados	12.00 about
Kingston	9.25@9.50
Curacao[2]	10.00@10.25
Santiago	9.50 about
Guantanamo	9.50 about
Bermuda	9.00@9.50
Mexico:	
Vera Cruz	10.00@10.50
Tampico	10.00@10.50

[1] Net bid. [2] And p. c.
W. W. Battie & Co.'s Coal trade Freight Report.

The Chartering Committee's maximum sail rates are to Pernambuco or Bahia $18.50 net, and to Para $15.50 net. To the other ports the rates are still $19.50 net to Rio or Santos $18.50 net to Montevideo, Buenos Ayres or La Plata. Gross rates to all of the above destinations are $1.50 over the net rates.

COAL AGE

Vol. 13 NEW YORK, MARCH 2, 1918 No. 9

REVOLUTIONARY PLANS

BY FLOYD W. PARSONS

Important coal measures are being perfected and will soon be made operative by the Fuel Administration.

Jobbers—

THERE IS a unanimity of opinion at Washington concerning jobbers. The determination is to do away entirely with coal speculation. Some jobbers will go out of business. Those having title to coal outputs will not. It is likely some small operators will be pleased to have certain jobbers finance and manage all coal sales. Local fuel administrators, however, when necessary will be the link binding the producer and the consumer together. Washington is aiming at a "mine-to-bin" route for coal.

Plans for Zoning Coal—

A ZONE SYSTEM will shortly be put into operation. Its purpose is to save transportation effort. Speaking generally, the plan will be based on the following principles: The country will be divided into three grand divisions—Eastern, Central and Western. The Eastern section will be supplied by the Allegheny coals. Roughly speaking, the Western limit of this Eastern zone will be the Ohio-Indiana line. All long rail hauls of these Allegheny coals will be eliminated, but this coal will be permitted to reach the Northwest by way of the Lakes. Byproduct gas coals and smithing coals will be permitted to go out of their zone in special cases.

The Central field will have as a western boundary a line between the Mississippi and the Missouri Rivers. This will create a sort of vacuum zone in the Western Mississippi Valley. Colorado, Wyoming, Iowa and the Southwest coal states will be called upon to supply the markets in this barren territory.

Illinois, Indiana and western Kentucky will be expected to increase shipments into the dock or lake territory and into their own normal markets to replace the all-rail Eastern coals cut out.

Inside of the Central and Western zones will be smaller zones, limiting each shipper to short hauls. The net result will be a material gain in transportation facilities.

In the West the trouble has been lack of locomotives and cars, which this zoning will lessen. In the East the trouble has been chiefly due to congested gateways. Much Southern coal could have been gotten north had it not been for this trouble. New England has particularly suffered.

Right here it is worth noting that New England, however, did get more rail coal this winter than ever before, but the loss resulting from the Government taking away ships was not made up.

The details of the zoning scheme will be given out by the Fuel Administration shortly. It is certain, however, that the zone system adopted will be flexible, and that it will be made effective by embargoes. Changes will be made as necessity dictates. Enlargement of output will be encouraged.

Dirty Coal Remedy—

JOHN WHITE, representing the miners, has arrived at a perfect understanding with the Fuel Administration concerning dirty coal. Preventive measures will start with the miner. Fine or discharge will be handed the miner who loads impurities at the face. Operators failing to require clean loading will be recommended for closing down by district inspectors to be appointed. It is further likely that new price adjustments will recognize the ash problem and provide additional payment to operators who inaugurate methods (mechanical or otherwise) that result in producing a superior product.

IDEAS AND SUGGESTIONS

What Does the Future Hold in Store for the Coal-Mining Industry?

BY CHARLES M. MEANS
Consulting Mining Engineer, Pittsburgh, Penn.

REGARDLESS of any price the Government may fix for coal during the period of the war, regardless of any price the economic conditions after the war may dictate, it is fully apparent that true efficiency will soon enter into the operation of all successful coal-mining plants.

Efficiency, in its ordinary accepted meaning, as applied to coal mining, has been lost sight of to a large degree because of the unusual conditions surrounding the industry. It has been a question of quantity, and as a general proposition the whole matter has been centered on how much coal can a certain mine produce. The margin between the cost of production and the selling price has been such that the finer features of economy could be passed up in favor of increased output. The industry is in such shape as to warrant a retrospective glance at what has happened; and, using the past three or four years as a guide, we may safely theorize as to what the future may have in store.

Beginning at a period just after war was declared in Europe, we find the coal industry at low ebb. From this condition we climbed to unheard-of prices, with maximum production in all fields. The cost of production increased, but at a much lower rate than the selling price. We reached a maximum insofar as selling price was concerned, and from that time the profits have receded and will continue to recede. The cost of production did not follow the selling price, but continued to increase and is still on the upward trend. The time is inevitable when the cost of production will approximate the selling price. Then will come the reconstruction period, and only those operations that have properly protected themselves by efficient methods will weather the storm.

The tide has already started to go out; the margin of profit is growing less and less each month; and just as certain as we have reached the maximum profit period we will continue to take less and less margin until we again touch bottom. When this time will come is impossible to predict; but we must recognize that it is ahead, and that we are slowly and surely moving toward it.

This is certainly a time to consider trimming sails and applying such methods as will allow us to operate on a much-reduced margin of profit. The coal industry will never go back to the conditions existing during the prewar period, but will be stabilized on a new and different basis. Methods that were formerly successful must be thrown in the discard, and schemes must be worked out that will meet the inevitable changed problems we will be called upon to solve. Precedent cannot be followed, and a new and better way must be found and applied to the problems as they present themselves.

Practical Underground Motor Curves

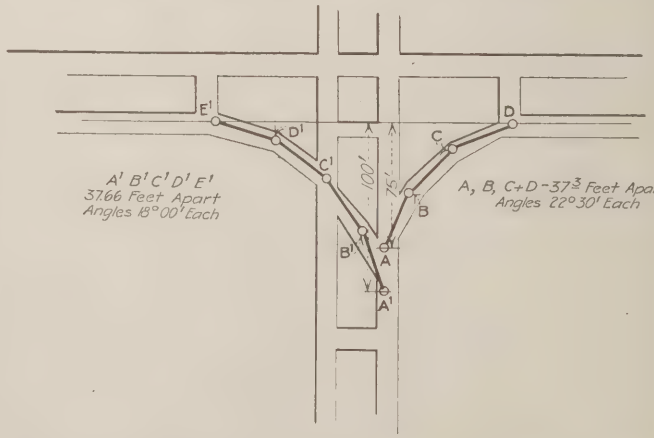
BY HARRY GOODNOW
Duquoin, Ill.

It is easy for the engineer to figure theoretical curves that will take a motor and trip at high speed without derailment, but to have new entries turned off that will contain such curves without making them too wide is a different matter.

To begin with, every cut of the machine must be planned in advance and a plain sketch with the sight lines and the ribs showing is nearly indispensable. This must be followed up with the surveyor's personal attention and the mine manager's hearty coöperation.

The following is a description and the accompanying drawing illustrates a pair of sub-main entries to be turned off, as usual, at an angle of 90 deg. from the main entries. This plan calls for three changes of sights and it will, in a 9- to 12-ft. entry, contain a regular curve of 92-ft. radius.

Plan to begin your curve at a point 75 ft. before reaching the theoretical sight line of the new entry. At this point (called *A*) widen, toward the way you are going to turn, about 2 ft. in 6 and about 4 ft. in 12 ft. from *A*. Now put in a sight plug at *A* on the transit line of the main entry and, from *A*, turn an angle of 22½ deg. toward the widened side, setting sights on



SUB-MAIN ENTRIES TO BE TURNED AT 90-DEG. ANGLE

this line. Run these sights to the face and mark off the rib of the new entry carefully. A hand-cutting on the ribs forming the acute angle between the two entries and from 4 to 6 ft. in will save cribbing or concreting later. The machine man (or pickman) can then proceed on both entries, being particularly careful in the running of his sights.

At a distance of 37.3 ft. from *A* begin to angle the new entry a trifle more till past far enough to set the plug *B* at the distance of 37.3 from *A*. From *B* turn 22½ deg. more from the line *AB*. Repeat this at *C* and *D* 37.3 ft. more each. *DE* will then be on the true course of the new entry and *D* will be at a latitude of 75 ft. and a departure of 75 ft. from *A*.

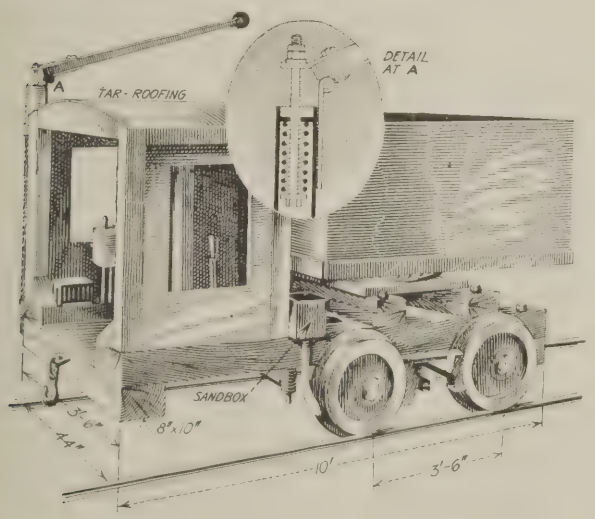
With the new "back" entry turned in its normal place and run in, the first crosscut (at 60 ft.) will have, within a few feet, its normal pillar to the haulage road.

With this system you have lost a few feet of extra yardage and a few hours' thought and watching while you have gained a narrow entry which will contain a regular curve. This method, to my knowledge, has been tried out successfully at two mines at least.

A combination of the foregoing curve with one where the point *A* is 100 ft. from the proposed course and turned with four changes of sight lines each angled 18 deg. for a distance of 37.66 ft. will keep the switches separate where you wish to turn your entries both ways from the main. This tunnel will contain a curve of 120-ft. radius.

A Homemade "Dirt Motor"

The superintendent of a mine "somewhere in Ohio" stood watching five or six men struggling to push a loaded dirt truck out onto the dump. It took these men 10 min. to dispose of two tons of slate and refuse. He probably said to himself something like this: "It is



DETAILS OF HOMEMADE DIRT MOTOR

costing us a lot of money to move this dirt, both in time and in the stopping of coal hoisting. I have all the old material that we need. I'm going to build a motor that will do this work, and other things besides." This man usually does what he thinks necessary, so in a few days the "dirt motor" shown in the accompanying illustrations was made.

The frame as shown is built up of 8 x 10-in. oak; the cab is built of 2 x 4-in. pine and common house siding; the platform for the turntable is made of 2½ x 8-in. oak. The trucks are a pair that was discarded from a 6-ton gathering locomotive; the motor (about 25-hp.) is also from a 6-ton locomotive. A Westinghouse controller is used, in series with a cast-iron grid resistance. The trolley connection is homemade throughout, except the trolley wheel.

The dirt box (see dimensions in drawing) is constructed of ¼-in. sheet iron. This is mounted upon a



VIEW OF HOMEMADE DIRT MOTOR

turntable with a ball joint and roller bearings, the rollers being short pieces of 1¼-in. pipe. This box, which holds about 4 tons, can be dumped from three positions. Refuse from the mine is deposited directly into a chute and thence into the dirt box.

Besides removing all the dirt, one man handles all the boiler coal, house coal, ashes from the boiler house, and does many other things too numerous to mention. This larry has paid for itself many times over. The only item of expense for repairs in two years has been two new trolley wheels.

Weight of Cement and Concrete

The following information is taken from "The Ransome Book—How To Make and How To Use Concrete":

	Lb.
Portland cement weighs per barrel, net	376
Portland cement weighs per bag, net	94
Natural cement weighs per barrel, net	282
Natural cement weighs per bag, net	94
Loose portland cement weighs per cubic foot, about	92
Portland cement mortar (1 : 2½) weighs per cubic foot, about	135
Portland cement concrete weighs per cubic foot, about	130
Cinder concrete weighs per cubic foot, about	112
Conglomerate concrete weighs per cubic foot, about	150
Gravel concrete weighs per cubic foot, about	150
Limestone concrete weighs per cubic foot, about	148
Sandstone concrete weighs per cubic foot, about	143
Trap concrete weighs per cubic foot, about	155

The Canal as a Carrier of Coal

By W. W. WOTHERSPOON
State Superintendent of Public Works, Albany, N. Y.

THE Federal Fuel Administrator recently stated that there was 20,000,000 tons of coal at the mines that could not be distributed on account of the inadequacy of railroad equipment. Prominent railroad authorities have stated that the widespread coal famine does not result so much from decreased production and increased consumption as it does from a shortage of cars.

The United States Geological Survey recently announced that soft coal operators during one week in July produced 76.5 per cent. of their capacity. The inadequacy of railroad facilities are blamed for 12 per cent. of the 24 per cent. shortage from maximum.

It is evident, therefore, that the coal problem is a matter of distribution rather than production, and the solution must be reached by increasing the means of distribution and obtaining the greatest efficiency from present facilities.

According to the United States Geological Survey, in a booklet entitled "Coal in 1915," treating with distribution and consumption, coal reaches the markets from producing areas by three general methods of transportation: (1) All rail; (2) rail to tidewater, thence coastwise to coast ports; (3) rail to Great Lakes, thence via lakes to lake ports. Considering the subject from the standpoint of New York State consumers, the second and third methods may be dismissed. From the statistics published by the Geological Survey, it is shown that little of the coal routed to tidewater or to the Great Lakes comes into New York State.

Of all states producing coal, it is shown by the investigation of the Geological Survey that the states of Maryland, Ohio and West Virginia were the only producing areas delivering coal in New York State markets aside from Pennsylvania. Pennsylvania is the greatest coal-producing state in the country. Bordering New York on the south, with its mines in close proximity to the dense population and intense industrial activity in New York, it is natural that Pennsylvania coal should be consumed in great volume here.

Statistics for 1915 show that although Pennsylvania was its own best customer, New York State ranked next, consuming more Pennsylvania coal than any other single state. Out of a total of 157,955,137 tons of bituminous coal produced in Pennsylvania in 1915, there was over 14,000,000 tons shipped into New York State, or something over 8 per cent.

Pennsylvania produced 88,995,061 tons of anthracite in 1915, of which over 20,000,000 tons was shipped into New York. This tonnage moved entirely by rail. Therefore, the first method of transportation mentioned by the Geological Survey (all rail) has been the only means of distributing Pennsylvania coal in New York.

With the completion of the improved canals another route and means of distribution is provided. The canal system extends from Buffalo at Lake Erie on the west, to the Hudson River on the east. To the north, it reaches Lake Ontario at Oswego, and the St. Lawrence River through the Champlain Division, Lake Champlain and connecting Canadian waterways.

Near the exact center of the state, the Erie, or main east and west channel, makes connection with the Cayuga and Seneca Division. This section runs southward connecting Lakes Cayuga and Seneca. Watkins, on Seneca Lake, and Ithaca, on Cayuga Lake, are the two terminals of the canal system nearest the bituminous and anthracite coal fields of Pennsylvania.

A rail haul of less than 30 miles from New York-Pennsylvania state line makes connection with the canal system at points about equidistant from its western, northern and eastern termini.

To all that section of the state between Buffalo on the west, Oswego on the north and Albany on the east, on the line of the canal, the average water haul is 165 miles from Watkins and 143.4 miles from Ithaca.

Of the 157,955,137 tons of bituminous coal produced in Pennsylvania in 1915, 83,698,389 tons was transported by rail. The Pennsylvania R.R. transported 57,059,578 tons, or about 68 per cent., and the New York Central 8,337,868 tons, or about 10 per cent. These two lines were the largest bituminous coal carriers.

There are no statistics available as to the portion of Pennsylvania anthracite production transported by individual railroads, but the five railroads operating from the anthracite fields of Pennsylvania and making connection with the canal system at various points between Buffalo and Albany carried 43,951,145 tons of anthracite coal in the year ended June, 1916.

It is shown by the United States Geological Survey that 14,430,879 tons of Pennsylvania bituminous coal was consumed in New York State in 1915. This is exclusive of railroad coal and bunker fuel for ocean vessels and steamships on the Great Lakes.

Since the Pennsylvania R.R. transported 68 per cent. and the New York Central 10 per cent. of the total bituminous coal mined in Pennsylvania and moved by all-rail routes to other states, it is reasonable to assume that these two roads would participate to the same degree in bituminous coal moved into New York State. On this basis, the coal tonnage of the Pennsylvania R.R.

A SURVEY of the commercial possibilities of the improved canal system of New York reveals a very important feature of the canal operation that is of statewide interest; namely, the ability of the improved canals to transport a large portion of the coal, both anthracite and bituminous, consumed in this state.

At the present moment, when the coal situation is commanding nation-wide attention, any medium that offers even a partial solution of this big and vital problem is deserving of serious consideration and should be utilized in the fullest measure, whenever and wherever available.

from the Pennsylvania bituminous fields into New York State would have been about 9,813,009 tons. The New York Central tonnage would have been about 1,443,000 tons, but inasmuch as it appears the Pennsylvania R.R. is the controlling factor in the movement of Pennsylvania bituminous coal, the traffic of the Pennsylvania R.R. alone will be considered.

It is difficult to estimate the anthracite tonnage that was transported into New York State by each of the five hard-coal roads. The percentage of each line to the total tonnage transported, if applied to the New York State consumption would, however, give the following approximate basis:

	Per Cent.	Total Tonnage
Lehigh Valley	30.5	6,340,795.67
Delaware, Lackawanna & Western	23.2	4,833,162.61
Delaware & Hudson	22.5	4,677,636.15
Erie	18.7	3,887,635.38
New York, Ontario & Western	5.1	1,060,264.19
Totals	100.0	20,789,404.00

On movement of coal from the Pennsylvania bituminous fields via Pennsylvania R.R. into New York State, by far the greatest area of the state is served by the joint Pennsylvania and New York Central routes. The junction of the New York Central and Pennsylvania railroads at which there is the greatest coal interchange and through which the greatest area is served is at Himrods, N. Y., a point about 15 miles south of Watkins, N. Y., the canal terminal at the southern extremity of Seneca Lake. Soft coal taken from the Pennsylvania R.R. at Himrods Junction destined to points on the line of the New York Central between Buffalo and Albany, is carried by the New York Central over its Pennsylvania Division northward to Lyons, thence east and west of Lyons to all points on the main line. This all-rail route practically parallels the canal route via the Cayuga-Seneca and Erie canals from Watkins.

The route of the anthracite movement also closely follows the route of the canal. Via the Lehigh Valley R.R., anthracite is delivered to lines serving the territory intermediate to Albany and Buffalo at Weedsport, Geneva and Canastota, N. Y. Via Delaware, Lackawanna & Western R.R., the point of interchange is at Syracuse and Utica. Over the New York, Ontario & Western R.R., the interchange may be made at Oneida and Utica. Excepting Canastota and Oneida, all of the interchange points named are ports on the canal system. On Lehigh Valley traffic via Geneva, the coal is carried through Ithaca, the canal terminal at the southern extremity of Cayuga Lake.

The source of the greatest bituminous production in Pennsylvania is said to be in the Clearfield District. Altoona, Penn., is about the geographical center of this area. From Altoona to that section of New York State between Albany and Buffalo and as far north as Oswego, the average rail haul is about 317 miles. On the assumption that the average car-mile movement is about 20 miles per day, an average 317-mile haul would require about 30 days per car per round trip.

An annual movement of 9,813,000 tons is an average monthly tonnage of 817,750 tons. This tonnage, on the average loading of 50 tons per car, would require 16,355 cars per month for its transportation. As it takes a car 30 days to make a round trip, that number of cars must be constantly in service.

Suppose, however, instead of routing the bituminous coal via the all-rail route into New York, it was hauled by rail to Watkins, N. Y., and thence transported by canal into the same consuming areas.

Watkins is about 190 miles from Altoona. At 20 miles per day a car may make a round trip between Altoona and Watkins in 20 days. It requires 30 days via the all-rail route. Therefore, the same amount of coal could be transported from the bituminous fields to Watkins for distribution via canal in New York State with two-thirds the number of cars required by the all-rail movement. This car saving would amount to over 5000 cars per month.

The Scranton-Wilkes-Barre District is about the geographical center of the Pennsylvania anthracite fields. The shortest rail mileage from the anthracite region to a point of connection with the canal via each of the five hard coal roads is:

	Miles
Via Delaware, Lackawanna & Western to Ithaca	113.0
Via Lehigh Valley to Ithaca	128.0
Via New York, Ontario & Western to Utica	169.2
Via Delaware & Hudson to Schenectady	194.0
Via Erie to Rochester	254.0

As a distributing medium, the routes via the Delaware & Hudson, the Erie, and the Ontario & Western do not seem practicable insofar as the average rail and water haul to the territory between Buffalo and Albany via these routes greatly exceeds the haul through the Lehigh Valley and Lackawanna railroads connecting with the canal at Ithaca. In demonstrating the ability of the waterway to transport the anthracite tonnage, therefore, the shortest and direct routes only are taken into consideration.

Twenty-Three Days for Round Trip

From Scranton to the section of the state between Albany and Buffalo and northward to Oswego, the average all-rail haul via the Lehigh Valley and Delaware, Lackawanna & Western railroads is approximately 231 miles. On a 20-mile per day car movement a round trip would average 23 days. The anthracite tonnage under consideration aggregated 20,789,404. This represents approximately 1,732,450 tons per month. On the 50-ton per car basis, this volume would require about 34,649 cars per month. Since it takes an average of 23 days for a round trip, 26,565 cars must therefore be constantly in service in order to transport this volume of tonnage.

If the anthracite tonnage were carried by rail to the point of interchange with the canal, an average rail haul of 120 miles is involved. The 20-mile per day car movement would entail 12 days per round trip. This results in a car saving of nearly 50 per cent. and would conserve over 13,000 cars per month.

A utilization of the canal for the transportation of anthracite and bituminous coal to the extent indicated would therefore result in a conservation of over 18,000 cars monthly, and the equipment thus conserved might transport 900,000 tons of coal per month to other territories not accessible via water routes. During the seven months' season of navigation, the conservation of so large a number of cars would augment the railroad facilities to an extent greater than demand for the distribution of the 20,000,000 tons which the Fuel Administrator states cannot be transported on account of the car shortage to territories where it is sorely needed.

The 317-mile average all-rail haul on the annual bituminous tonnage creates a ton mileage per month of 259,226,750 ton-miles. On the anthracite tonnage with an average all-rail haul of 231 miles, the ton mileage monthly would be 400,195,950 ton-miles.

If the bituminous were routed via canal through Watkins, the ton mileage would be decreased to 155,372,500 ton-miles. A canal routing via Ithaca on anthracite coal would decrease the anthracite ton mileage to 207,894,000 ton-miles. This represents a monthly ton-mile decrease of 296,156,200 ton-miles and during a seven months' season of navigation would total 2,073,093,400 ton-miles.

The coal traffic of the rail lines for a seven months' period of canal navigation would aggregate about 17,850,000 tons. Let us consider whether the canal can physically accommodate this large tonnage volume.

The canals are limited in their capacity only by the quantity of water utilized in operating the locks. Between the Cayuga-Seneca and Erie divisions of the improved canal system there are four locks, two combined at Seneca Falls, one each at Waterloo and Cayuga. It is known that the available water supply will permit the passing of boats through these locks at least once every half hour. The lock chambers on the enlarged canal can accommodate five of the old-type 240-ton boats with their towing tug at one time. Operated 48 times a day, they may accommodate 240 boats with a carrying capacity of 57,600 tons per day. During the season of canal navigation, the Cayuga-Seneca canal is capable of transporting 12,376,000 tons or almost 75 per cent. of the total tonnage of the rail lines.

This estimate is based on the utilization of the Cayuga-Seneca canal exclusively, while it is quite prob-



THE solution of the coal problem confronting the majority of New York State industries is in their own hands. A maximum utilization of the canal facilities and the fullest measure of coöperation and support on the part of shippers is all that is necessary. In the protection of their own interests, as a measure of relief to other territories not accessible by water routes, and as a patriotic duty, the canal should be used to the very limit of its capacity. This map describes the rail and canal routes cited in Mr. Wotherspoon's article.

able a large coal traffic might be developed through other ports of transshipment, such as Syracuse, Utica or Weedsport, which are on the Erie Division. In view of the ability of the Cayuga-Seneca Division to transport 75 per cent. of the rail-borne coal traffic during the season of navigation, there is no question but the remaining 25 per cent. could be cared for through other rail and canal routes. It seems evident that the improved canal system can readily accommodate the entire bituminous and anthracite coal tonnage.

It is apparent that a utilization of the canals would materially relieve the coal and car shortage, but there are still other benefits that may be realized by the diversion of this volume of coal from the rail to the canal route.

Exclusive of the actual shortage of cars, the inability of the railroads to move cars promptly is a perplexing problem confronting railroad managers. It cannot be disputed that a conservation of 18,000 cars per month, made possible by the use of the canal for the coal traffic, would appreciably relieve the condition. Since an engine may haul perhaps 100 loaded coal cars, the conservation of locomotives would amount to 180 monthly. The benefits which would arise from the adoption of the plan would be almost incalculable.

When every foot of track in yards and terminals is at a premium, the withdrawal of 18,000 cars per month for seven months in the year releases over 850 miles of track for other service. This is the equivalent of 850 miles of new track and its value is beyond reckoning.

Use of Canal Means Economy in Costs

The third advantage to be derived from a utilization of the canal for coal transportation and what perhaps is of the greatest interest to the consumer is the economy in transportation costs. The average rail rate on bituminous coal from the Clearfield District to the area in New York State between Buffalo and New York is $2.02 per ton. For the average haul of 317 miles this rate yields a ton-mile rate of 6.3 mills. The Pennsylvania R.R. publishes a rate of $1.48 per ton on soft coal from the Clearfield district to Watkins for transshipment. This rate yields 7.7 mills per ton-mile.

It is believed coal may be profitably transported in large volume via the canal at a rate of 2 mills per ton-mile. The average water haul from Watkins being 165 miles, an average canal rate from Watkins would be 33c. per ton. A 33c. canal rate plus the rail rate of $1.48 from mines to Watkins makes a through charge of $1.81, exclusive of terminal charges. These are an unknown factor but should not materially increase the through charge if modern and economical transshipping machinery were provided.

Eliminating terminal charges, however, it is seen that the joint rail and canal route creates a saving in the cost of transportation per ton on bituminous coal of 41c. and this, in spite of the fact the rail rate to Watkins exceeds the average rail rate to points between Buffalo and Albany by 1.4 mills per ton-mile. If the rate to Watkins was constructed on the 6.3 mills per ton-mile basis yielded by the average all-rail rate, the result would be a rate from the mines to Watkins of $1.21 and it would increase the saving in the rail and canal route to 68c. per ton.

The average rail rate on anthracite coal from Pennsylvania fields to the territory in question is $1.947 per ton. The average rail haul is 231 miles. This yields a ton-mile rate of 8.4 mills. The hard-coal roads do not publish transshipping rates to points of interchange with the canal that are appreciably lower than the local rate as is the case via Pennsylvania R.R. from the Pennsylvania bituminous fields to Watkins, N. Y. However, if rates were put into effect from the anthracite region to Ithaca, based on the average 8.4 mills per ton-mile all-rail anthracite rate, on the average rail haul of 120 miles, the result would be a rate of $1.108 per ton. A two-mill per ton-mile canal rate on the average canal mileage of 113 miles from interchange points to territory between Buffalo and Albany yields a rate of 22.6c. per ton. This combination would make a through rail and canal rate of $1.334, or 61.3c. less than the all-rail rate exclusive of terminal charges.

Would Require Constant Service of 1062 Boats

The foregoing shows that the utilization of the rail and canal route would result in a saving in the transportation cost of 68c. per ton on bituminous coal and 61.3c. per ton on anthracite coal. On the aggregate bituminous and anthracite tonnage for the seven months this saving per ton would amount to over $11,000,000.

The problem of supplying a sufficient number of boats is the only obstacle in the way of the immediate utilization of the rail and canal route. It, however, is not difficult of solution. The average canal haul to the territory between Buffalo and Albany from the various possible points of transshipment is about 115 miles. Assuming boats will proceed 4 miles per hour, on the average, a round trip can be made in three days at the most. A movement of 17,850,000 tons of coal during the season of navigation means a daily tonnage of 85,000 tons. To transport such amount of coal each day would require 354 boats of the 240-ton type. On the basis of a three-day schedule, the traffic would require the constant service of 1062 boats. The census made by the Superintendent of Public Works during 1917 showed there were approximately 675 canal boats in service. These, to a great extent, were boats of the old type, unsuited for the carrying of grain or other high-grade commodities. They are, however, well adapted for the coal trade.

If all the present boats were utilized, the movement of the total coal tonnage under consideration would require approximately 387 additional boats of a 240-ton capacity. The type of boat required is simple in design and cheap of construction. A sufficient additional number of wooden boats could be built with little or no delay. Should the new barges be of larger dimensions a less number would be needed.

That the industrial interests of New York State once recognized the opportunities afforded by the canal in the transportation of coal is apparent from the statistics of canal commerce of a few decades ago. Over a million and one-half tons of coal have been transported on the canals of New York in a single season.

Why this commerce passed from the canals to the railroads is readily explained. The first cause, no doubt,

was the lack of modern and properly equipped terminals on the canal. A second factor was the convenience offered big consumers by the railroads in providing private sidetracks, thus enabling the factories to unload at their plant. A third and most potent contributing cause was the inefficient and undependable service provided by the individual boat owner. Big shippers found the boat owner here today and gone tomorrow. When there was an urgent need of boats none were to be had. All of these expensive and unsatisfactory conditions, abetted undoubtedly by railroad competition and discriminatory railroad rates, forced the coal traffic from the state waterways.

In the season of 1917, despite the urgent need of manufacturers and the inability of the railroads to adequately serve their needs, but 234,941 tons of coal was carried on the canals, and practically none over the Cayuga-Seneca Division.

The transportation situation now existing demands that the commercial and manufacturing interests awaken to the peril that threatens them. The railroads must be augmented by every available means of transportation if they are to survive the burden imposed on them and efficiently serve the nation at this most critical period. The improved canal system of New York State is the finest substitute for rail transportation available.

There is no reason why a large portion of the bituminous and anthracite coal consumed in the state should not be transported by the canals. The conditions influencing the routing of coal via the rail routes have been entirely overcome in the construction of the new canal. Terminals are available for service at practically every port of the canal system. They have been or will be equipped with devices for the speedy and economical handling of the traffic. If the coal traffic warrants special machinery it can be provided. Coal may be unloaded from barges, loaded to cars and switched to industries at a comparatively small cost. The state and Federal laws provide for this.

If it could be assured that the coal consumed in New York would be routed via the canal, no reason exists why boats capable of transporting coal to the canal's capacity should not be speedily constructed. Under capable management the requirements of all could be adequately and efficiently served. The coal-carrying boats, to render the maximum of service, should be under some central ownership or control. The railroads now voluntarily offer to coöperate with dependable water lines. Destructive railroad competition need no longer be feared. If rates are discriminatory, the state and Federal commissions are empowered to take summary action.

With the routing of coal through the canal assured, and with the necessary boats in existence, the only facilities then lacking would be temporary storehouses, coal trestles, or other structures or devices which would permit the cheap and prompt transfer of coal from car to barge. No difficulties exist in the providing of these facilities to men who earnestly take up the proposition.

In the case of export coal, it is believed canal barges may transport coal from transshipping in central New York to shipside in New York harbor, thus eliminating transshipment and lighterage now required in the exportation of coal through New York and appreciably relieving the harbor congestion.

Work of Labor Divisions of War Administration Coördinated

Upon the recommendation of the Advisory Council, created to report on the handling of industrial relations growing out of the war, the Secretary of Labor has arranged for the coördination of the industrial service (labor) activities being developed in the various purchasing and supervisory offices of the war administration. Simultaneously a number of new bureaus have been established and will assume the coordinating functions.

A well-developed industrial service division is in operation in the Ordnance Department and similar organizations are being worked up in the other purchasing and supervisory branches of the War Department as well as in the Navy Department and the Shipping Board. These bodies are all developing plans for accomplishing similar results in their own given departments. In some cases they might, if not coördinated, work to cross purposes, and in any of their activities exchange of views on methods is desirable. The necessary machinery for getting together is now provided by the action of the Secretary of Labor. The following new bureaus are established to effect the desired coordination:

1. Adjustment Bureau—to deal with disputes.
2. Condition of Labor Bureau—to administer conditions of labor within business plants, such as safety, sanitation, etc.
3. Information and Education Bureau—to promote sound sentiment and to provide appropriate local machinery and policies in individual plants.
4. Women in Industry Bureau—to correlate the activities of various agencies dealing with this matter.
5. Training and Dilution Bureau.
6. Bureau of Housing and Transportation of Workers.
7. Bureau of Personnel (which may possibly be fused with the Information and Education Bureau).

The present United States Employment Service will act as the coördinating bureau on the procurement of labor.

For Our Forthcoming Success Number

Genius is the nice adaptation of means to ends. It does not so much consist in size as in ingenuity and suitability. We wish our readers to send us accounts of the way in which they have solved their puzzles. If this was not done in elaborate and costly ways, so much the better, for most of us have not the wherewithal to attempt either elaborate or costly devices.

We are looking for kinks and schemes which saved money, increased output, avoided troubles and protected life and limb so that by publication those methods may save for our readers what they saved for the writer. It will be a pleasing task to write the record of some success for our Success Number and, moreover, *Coal Age* is quite willing to pay for it. So if there is a successful performance on your mind, let *Coal Age* have it so that it may spread the good tidings and incidentally furnish the writer with some spending money. Photographs and drawings of the methods adopted will be more than welcome. The Annual Success Number will be issued Apr. 13, and all manuscript should be in our hands not later than Mar. 25.

Supporting the Roof in Coal Mines—II

By R. D. BROWN
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SYNOPSIS—*Illustrates designing of timber sets by formula, working out several cases, covering round and square timber. The different methods of timber preservation are discussed and the advantages and disadvantages noted. The cost of timbering is tabulated; also the safe loads for square beams and the comparative strength of various woods.*

TWO general principles, or conditions, affect the design and erection of timber sets. First, the weight to be supported is an unknown variable quantity; second, the scarcity of skilled labor may make the adoption of a simple standard design necessary for both economy and safety. The design of the common three-piece set, illustrated in Figs. 7 to 11 inclusive, is not ordinarily based on mathematical calculations. However, if the expected weight may be approximated, the size of the section, or diameter of collar, may be computed by the use of the following formulas. For round timber collars the formula is

$$W = 0.065S\frac{d^3}{l} \qquad (1)$$

in which

W = Safe load in pounds;
d = Least diameter of collar in inches;
l = Length of clear span in feet;
S = Safe unit fiber stress for seasoned timbers in pounds per square inch.

Safe unit fiber stress for seasoned white oak is 1200 lb. per sq. in. For other kinds of wood, the safe unit stress may be found by using Table III, which gives the strength of various kinds of wood compared with white oak. The safe unit stress for green timber is approximately 65 per cent. of that of seasoned timber.

For sake of illustration, let it be required to design the beam for an oak set which must support a maximum weight of 12,500 lb., length of span to be 8 ft.

$$d = \sqrt[3]{\frac{lW}{0.065S}} = \sqrt[3]{\frac{8 \times 12{,}500}{0.065 \times 1200}} = 10.86, \textit{ say } 11 \textit{ in.}$$

For round timber posts, the rule in mine timbering is to make the minimum diameter of the post, in inches, equal to its length in feet. For example, in order that a 6-ft. post shall present equal resistance to bending and crushing, the diameter of its small end must be 6 inches.

For squared timber collars, the formula is

$$W = \frac{bd^2S}{9l}$$

in which

W = Safe load on the collar in pounds;
b = Width of collar in inches;
d = Depth of collar in inches;
l = Length of collar between supports in feet;
S = Safe unit stress in pounds per square inch.

The values of W, S and l are known and, by assuming the width, the value of d is easily calculated; or, by assuming the depth, the value of b may be calculated. Other conditions being equal, the depth of the beam should be greater than the width for practical economical sections.

To illustrate, let it be required to design a rectangular oak beam to support 3 ft. of loose slate in a 12-ft. entry, assuming the timber sets to be 4-ft. centers and taking the weight of the slate as 160 lb. per cu.ft.

$Weight = 3 \times 12 \times 4 \times 160 = 23{,}000$ lb.;
$S = 1200$ lb.;
$l =$ say 10 ft.;
Assume $b = 8$ in.;

$$d = 3\sqrt[2]{\frac{Wl}{bS}} = 3\sqrt[2]{\frac{23{,}000 \times 10}{8 \times 1200}} = 14.68, \textit{ say } 15 \textit{ in.}$$

TABLE III. COMPARATIVE STRENGTH OF VARIOUS KINDS OF WOODS

Kind of Timber	Comparative Strength When Used as a Beam; the Strength of White Oak Being Taken as Unity	Comparative Strength When Used as a Post; White Oak Being Taken as Unity
White oak	1.00	1.00
Red oak, No. 1	0.95	1.00
Red oak, No. 2	0.90	0.90
Hickory	1.00	1.00
Longleaf yellow pine	1.00	0.90
Shortleaf yellow pine	0.75	0.90
Norway pine	0.65	0.80
White pine	0.60	0.70
Spruce	0.75	0.80
Cypress	0.50	0.80
Hemlock	0.50	0.80
Chestnut	0.70	0.80
Cedar	0.60	0.70
Douglas fir	0.65	0.90

TABLE IV. SAFE LOADS FOR SQUARE TIMBER BEAMS

Length of Span, Feet	Safe Loads in Pounds for Oak Beams with Uniformly Distributed Loads									
	6x6	7x7	8x8	9x9	10x10	12x12	14x14	16x16	18x18	20x20
6	**4,800**	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	4,110	**6,530**	.....	.....	.....	.....	.....	.....	.....	.....
8	3,600	5,720	**8,530**	.....	.....	.....	.....	.....	.....	.....
9	3,190	5,080	7,590	**10,800**	.....	.....	.....	.....	.....	.....
10	2,880	4,570	6,830	9,720	**13,330**	.....	.....	.....	.....	.....
11	2,610	4,150	6,210	8,830	12,120	.....	.....	.....	.....	.....
12	2,400	3,800	5,690	8,100	11,110	**19,200**	.....	.....	.....	.....
13	.....	3,520	5,250	7,480	10,260	17,720	.....	.....	.....	.....
14	.....	3,270	4,880	6,940	9,520	16,460	**26,130**	.....	.....	.....
15	.....	3,050	4,550	6,480	8,890	15,360	24,390	.....	.....	.....
16	.....	.....	4,270	6,070	8,330	14,400	22,870	**34,130**	.....	.....
17	.....	.....	4,020	5,710	7,840	13,550	21,520	32,130	.....	.....
18	.....	.....	3,790	5,400	7,410	12,800	20,330	30,340	**43,200**	.....
20	.....	.....	.....	.....	6,670	11,520	18,290	27,310	38,880	**53,330**
22	.....	.....	.....	.....	.....	10,470	16,630	24,820	35,350	48,480
24	.....	.....	.....	.....	.....	9,600	15,240	22,760	32,400	44,440
25	.....	.....	.....	.....	.....	.....	14,640	21,850	31,100	42,670

NOTE.—The loads given in heavy figures are the safe loads based upon the extreme shearing stress of 100 lb. per sq.in.; and should not be exceeded for shorter spans, to avoid failure of the beam by shearing. Safe loads are for seasoned timber; for green timber use two-thirds of the value shown. For loads concentrated in the center of the span, use one-half the safe uniformly distributed load. Safe loads for rectangular beams may be obtained from the table for square beams, by direct proportion of width to width. The load for a 10 x 12-in. rectangular beam is five-sixths that of a 12 x 12-in., etc. Safe loads for timber beams of other species than oak may be obtained by direct proportion. The weight supported by each species is directly proportional to the allowable unit stress. For a comparison of the strength of various kinds of timber based on the allowable unit stresses, see Table III.

Preservation of Timber Sets

In most localities woods suitable for use as mine timbers are becoming more scarce and costly. Substitutes must be found, or the wood available must be treated to prolong its life. The cause of mine-timber decay is generally an invisible fungus growth, which establishes itself on the timber and rapidly develops in the cool, damp atmosphere. Fully one-half of all mine timbers fail through decay before failing mechanically.

There are two kinds of decay—dry rot and wet rot. Dry rot is the decay caused by a fungus growth attacking the timber internally with little outward sign of deterioration. Wet rot is decay commonly caused by alternate wetting and drying, and attacks the sap wood or outside of the timber first. Timber kept permanently wet will last many years because the air bearing the fungus growth cannot obtain an entrance into the pores of the wood. Peeling and seasoning will arrest the rapidly growing fungi, but a preservative should be used to effectively increase the life of the wood.

The advantages of the use of preservatives are: (1) Treated timber will have a longer life than untreated and, under ordinary circumstances, will prove more economical; (2) the dangers of falls of rock are lessened because of fewer renewals.

The disadvantages of the use of preservatives are: (1) The first cost is great; (2) since the timber must be seasoned before treatment capital is tied up; (3) the strength of timber is decreased by preservatives; (4) preservative treatment is expensive, unless a plant is specially equipped and is operated extensively; (5) coal tars used as preservatives may add to the inflammability of the wood.

In the various methods of treatment all wood must be properly seasoned, or the treatment will not be effective, as the preservative will not be able to penetrate into the pores of the wood, to remain as a permanent preservative. The three common methods of treatment are painting, absorption and penetration.

Painting consists in the simple application of the preservative with a brush, or, in cases, by dipping the timber momentarily in a preservative solution.

The absorption process consists in placing the timber in a tank of preservative, either hot or cold, and allowing the liquid to penetrate into the crevices and pores of the wood. In order to make the treatment more effective, the liquid should be heated to a temperature of about 212 deg. F. The heat will drive off the air and some water from the wood and allow a deeper penetration. After the timber has remained in the hot liquid for some time, it should be taken out and placed in a tank of cool liquid, or be allowed to cool off in the original tank.

The penetration process is used in applying the same chemicals, as in the absorption process; but the application is made under pressure which, with the aid of heat, causes the preservative to penetrate deeper into the heartwood. As this form of treatment requires a large and expensive plant to operate economically, it is hardly suitable for the treatment of small quantities, which are necessary for most coal mines.

The preservatives used are: (1) Coal tars and creosotes, these being the most common and in many ways the most efficient preservatives; (2) metallic salts, such as zinc chloride, copper sulphate and mercuric chloride, these being excellent preservatives but easily leached out by water; (3) coal-tar derivatives, such as phenol, which is mixed with metallic ammoniates in the Aczol process; and carbolineum, which is a mixture of zinc chloride and a certain coal distillate.

Creosote and zinc chloride have proved most satisfactory in actual tests, and are used most extensively in the absorption and penetration processes, while carbolineum is more generally used in brush treatment.

TABLE V. COMPARISON OF ZINC CHLORIDE WITH COAL-TAR CREOSOTE FOR MINE TIMBERS

Factor	Zinc Chloride	Creosote
Inflammability	Less than untreated timber	More inflammable at first, less later
Corrosion of spikes	Will corrode spikes	Not corrosive
Volatility	Nonvolatile	Volatile—affects mine air
Leachability	Leaches; do not use in damp places	Does not leach
Life of timber	About 2½ times untreated	About 3½ times untreated
Cost of treatment	Less than creosote	Approximately twice that of zinc chloride

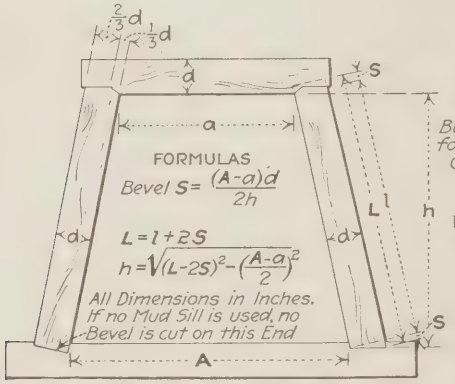


FIG. 7 DETAIL OF A FRAMED TIMBER SET

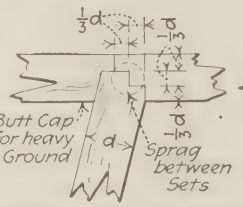


FIG. 8 Detail of Joint for a Framed Set in Heavy Ground

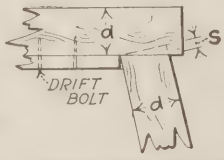


FIG. 9 Detail of Joint for a Common Framed Set

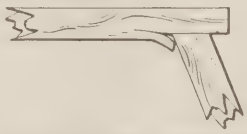


FIG. 11 Example of Framing which has failed under Weight (Point of Leg should have a Bevel Cut)

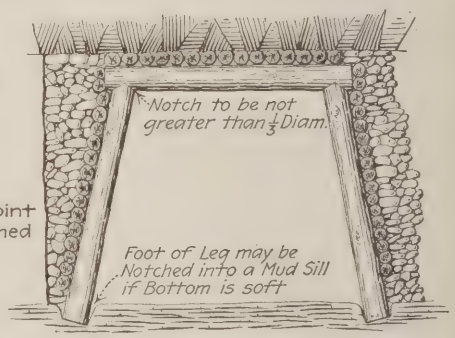


FIG. 10 WELSH TIMBERING

The cost of placing wood sets varies with the following conditions: (1) Cost of the timber on the ground; (2) methods of placing, depending on conditions such as hitches to be cut into the roof or rib, the amount of gob to be moved and the character of the roof overhead; (3) size of the timber. With larger sizes, a gang of men will be required, instead of two men usually working together; (4) amount of lagging used.

If the timber gang is to work efficiently, all materials and necessary tools should be delivered promptly when needed. A superintendent should always be close at hand to direct the erection of each set. Whenever a gang is employed underground, some individual is willing to shift his particular part; intelligent supervision is the only cure for this evil, so common to mine work.

TABLE VI. ACTUAL COSTS OF PLACING TIMBER SETS

Size of Collar	Size of Legs	Approx. Weight, Pounds	Cost f. o. b. Mines	Cost in Place
24-in. yellow pine	24 in.	5,040	.....	$15.00
18 to 22-in. pine	18 to 22 in.	4,150	$12.00	34.50
12 x 12-in. pine creosoted	12 x 12 in.	1,575	10.56	15.70
12 x 12-in. x 10-ft. oak	12 x 12-in. x 7 ft.	1,340	7.92	13.06
10 x 10-in. oak	10 x 10-in.	1,240	7.90	12.30
12-in. by 17-ft. oak	No legs	.....	3.20	8.86
8-in. by 12-ft. oak	8-in. by 6-ft.	.....	1.60	3.35
8-in. by 18-ft. oak	8-in. by 6-ft.	.....	2.90	6.09

TABLE VII. SHOWING THE COMPARATIVE SIZE OF WOOD AND STEEL CROSS-BARS OF EQUAL STRENGTH; ALSO OF REINFORCED-CONCRETE BEAMS IN PRACTICAL SIZES 10-FT. SPAN

Diameter of Round Oak Timbers, Inches	Safe Load Round Oak Timbers, Pounds	Dimensions of Sawed Oak Timbers, Inches	Size of Steel I-Beam Depth in Inches	Weight of Steel Beam in Lb., per Ft.	Dimensiosns of Reinforced-Concrete Beam, Inches
6	1,697	4x6	3	5.5	8x10
7	2,695	4x7	4	7.5	10x10
8	4,022	6x7	5	9.75	10x12
9	5,727	7x8	5	12.25	12x13
10	7,856	6x10	6	14.75	12x14
12	13,575	8x12	8	18.00	12x18
14	21,556	8x14	9	25.00	12x22
15	26,515	10x14	10	25.00	.....
16	32,178	12x14	10	40.00	.....
18	45,816	14x16	12	40.00	.....
20	62,847	14x18	15	42.00	.....

NOTE.—The loads assumed in Table VII are the uniform safe loads for round oak bars; fiber stress 1,200 lb. per sq.in.; safety factor about six. All bars whose dimensions are found on the same horizontal line are approximately of equal strength. For bars of other species of wood, increase the dimensions of the oak bars given in Table IV, by multiplying by the factor found in Table III.

General Specifications for all Mine Timbers—All timber shall be cut when the sap is down, preferably in the months of September to January inclusive. All timber not sawed shall be peeled, unless otherwise specified. Timber must be sound and free from incipient decay. Seasoned timber shall show no signs of decay and shall be free from worm holes.

Specifications for Round or Split Props, Posts and Bars—The following listed kinds of wood will be classed as No. 1: White oak, red oak, black oak, post oak, ash, hickory, locust, longleaf yellow pine, shortleaf yellow pine, douglas fir, hard maple, elm and woods of equal strength. All soft woods, such as white pine, cedar, spruce, cypress and gum, shall be classed as No. 2. No timber shall have a diameter of less than 4 in. If the minimum diameter is specified, and the timber is tapering, the diameter of the small end may be ½ in. less, if the diameter of the large end is proportionately larger. If the stick of timber is made by splitting from a larger section, no diameter or sectional dimension shall be less than the specified minimum. The lengths of posts shall not vary more than 1 in. No timber will be accepted if a line projected from the center of one end of the stick to the center of the other end does not fall entirely within the stick.

Specifications for Sawed Props, Posts and Cross-Bars—The grading for sawed timber will be the same as for round timbers. All timbers must be sawed to the size specified, with no variation of more than ⅜ in. All timber shall be sound, free from decay and show no knots larger than 4 in. in diameter, in the center of any stick; and no knot greater than 2 in. in diameter.

(To be concluded)

Compensation Paid Pennsylvania Mine Workers During 1916

Tabulations of the accidents causing death and disability to workers in and about the anthracite and bituminous coal mines of Pennsylvania, for the year 1916, have been compiled from workmen's compensation agreements filed in the Bureau of Workmen's Compensation and from accident reports submitted to the Bureau of Statistics.

Fatalities and serious accidents in which compensation agreements have been filed, or where the cases were not compensable under the law, are not included in the tabulations. The tables do, however, include compensable cases for fatalities in which it was necessary for the employers to pay only funeral expenses.

These compensation tables indicate that there were 792 fatalities in the anthracite and bituminous coal fields during 1916, while all accident reports received by the Bureau of Information indicate that 1112 workers were killed in and about mines during the same year. The difference in two totals represents open cases and cases not compensable under the law, or cases otherwise classified for compensation in the Workmen's Compensation Bureau.

Anthracite Field—Compensable Accidents in 1916—There were 491 workers killed in the anthracite field for whom workmen's compensation was awarded during 1916, and 9413 workers injured and disabled for periods exceeding 14 days and paid compensation. The average medical cost per accident was $20.14. The amount of compensation paid and awarded during 1916 for fatality cases amounted to $1,260,804.

The amount of compensation paid for disability cases during the year 1916 was $410,845, and it has been estimated that the amount required to carry these 1916 disability claims to completion would be $56,602. The total amount of compensation paid and awarded in the anthracite field during 1916, and estimated to complete disability claims, was $1,728,251. The estimated medical cost for all compensation accidents in the anthracite field, during 1916, was $199,468. The total number of dependents of workers killed and injured in and about anthracite mines during 1916 was 5409.

Bituminous Field—Compensable Accidents in 1916—There were 301 workers killed in the bituminous field, for whom workmen's compensation was awarded during 1916, and 10,710 workers injured and disabled for periods exceeding 14 days and paid compensation. Two women employees were injured in the bituminous field and disabled for periods exceeding 14 days. They were paid compensation. The average medical cost per accident was $18.92. The amount of compensation paid and awarded during 1916 for fatality cases amounted to $771,748.

The amount of compensation paid for disability cases during the year 1916 was $516,493, and it has been estimated that the amount required to carry these 1916 disability claims to completion would be $37,795. The total amount of compensation paid and awarded in the bituminous field during 1916, and estimated to complete disability claims, was $1,326,036. The estimated medical cost for all compensation accidents in and about bituminous mines during 1916 was $208,329. The total number of dependents of miners killed and injured in the bituminous field during 1916 was 10,179.

Anthracite Field—Noncompensable Accidents in 1916—There were 16,979 workers in and about the hard-coal fields injured during the year 1916 and disabled for periods less than 14 days. One of these injured workers was a woman. The total number of days lost by workers disabled for periods less than 14 days amounts to 96,711. The wages lost by workers disabled for periods less than 14 days amounted to $227,629. The average medical cost for each accident was $5.52. The average number of days lost per accident was 5. The average wage loss per accident was $13. The total estimated cost was $93,727.

Bituminous Field—Noncompensable Accidents in 1916—There were 17,510 workers in and about bituminous mines injured during the year 1916 and disabled for periods less than 14 days. One of these injured workers was a woman. The total number of days lost by workers disabled for periods less than 14 days amounted to 110,710. The wages lost by workers disabled for periods less than 14 days amounted to $299,951. The average medical cost for each accident was $5.03. The average number of days lost per accident was 6. The average loss per accident was $17. The total estimated medical cost was $88,072.

A NOTED SPEAKER has said "Books are better than gold." Take the hint and read your trade paper. The subscription price is a bagatelle compared with the benefits you will derive from it.

Anthracite Coal Stripping—IV

By THOMAS F. KENNEDY
Scranton, Penn.

SYNOPSIS—*This article deals with the calculation of the quantities of overburden and coal. Three methods are in use for determining these quantities. The first and most common gives fairly close results; the second is rapid and forms a good check upon the first; the third involves extra work but gives a closer approximation to actual quantities than either of the others.*

AFTER the economic stripping limit has been staked out upon the surface and the necessary elevations have been taken, preliminary estimates of quantities of overburden and coal are next determined, in order to furnish to the contractors information for bidding. In making the estimates of quantities in place, the engineer cannot furnish minutely accurate figures, but only an approximation. In other words there is no absolutely correct method of calculating the volume of overburden or tonnage in a stripping problem.

All formulas used in estimating volumes assume the solid to be bounded by planes, while the actual bounding surfaces are irregular, curved and undulating. This is true of a bed of coal which rolls and generally has not only irregular and undulating top and bottom bounding surfaces, but also an overburden which likewise possesses similar characteristics. In determining the amounts of the various classified materials, the accuracy of the estimates depends upon the thoroughness of the prospecting, the number of proving holes, the ability of the driller in judging the thicknesses of the various strata (when a churn drill is used), recording the results, and finally the method of calculation.

Methods of Estimating Overburden

To estimate the quantities of overburden and coal in a stripping problem there are several good methods in practical use. The most common of these are the average end area (vertical method), and the average thickness and contour sections (horizontal method), which will be described in detail. The explanation of the methods that follow applies only to preliminary estimates of quantities in place, while the final estimate operation will be described later.

The average end method, which is used by many estimators in calculating volumes in excavations, cuts and fills, dumps, etc., is the most common method of determining the quantity of overburden in stripping work. In order to explain clearly the application of the average end method of determining the volume of overburden, a typical problem in stripping will be assumed. Referring to Fig. 1, a plan and several cross-sections of a proposed stripping are used in the quantity calculations. By studying the plan and cross-sections, it will be seen that the following data must be obtained in the field—namely, all topographic features, the proper location of each borehole, the surface elevations of each borehole and breaks, borehole sections and all other information that might be used in determining the stripping limits.

The surface elevation and section are written alongside of each borehole. In the explanation of this method of calculation only a limited number of boreholes, with their surface elevations and sections, are shown upon the plan. Several elevations on the bottom of the coal bed in the faces of the chambers abutting the proposed stripping area are shown.

After a thorough study of the problem, the overburden limit is determined and delineated upon the plan, as described by the writer in *Coal Age*, issue of Jan. 5, 1918. The calculation of the overburden is then considered.

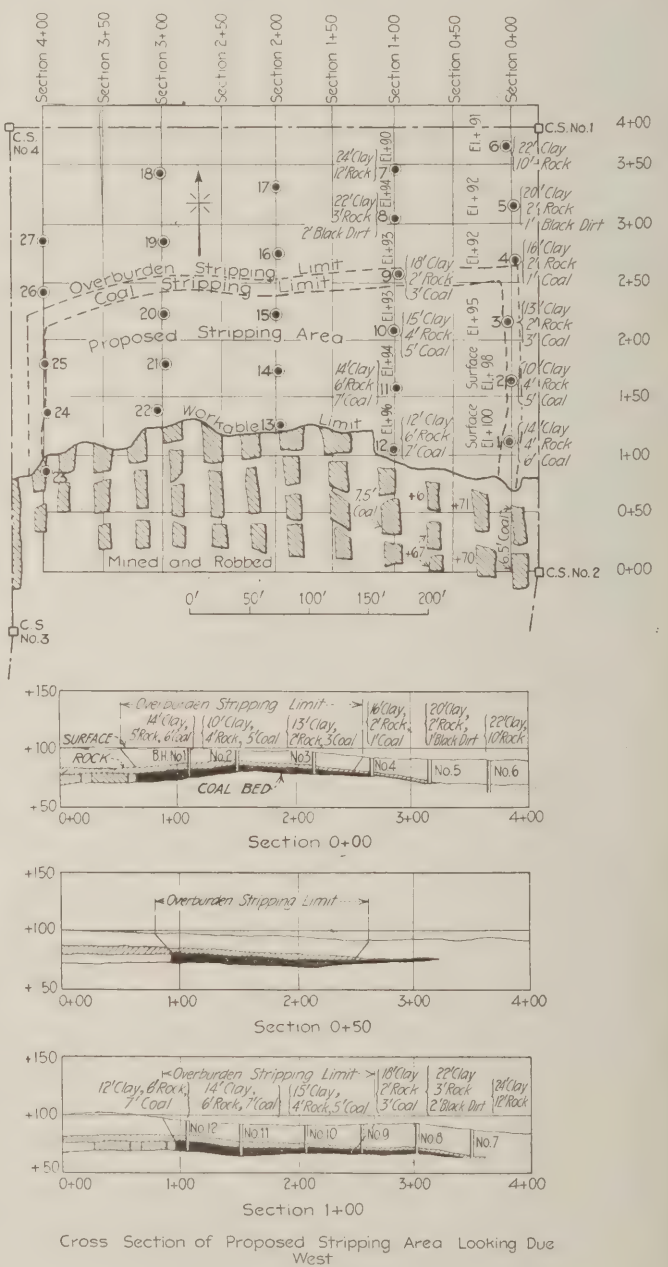


FIG. 1. AVERAGE END METHOD OF CALCULATING OVERBURDEN

The scale of the plan should be either 1 in. = 25 ft. or 1 in. = 50 ft., depending upon the size of the strip-

ping area, a small area requiring a large scale while in a large proposition the smaller scale may be used. The large scale produces closer results. As will be noted, the scale of the accompanying plan and cross-sections is 1 in. = 100 ft., used only for descriptive purposes.

The longest dimension of the stripping area is seen to be east and west. The cross-sectioning of the area at

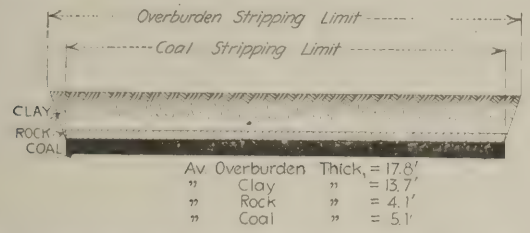


FIG. 2. AVERAGE THICKNESS METHOD OF CALCULATING QUANTITIES OF OVERBURDEN AND COAL

right angles to the longest dimension is most desirable, because more sections can be obtained for calculation purposes, incidentally producing the most probable volume value and reducing the probable error to a minimum. The choosing of the cross-section interval depends upon the variation in thickness of the overburden, which information is furnished by the borehole sections.

If the thickness is uniform throughout the proposed area, a cross-section interval of 50 ft. is good enough for close calculation purposes; but when the sections show a varying thickness, a distance of 25 ft. should be used. The cross-sections as constructed are drawn to a scale of 1 in. = 10 ft. vertical and horizontal in the usual manner by using the surface elevations of the boreholes and breaks and borehole sections. Cross-sections 0 + 00 and 1 + 00 are plotted from the borehole information, and section 0 + 50 is plotted by interpolation of sections 0 + 00 and 1 + 00. The overburden stripping limit and slope line are drawn upon the section which shows the area of overburden to be excavated and the portion of the coal bed to be stripped.

Determining Volumes of Clay and Rock

The volume of overburden between sections 0 + 00 and 0 + 50 is then determined by multiplying the average of the overburden areas of the two sections by the interval distance, 50 ft. in this case. When the material to be excavated is classified, the volumes of clay and rock are obtained by running the areas of the clay and rock separately, and applying the percentage ratio to the total volume of overburden. The area may be obtained by dividing the overburden into triangles, trapezoids, etc., or by using a planimeter, which is good enough for close results. When the planimeter is employed three readings at least should be taken and the mean average used. The volumes between 0 + 50 and 1 + 00 are found in the same manner and the total quantity is the summation of the sectional volumes. In stripping contracts classification of overburden is noted, so that the number of cubic yards of clay and of rock should always be calculated.

The most practical way of estimating the tonnage of a stripping is the foot-acre method. The tonnage in any coal bed depends upon the area of the bed, the coal thickness and the specific gravity of the coal. The specific gravity can be calculated by procuring various representative samples of the coal from the drillings and weighing the combined amount in the air on a delicate scale and then weighing it immersed in water, noting the loss in the weight of the coal. The specific gravity is then found by dividing the weight of the coal in the air by the loss of weight of the coal in the water. The specific gravity of anthracite coal will vary from 1.3 to 1.8, the average being about 1.5. The total number of long tons in place is found from the following formula:

$$X = \frac{(43{,}560)(sp.gr.)(62.5)(T)(N)}{2240}$$

in which

X = Number of long tons of coal in place;
43,560 = Number of square feet in one acre;
$Sp.gr.$ = Specific gravity of coal;
62.5 = Weight of 1 cu.ft. of water in pounds;
T = Average thickness of coal bed in feet;
N = Number of acres of coal to be stripped;
2240 = Weight of 1 long ton in pounds.

In making the estimate of merchantable or marketable tons of coal, the following important factors should be considered—namely, coal impurities, fuel and breaker losses, dockage and other allowances, characteristic of each individual stripping. In a virgin coal stripping 80 per cent. marketable seems to be an average figure, while in a mined-out territory it will drop as low as 50 per cent.

The second way of determining the volume of overburden is the average thickness method. The total volume of the overburden is found by multiplying the mean

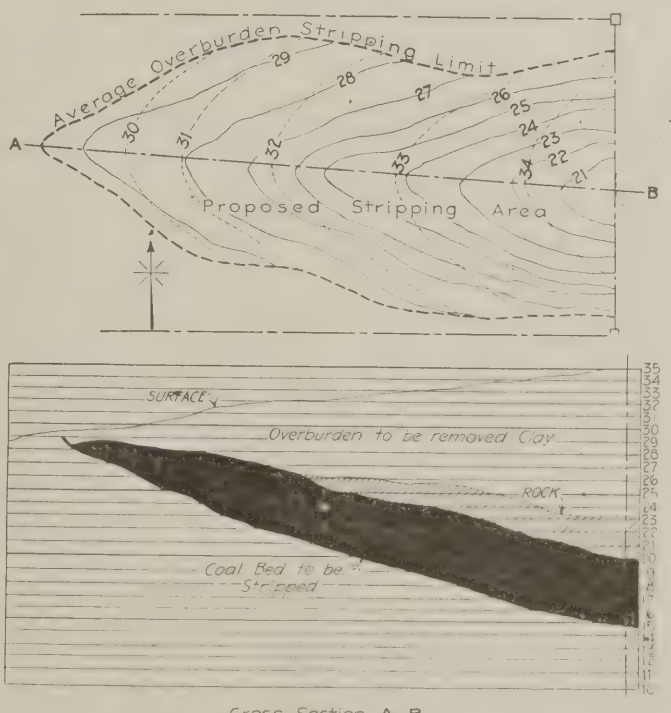


FIG. 3. CONTOUR METHOD OF CALCULATING OVERBURDEN

area of the areas included in the overburden and coal stripping limits by the average thickness of the overburden, as obtained from borehole sections. Referring to Fig. 2, the average overburden thickness is 17.8 ft., the average thickness of clay 13.7 ft., and the average thickness of rock 4.1 ft., so that the number of yards of

classified material can be obtained from the above percentages.

In discussing the third way, or contour method of overburden calculations, a problem is shown in Fig. 3. From the borehole data and other information the internal contours of the coal bed are shown in full lines, while the external surface contours are drawn in broken lines. The contours are delineated every foot for close calculation. The overburden stripping limit shown is the average limit of the overburden and coal stripping limits. It will be assumed further that the area to be stripped extends to the west property line.

The volume of the overburden is estimated in the following manner: The volume between contours 20 and 21 (see cross-section *AB*) is obtained by multiplying the mean area of the areas included by contours 21 and 20 and the west property line, by the contour interval, 1 ft. in this case. The volume between contours 21 and 22 is obtained in the same manner. The total volume is the summation of the horizontal sectional volumes. The amounts of clay and rock are obtained as described in the second method above. This method is the horizontal slicing of the overburden through the contours, while in the first method the average end areas constitute the vertical slicing at certain cross-sectional interval distances.

In conclusion it might be said that the first method, the most common one in use, should be taken advantage of because the cross-sections must be plotted for other general information and the results are fairly close. The second method is quick and serves as a check upon the first, while the third entails extra work in drawing contours but furnishes the closest estimate of volume. All three methods produce the required practical results.

(To be continued)

Legal Department

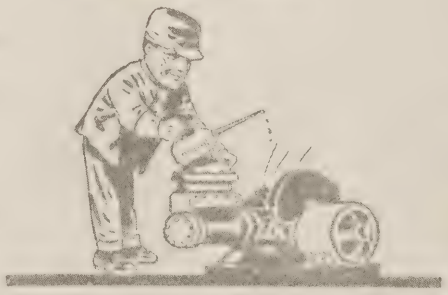
CHATTEL MORTGAGES—TERMINATION OF LEASES—A coal company could give a valid mortgage covering book accounts and personal property to be acquired in the future, as well as existing property. The right of a lessor of premises used as a coal yard to forfeit the lease because of the lessee's default in paying taxes as agreed was waived where no attempt to declare a forfeiture was made until eight or nine months after the default occurred. And a rendering of statement for rent and acceptance of payment thereof waives any right to forfeit the lease arising before the rent accrued. (New Jersey Court of Chancery, Commercial Trust Co. vs. L. Wertheim Coal and Coke Co., 102 Atlantic Reporter, 448.)

RIGHTS UNDER WATER-TRANSPORTATION CONTRACT—Where a Great Lakes transportation company contracted with a coal-mining company to employ certain of its steamers on all their west-bound trips in carrying the coal company's product, for three seasons, and, by reason of several years' previous practice under such arrangement the coal company's business had been so built up that water transportation was essential to its profitable operation, and it appears that other vessels would not be available as substitutes, the law raises an implied obligation on the part of the transportation company to continue operation of the boats during the life of the contract, and the coal company is entitled to restrain the transportation company from disposing of its boats in such manner that the contract would be broken and such company would not be financially responsible for the damages sustained by the coal company in consequence of breach of the agreement. The contract having been made with full knowledge of war conditions in Europe, the courts will not deny the coal company relief because a sale of the vessels might be highly advantageous to the transportation company. (United States Circuit Court of Appeals, Seventh Circuit; Great Lakes & St. Lawrence Transportation Co. vs. Scranton Coal Co., 239 Federal Reporter, 603.)

THE WAIL OF THE PUMP

By RUFUS T. STROHM

I'VE got no pull, an' I'm out of luck,
An' I don't know a friendly soul
To take my part, which is why I'm stuck
Way down in this blasted hole;
An' here I sit in the blightin' dark
An' clatter an' clank an' clump;
But take my word that it ain't no lark—
This bein' a common pump.



With now and then a squirt of oil

I DO my angels-could-do-no-more,
An' I do it night an' day,
A-helpin' the chaps that drill an' bore
In makin' the bizness pay.
I'm a homely duffer, but goodness knows
That I'm always on the jump;
Still, no one pays any heed, I s'pose,
Because I'm a common pump.

THE life that the hoistin' engines lead
Is a cinch compared to mine;
They're rubbed an' groomed like a racin' steed
Till their brass an' brightwork shine;
But all I git is a chanst to toil
In the dirty, inky sump,
With now an' then just a squirt of oil,
For I'm but a common pump.



Getting word of praise before Gabriel blows his trumpet

IT'S true my looks is agin me, bo,
For my coat is grime an' rust,
But here's a thing that you may not know—
I've a heart inside my crust;
An' before ol' Gabriel ups an' plays
That blast on his brazen trump,
I'd like to hear just a word of praise
Let fall for the common pump.

Mining Engineers Consider Industrial Relations

By R. DAWSON HALL
Associate Editor, "Coal Age"

SYNOPSIS—*The American Institute of Mining Engineers devotes a session to coal, a session to nonferrous metallurgy, one to mining and milling, one to iron and steel, one to petroleum, and two, the most animated of all, to employment problems.*

THE new era in which we find ourselves was well marked at the recent meeting of the American Institute of Mining Engineers. It is an era of social questions. One wonders what the founders of the institute would have thought if out of nine sessions seven had reference to seven different phases of mining while two related to the human factor in the industry.

Our predecessors would be surprised to find that engineers brought up to regard the material side of their profession as all absorbing now allowed the immaterial side of their industrial activities to take paramount place in their consideration. The institute is being changed rapidly by forces from without. We are no longer able to overlook the problem of the human factor in mining.

Some people take no small satisfaction from the fact that we are rising to a better conception of human relations. Unfortunately, it seems more likely that our welfare work is but a poor substitute for the mutual understanding of earlier years. The laboring classes are becoming a segregate class of men with different ideals, psychology, reactions and purposes to the employing class. So long as this exists there is need for industrial diplomacy.

Need for Greater General Cultural Equality

The only complete cure is to so educate the workingman that he will have similar ideals, psychology, reactions and purposes. This alone will make the ambassadors unnecessary. Two men cannot associate unless they have similar viewpoints, and the only satisfactory solution is one which succeeds in implanting in both classes the highest type of ideals. There will certainly be no true democracy till the employer and employee, when thrown together, can discuss their common interests with mutual comprehension.

It seems that in this unification and ultimate unity lies success, and not in any skilled pourparlers between segregated classes. As the workingman becomes relatively less literate and less cultured than his employer, the employer and the employer's family will necessarily segregate themselves more completely from the workingman. Decreased literacy and decreased culture is sure to follow such a separation, and the segregation will gradually become more and more complete till the conditions in Europe, and especially in Central Europe, will follow. There the respective classes talk almost different dialects.

We need above all things a cultural equality without which the people of the nation cannot possibly live a common life. This disposition of persons to separate into cliques arises from their cultural inequality. The uncultured man is as much repelled by the cultured man's life as the cultured man is repelled by the life of the uncultured.

When the institute met at the Engineering Societies Building, 29 West 39th Street, New York City, Feb. 18, for its 116th meeting, it found the Coal Session at the head of the program and Edwin Ludlow, president of the Lehigh Coal and Navigation Co., presiding.

The papers were read by title and then a synopsis was given, usually by the author. The first paper presented was a valuable article on "The Drifton Breaker," by E. P. Humphrey. A most interesting paper by R. E. Hobart, mechanical engineer of the Lehigh Coal and Navigation Co., followed. It was entitled "The Economy of Electricity Over Steam for Power Purposes In and About the Mines." The author compared the cost before and after electrification. With steam the cost of power was 13.7c. per ton, with electricity a trifle under 7c. The charges were practically cut in two.

Electricity Saved Costs and Raised Output

However, it must be remembered that the tonnage was larger after the introduction of electricity, and the larger tonnage had probably some effect on the lower cost of power. But this larger tonnage is, at least in large degree, creditable to electrical operation. In this connection the author of the paper said: "As the use of electricity permitted more efficient work and less loss of time from repairs, drownouts, etc., the coal hoisted increased from 343,665 to 435,073 tons per year." The saving, figuring on a basis of 435,073 tons per year at the cost per ton for steam and electric power respectively, figured at $29,149 per annum.

In an animated discussion it was pointed out that the electric current costs at the colliery had no item as large as that credited to the running of the air compressor. The electrical advocates suggested that a plant where nearly 40 per cent. of the electric current went to the running of an air compressor could not be regarded as a real electrical plant. They hinted that a more complete electrification might well have shown even better results as the losses on the compressed-air lines were much greater than those on electric current.

On the other hand it should be observed that the lift demanded of the steam hoist was 581 ft. and of the electric hoist 266 ft., not one-half as much. Hoisting, however, did not constitute a large percentage of the burden. In the electrical plant it cost only 15 per cent. as much as the whole load. What it cost with the steam plant is not revealed. It may have been much more.

Objection was taken to the fact that no equipment prices were given. The author declared, however, that

new equipment had to be bought when the site of the shaft was changed, and the question of what net profit could be obtained by replacing old equipment with new did not arise. A change of some sort was necessary. In the course of the discussion Eli T. Conner testified to the economy effected by the introduction of electricity in a plant under his charge.

W. P. Frey's paper on the "Briquetting of Anthracite Coal" was also one furnished from the experience of the Lehigh Coal and Navigation Co., which under broad-minded management is giving the coal industry the full benefit of its experience. W. P. Frey is fuel engineer of the company. The paper stated that as a result of replacing the coal-tar pitch binder by hydrolene, or "asphaltum" as the Standard Oil Co. prefers to term it, the company has been able to turn a losing venture into a winning one. Still the cost of the briquetting is quite large, silt at $1 a ton making briquets costing $3.35 after every item of expense is charged.

Use of Large and Small Percentage Binders

The "Dutch-oil process," as it is called, has the advantage that it livens the combustion of the more completely carbonized anthracite, when that material is briquetted. The cornstarch-asphaltum binder, described by Burke Baker in his discussion, can have that effect only in moderate degree, but then many anthracites do not need it and none of the bituminous coals require any help from added bituminous matter.

The Dutch-oil process improves the heating qualities of the anthracite. A binder with less oil does not improve the fuel in an equal degree, but again some fuels do not need that improvement—they have a coal content with more available hydrogen and they have a lower ash percentage. At this present time it is not well to make a selection without a full knowledge, seeing that both binders have such excellent points.

It was said in the discussion that where 7 to 10 per cent. of losses were sustained in the handling of anthracite at the yards the degradation of briquets was less than 1 per cent. It was also stated that by the Dutch-oil process briquets could readily be made with 5 per cent. of hydrolene instead of 7 per cent., but as a result they would be less easily consumed.

The objection to the original coal-tar process was said to be the necessity for complete dehydration of the coal, but with the masticator used in the Dutch-oil process 2 or 3 per cent. of moisture in coal does no harm as saponification takes place with advantage.

"Heating of Coal in Piles," by C. M. Young, was neither read, briefed nor discussed, as Mr. Young was not present as promised. G. S. Rice gave an illustrated address in place of an abstract of his "Review of the Coal Situation of the World." He showed maps and photographs of scenes illustrating the foreign coal fields. A map of France showed the distribution of coal before the war in the various French *départements.*

It was evident that the French coal was used in the *départements* near where it was mined. British coal was largely used near the ports and German coal near the frontier. This map brought A. H. Storrs to his feet. He said it evidenced the fact that even before the war there was a minimum of cross-hauling in France, and he urged that in America, at least during the war, an attempt be made by careful zoning to prevent unnecessary cross-hauling.

The article by C. F. Wang on the "Pen-Hsi-Hu Coal and Iron Co., South Manchuria," was discussed, but not at great length. It shows clearly how the introduction of machinery is no solution of difficulties unless it is accomplished by skillful and sympathetic management. As one man put it: It does not do to put Occidental machinery in Oriental hands and expect that it will do all that it is doing in the Occident. It is necessary to provide Occidental management if the machinery of the West is to do what is planned for it. The East has its guilds and its ways. "East is East and West is West."

Mr. Wang tells us in his paper without comment or hysteria, "There are about 1500 miners in the coal mine alone." Probably this includes all the mine workers. Just below he says, "The daily output for 1917 is about 1200 tons," which is an output of 1200 long tons from 1500 men working in No. 1 pit in 15 ft. of coal, in No. 2 pit in 12 ft. of coal, and in No. 3 pit in 7 ft. of coal. Of course, the coal pitches heavily, about 20 deg., and has some heavy partings, especially the thicker coal. But even granting these drawbacks the tonnage is distressingly low.

Then again, Mr. Wang without comment tells us that the No. 1 coal before washing gives 8442 calories and after washing only 8200 calories, that before washing the sulphur content is 0.709 per cent. and after washing 1.16 per cent. The ash is lowered, however, by washing, from 11.30 per cent. to 8.56 per cent.; the fixed carbon is increased from 70.88 to 79.50 per cent. The volatile matter is lowered from 17.72 to 14.94 per cent. As a result the fuel ratio is changed from 4 to 5.321.

Whoever heard of a coal that changed the nature of its vegetal content in this manner by the mere process of washing? One would think that the process must surely be one of distillation, not of mere gravimetric displacement. Of course, it is possible that by some strange freak of nature the coal in the slate might be more bituminous than that in the clean bed; but if so, how so? It is certainly a mysterious matter.

Cheap Labor Gets Out Coal for $3.76 per Ton

The costs per long ton—for apparently the long ton is meant—are $3.76. The wage of the men is not given, but it is doubtless extremely small. The miners work 12 hours and are hurried along by that piece system which all authorities, from Tubal Cain to Taylor, are convinced gives the best results. Something is wrong, however, or the cost would not be so high.

We are told to fear these Chinese with their fearsomely low rates of pay. We hear every little while the story that we must pay American workingmen less or be swamped by the yellow peril. As a matter of fact, we do not *pay* our workingmen big wages—they *earn* big wages. Their large product assures them of it. When Chinese laborers do an American laborer's stint they will earn good wages, for they will get in proportion to their production. Can anyone wonder that men who work as inefficiently as these Chinese are at the ragged edge of poverty? Were it otherwise, economic law would be a fraud and a deceit.

(*To be continued*)

Ash Influence on Fuel Value of Small Anthracite Coal*

By FRANK G. PHILO

THE value of coal as fuel depends not alone upon the total number of heat units, or B.t.u. per pound, but upon the fraction of the total heat contained which can be produced under actual conditions of combustion and operation. The B.t.u. value of one coal as represented by a calorimetric determination may be higher than a second actually, but the lower B.t.u. coal often shows a higher actual fuel value. This can be seen when it is considered that the calorimetric determination does not include the moisture in the coal, as fired, the amount and composition of the ash, whether it contains excessive slag or clinker-forming constituents, or there are present such impurities as sulphur compounds, which in spite of their heat-producing properties are often the cause of partial corrosion of the boiler, the breeching and the bunkers.

The sample of coal tested by the calorimeter is usually burned in an atmosphere of pure oxygen, a condition much different from that in practice, where an atmosphere of only 21 per cent. of oxygen exists. It follows that the most practical way to determine the relative fuel value of different coals is to burn a considerable amount of each grade upon the grates and in the furnace under operating conditions and note the characteristics accompanying each grade.

Tables I and II and the charts, Figs. 1 and 2, show the results of tests during which over 20,000 tons of No. 3 buckwheat coal were fired and over 500 chemical analyses were made.

The coal used was fired into the same type of furnace and upon the same "sawdust" grate, having small circular air spaces ranging from $\frac{3}{32}$ to $\frac{1}{8}$ in. in diameter. The area of the air spaces represented about 8 per cent.

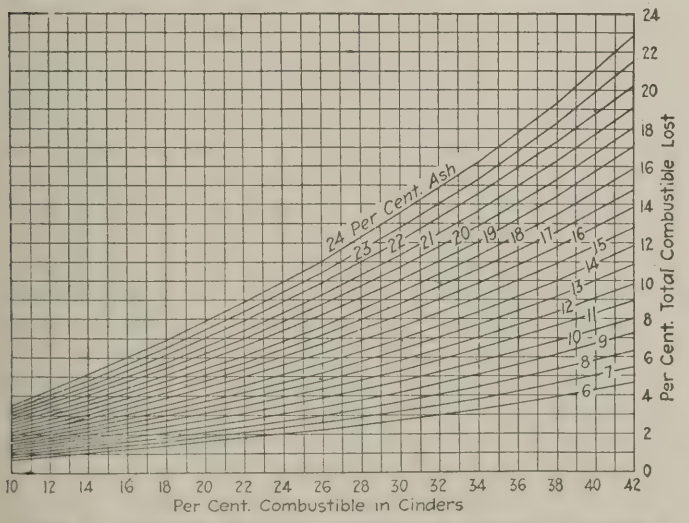


FIG. 1. CURVES WHICH DESIGNATE ASHPIT LOSSES

of the total grate area. Forced draft was used, and an average pressure of 1 in. of water. As practically no coal fell through the small openings, the fuel losses in the ashpits represented these, due to the combustible carried with the ash at cleaning periods, which, in this plant, occur once every six hours. It was found practically impossible to economically burn out more combustible after it had been burned until it represented about 18 per cent. of the material left on the grates after "pushing back." This fixed ratio of combustible to refuse mainly accounts for the rapid rate in which

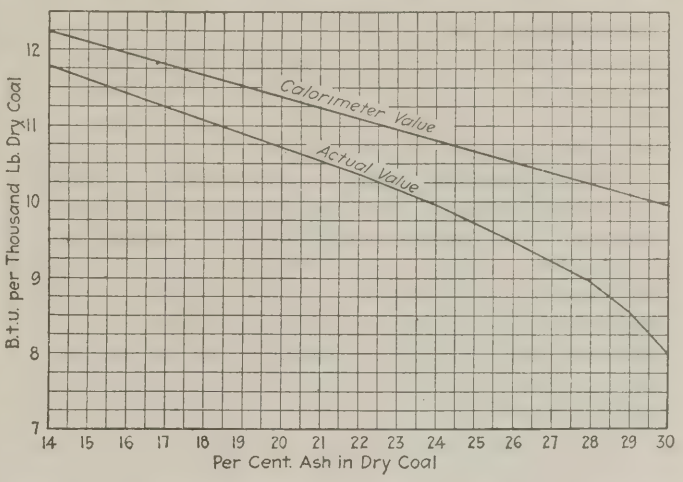


FIG. 2. CURVES SHOWING ACTUAL AND CALORIMETER VALUE OF FUEL

the losses in the ashpits increased with the higher ash coals. The percentage of the total combustible lost was calculated from the following formula:

$$\textit{Per cent. total combustible lost} = \frac{(\textit{per cent. ash in dry coal}) \times (\textit{per cent. comb. in dry refuse})}{\left((100 - \textit{per cent. ash in dry coal}) - (100 - \textit{per cent. combustible in dry refuse})\right)}$$

With anthracite as fuel, the value of the combustible in the refuse is almost the same as that of an equal weight in the coal fired, so no correction was applied.

TABLE I. COMPARISON OF THE CALORIMETER VALUE AND ACTUAL VALUE OF DIFFERENT ASH COALS *

Per Cent. Ash in Dry Coal	Calorimeter Value per Lb. Dry Coal B.t.u.	Actual Value per Lb. Dry Coal B.t.u.	Act. Val. / Cal. Val. Per Cent.
14	12,220	11,755	96.2
16	11,920	11,420	95.8
18	11,640	11,080	95.2
20	11,350	10,714	94.4
22	11,080	10,348	93.4
24	10,800	9,936	92.0
26	10,510	9,459	90.0
28	10,240	8,949	87.4
30	9,950	8,000	80.4

* The "actual value" of a pound of coal is here taken to mean the difference between the total B.t.u. contained in 1 lb. of dry coal fired and the B.t.u. in the combustible in the dry refuse per pound of dry coal fired.

To simplify the calculation of ashpit losses the curves in Fig. 1 were plotted, based on the formula given.

TABLE II. CALORIMETER AND ACTUAL VALUES OF DIFFERENT ASH COALS AS COMPARED WITH 14 PER CENT. ASH COAL AS A STANDARD

Per Cent. Ash	Calorimeter Value (Cal. Val. of 14 Per Cent. Ash Coal) Per Cent.	Actual Value (Act. Val. of 14 Per Cent. Ash Coal) Per Cent.
14	100.0	100.0
16	97.5	96.9
18	95.3	94.1
20	92.9	91.0
22	90.7	88.3
24	88.4	84.5
26	86.0	80.5
28	83.8	76.1
30	81.4	68.1

*Reprinted from "Power."

The tables and curves will be found useful in calculating the penalties to be imposed for high ash when coal is to be purchased on specification. Although the actual values given will not apply to all sizes and kinds of coal, the actual-loss curve will be about the same. Of course, in computing the economic value of the different coals, due allowance must be made for the transportation costs, cost of handling the coal and refuse, and the increased depreciation and maintenance charges against the grates and stokers that accompany high ash and clinker. The reduction of the capacity of the boiler and the furnace must also be borne in mind, especially in plants where the boilers are required to operate at high overloads.

Third Liberty Loan Soon To Be Issued

The third Liberty Loan will undoubtedly exceed in amount not only its two predecessors in this country, but any single war loan or other loan ever offered in the history of the world. The program of the Treasury is of course subject to such change as the rapidly changing conditions of the war may warrant.

No loan of such proportions can be successfully absorbed unless the entire nation responds to the offering and unless every citizen prides himself on the practice of self-denial to the end that he may subscribe to the limit of his ability. The number of subscribers to the last loan has been estimated at 10,000,000. Proportionally for the new loan it must exceed 15,000,000, or contain one in six at least of all the men, women and children in the country.

It must be obvious from the foregoing that Americans individually will need to squeeze the dollar they spend on themselves as they have never yet done before. Luxuries and extravagance must go completely out of fashion; should, in fact, be considered little short of treachery. Shabby clothes and old hats must be worn longer, diet be cut to the wholesome essentials, and we must no longer hire others to do for us those things which we can do for ourselves.

As a belligerent this country has already outgrown the "business as usual" stage of thought as well as of practice. There is not enough capital, labor, coal, transportation or raw material to go round if those industries which are not essential to the conduct of war are continued at their normal productiveness. A vast multiplication and expansion of the essential industries is only possible when other unessential industries are bled white of capital, labor and materials to support the increase in the activity of the essential industries. Every unessential industry which continues in operation must be considered as bidding against the nation for its life's blood.

The complexity of the modern industrial organization has helped to confuse the popular mind regarding the function of money. There is a widespread assumption (1) that money is a miracle worker and can make good for the nation as a whole the shortages in labor and materials which it seems to correct in individual cases, and (2) that some virtue attaches to the keeping of money in circulation by promiscuous expenditure.

In England these fallacies have been successfully assailed in connection with the War Savings Movement. In that country it is termed the "gospel of goods and services," and we may translate it into American as a "gospel of labor and materials."

Labor and materials are the only things that count in support of the fighting machine and they cannot be bought if they don't exist. At any given time there is only just so much of these vital necessities available in the country as a whole for all the many purposes of industry. Every unessential industry which burns coal deprives the essential industries by just so much of the supply available for their purposes. So does every housewife who burns an unnecessary hodful in her kitchen range[1]. Every man who buys a new overcoat is bidding against Uncle Sam who is buying overcoats for soldiers. And every dollar spent on a luxury is helping to support an unessential industry in the competitive consumption of essentials. Money spent on Liberty Bonds gets as wide and as immediate circulation as that spent on candy or theater tickets, but it goes to support industries which produce those things which the Government needs.

But if it is true that, in the last analysis, labor and materials are the only things that can be of any value in the support of our fighting machine, it is also true that the only economy of these things which counts is present economy. We cannot increase the present supply of these things with the thought that we might have used more of them than we did a year ago. The only food or clothing or fuel or munitions of interest to our soldiers and sailors is that which is available today. Past savings of these things have all been absorbed.

The war must be waged entirely on present savings. Hence the imperative necessity for thrift, not only on the part of those who have never before put aside anything, but also on the part of those who normally would be spending the income from past savings. The latter especially must be made to feel that in living on such incomes they are simply exchanging their own past savings or those of their ancestors for the present savings of others, in other words, competing with Uncle Sam for these present savings. It is their duty in the present situation not only to practice self-denial in the matter of consumption but if possible to support themselves by some occupation of value to their country and turn over their private incomes to the Government in the form of Liberty Bond investments.

It is every citizen's double duty to produce more and consume less, not only that he may have greater individual savings with which to invest in the Government's securities, but also that he may help to increase the aggregate of labor and materials (the war surplus) which the Government may purchase with the proceeds of these securities.

To inspire the average citizen with zeal for his twofold effort, to justify to his mind his unaccustomed sacrifices for the common good, it is highly necessary always that his realization of the issues involved in the war be strengthened and that on the one hand he should visualize more perfectly the power, ambition, cruelty and arrogance of the enemy, and on the other the vastness of his country's needs, its tremendous preparations and the heroism and self-sacrifice of its defenders.

[1]This is only true when the miners are working steadily and the coal is hauled by an overoccupied transportation agency. A hodful of coal burned on a mine tipple by a company that has cars only three days a week is not taken away from the war and does not injure the nation.—Editor.

New Apparatus and Equipment

Securing Better Mine Ventilation

One of the great causes of waste in underground operations has been lack of ventilation. Operators are learning that by supplying better and more air to the men the output is increased, costs are lowered and the general health of the men is improved.

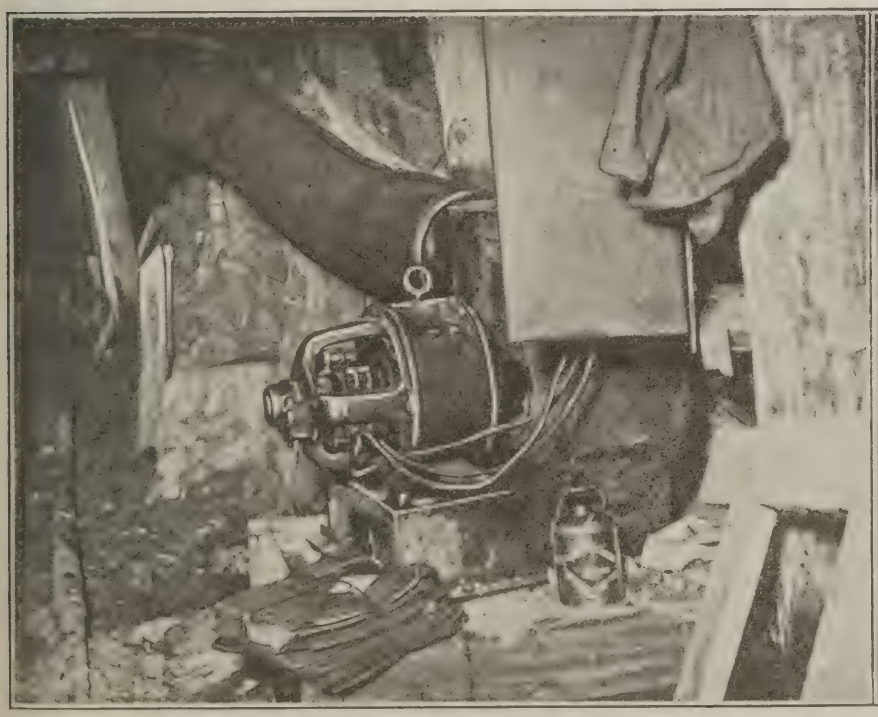
The most successful development in mine ventilation has been found in the use of specially treated canvas tubing, which makes a satisfactory air duct and meets all the necessary requirements. It is light, easily and quickly installed, combines toughness with flexibility, and satisfactorily stands the severe conditions of mine work. The Bemis Brothers Bag Co., of St. Louis, Mo., has recently introduced its Flexoid tubing, and it is used by a number of operators both in the United States and in foreign countries with excellent success. Flexoid tubing is made by saturating a strong canvas with a special preserving compound that protects the fiber from dry rot, acid water and the action of the weather. No tools are required to make the coupling, which consists of two contracting rings with flanges sewed in each end of the tubing. The coupling is made by inserting one ring inside the other and placing the rings parallel so that the flanges catch the ends and hold them



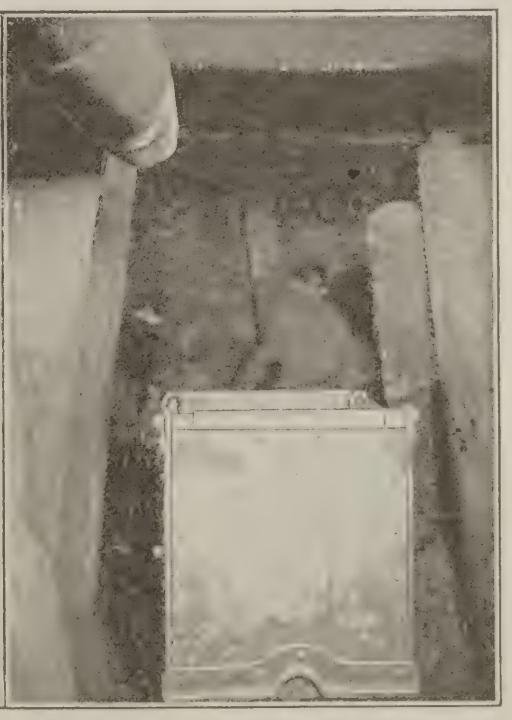
SUSPENDING A 100-FT. SECTION OF FLEXOID TUBING



JOINING TWO SECTIONS OF FLEXOID TUBING



MOTOR, BLOWER FAN AND TUBING INSTALLED UNDERGROUND



DRIFT, 15 MINUTES AFTER BLASTING

fast. The tubing is supported from a wire attached to sprags placed at 15-ft. intervals in the roof. Suspension hooks, furnished with each section, are placed in brass eyelets in the seam and the other end of the hooks slipped over the wire. "Blasting pieces" are provided so that the extension of the tubing may be carried up to the face of the drift, and, when the time for the blasting arrives, the extended portion can be quickly removed. The blasting piece has special snap hooks that attach the piece to the wire and provide a simple fastening that is easily handled.

Portable Scoop Conveyor

A new type of portable belt conveyor which has found a ready market is manufactured by the Portable Machinery Co., Inc., of Passaic, New Jersey.

The machine is operated either by electric motor or gasoline engine and is known as the scoop conveyor because the conveying belt receives its material from a scoop which can be pushed into or completely buried in the material to be conveyed.

The object of the scoop conveyor is to provide a portable machine that can be readily handled by one man for the purpose of loading and unloading, stacking and reclaiming loose materials such as coal, coke, ashes, crushed stone, sand and gravel.



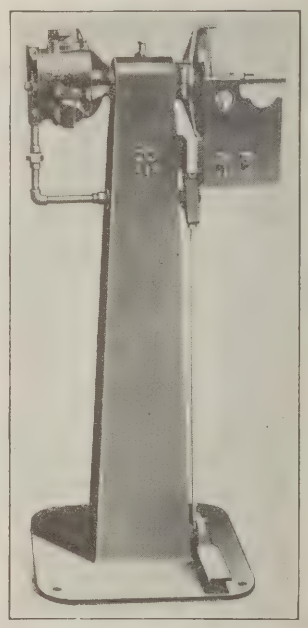
NEW TYPE OF PORTABLE BELT CONVEYOR

From the accompanying illustration it will be noticed that the scoop conveyor has a wide range of application. The manufacturers claim that it will handle sacks, packages, boxes and various manufactured products and that one man with this conveyor will handle loose materials at the rate of 1 ton in 1½ minutes.

Keeping cars and trucks moving and cutting cost of hand shoveling is a necessity under present-day operating conditions, and a large number of well-known manufacturing concerns are already using from 1 to 10 of these machines for this purpose.

New Grinder for the Drill-Sharpening Shop

Better results are obtained from drilling machines if adequate attention is given to the forming of bits and shanks on rock drill steels. Properly designed machine sharpeners forge both bits and shanks so that these are formed perfectly and gaged accurately. A punching machine enlarges the hole in hollow steel to its proper size. But one thing remains, the squaring off of the drill shank.



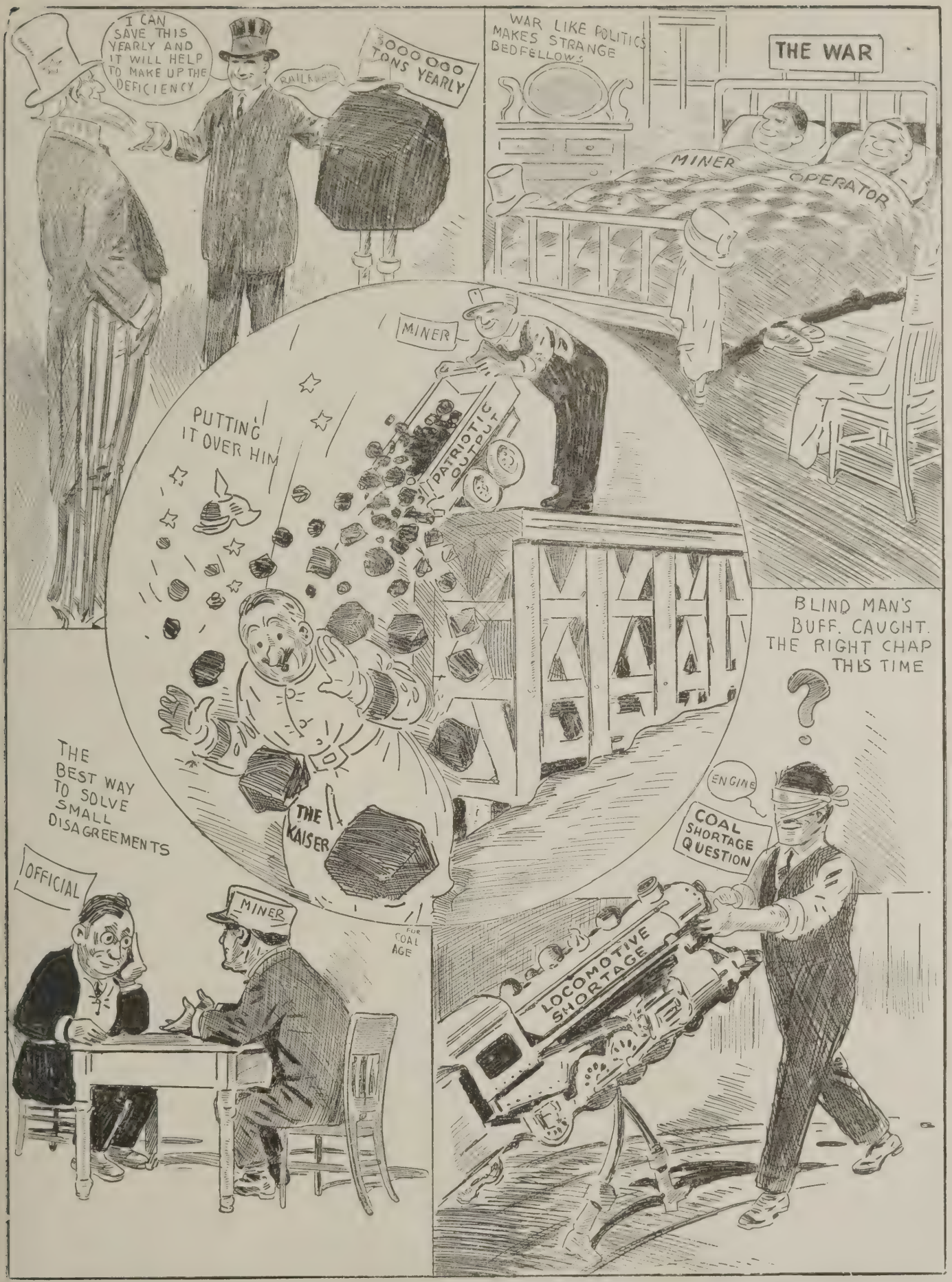
Imperfectly made shanks —that is, shanks not square on the end—are the chief cause of drill piston breakage. This is an expensive item not only in the cost of replacement but also in the time that the drilling machine is out of commission. Furthermore, with imperfect shanks it is not possible to take advantage of the full force of the piston blow, and drilling speed is retarded.

As a help in securing shank perfection, the Ingersoll-Rand Co. has developed the "Little David" pedestal grinder, an illustration of which is shown herewith. This tool, like the sharpener and punching machine, operates on compressed air. It is light in weight, readily portable and requires only a planking support. The powerful three-cylinder motor operates in a bath of oil.

A single foot lever controls the machine, leaving the blacksmith free to hold the steel with both hands. Ordinarily the grinding wheel used is 8 in. in diameter with a 1-in. face. As a further convenience the spindle is fitted with a No. 2 Morse taper socket to take a rose reamer for countersinking the hole in the end of the shank. This operation guards against cutting the water tube of the drilling machine.

This grinder also finds employment in truing the edges of drill bits, pointing picks and grinding other tools around the blacksmith shop. The complete machine weighs 195 lb., is 44⅝ in. high and occupies a floor space 17 x 20⅜ in. It operates satisfactorily with air pressures of 60 to 100 lb. per square inch.

At a Mine in Pennsylvania 3¼ tons of coal are mined for each employee when all names on the payroll, in whatever capacity, are considered. In the coke region one man is employed for every coke oven. Assuming that there are four dependents for each worker, the population to be provided for in mining camps can be approximately determined.



How the Coal Age Cartoonist Sees the High Lights in the National Coal Situation

Ice Gorges Cause Serious Damage

To break up the recent heavy ice gorge in the Monongahela River in the vicinity of Brownsville, Penn., it was necessary to resort to the use of dynamite. Brownsville is in the heart of the coal-mining industry of the Monongahela Valley, and when the first ice gorge broke it caused much damage to the coal interests of that region. A second gorge that formed soon after the first added considerably to the havoc wrought by the masses of drifting ice.

The towboat "Alicia," valued at $50,000, and owned by W. Harry Brown, a large coal operator, was caught in one of the ice jams and put out of commission.



TOWBOAT CAUGHT IN ICE JAM

Every effort will be made to save the boat after the ice has run out. An idea of the condition of the Monongahela River during one of these ice jams can be had from the accompanying illustration.

A partial list of the damage caused by the forming of these ice gorges is as follows: Maxwell tipple of the H. C. Frick Coke Co.; swept away; loss estimated at $9000. One heavily loaded coal barge owned by the H. C. Frick Coke Co.; sunk; loss, $3000. Delworth tipple of the H. C. Frick Coke Co.; swept away; loss placed at $9000. Knob tipple of the Pittsburgh Coal Co.; wrecked; loss, $5000. Three abutments, a supply house and 75 ft. of steel track, together with two loaded coal barges swept away, owned by Reliance Coal and Coke Co.; loss placed at $15,000.

War-Time Conditions Bring About High Fatality Record in Coal Mines

The demoralization forced upon the coal-mining industry by war-time conditions is said by the Bureau of Mines to be responsible for the highest fatality record from accidents in that industry in the last seven years. During the year 1917, there were 2695 men killed in coal mining, which is an increase of 470 over the previous year. Said Secretary of the Interior Lane, in speaking of this matter recently:

At least, temporarily, it gives a black eye to the splendid efforts of the Bureau of Mines in its campaign with the miners and mine operators for safer conditions. Until the war struck us there had been a constantly decreasing death rate which was much gratifying to the men of the Bureau of Mines as well as to myself. There had been the utmost coöperation between the industry and the bureau, and it had begun to appear as if we had passed those disgraceful days when human life was cheaper than a mine mule.

Although the war has changed all this for the time being, it is still our duty to analyze and see if we cannot correct some of the conditions even during the war, for a single life saved is not only humane, but a step toward victory. The unfortunate death toll of last year is undoubtedly due to the fact that the industry has been speeded and retarded spasmodically throughout the year. There was the unusual demand for coal, the uncertainty of prices at the mines, the failure at times of the transportation facilities, and the changing of markets to avoid long unnecessary hauls, the difficulty in obtaining experienced men to offset enlistments, the draft, and miners voluntarily returning to their countries in Europe to take part in the war. All these factors combined against the best efforts of the operators to produce coal in sufficient quantities to keep the country supplied with the necessary fuel, and also to have the safety conditions which we expect.

The speeding up of the mines at times, under the circumstances, was conducive to a high death rate. Mines found themselves short of labor and compelled to employ new and inexperienced men from other fields. Many of the experienced mine foremen and safety engineers had either enlisted or been drafted into the army, or obtained more remunerative employment elsewhere, with the result that less experienced foremen had to be placed in charge of some of the workings. With the exceedingly large demand for coal, it was not possible for the operators and others concerned to give as much attention to accident prevention at the mines as in recent years under normal conditions.

Mines which have not been able to obtain an adequate supply of coal cars have been operated only part time, which again is not conducive to safe conditions. This has resulted in an increase of certain dangers, especially those due to gas, dust and falls of roof, which would not obtain in the case of the mines operating full time. An active mine will ordinarily be kept in better condition than one operated only part time.

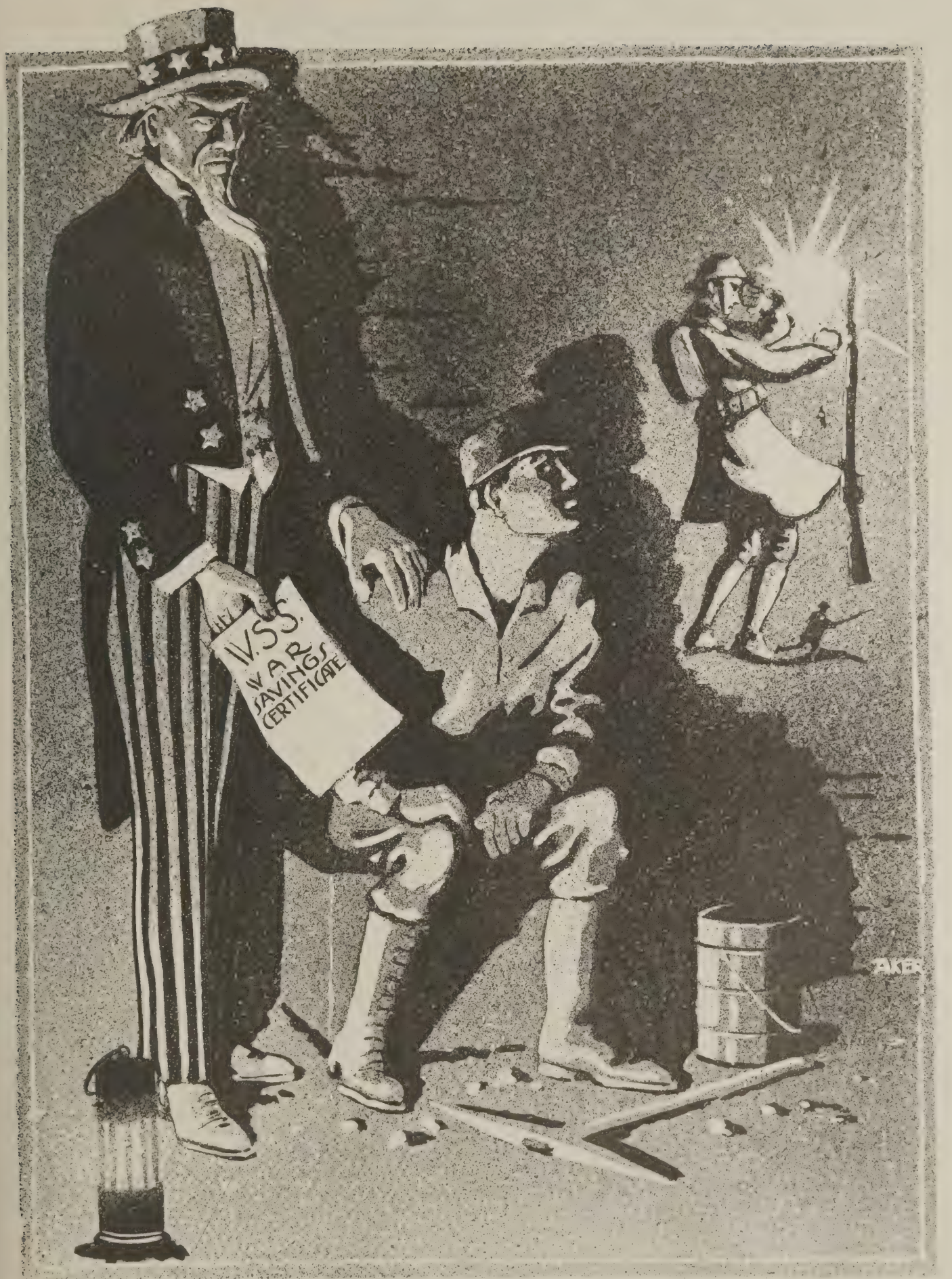
The remedy, therefore, both for a sufficient supply of coal and greater safety for the men lies in a continuous, steady flow of coal from the mines, without these overstraining bursts of speed and these part-time operations that led to a neglect of the usual precautions in the mine.

I am satisfied, from what the industry has done in the past, that this year with the bettering of the conditions over which the operators have had no control, there will be a greatly increased production of coal and without an unusual sacrifice of life. Given the proper encouragement and cooperation, the coal-mining industry will not fail.

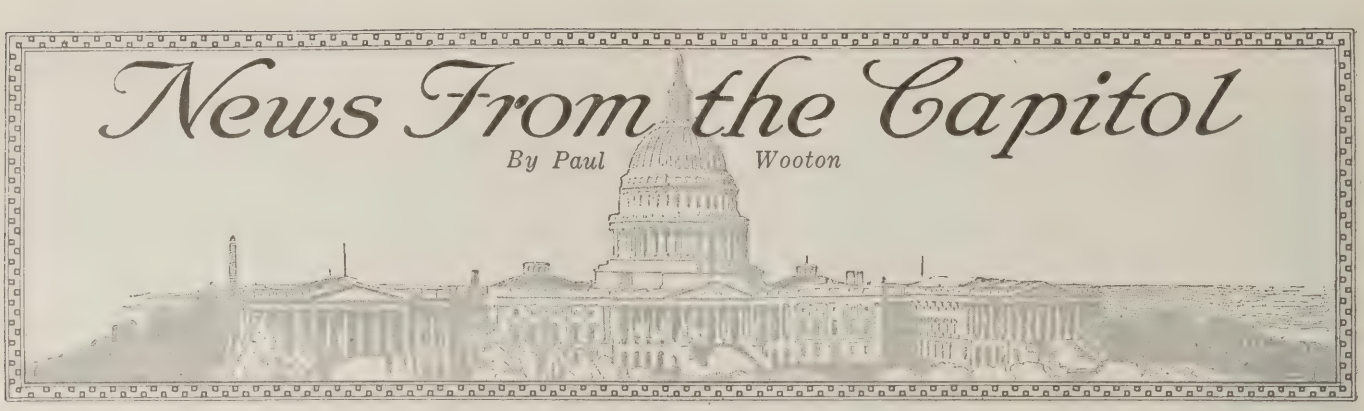
Coal Handled by Milwaukee Dock Companies During 1917

The following table shows the amount of coal handled by the various companies at Milwaukee during 1917:

	Anthracite, Tons	Bituminous, Tons	Total Tons
Milwaukee-Western Fuel Co	567,381	1,199,604	1,766,985
Lehigh Valley Coal Sales Co	166,347	.....	166,347
Philadelphia and Reading Coal and Iron Co	25,175	.....	25,175
Kanawha Fuel Co	8,500	.....	8,500
Central Coal Co	.....	.....	.....
Youghiogheny & Ohio Coal Co	.....	217,006	217,006
Gross Coal Co	109,654	59,112	168,766
Callaway Fuel Co	28,145	20,307	48,452
Wisconsin Coal and Dock Co	.....	271,808	271,808
Milwaukee Coke and Gas Co	.....	1,093,335	1,093,335
Illinois Steel Co	.....	10,646	10,646
Milwaukee Gas Light Co	.....	121,241	121,241
Joseph Schlitz Brewing Co	5,545	23,553	29,098
A. F. Gallun & Sons	.....	7,039	7,039
North Side Coal Co	11,791	1,907	13,698
Grand total	922,538	3,025,558	3,948,096
1916	853,217	3,737,167	4,590,384
1915	1,085,745	3,785,076	4,870,821
1914	1,044,912	3,891,128	4,936,040



Uncle Sam Needs Your Savings To Feed, Clothe and Protect Your Boy "Over There"



[Men of the coal industry who find it necessary to get to the national capital on business these days are invited to avail themselves of the facilities afforded by the Washington Bureau of "Coal Age," which is centrally located in the Union Trust Building. The bureau is in charge of Paul Wooton, who is in a position to be of material assistance to those who have business to transact with Government officials. Have your mail addressed care of "Coal Age," Room 307, Union Trust Building, Washington, D. C., while at the capital.—Editor.]

Weekly Production Statistics

Better car supply during the week ended Feb. 16 allowed the bituminous coal mines of the country to pull decidedly away from the low production average of December and January. The production for that week amounted to 11,084,000 tons, according to the estimate made by the United States Geological Survey. Beehive coke production also increased markedly. It was 557,000 tons for the week ended Feb. 16. Anthracite shipments were 35,486 cars as compared with 32,011 cars during the week preceding. Byproduct coke production was 381,973 tons. For the week ended Feb. 9 the bituminous mines were operated at 64.4 per cent. of their capacity. Practically 28 per cent. of the loss was due to unfilled car orders.

Domestic Consumers Advised To Buy for Next Winter's Requirements

There is a tendency on the part of some to believe that the coal situation is a past issue, now that the weather has moderated. It is pointed out at the Fuel Administration, however, that this is in no way the case. While the acute demand for domestic coal is easing off somewhat, there is every reason to believe that the problems presented by the coming year will be more difficult to solve than were those of the coal year about to close. The industrial demand for coal is sufficient to take every pound of coal produced. Domestic consumers, it is believed, will do well to lay in their actual requirements of coal as early as they can secure them. Every effort will be made, however, to prevent overstocking. The retailers are expected to contribute importantly in this effort. It is feared that the experiences of the domestic consumer during the unusually hard winter just passing will tend to a general desire to hoard coal for next winter.

New England Not Receiving Enough Coal

It was the fear of losing labor rather than an increase in coal supply that caused New England to follow closely after the Federal Administrator in suspending the fuelless day order. The demand for labor outside of New England, where six days full time was assured, was having a demoralizing effect on industrial organizations in New England states. The absolute requirements of New England were fixed at 1000 carloads of coal daily. During the first half of February, however, statistics show that receipts have not averaged over 300 cars daily. On only one day during that period did the aggregate receipts at all the New England gateways reach 500 cars. An improvement in delivery during the latter half of February is expected as a result of improved weather conditions. The ice in Long Island Sound is giving less trouble, presaging increased deliveries from southern tidewater ports.

Zoning Plan of Fuel Administration Rapidly Assuming Shape

The Fuel Administration's zoning plan is rapidly assuming shape. A tentative program, which will follow in a somewhat general way the proposal of the railroads, is being concluded. The zones, however, will be considerably broader than are those in the plan submitted by the railroads.

It is now clear that there can be no great limit set on the movement of Lake coal to the Northwest, but the all-rail movement from West Virginia and eastern Kentucky for that section of the country will be cut off. The supply of smokeless coal for Illinois and Indiana will be very largely curtailed. The only way that it will be possible to move coal from one zone to another will be by special license. Every effort now is being made to fix exact boundaries for the various zones. This is complicated by the fact that some of the zones will be broader in the summer than after Oct. 1, when weather conditions will necessitate some restrictions.

Another important element entering into the fixing of the boundaries is reports from the railroads as to their ability to move the coal as prescribed. Director General McAdoo has directed his operating office to report at the earliest possible moment on this phase of the matter. The zone boundaries must be fixed before Apr. 1, so that purchasers may know where they may buy and operators be informed as to the territory from which they may accept orders.

Director of Bituminous Coal Distribution

Carrying out his plan for the placing of coal distribution in the hands of practical coal men, J. D. A. Morrow, the manager of distribution for the Fuel Administration, has secured the appointment of A. W. Calloway as director of bituminous coal distribution. Mr. Calloway is president of the Davis Coal and Coke Co., at Baltimore, and occupies the same office with the Terminal Railroad and Coal Co., of Pittsburgh. Competent coal salesmen and shippers will be placed in charge of various subdivisions of Mr. Calloway's work.

New Prices To Be Announced by April 1

All applications for price revision now pending are to be acted on by the Fuel Administration before Apr. 1. The matter of dirty coal also is to receive prompt attention as is the recognition of different qualities of coal. Accompanying an announcement to this effect, made to "relieve uncertainty on this score as far as possible before the beginning of the new coal year," was a statement that is exciting considerable comment. It is: "The Fuel Administration believes that it has devised a speedy and accurate method for using the cost information which it has in hand, and that it has worked out the fundamental principles which should guide it in considering applications for modifications of coal prices."

No Change in Distribution of Anthracite During 1918

Anthracite distribution during 1918 will be the same as during 1917, insofar as Fuel Administration officials now know. Statements to the effect that no anthracite is to be permitted to go to the Lakes for transportation to the Northwest or to be handled by rail to any of the Western states were declared to have been unauthorized. In fact, a delegation of anthracite men, who visited Washington a few days ago, was authorized to take orders on the basis of the same distribution as was made last year.

First of So-Called "Nonessential" Industries Is Restricted in Use of Fuel

Particular significance is attached to the order of the Fuel Administrator which limits the use of fuel for the production of window glass to 50 per cent. of the amount manufactured in 1917. This is expected to be the forerunner of further curtailments of unnecessary activities which require the use of fuel. Fuel Administration officials have wracked their brains on the multitude of problems growing out of any determination as to what are nonessential industries. As a consequence, they avoid application of the term "nonessential" whenever it is possible. The agreement with the window-glass manufacturers is indicative of the new line of procedure in the attack on the nonessential-industry question.

For several months, special surveys of certain industries have been in progress. One of the developments of this reconnaissance was that the window-glass industry was likely to manufacture 50 per cent. more common window glass in 1918 than would be required. A conference with manufacturers developed that the majority was willing to reduce production 50 per cent. under the condition that all competitors would be bound by the same restriction.

Figures compiled by the Fuel Administration show that the curtailment of window-glass manufacture will save 500,000 tons of coal during this year and will keep 18,000 carloads of merchandise off the railroads. By extending to all industries the policy that no fuel is to be used to manufacture any greater quantity of finished products than are actually needed this year, and by effecting widespread economies in the use of fuel, a repetition of this winter's shortage of coal can be avoided. Fuel Administration officials do not expect coal production from Apr. 1, 1918, to Apr. 1, 1919, to exceed by more than 5 per cent. the production during the twelve months preceding. For this reason no reliance is being placed on increased production, but every effort is being made to prevent the use of fuel in the manufacture of a surplus of products not needed during the current year.

Would Discontinue Special Assignment of Railroad Cars to Mines

A radical change in the method of supplying the railroads with coal probably will be made in the near future, it is believed here. That all concerned may have a chance to be heard, the Fuel Administrator has called a general conference for Mar. 1. Since the disposition of 175,000,000 tons of coal is involved, it is expected that the conference will bring to Washington a large number of coal operators, railroad officials and others interested. The National Coal Association has recommended that railroad fuel be supplied by the district representatives of the Fuel Administration and that the special assignment of railroad cars to mines be discontinued.

Brief Washington Notes

By reducing the number of stops made by electric cars, the Fuel Administration predicts a fuel saving of 1,500,000 tons of coal a year. This is the latest important step taken by the conservation division.

The additional $1.35 a ton allowed on export and bunker coal will apply only when such coal is placed aboard foreign bound vessels. An interpretation of the bunker coal ruling by the Fuel Administrator prohibits the billing of coal at the special bunker price until the coal is actually aboard.

January's coal production is 5,000,000 tons short of the production attained in January of 1917. The showing was even worse than that during December. The Geological Survey, which gives out the figures, attributes "this alarming depression" to an "unprecedented congestion of the transportation system of the country induced in part by unusually severe weather."

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The anthracite region has been having quite a few strikes. The United Mine Workers unfortunately cannot excuse itself and deny its responsibility for them, as its men are now among those who are striking. We plead with them to leave such matters to the Conciliation Board for decision. Their interest and the interest of the country seconds this appeal. The conciliation board is not partisan, and it is best to leave adjudication where it rightly belongs.

The bituminous regions of central and western Pennsylvania are just now showing a better spirit than the anthracite region. The biennial convention of District No. 5 of the United Mine Workers met at the Moose Temple, Pittsburgh, Penn., on Feb. 22, and when some delegates sought a readjustment of the slate-handling question and of some other working conditions in the district, their action was quickly squelched by voting the "previous question."

WESTERN PENNSYLVANIA MINERS WORKING WELL.

The scale is settled; the men are making better pay than ever before—when they work—so why even appear to violate a contract duly made which the companies have repeatedly revised, whenever new conditions involved new disadvantages to the wage earner?

The Czecho-Slovaks, who form 40 per cent. of the mine workers of the district, and, with the Poles, form 60 per cent., introduced and succeeded in passing a resolution petitioning President Wilson "to continue to stand firmly for the emancipation of the Czecho-Slovaks from the rule of the Teuton-controlled Hapsburg monarchy"—a most excellent resolution.

A vote was taken and the delegates were found in favor of spending $5000 for an educational campaign among the miners for the establishment of coöperative stores. Hitherto the Miners' Wage Scale Committee has consisted of the district president, the vice president, the secretary and the executive board. It was decided that henceforth seven other members would be elected to represent the seven subdistricts.

ILLINOIS ROUGH HANDLING DISLOYAL WORKMEN.

In Illinois, the mine workers are thoroughly imbued with the war spirit. It fares ill with any who are believed to be lacking in it, as is well instanced by what happened to Henry Martini when he refused to give back to Victor Saccaro the job he occupied before he left for service in the navy.

It is said by District Attorney Knotts that an investigation by Federal authorities failed to find any evidence that Martini was disposed to be unpatriotic. It is said that the matter was nothing more or less than a labor dispute, into which patriotism did not enter except as a reason for continuing at work. However, if Martini really said that the man should look to the navy for work, he cannot be exonerated.

The Peoria meeting is exhibiting the excellent spirit of the Illinois miners. The union in that state has subscribed for $350,000 of Liberty Bonds, of which $100,000 are already delivered. They expect to buy in all $500,000 worth of these bonds. The organization in the state has roughly $2,000,000 put by.

In Alabama the union has ordered the mine workers back to work and an arbitrator has been appointed by the Federal judge. The "big stick" of the Fuel Administration will probably smooth out all difficulties.

The delegates of District No. 18 met at Fernie, B. C., on Feb. 19. The district includes all southeastern British Columbia and the Province of Alberta. During the past year its authority has been extended by the unionization of the mining camps north of Edmonton, along the Canadian Northern and Grand Trunk railroads. The miners at the Drumheller mines are highly incensed at the action of the Northwestern Mounted Police in bringing up a machine-gun to keep order in that district.

The Scottish miners at a conference in Glasgow, Scotland, on Feb. 22, decided against the Government man-power bill, under which more miners would be called into the army. The New South Wales Government intends to nationalize all the mines in the state and has agreed to supply the states of Victoria, South Australia and West Australia with coal for five years.

National Board of Labor Called

Feb. 17, the first 10 members of the new National Labor Board were named; five of these represent the employers and five the employees. The National Industrial Conference Board and the American Federation of Labor were to choose two other representatives on the board. On Feb. 27 the latter selected Frank P. Walsh, of Kansas City, Mo., formerly chairman of the Industrial Relations Commission.

The representatives of employers are: Loyal A. Osborne, New York, vice-president of the Westinghouse Electric and Manufacturing Co., and chairman of the executive committee of the National Industrial Conference Board; Charles F. Brooker, Ansonia, Conn., president of the American Brass Co.; W. J. Vandervoort, East Moline, Ill., president of the Root & Vandervoort Engineering Co.; L. F. Loree, New York, president of the Delaware & Hudson Railroad Co., chairman of the board and executive committee of the Kansas City Southern Railroad Co., president of the Hudson Coal Co., Northern Iron and Coal Co., and Schuylkill Coal and Iron Co.; C. Edwin Michael, Roanoke, Va., president of the Virginia Bridge and Iron Co.

The representatives of the workers are: Frank J. Hayes, president of the United Mine Workers of America, Indianapolis; William L. Hutcheson, president of the United Brotherhood of Carpenters and Joiners of America, Indianapolis; J. A. Franklin, president of the Brotherhood of Boilermakers and Iron Shipbuilders of America, Kansas City, Kan.; Victor Olander, representative of the International Seamen's Union of America, Chicago; T. A. Rickert, president of the United Garment Workers of America, Chicago.

Labor Shortage in Hard-Coal Mines

Complete figures just tabulated show that the anthracite mine workers numbered 153,534 at the beginning of this year, divided as follows:

Occupation	Number of Men	Per Cent.
Miners	42,485	27.67139
Miners' laborers	22,705	14.78826
Company men, in mines	41,271	26.88070
Company men, outside mines	41,695	27.15685
Other mine workers	5,378	3.50280
Total	153,534	100.00000

With more mine workers there can be an increased production of anthracite. With the present labor supply it will be difficult to raise shipments much above the 77,133,000 tons reached last year.

Before the war, the number of anthracite mine workers was 177,000. In 1914, the number ran up to 180,899.

With the two wage increases last year, the wage scales since Dec. 1 last have been the highest ever paid in the anthracite industry. Every mine worker is now able to find employment at full time for six days a week, with the pros-

pect that such favorable labor conditions will continue indefinitely. How important this is will appear in the fact that taking a ten-year period to 1916, the average time which the breakers ran was only 221 days per annum.

Frequent Troubles in Anthracite Region

The anthracite region seems to have altogether too many strikes, and the Industrial Workers of the World cannot be blamed, at least, with some of them. Fortunately, the strike at the Enterprise colliery came to an end Saturday, Feb. 16. W. L. Connell, the owner of the mine, had assured District Board Member Hollister and other union leaders that the difficulties would be satisfactorily settled and on this score the union officials recommended the men to return to work. If Mr. Connell does not do what is expected, there is still the Conciliation Board.

In our issue of Feb. 16, it was recorded that the 1100 men and boys at the Archbald colliery of the Delaware, Lackawanna & Western R.R. Coal Department went on strike from Feb. 4 till Feb. 7. They struck again on Feb. 20 and returned to work Feb. 23. There is to be no change in working conditions.

On Feb. 19 the National colliery of the same company, located near Scranton, Penn., went on strike, 1900 employees being laid idle by that fact. Up to Feb. 24, the strike was not settled and no committee had taken up the grievance with the company officials, according to S. D. Dimmick, the assistant manager of the company.

On Feb. 19 a strike occurred at the Centralia colliery of the Lehigh Valley Coal Co., near Mount Carmel, in the lower anthracite region. The disagreement is about a requirement of the company that certain breasts, where about 20 men are employed, shall have two manways instead of one, one on each side of the breast. The men do not object to the order but they want pay for providing the second manway.

When the men refused to make the second manway without additional compensation, the company decided that it would not work the part of the mine where it desired to put two manways to a breast. The mine workers either quit the mines from preference or were compelled either to quit or work the two-manway places. The United Mine Workers of America took up the dispute with the company but without result, and a strike finally occurred. The men are breaking their agreement, of course, though it seems they were not hasty in doing so.

The miners wanted two-manway pay till the Conciliation Board ordered otherwise. The company, in the event of a favorable decision, would then have had to collect from the miner the excess money paid him, which might have been hard. The company elected to stand by the contract, which provides that the Conciliation Board shall decide the question and that the pay shall be regulated for the whole work under dispute both before and after award. On Feb. 22, James Matthews, the district president, got the men to agree to return to work and let the Conciliation Board decide on the merits of the controversy. However, on Feb. 26, Tuesday, the strike was still in full operation. The output of the colliery is about 2000 tons a day, the men numbering about 800.

The mine workers do not like the changes in the dues as made in the international constitution. These were made necessary by the lawsuits in which the union was involved and by the bonds it was necessary for the union to put up. The change becomes effective Apr. 1. The constitutional provisions which change the dues of the local unions from 25c. to 50c. per month for each member run as follows:

"Sec. 12—The local dues to be paid by each member shall not be less than 75c. per month, together with such assessments as may be levied by the different branches of the organization.

"Sec. 13—Every local union shall pay direct to the international secretary-treasurer a per capita tax of 50c. per month per member and such additional assessments as may be levied by an international convention, referendum vote of the members or in accordance with Section 25 of Article 9, payment of per capita tax to be based upon the amount of dues collected each month by the local union."

Unfortunate Dispute in Alabama

Both John P. White, the labor chief in the Fuel Administration and Rembrandt Peale, the operators representative have been sent to Alabama to settle the strike which threatened to spread by sympathy to mines which were not directly affected by the controversy. As Mr. Peale wrote the agreement in question, he is in close touch with all developments.

The problem for the Fuel Administration is whether to compel the furnace companies, which had the strikes, to abide by a contract that they have never accepted. It is quite possible that the Fuel Administration will decide that its will is law and must be obeyed. It used the big stick on the smaller companies, and they agreed to abide by the terms of an agreement of which they did not approve. It is hardly likely that it will tolerate the refusal of the larger companies to sign, or abide by, that contract.

At the same time the men working for the smaller companies which have signed the scale do not appear willing to abide by their agreement. They work longer or shorter hours at their pleasure instead of abiding by their pledge. The steel corporations have given their men no less than six raises in pay recently. They have concededly done more than anyone else to promote good conditions. Must they also accept a provision they regard as tantamount to recognizing the union?

By Feb. 18 the number of strikers had increased to 15,000, the Yolande, Rock Castle and Searles mines going on strike on that date, thus extending the strike to three new companies. The next day the Edgewater mine of the Tennessee Coal, Iron and Railroad Co., with 900 men, closed down. On Feb. 20, Frank J. Hayes, the president of the United Mine Workers of America ordered the coal miners in Alabama to return to work pending a settlement of the differences with their employers.

The Fuel Administration reported on Feb. 23 that H. C. Selheimer, of Birmingham, was selected as umpire. His appointment was approved by President McCormack, of the Alabama Coal Operators' Association and President Kennemer, of the Alabama branch of the United Mine Workers of America. The appointment was made by Federal Judge W. V. Grubb, of the Northern district of Alabama. The Administration has indicated that the mines are all in operation as usual, pending a settlement.

Apparently Mr. Sellheimer has not been approved by the Tennessee Coal, Iron and Railroad Co. and the Republic Iron and Steel Co., but only by the coal operators' association, to which apparently these companies do not belong. They are not signatories to the contract. If they are brought to time it will be not under the agreement, but under the fiat of the United States Fuel Administration.

Mine Workers Take Public Action

The mine workers of late have been taking concerted action to secure their ends as ordinary citizens. They have just as much right to do this as engineers, bankers or lawyers. There is no reason why all action of mine workers shall be in direct relation to their industry. However, one might take some exception to the activities recorded below. Perhaps they are not well advised, but much public and political activity is subject to just such criticism. Mine workers are as much entitled as other groups to make mistaken decisions.

At a mass-meeting of miners from Shamokin, Kulpmont, Ashland, Centralia and Mount Carmel a drive was started to raise a fund of $3000 with which to engage the service of an engineer to ascertain the physical value of the Shamokin and Mount Carmel Transit Co.'s trolley line, from which special rates to miners were recently withdrawn along with the six-for-a-quarter tickets and upon which a 6c. fare has been established.

The actions of the company have caused the mine workers to make vigorous protests to the Public Service Commission. Prominent attorneys have been employed by the mine workers, and it is the purpose of the miners to ascertain the value of the road, and in this way to prove that the increase in fare is not justified.

EDITORIALS

Make It a Little Easier for Weak-Kneed Patriots

THE weakest link in the whole national chain in this war is transportation by land and by sea. The greatest need is to strengthen this link. To do so will take much money, but with the Interstate Commerce Commission holding down railroad rates who knows what will happen when the war is over. Conditions may be even worse with the railroads than they were before the war started. We would all like to buy railroad stocks and bonds if only we knew that the money expended would come back to us. Many good patriots would be willing to buy them if they received interest equal to that paid on Liberty Bonds, or even no interest at all. All they are looking for is to conserve their capital.

Somehow we do not like to give away our money to the railroads. We are accustomed to give it to hospitals and the Red Cross, but we are not ready to buy stocks and bonds with the almost certain assurance of loss. Something must be done to finance the railroads either out of Liberty Bonds or from some other source. The public will not buy railroad securities till they become secure, and they can never be secure so long as they are the victims of politics.

The Manager's Idle Moments

UNFORTUNATELY, the mines in the bituminous regions are not working steadily. The idleness, however, gives the manager a chance to put his plants in order; and the necessity for keeping day men at work, as a means of preventing migration, affords a reason for employing the day hands at the mines for this purpose even when no coal is dumped.

There is therefore an opportunity to prepare for the days ahead. It will go hardly with the manager if his mines are laid idle for some internal cause when he has railroad cars on his sidetrack. The men will be discontented and leave him, his allotment will be cut down, and the mine owners will look for a more efficient man.

Consequently, the whole problem of mine management should be scanned again. Shortage of men has modified that problem immensely. Perhaps the haulage problem can be solved by closing down certain headings and openings. There is no cross-hauling at the mines, but there is something almost equally bad. In many places coal is being hauled from one section of the mine past another section that could be arranged to take care of the whole tonnage needed.

Most mines would be helped by greater concentration. The supervision problem is an important one. Most people regard the boss as a man who drives people to work. There is truth in that view, but it is also true that he is the man who helps men to work. He is the "liaison" officer at a mine. He coördinates effort. The mine workers need him. They are entitled to his services.

No mine operation should lag for the lack of immediate authority. When the mine is large and rambling time is lost trying to get word to the boss, where, in a smaller mine producing the same tonnage, he is readily at hand. By concentration of its work many a mine crippled for lack of supplies could be enabled to operate efficiently. It could keep up its haulage conditions to a high degree of efficiency by reducing the length of road kept in operation.

Some companies have too many mines working. They would do better if they concentrated their effort on a few and ran them intensively. The equipment on hand would go further, and much water that is now pumped would automatically flow out of the swags to the drift mouths or the sumps. The machines would do more work, and the few roads maintained would be in better running condition.

Take a careful view of your duties and cut all red tape. The present conditions demand drastic remedies, and we must rise in every way to the occasion. There must be a lopping of nonessentials in our industrial operation. Because we needed more elbow room when men were plentiful is no reason for trying to use that elbow room now. Because we hoped that we could find men to operate a new drift is no reason why we should try to run it now that the men have not materialized. Every problem is a new problem. There are new conditions which modify it. It should not be solved as if the old conditions still existed, but on the conditions now surrounding it.

Are We a Nation of Individualists?

ONE of the evident signs that we are approaching an industrial and economic crisis is the amount of criticism that is being showered on those in charge of Government activities, nearly all of which at present relate to the war. The attempts to blame these various inefficiencies on individuals are being made on all sides. It was only natural in this confusion that army officers and Government officials in general should be the first to receive the blow, for we have always held the theory that Government officials were far more inefficient than our business men.

The number of applications from private manufacturers for the help of "efficiency engineers," which has so largely increased lately, is indicative of a realization on the part of many of our manufacturers that their methods also are not what they should be. The people who are applying for help are in many cases no worse off, as far as their methods are concerned, than others who have not yet discovered how badly they are doing their work.

The whole subject seems to resolve itself concretely into the fact that our business and industrial systems

are not suited for times like these, when it is necessary to combine all our energies and exert our full driving power toward the achievement of one supreme object.

We should not be surprised that this is the case, for our economic theory has never contemplated teaming up all the industries of this country for one object, but has rather discouraged that idea and encouraged individual competition of the most strenuous kind. In other words, we are a nation of individualists who have never really seriously contemplated coöperation for the common good.

When this problem of coöperation is suddenly put up to us, as it has been by the war, it is not surprising that our business men, trained in the individualistic school, should be entirely unfitted to solve the problem. Moreover, it might be expected that the men who have been most successful in individualistic, competitive business, in which profit was the main aim, should be actually the ones least fitted to establish a scheme of business and production for the benefit of the community. This is a new problem to them, and one altogether outside of their experience.

It is to be granted that such business men may have individually great driving power, but this very excess of driving power in individuals or corporations is likely to make the confusion all the worse, unless a means of coördination is established which will keep the driving power of the individuals or corporations in proper balance.

What to Do First

IT IS said that we are preparing to produce for the war in France much more than we can ship to that country. If that is true, we are riding to a fall. If we cannot find a way of placing the products we are making, we may as well spend some of our efforts on our domestic needs.

First of all come, of course, the merchant marine, the docks for the construction of vessels, the channels to reach those docks, the towns for the ship workers and all that will assist in the construction of ships. Then we need to spend money on railroad locomotives and cars. We cannot in the short time available do much toward increasing the capacity of our railroads other than in regard to terminal facilities, but these should be of the best.

Motor-truck transportation should be allowed to replace horse transportation, and this will keep the automobile factories busy. As we have now to supply the Allies with grain without help from Russia, Australia and India, it is essential that we have increased grain-handling facilities so that none of our bountiful harvests shall be lost by lack of provident care. Consequently, grain-elevator service will probably have to be developed. Furthermore, we should enable our lakes and canals to serve our transportation needs more fully.

Unfortunately, governments are apt to take an interest only in what are stereotyped government activities. Until the United States took over the railroads it did not seem to care a jot that the industry was going progressively to destruction. That was a matter left to the railroads, as if the railroads were not one of the essential limbs of the nation, a limb which could not suffer without all the other members suffering with it. Even now the railroads do not seem to be getting the consideration they deserve.

The innate militarism of mankind resolutely sets itself against seeing war as a great big business to be conducted on business principles. It is not merely shot and shell, but the conduct of a national life that is demanded; and we must look ahead to see that the indirect sources of our power are not forgotten and allowed to become inept even though they happen to look unmilitary and quite indirectly of assistance in the war. The transportation matter should have been carefully considered when we were "being kept out of war." Then was the time when we should have been fostering an arm which keen observers had noted for years was progressively becoming paralyzed. A diagnosis would have been quite easy to any who resolutely set himself to find the cause.

These needs must always be kept in mind. The wealth of the country must be carefully directed so it will help in solving them. Money should be guided to the civilian industries which need speeding. The Government should not only forbid the sales of stock in nonessentials, but it should indicate to the public those lines of industry which will need financial encouragement and investment if the war is to be won with minimum difficulty. Steel and byproduct plants need some such a word of encouragement from the Government authorities. Unfortunately, too many of the elective princes of our country show a positive aversion to industry because they have not set their seal upon it. Trade is vulgar and only statecraft, politics and the waging of war, they feel instinctively, should occupy the time of those who are given the work of governance.

So it comes we act like the young cub who was given charge of a company store. The first day he took charge he bought $400 of perfumes. With due pushing, such a line would hardly have been sold out in 10 or 15 years. Yet a week after he was out of flour. The essentials of living had not appealed to him. Some of the makers of our nation have an equal failure to understand the basis of our national existence.

Fuel Administration Striking Its Gait

LIKE most hastily constructed organizations that are given unlimited powers, the Fuel Administration in Washington has been a mushroom affair. Little by little system has developed out of chaos, until now really effective work is being accomplished.

Coal operators will no longer have occasion to fear the consequences of ill-advised regulations promulgated by men inexperienced in coal mining. A carefully selected committee composed of some of our best-known mining engineers is now preparing the data on which prices are based. Mr. Lesher has a world of information that is proving invaluable to those perfecting zoning plans. Mr. Morrow, in bringing to his aid men like A. W. Calloway and H. N. Taylor, is doing a service that cannot help but foster the confidence of the industry. Coal men will likely have to make many sacrifices and put up with numerous aggravations. However, these recent moves at Washington cause us to feel that injustices will not be rendered.

DISCUSSION BY READERS

The Fuel Situation

Letter No. 1—It is a well-known fact that the little things in life are the most decisive and often exert a powerful influence for good or bad. Too often it happens that our devotion to minor matters obscures the broader vision that is so necessary for the successful management of large undertakings. But the greater and more influential the part we play in our everyday life, the less is our mind absorbed in the consideration of unimportant details, which should always be subordinated to the main proposition.

The fuel situation, today, which has been fully set forth in *Coal Age*, is a large proposition, requiring the broadest vision possible. To meet the growing complications incident to the production of coal at the mines and its transportation to market and distribution to points where it is most needed, the Government, some time since, organized a Fuel Administration, whose avowed purpose was to increase the production of coal, and to insure the nation an adequate supply of fuel to meet the increased demands for the war.

Work Confronting the Fuel Administration

Kindly permit me to submit to the readers of *Coal Age* the question of whether this policy has been carried out by the Fuel Administrator. Personally, I am inclined to think that he has confined his attention more to the curing of some of the many prevailing evils in the coal industry, rather than overlooking these, for the time, and giving his entire attention to increasing the supply of coal.

It is true there have existed many hindrances and, to relieve the congestion of traffic and increase the means of transportation of coal, embargoes on freight have been proclaimed and industries have been forced to observe workless days. The price of coal to consumers has been reduced and jobbers' "gouging" commissions curtailed. Statistics show that more coal is being produced, today, than ever before; and, to assist in its distribution to where it is most needed, producing and consuming zones have been established for the purpose of avoiding cross-hauls.

Notwithstanding all this, however, the nation is today suffering from a serious shortage of coal. While it is easy to charge this unhealthy state of affairs to the inefficiency of the Fuel Administration, we must admit that it is another matter to blazon the path to effitiency. We are all critics at heart and, while this is largely justified in respect to the present emergency, we must admit that what the nation needs is constructive criticism. It must be remembered that it is wrong to pull down unless we can rebuild something better.

In respect to the work to be performed by the Fuel Administration, it is only possible to suggest, in a general way, that the closest attention should be given to big things, while matters of minor importance are left to shift for themselves. Let the Administration strive to adopt an expansive and liberal policy, keeping clearly in mind the need of increasing the production of coal, and transporting and distributing the output to the centers where it is most needed.

Let us hope that there will be the heartiest coöperation on the part of the Administration, the coal mines and the railroads, which alone will enable them to increase their services to the nation. The great cry of the country today is "service," and what is needed to accomplish this is the larger vision and comprehensive grasp.

N. H. S.

Boston, Mass.

Working the "Rooster Coal"

Letter No. 1—Replying to the inquiry of Mine Foreman, *Coal Age*, Feb. 16, p. 349, asking for information in regard to the working of what is known as "rooster coal," which occurs, in many districts, in connection with the Pittsburgh seam, let me say that I have had some experience with this coal, in a district where it was probably above the average both in thickness and in quality.

In the district to which I refer, the rooster coal reached a thickness of 4 ft. in places, but would thin out to 2 ft., perhaps not 50 yd. away and, at times, the thickness would vary that amount in a single room. My experience with this coal is that it is most variable also in quality and, frequently, half of it must be thrown out as being unmarketable. The result was that, in this locality at least, the seam would hardly pay to work separately.

The section of the seam, as given on page 349, is almost identical with that in the locality I have mentioned; but the drawslate varies much, reaching a thickness of 4 ft., in places, and again thinning out to 6 in. I have known the shales overlying the drawslate to vary from 8 ft. in thickness to barely 3 ft. in some places. Indeed, I understand that the two seams almost come together, in certain sections, but I have never found it so in my own experience.

Variable Conditions Forbid Roomwork

Referring to the question of the feasibility of working this seam, I would not say that it is ever practicable to do this in driving the rooms, chiefly because the roof above the rooster coal is quite variable, consisting of a hard sandrock, which is frequently replaced by shale.

It is well to observe here that the shale separating the two seams does not make a good roof in rooms. I have even seen it start to break on a narrow entry and it became necessary to take down the loose material up to the rooster coal, in order to avoid frequent roof falls. In one instance that I recall, we were obliged to handle 6 ft. of this shale roof over a sidetrack where it was impossible to support it, although the place was well

timbered with center posts set between the tracks. This made a large amount of rock to handle and was expensive.

Although the method we employed in working these seams resulted in recovering hardly more than 60 per cent. of the rooster coal, I do not know that it could be improved. Briefly discribed, it was as follows:

When the heading had advanced far enough, No. 1 room was turned in the lower seam. This was driven up in the usual manner and when it was finished the miner pulled the rails back a distance of about 30 ft. from the face and drew the props, allowing the roof to fall in that space.

ROOSTER COAL WORKED OUT RETREATING

This being done, the miner cleared a passageway to the edge of the fall so that a car could be pushed close up to the slate. A shot was then put up in the rooster coal, which was allowed to fall on the slate. Frequently, it was possible to load this coal directly into the car, from the top of the fall, while at other times it was necessary to throw the coal to the bottom before load ing.

No. 2 room was worked in about the same manner, except that the pillar between rooms Nos. 1 and 2 had to be drawn. This was done by making about two cuts of a Goodman shortwall machine. I have seen 12 to 14 pillars taken out before the top rock would break above the rooster coal. At other times, however, I have known it to come down on top of the coal.

Permit me to say, in closing, that I consider this method as practicable as any that can be employed and would only suggest one change. That is, if possible, the headings should be driven up their full distance before any rooms are turned. Then drive six rooms abreast at the inby end of the heading. When these have reached their limit start to draw the last pillar and follow this with the others in order, carrying the gob line at an angle of about 45 deg. with the heading.

I believe this plan would be a considerable improvement over the previous method, as it would be impossible to recover the entry stumps more completely, as quickly as the pillars are finished in the rooms. There may be places where it would be possible to drive entries and rooms in the rooster coal, but this has not been my experience. THOMAS HOGARTH.

Heilwood, Penn.

Shaft vs. Slope Opening

Letter No. 6—This discussion recalls to my mind the serious difficulty I once experienced in trying to keep a slope open in the summer time. There were continual falls of roof taking place, owing to the rapid decay of the timbers caused by the alternate dry and wet condition of the slope at that time of the year. Much trouble was caused also by accumulations of ice in the winter time. I will not go further into detail than to say this slope was driven on the dip of the seam.

My experience in operating slope mines has been such that I have no hesitancy in saying that two shafts are much to be preferred to two slopes, when opening a mine. There may be conditions, of course, when a slope opening would naturally be chosen, especially in the working of an inclined seam that outcrops on the property. However, in all cases where the seam is level and lies at a reasonable depth below the surface, my preference is for a shaft opening.

In respect to the expense of sinking, there will be more rock to handle in sinking a shaft 10 x 20 ft. and 118 ft. deep than when sinking a slope, on an inclination of say 30 deg. and having a cross-section of 6 x 10 ft. The slope would be practically 236 ft. in length. When the shaft is once down and properly timbered, however, it will not only cost less to maintain and cause less delay in hoisting than a slope opening, but will afford the quickest means of ingress and egress to and from the mine.

In the operation of a shaft mine, I would arrange to lower and hoist men at the hoisting shaft, until such time as the output of coal was sufficient to keep the engines running continuously throughout the shift. In that case, the men would be hoisted at the second opening, which should be equipped with means for that purpose. LUMEN.

West Leisenring, Penn.

Electrically Driven Mine Pump

Letter No. 1—I have been much interested in the inquiry of John Martin, *Coal Age*, Jan. 26, p. 214, in which he describes the difficulties experienced in the operation of an electrical mine pump.

Mr. Martin attributes these difficulties to the fact that the 5-in. discharge pipe of his pump extends but a short distance from the pump and then connects with an 8-in. pipe line. This is a very similar arrangement to the installation in the mine of which I have charge, and which has given the best of satisfaction. For this reason, I believe that the difficulty, in Mr. Martin's case, arises from other causes.

In our mine, I am operating an electrical pump having an 8-in. suction and an 8-in. discharge, the latter being connected, at a little distance from the pump, with a 10-in. pipe line. This installation, however, differs somewhat from that described by Mr. Martin, as our slope has a grade of only 6 per cent., instead of 25 per cent., as in his case; but the slope is 2700 ft. long, while Mr. Martin's is only 800 ft. long. Therefore, while we are working against a static head of 162 ft.. as compared with the 200-ft. head, in his case, yet, the greater length of our pipe line will increase the friction head so that the two cases are practically the same in this respect.

As I stated previously, we have experienced no trouble whatever, except at one time when the pump was started with the discharge valve closed, and the result was that the driving rod of the pump was broken and the shaft bent.

Allow me to suggest that, in my opinion, Mr. Martin's difficulties may arise from one or both of two causes: Either (1) the pump is too light for the work it is required to perform and, owing to the inertia of the water column when the pump is started, the piston rod is bent or the journal casting broken; or (2) it may be that the foundation on which the pump rests is too light or insecure, allowing the pump to shift its position slightly, which would throw it out of alignment and produce the results he has described. I hope these suggestions may be of service to Mr. Martin.

McIntyre, Penn. SAMUEL JONES.

Shotfiring re Explosion

Letter No. 5—The recent discussion, in *Coal Age*, relating to shotfiring in mines, has called forth the interesting question of the inflammability and explosibility of the gases produced by the combustion of black powder, and this led to the present discussion of the relation of shotfiring to the possibility of starting an explosion in mines and, incidentally, involved the question of reducing the circulation of air in the mine at firing time, with a view to utilizing whatever extinctive effect the gases produced in blasting might have, as claimed by John Verner, *Coal Age*, Nov. 3, p. 774, and Jan. 5, p. 33.

Some years ago, I had occasion to investigate this subject and reached results that may be of interest in this connection. I first tried to obtain samples of the air, at the faces of rooms where shots had been fired but a few moments previous. In this attempt, I was not successful in securing satisfactory examples for analysis and it became necessary, therefore, to depend upon experimental work performed in the laboratory.

Experiments with Black Powder

In the experiments that were conducted, charges of black powder alone and the same powder mixed with various quantities of fine coal dust were fired. As a result it was found that the gases given off by the explosion, in some cases, would burn readily and even explode when mixed with air. The results of these experiments were published in the Transactions of the American Institute of Mining Engineers, Vol. 41, p. 454.

The combustible gases, which may be present in the fumes from black powder, originate from three sources: (1) The gaseous products of the explosion may contain insignificant amounts of combustible gas, even when the composition of the powder is such as is required to make its explosion complete. (2) The heat of the explosion may distill certain volatile combustible constituents of the coal. (3) When black powder is fired in the presence of fine coal or dust, the result is much the same as what would be obtained if the powder contained an excess of carbon. In that case, the nitrate would not be present in sufficient quantity to furnish oxygen enough to burn all the carbon to carbon dioxide and a certain amount of the monoxide would be produced, which is combustible.

What the Experiments Show Is Possible

While such experiments do *not* show that combustible gases are invariably given off when black powder is exploded in the presence of coal, they *do* show that the explosion of the powder, under such conditions, may produce gases that are combustible. Indeed, the gases resulting from the explosion of black powder alone, under apparently uniform conditions, are not of constant composition; and, as has been shown, the presence of combustible gases resulting from the explosion depends on the composition of the powder and the coal.

But, since the presence of combustible gas will aid the explosion of coal dust, it follows that an explosion may occur, as has been suggested in this discussion, because of the possibility of such gases being produced when coal is blasted in a close place or heading. This is particularly liable to occur when a blownout shot projects its flame into the gases and dust produced by a previous shot.

Many explosions have taken place, in Kansas, under circumstances which strongly indicate that powder fumes were concerned in the explosion. It is the custom there for shotfirers to work rapidly and sometimes several shots are exploded at nearly the same time. The holes are heavily charged with powder, and the conditions are favorable to the production of explosive gases.

In 1909, an explosion, in which powder smoke was supposed to be concerned, occurred in an Illinois mine. At that time, 182 shots had been fired and but four remained when the explosion took place. The explosion was attributed, by the mine inspectors, to the excessive use of powder in blasting the coal.

C. M. Young,
Assistant Professor of Mining Research.
Urbana, Ill.

Letter No. 6—Opinion, generally, seems to favor an increased circulation of air at the time of firing shots in mines, instead of reducing the quantity of air in circulation at such times. For my part, I cannot understand how it would be safe practice to fire shots in a mine generating gas, when the ventilating current has been reduced. Nevertheless, John Verner contends that this has been done with good results.

Practice and theory have always agreed that it was proper to maintain a good circulation of air in the mine, sufficient to remove all dangerous, explosive, or noxious gases as quickly as they are formed and thus keep the mine healthy and safe. We are taught, and it is common practice where the shots are fired by shotfirers after all the men have left the mine, to begin that work on the end of the air.

Reasons for Maintaining a Good Air Supply

It has been explained that where a good ventilating current is maintained the smoke and gases produced in firing will be swept out of the mine and the places in which shots are yet to be fired will be kept clear. It has even been suggested that the circulation, in certain sections of the mine, be temporarily increased by regulating the air passing into those sections where shots are yet to be fired. When the work is finished the normal circulation in such sections is restored.

It is reasonable to believe that, in a mine generating gas, a reduced circulation of air will result in a greater accumulation of gases in the working places, and this condition would certainly be conducive to an explosion taking place when shots are fired. Aside from this, however, shotfirers should not be asked to work in a reduced air current, which is always a menace to health if not to safety.

In regard to the inflammability of the gases produced in the explosion of powder, I have frequently tested this fact by igniting the gas in the crevice of a shot. It seems to me that this illustrates fairly well the condition that would exist at the working face if the circulation of air is reduced.

The same result is obtained whether dynamite or black powder is used and, sometimes, it is possible to ignite the gas produced by permissible powder. I have seen mice overcome by the deadly effect of these gases when venturing to crawl into what remained of an auger hole where a shot had been fired.

R. J. Pickett, in his letter, *Coal Age*, Feb. 9, p. 301, has referred to the dangerous practice of tamping holes with dummies filled with fine coal dust. I agree with him that this could not be done when the shots were fired with a needle and squib and the tamping had to be done more carefully. State laws, the instructions of powder companies, and one's own common sense warn against such practices.

It is poor argument to condemn the use of permissible powders when so little attention is given to properly preparing shots. These points cannot be too deeply impressed on miners whose prejudices are often deeply rooted.

In Indiana, in mines where no machines are used, I am informed that the prevailing practice is to shoot the coal off the solid and, if this is true, there is all the more reason for tamping the holes properly their entire length. The fuse should be of sufficient length that it can be lighted after the hole has been tamped fully to the face of the coal. W. H. NOONE.

Thomas, W. Va.

Examination of a Mine

Letter No. 3—It would appear from the letter of Robert A. Marshall, *Coal Age*, Feb. 2, p. 256, that the mining law of Colorado requires the fireboss to make but one examination a day, which is done before the men enter the mine in the morning. According to his statement, on returning from breakfast the fireboss is supposed to do whatever work the mine foreman may find most urgent.

In my opinion, that is not a safe plan to adopt in the operation of a gaseous mine. It is my belief that any mine generating gas or dust in dangerous quantity should require the entire time of the fireboss, who should make a separate examination of every working place in the mine while the men are at work. He should also make a separate report of such dangers as he may find in going about the mine the second time.

When making his second round the fireboss is very apt to find men who are violating the mine regulations or some requirement of the mining law. He should, in every case, report the names of such offenders to the mine foreman, as the health and safety of the workers and the security of the mine depend on the strict compliance of the men with every requirement of the law.

THE SECOND EXAMINATION IN PENNSYLVANIA

The Pennsylvania Mining Law requires a second examination to be made by the fireboss while the men are at work in their places. It is the custom there for the fireboss to start to make his second round immediately on his return from breakfast.

This time, he examines each working place where the men are at work. He not only examines the place for gas and to ascertain the condition of the roof, but gives any needed instructions to the men, in respect to setting timbers and mining coal with safety to themselves and others. The fireboss also takes note of what material is on hand in each place and orders any further material that may be needed.

I heartily agree with Mr. Marshall in his suggestion that we should do everything in our power to sidetrack the Grim Reaper, who constantly lurks about the mine seeking his victims. Where danger is discovered it is the fireboss' duty to withdraw the men from the place or remove the danger promptly. When a place cannot be made safe at once, a danger signal is placed at all entrances to the place and the men are withdrawn and not permitted to return to work, until it is again made safe. All such dangers must be reported promptly to the mine foreman, whose duty it is to give immediate attention to the removal of the danger.

Dubois, Penn. ROBERT WILLIAMS.

Danger and Discipline

Letter No. 1—Referring to the fact that the fatality rate in coal mining has exceeded the tonnage rate, during the past year, the statement is made in an editorial, *Coal Age*, Jan. 12, p. 67, that "there is little question but that greater discipline would result in reducing that fatality rate." I can heartily indorse this sentiment, but wish to add that there is a wide difference between discipline enforced in the mine, and the posting of "safety rules," which are so frequently ignored.

It is not difficult for even the casual observer to see that coal mines are being operated today under strained conditions. The miner is urged to dig all the coal he can and, in order to assist him in doing this, discipline is neglected and safety rules are too frequently suspended in the effort to increase the daily output of the mine.

NUMEROUS CAUSES OF LAX DISCIPLINE

Mine officials charged with the enforcement of safety rules become lax and, as a result, the miner takes many chances. The patriotism of the miner should lead him to employ every energy in producing coal, but patriotism does not call for the neglect of mine discipline and the setting aside of safety rules.

Owing to the unprecedented demand for coal and the scarcity of men, the miners' wages have been increased. This has drawn many inexperienced men from the farms to work in the mines. The result is that the standard of competency has been lowered and the fatality rate is bound to be increased.

In addition to the employment of many incompetent men in the mines, the tendency of experienced miners to take advantage of the leniency of mine officials in respect to mining rules and regulations helps to increase the number of mine accidents.

Because an experienced miner can put out a good turn of coal he is not disciplined for his disregard of safety rules, which not only endangers his own life but is a menace to others. Seemingly, little attention is given to the fact that one careless act, through lack of discipline, may result in the loss of several lives, and days of idleness when the mine must be shut down.

Mine officials appear willing to take these chances, claiming that they have to relax the discipline of the mine, for a time, during the present scarcity of labor and the great demand for coal. They say this is necessary in order to keep the men they have and get others.

Glancing over a mine inspector's report recently, I noticed that the question was asked, "Does the foreman enforce rigid discipline?" This question was followed by an unfilled space. Upon my calling the inspector's attention to the item, he remarked, "Practically, there

is no discipline in many of the small mines, now. In order to get and keep men, discipline has been thrown to the four winds in many instances." In response to my statement that "Soon the accident rate will be increased in the mine," he replied, "That is already true, today."

No one will attempt to deny that the effect of suspending rules of safety, for any reason whatsoever, will be to destroy all order and system and increase the accident rate. To require a strict observance of mine rules today, and permit their violation tomorrow, as some mine officials are doing, is equivalent to having no rules at all.

Necessity of Enforcing Safety Rules

While miners are frequently a little stubborn, my experience is that most of them are willing to obey rules of safety where they are consistently enforced in the mine. But, they are quick to take advantage where there is any laxity observed in the enforcement of such rules. My observation leads me to believe that, in a number of instances, the foreman is more to blame than the miner, because of his slack and inconsistent methods. But almost without exception the blame for an accident is laid on the miner.

To illustrate this fact, let me assume that the superintendent is pushing the foreman for an increased daily tonnage. In turn the foreman urges the miners to load more coal and, to do this and assist the boss to the extent of his power, many a miner neglects a piece of bad top that should be timbered before he loads his coal.

The miner takes a chance and starts to load his coal but is caught by the fall of the loose piece before he has finished the car. It may be that the boss came into the man's place while he was loading and observed the danger, but said nothing except to express his satisfaction at the number of cars being loaded. I want to ask, Where would the blame for such an accident rest—on the miner or on his foreman?

John Rose,
Dayton, Tenn. Former District Mine Inspector.

The Handling of Men

Letter No. 6—To my mind, the efficient handling of men is an important factor in coal mining, especially under the present labor conditions. To be successful in getting the most out of men and keeping them satisfied and contented, a foreman must be a good student of human nature. In dealing with his men he must use tact and diplomacy.

The coal-mining industry employs workers from all quarters of the globe. In our mines are found English, Scotch, Welsh, Irish, French, Swede, German, Russian and Italian workmen. In a few instances Chinese coolies from the Far East and Mexicans from beyond the Rio Grande are employed. These representatives of different nationalities each possesses characteristics peculiar to his race and often presents a marked contrast with the qualities of the American miner.

To deal successfully with these men, the foreign miner must be treated largely from his own standpoint or way of thinking and acting. Many individuals of the same nationality manifest certain traits peculiar to the section of the country from which they hail. Some may come from the north of England, others from the plains of Italy, and these present quite different characteristics. While the Englishman has a roundabout method of dealing, the Italian has a more decisive way and requires being treated accordingly. All have their prejudices and moods. The man who presented no difficulty yesterday may seem to be quite impossible today.

The foreman is often compelled to deal with these men not as he ought to, in view of their acts, but as his judgment and tact will suggest. Agreement with opinions and tastes, in some pososible respects, and the tactful changing of the subject when one cannot agree, will go far toward producing harmony and success. Patience is the mine foreman's greatest asset. To keep the confidence of these men the foreman must be absolutely genuine and sincere at all times. The successful foreman can never ride roughshod over his men. He must be human in his dealings with them. The methods of war have no place in a coal mine if the best results are to be obtained. Let every foreman study to please his men and he will find them more willing to please him and do his bidding.

Smithton, Penn. Robert Littlehales.

The Old Guard

Letter No. 1—A Foreword that appeared some time since in *Coal Age* [Vol. 12, p. 309] impressed me deeply at the time. It spoke of "recompensing loyalty" in faithful employees who, after a lifelong service of devotion to one company have been set aside for younger men, regardless of the fact that the experience and counsel of the older men are valuable assets in the economical and safe operation of the mine.

The truth conveyed in this Foreword, which might well have been entitled "The Old Guard," was forcibly brought home to me recently while shopping in one of the large department stores in a near-by city. In this store I observed two or more gray-haired men who had seen their 40 or 50 years of service and had probably been retired, only to be placed again in the harness owing to the urgent need when the war crisis had called younger men to the colors.

These members of "The Old Guard" were willingly doing their bit and serving beyond their time, as a loyal act to their employers. It occurred to me that the same loyalty to service would be displayed by more than one veteran in the mine service, and that their experience and knowledge of mining conditions would be valuable.

If "The Old Guard" render efficient service in the store, why is it not possible to secure the same efficiency by placing "The Old Guard" at the mines in positions where their mature judgment would be of service. The younger men can learn much from the experience of those who are older, and greater safety and economy would result. My suggestion, for the present emergency at least, is to put the "The Old Guard" back again in harness where they can render efficient service in work of which they are capable.

Berlin, Penn. Joseph A. Graves.

INQUIRIES OF GENERAL INTEREST

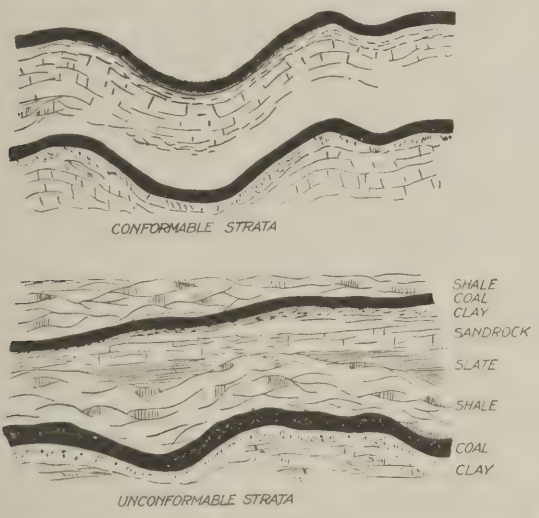
Conformity in the Coal Measures

I desire to ask for information in regard to the general correspondence of local dips and rises in two seams of coal separated by from 40 to 80 ft. of intervening strata. For example, when a dip or rise is found in the working of a lower seam is it reasonable to expect that a corresponding dip or rise will be encountered, at the same point, in an overlying seam? Or, say where a well-defined basin exists in one seam, would it be expected that a similar basin would be found in another seam lying a considerable distance above the first?

I would like to hear from men who have had experience in working seams overlying or underlying others that have been previously worked, and who have observed in regard to the occurrence of similar elevations or depressions in both seams at the same point.

Clarion, Penn. J. W. S.

Two seams lying in the same formation, although separated by 50 or 100 ft. more or less are very apt to present similar features at the same point in the seam. For example, as illustrated in the upper half of the accompanying figure, a general roll forming a syncline



IDEAL SECTIONS IN THE COAL MEASURES

or an anticline in the formation is very liable to affect both seams, but this is not always the case. As shown in the lower half of the same figure, it sometimes occurs that the intervening strata are unconformable between the two seams, in which case the configuration in the upper seam will not correspond to that in the lower seam.

The question of correspondence in the physical features in two seams, the one overlying the other, will depend on what has taken place between the time when the lower seam was deposited and that when the upper seam was laid down. There may have been a period of disturbance in the interim between the deposition of the two seams.

The disturbance may have elevated certain portions of the lower seam and depressed others, forming anticlines and synclines in the strata. Following this period of unrest, the upper seam is laid down on the disturbed formations, in which case its bedding would be practically level, where synclines and anticlines occur in the lower seam.

Again, during the period of the deposition of the two seams, there may have occurred a general elevation of the strata so as to form a land surface, and, before the laying down of the second seam, this surface may have been eroded by geological agencies such as wind, water, or ice, whereby a configuration results that is entirely distinct from that existing in the lower formations. Somewhat later, a sinking of the strata occurs and the upper seam is deposited over this area, which has been thus changed by erosion, and unconformity results.

It is evident that any disturbance occurring after the deposition of the two seams will affect both alike, and the same dips and rises that occur in the one seam will be found in the other. But, should such a disturbance occur during the period separating the deposition of the two seams, as has been described, the upper seam will not generally be found conformable in all respects, with the configuration of the lower seam.

The accompanying figure illustrates the two conditions, showing, respectively, conformity and unconformity in the strata enclosing two seams of coal. As previously stated, the former condition is the more common. Especially is this true throughout the bituminous coal fields, where there has been less faulting of the strata and violent disturbance that would give rise to unconformity.

We know that this question of the correspondence of dips and rises in two contiguous seams will meet with a hearty response from the many practical mining men who are interested in the Discussion department of *Coal Age*, and shall be glad to learn the results of their observations and experience.

Elevation of Outer Rail of Track

Can you give me a simple rule for ascertaining the proper elevation for the outer rail of a mine track?

Springfield, Ill. MINE SURVEYOR.

Stretch a line, as a chord of an arc, on the inside or gage line of the outer rail of the track, allowing 17½ in. in the length of the line, for each mile per hour in speed of hauling. The middle ordinate of this cord will be the required elevation of the outer rail. Thus,

For a speed of 4 mi. per hr., length of chord is 5 ft. 10 in.
For a speed of 6 mi. per hr., length of chord is 8 ft. 9 in.
For a speed of 8 mi. per hr., length of chord is 11 ft. 8 in.
For a speed of 10 mi. per hr., length of chord is 14 ft. 7 in.

EXAMINATION QUESTIONS

Utah Mine Foremen's Examination, Held at Price, Nov. 7, 8, 1917

(*Selected Questions*)

Ques.—If the total pressure upon a ventilating door is 400 lb. when the water gage is 2½ in., what is the area of the opening; and what is the height of the door if its breadth is 5 ft. 6 in.?

Ans.—A water gage of 2½ in. corresponds to a pressure of 2½ × 5.2 = 13 lb. per sq.ft. The total pressure on the door being 400 lb., the area of the opening is 400 ÷ 13 = 30.77 sq.ft. The breadth of the opening being 5½ ft., its height is 30.77 ÷ 5.5 = 5.59 or, say 5 ft. 7 in.

Ques.—Compare the perimeters and areas of the following airways: One airway is circular and 7 ft. in diameter; another 6 ft. by 5 ft. in section; and a third 5½ ft. square. State which of these airways you would prefer, and find the velocities, in feet per minute, when an air current of 12,000 cu.ft. per min. is passing in each.

Ans.—The circular airway has a perimeter of 3.1416 × 7 = say 22 ft. Its sectional area is 0.7854 × 7^2 = 38.48 sq.ft.

The perimeter of the rectangular airway is 2(6 + 5) = 22 ft. Its sectional area is 6 × 5 = 30 sq.ft.

The perimeter of the square airway is 4 × 5.5 = 22 ft. Its sectional area is 5.5 × 5.5 = 30.25 sq.ft.

When passing 12,000 cu.ft. of air per min., the velocities in these several airways are as follows:

Velocity in the circular airway, 12,000 ÷ 38.48 = 311.85 ft. per min.

Velocity in the rectangular airway, 12,000 ÷ 30 = 400 ft. per min.

Velocity in the square airway, 12,000 ÷ 30.25 = 396.69 ft. per min.

For the purposes of ventilation, the circular airway is preferred, because it gives the largest sectional area for the same rubbing surface; and it will therefore pass a large quantity of air for the same unit pressure, than either the rectangular or the square airway.

Ques.—What method of ventilation lessens the danger of an explosion and reduces friction?

Ans.—Splitting the air current in a mine reduces the danger of an explosion, by distributing the air to the different sections of the mine in proportion to their needs. At the same time, the velocity of the air current at the working face is reduced, with the result that less mine dust is carried in suspension in the air and the gases produced in each section are conducted at once to the return airway and carried out of the mine without passing into the other sections. In this system, a local explosion of gas or dust occurring in one section is not liable to be transmitted to another section of the mine.

Also, by dividing the air current into two or more splits, the same quantity of air is circulated at a less velocity, which greatly reduces the friction of the air and lessens the power necessary to produce the circulation. While splitting the air current does not reduce the danger of a local explosion occurring in a working place, it does reduce the danger of that explosion being extended throughout the workings of the mine and producing a mine explosion.

Ques.—If 13 cu.ft. of air, at the ordinary temperature and pressure, weighs 1 lb., how many tons of air is passing through a mine in 8 hr., where the current measures 52,000 cu.ft. per min.?

Ans.—The weight of air passing through the mine in 8 hr., in this case, is

$$\frac{8 \times 60 \times 52{,}000}{13 \times 2000} = 960 \text{ tons}$$

Ques.—What should be done in case of accident to a ventilating fan or its driving machinery?

Ans.—Notify the men and withdraw them from the mine as quickly as possible. In the meantime, keep the fan going at a moderate rate, if possible, until all the men have reached the surface. Use every means to keep up the circulation of air in those sections of the mine where a longer time is required to withdraw the men. To do this, short-circuit the air in other sections where the men have been withdrawn.

In a large mine, where considerable time will be required before all the men can reach the surface, it may be possible to install a steam jet in the upcast shaft. Or, perhaps, a wind cowl can be constructed at the top of the downcast shaft, or at the mouth of the slope, to deflect the surface wind into the mine, where there is a strong prevailing wind on the surface. This work, however, must not interfere with efforts to get the men out of the mine as quickly as possible.

Ques.—A current of 3000 cu.ft. of air is at the explosive point; how much fresh air must be added so as not to get a cap on the safety lamp?

Ans.—Assuming that this air current is charged with gas to its maximum explosive point when it will contain 9.46 per cent. of gas, the quantity of gas in this current is then 3000 × 0.0946 = 283.8 cu.ft. per min. The lowest percentage of gas that can be detected on an ordinary safety lamp, as an unbonneted Davy lamp burning sperm or cottonseed oil, is 2 per cent., although some firebosses have difficulty to detect less than 2½ per cent. of gas. Estimating on the lower percentage, the total volume of air and gas when a cap is just discernible on the lamp, would be, in this case, 283.8 ÷ 0.02 = 14,190 cu.ft. per min. The quantity of air to be added to produce this result would then be 14,190 — 3000 = 11,190 cu.ft. per min.

Again, taking 2.5 per cent. as the basis of estimate, the total volume of gas and air in circulation when a cap is first discovered on the lamp, would be 283.8 ÷ 2.5 = 11,352 cu.ft. per min.; and the quantity of air to be added, in that case, would be 11,352 — 3000 = 8352 cu.ft. per min.

COAL AND COKE NEWS

Harrisburg, Penn.

Reports that Governor Brumbaugh is considering the idea of an extra session of the Legislature have caused numerous suggestions as to legislation to be included in the call. It has been 12 years since an extra session was held, and one would cost about $500,000 or more, according to its length. Among the suggestions made to the Governor are waterways for carrying coal and mine-cave legislation. Several delegations from the anthracite regions have called at the Governor's office during the past week, urging the Governor to include a remedy for the mine-cave evil in his call, should he decide to convene the Legislature.

Suggestions that the Fuel Administration fix a premium of about 10 per cent. for quality, in addition to the new price of $3.05 for coal at the mines, was made on Feb. 20 by Representative Louis T. McFadden, representing the 14th Pennsylvania district in Congress. Mr. McFadden is quoted as saying:

"Now that the Fuel Administrator has fixed a price for coal at the mines of $3.05 a ton, there should be added to the price he fixes a premium of about 10 per cent. for quality coupled with a condition that any producing company shipping coal of poor quality should be penalized for so doing.

"This premium would be incentive to the operator to bring his coal to the highest possible standard. When he has so done the railroads would be relieved of carrying much of the refuse that is now being carried and which is of no use to the consumer when he gets it."

It is pointed out by operators in the central Pennsylvania district that under the new price ruling of Dr. Garfield, where the price of run-of-mine steam coal is set at $3.05 net, there is no longer any extra allowance permitted on smithing coal. The rule now is that smithing coal must be sold at the price of prepared coal in the district where it originates, and as there is no prepared coal shipped from the central Pennsylvania steam-coal districts, the price of central Pennsylvania smithing is now $3.05 net at the mine, or $3.20 jobbing.

Coal operators in the Pittsburgh District have again taken up the question of higher prices per ton and are now working on a uniform system of cost sheets on which to base an application to Washington for a higher price. For the benefit of mines using electrical power, the matter of curtailing power from the West Penn Power Co. and other companies to less essential industries is under consideration.

Plans were outlined at a conference of fuel administrators from the central and western counties of this state on Feb. 23, to accelerate production and equitable distribution of bituminous coal for Pennsylvania industries. Many vital war industries are hampered by lack of bituminous. At the same time it was decided to begin a clean-coal campaign at the mines.

J. P. Cameron, bituminous distributor, addressed the conference. He told the fuel administrators that his office was compiling data of the capacity of the mines, points of distribution, and such other details of the coal industry as will enable him to arrange a plan of equitable car distribution, so that each mine will operate on the ratio of its capacity. At present many mines operate every day, while others in the same district only work one or two days each week. It was the unanimous opinion of the conference that the advance in the price of soft coal from $2.45 to $3.05 a ton has stimulated production, many mines having resumed operation after being closed for several months.

B. Leopold, county fuel administrator at Altoona, told the conference that during the coal crisis of several weeks ago the loyal support of the railroad officials and employees enabled him to supply fuel to homes and industries. This, he said, was in defense of the Pennsylvania Railroad and its employees. One of the developments of the conference was that more than 110,000 tons of coal are mined annually in the winter season by farmers, who are agriculturists in the summer months and miners in the winter. These men refused to operate their small mines at the prices fixed by the Government.

With the price at $3.05 a ton, hundreds of farmers have agreed to resume work in mines employing less than a dozen men. The fuel of the farmer-miners is used solely for domestic consumption. However, every such mine that is not producing throws a heavier burden on the large producers.

Millions of dollars worth of culm banks are disposed of by a decision of the Supreme Court in the equity proceedings of W. L. Kramer, of Pottsville, against John Slattery, of Port Carbon. By the decision independent coal companies which years ago deposited culm on lands now owned by big coal corporations still own the culm, even though the land on which it rests has changed hands.

Kramer asked the county court for an injunction against Slattery, an independent coal operator, to prevent the latter from using certain culm claimed by Kramer. The county court refused the injunction, but the Supreme Court orders a hearing, after stating the law, and places the costs on Slattery. G. T. O'Donnell & Co., of Philadelphia, who claimed possession of the big culm banks at Loyalton, did not press their contention when the case was called in court on Feb. 23, the announcement being made that the case was discontinued. This leaves the big culm banks in possession of T. D. Bergen, of Pottsville. It was asserted by the Philadelphia concern that they had made arrangements to buy the banks from Bergen for $150,000 and that the check for the first payment was handed over. Bergen, however, asserted that the check was never cashed and the preliminary agreements were not carried out.

PENNSYLVANIA

Anthracite

Mahanoy City—A committee of 70 representative citizens has decided to build a hospital here for injured miners. An organization has been effected with Councilman John Adams as president and D. Hiram Morgan as secretary.

Shamokin—Every colliery in the Shamokin-Mount Carmel district was in operation on Feb. 22, the first time in history that the miners worked on Washington's birthday. Record production was reported by company officials. Foremen met the men at the shafts and slopes as they left the mines and thanked them for their patriotism.

Scranton—Following the announcement on Feb. 20 that the Government had fixed standards for the anthracite coal operators, and expected that in the future every colliery in Lackawanna County would turn out a cleaner and better grade of coal, Tudor R. Williams, fuel administrator, has ordered six breakers closed until such time as they can at least approximate those standards. Mr. Williams has stated that three or four others now being investigated will be closed unless changes in their methods of preparation are made. He would not divulge the names of the operators who had felt the strong arm of the Government, because, he said, he hoped they would make immediate effort to obey the law.

Notice has been served on St. John's Catholic Church, by the Delaware, Lackawanna & Western R.R., Coal Department, that it will soon begin mining operations under the edifice and that if the congregation desires to purchase the pillars as a means of safeguarding the property it should act immediately. The entire property is valued at $250,000.

Kaska—The Kaska colliery of the Alliance Coal Mining Co. will be reopened this spring and will be operated with Harwood power furnished by the Lehigh Coal and Navigation Electric Co. This colliery was closed down some years ago when a disagreement between the railroads made it hard to get a car supply.

Zehner—The East Point Coal Co., operator of the Pound Creek mines near here, is without a breaker and is sending run-of-mine coal to market.

Jeddo—The G. B. Markle Co. is erecting a steel washery at its No. 4 breaker, which will increase the output about 500 tons daily.

Ashland—The reclamation of the old Bickel colliery at Lavelle, near here, abandoned more than 20 years ago, began Mar. 1, when the Laurel Hill Coal Mining Co., controlled by Wilkes-Barre capital, put into operation its big breaker, the most modernly equipped in this end of the anthracite region. The breaker has been erected at a cost of $100,000. The reopening of the long abandoned colliery is to be followed by the reclamation of other abandoned mines in which there remain hundreds of thousands of tons of coal in supporting pillars and in the underlying veins.

Audenried—The Lehigh Valley Coal Co. has purchased outright about 260 acres of coal land from the New York & Lehigh Coal Co. The purchase was effective Jan. 1 and anticipates the expiration of a lease in April, 1918, which the Lehigh Valley Coal Co. bought from George H. Meyers & Co. in 1892, and under which it has been mining coal in the tract since that time. The coal mined from the tract is taken to the Spring Mountain breaker at Jeanesville for preparation.

Bituminous

Indian Head—The properties of the Indian Creek Collieries Co., controlled by Vernon F. Taylor, of Indiana, has been sold to Pittsburgh capitalists. The property includes 800 acres of coal land, 20 miners' houses, the Indian Creek mine and other buildings connected with it. The new company has started improvements on the property and is installing a modern electric plant. The consideration was not made known.

Vintondale—The floods during the past week closed several of the mines along Black Lick Creek. In most cases the mines are on the north side of the creek while the towns are built on the south side. During the night several of the bridges connecting the mines and the towns were washed away and the mines were idle for a few days because no men could get over the creek to their work. Temporary bridges were soon constructed and in a few days the mines were working full capacity.

Pittsburgh—The annual meeting of the mine foremen and firebosses examining boards for the various bituminous districts of Pennsylvania has been called for Friday, Mar. 8, at the Seventh Avenue Hotel, Pittsburgh. The meeting will be attended by about 100 of the leading mining men of Western Pennsylvania.

Dubois—William Black, a Luthersburg miner, is in the local hospital for treatment of horrible burns about the head, face and especially the eyes, caused by the explosion of a carbide light. Mr. Black touched a light in his lamp and the gas exploded in his face. It is feared that his sight may be permanently destroyed.

WEST VIRGINIA

Charleston—The Wolf Den Coal Co., with a mine at Shallmar, on the line of the Western Maryland R.R., expects to ship coal some time in March. Due to delay in receiving equipment development work had been held up.

Horner—The Stone Coal Co. is now shipping from its new mine near here.

Accoville—The operation of the United States Block Coal Co., located on Coal River, have been taken over by the Carbon Hill Collieries Co.

Mullens—The Norfolk & Western Ry. has been ordered by the West Virginia Public Service Commission to extend a spur track to the Trace Fork Coal Co.'s mine at Trace Fork. The coal company has to pay for putting in the siding and maintaining it.

Bluefield—The commissary of the Pocahontas Fuel Co. at Switchback was burned recently. The building was totally destroyed, and the loss is estimated at $25,000. A short-circuit is said to be responsible for the blaze. This is the second time this company's store and stock has been burned. The company is confronted with a problem, as there is no building at Switchback large enough to store the goods necessary to supply the miners. A modern brick store-and-office building is under construction.

Tunnelton—The Car-Diff Smokeless Coal Co., which has been developing a mine in the Upper Freeport vein of coal on a tract of about 800 acres, acquired a few months ago by it at West End, near Tunnelton, Preston County, West Virginia, is now ready to ship coal. The company expects to start shipping about 300 tons a day and increase as development increases. The plant is on the Baltimore & Ohio R.R. at the west end of the Tunnelton tunnel.

ILLINOIS

Virden—Twenty-eight cases of powder exploded at the Royal colliery here on Feb. 22. Four men were killed.

Marissa—W. F. McMurdo of Marissa, E. F. Winkler, of Belleville, August G. Koesterer of Freeburg and George Wombacher of Mascoutah have been named as a committee to issue licenses to mine owners and superintendents for the use of explosives and have begun issuing them.

Witt—Fourteen suits brought by local property owners against the Peabody Coal Co. for damages caused by the settling of the surface of the ground when the company removed the props from the Witt mine have been settled by the payment of $4000 by the company to the plaintiffs, who divided it according to the amount of damage each had sustained.

Troy—The Donk Brothers Coal and Coke Co. is experimenting with storage battery motors in its No. 3 mine here. They are intended to take the place of mules in the gathering of cars from the rooms.

Edwardsville—Prospecting is being done on a tract of about 12,000 acres in Pin Oak and Edwardsville townships, preliminary to important development work. It is understood that at least four shafts will be sunk. The tract is convenient to the Illinois Central in the vicinity of Mont and Kuhn Station, the Clover Leaf east of Edwardsville and the belt line south of Edwardsville. Circuit Judge William P. Early is interested in the enterprise.

Chatham—The new Solomon coal mine will be opened soon. It is estimated to produce from 3000 to 5000 tons of coal a day when mined to full capacity. A seam of coal 7 ft. thick is available. From 500 to 600 men will be employed.

Lincoln—The mine of the Lincoln Mining Co. will be wrecked and business suspended, as announced two weeks ago. An effort was made by business interests of Lincoln to save the mine for the benefit of the city's growth and development as an industrial center, but it was found that the expenses of checking the fire raging in the mine would exceed the profits of the company. Accordingly, the work of razing the mine buildings and of sealing the shaft, after a temporary delay during which it was hoped to save the industry, were continued.

Springfield—Four miners were killed in an explosion in a mine of the Citizens Coal Company. The dead are Ray Hiner, Henry W. Heichel, Thomas Reilley and Ernest Cox. All four of the men were shot-firers and were buried in the explosion. It is not known what caused the explosion. But little damage was done to the property of the mine.

Springfield—Evan D. Jonn, state director of mines and minerals, has announced the following itinerary of the Miners' Examining Board for March as follows: Duquoin, Mar. 7; Christopher, 8; Harrisburg, 9; West Frankfort, 11; Herrin, 12; Belleville, 14; Collinsville, 15; Litchfield, 16; Springfield, 19; Pana, 20; Danville, 21; LaSalle, 23; Peoria, 25; and Canton, 25.

Virden—Four men were killed by a powder explosion in the Royal Colliery mine here when 28 kegs of powder exploded. It was being hauled in the mine on a car and it is understood that it became ignited either from an overheated journal or some similar cause.

Springfield—Four shotfirers were killed in an explosion in the Citizen's Coal Co mine here on Feb. 23, in the early morning hours. They were buried beneath the wreckage. Three others in the mine escaped. The property damage was small. The cause of the accident is unknown.

INDIANA

Terre Haute—Fire recently destroyed a $30,000 tipple and mining machinery of the Jackson Hill Coal and Coke Co. Manager J. C. Kolsom reports that the company will rebuild at once, and that its output has been lowered 2000 tons a day as a result of the fire.

Linton—The Greene Valley Coal Co. has changed its principal place of business from Terre Haute to Linton.

KENTUCKY

Pineville—A runaway of 37 mine cars at the Elliott branch mine of the Federal Coal Co., at Pineville, Ky., resulted in the wrecking of a number of cars, spilling of coal all about the tipple, and damage to the tipple to such an extent that it became necessary to shut down the mine for several days.

UTAH

Hiawatha—The Black Hawk mine of the United States Fuel Co. produced Feb. 1 what is believed to be a record breaking tonnage for the Rocky Mountain district. On that day 3358 tons of coal were loaded into 60 new cars of the Utah Railway Co., there being an average of 112,000 lb. or 56 tons to each car. During the month of January the mine produced over 50,000 tons of coal, an unusually high record for Utah.

Foreign News

Sydney, Australia—The government of New South Wales has agreed to supply the States of Victoria, South Australia and West Australia with all the coal they need for a period of five years. The New South Wales Government intends to nationalize all the coal mines in the state.

Personals

Loyall A. Osborne, of New York, vice president of the Westinghouse Electric and Manufacturing Co., and chairman of the executive committee of the National Industrial Conference Board, has been appointed, by the Secretary of Labor, a member of a committee on industrial peace during the war. This committee, which consists of five representatives of employers, five labor leaders and two public men, will provide a definite labor program in order that there may be industrial peace during the war, thus preventing interruption of industrial production vital to the war.



LOYALL A. OSBORNE

George Carter, formerly chief coal inspector for the G. B. Markle Co., of Jeddo, Penn., has been appointed Federal Coal Inspector for the lower end of Luzerne County, Pennsylvania.

J. B. Hart, president of the Hartland Colliery Co., of Clay, W. Va., is temporarily managing the affairs of the company since the death of M. McDonald Price, who was general manager of the company's mines in Coal & Coke R.R. territory.

W. H. Thompson, for many years prominent in the heavy electric traction work of the Westinghouse Electric and Manufacturing Co., has resigned to accept the position of works manager of the Fairmont Mining Machinery Co., of Fairmont, W. Va., makers of coal-mining equipment.

Charles M. Means, consulting mining engineer, with offices in the Oliver Building, Pittsburgh, Penn., has opened a New York office at 90 West St. Mr. Means, who is well known to the coal-mining industry, has delegated all office work to a member of his staff, and spends most of his time in the Pittsburgh office.

F. O. McGuinness, for some time northern sales manager of the Bader Coal Co., and manager of the Buffalo office of the company, has resigned to become the purchasing agent of several coal-consuming concerns, with office in Buffalo. In consequence of the resignation the office of the Bader Co. will be closed.

Douglas Bunting, mining engineer for the Lehigh and Wilkes-Barre Coal Co., Wyoming Division, will succeed General Superintendent Newbaker when the latter leaves for his new post with the Berwind White Co., on Mar 1. **Arthur Lewis**, now with the G. B. Markle Co., at Jeddo, will take the position vacated by Mr. Bunting.

E. J. Newbaker, division superintendent of the Lehigh & Wilkes-Barre Coal Co., Wyoming Division, Wilkes-Barre, Penn., has resigned his position, effective Feb. 28. After Mar. 1, he will be associated with the Berwind-White Coal Mining Co., and will have headquarters in their offices, in the Commercial Trust Building, Philadelphia.

Thomas Haulton, of Pittsburgh, Penn., chief electrician and master mechanic for the United Coal Corporation and subsidiary companies, has resigned, effective Mar. 1, to accept a similar position with the George M. Jones interests in Ohio, with headquarters in Toledo. Mr. Haulton will be succeeded by his assistant, **James A. Malady**, of Elizabeth, Penn.

Henry G. Davis, of Kingston, Penn., formerly identified with the mining department of the Lackawanna Coal Co., has been named superintendent of the Wilkes-Barre division of the Lehigh & Wilkes-Barre Coal Co.'s collieries. The appointment was announced by C. F. Huber, president of the company, at a banquet tendered in honor of E. J. Newbaker, who recently resigned. Mr. Davis left the Lackawanna company's employ on Feb. 21.

Obituary

Elias Phillips, for many years a state mine inspector in central Pennsylvania, died Feb. 21 as he was entering the Adams Express office at his home in Dubois, Penn. He was in apparent good health to the moment of his death, and his decease from acute dilation of the heart was a severe shock to the community. Mr. Phillips at the time of his death was 58 years of age. He leaves a widow, three brothers and two sisters. Tis inspection district was known as the 4th Bituminous, and covered parts of Clearfield, Jefferson, Clarion and Clinton and all Elk and Cameron counties. Mr. Phillips was a practical miner, having swung a pick in his earlier years. In later years he had by frugality and good judgment become possessed of a comfortable competency.

George W. Theiss, president of the Theiss-Bygate Co., large coal operators of Pittsburgh, Penn., died Feb. 22, at the Eye and Ear Hospital shortly after he had taken a stroke on a street car while bound for his office. Mr. Theiss had been in the coal business in Pittsburgh since 1885 and was identified with several large operating companies there. He was a former vice president and director of the Monongahela River Consolidated Coal and Coke Co. and a director of the Pittsburgh Coal Co. He was also a director of the Duquesne National Bank. He is survived by his wife and one son.

John B. Hamilton, formerly a resident of Columbus, Ohio, who was prominent in coal mining circles, died at Los Angeles, Cal., recently at the age of 84 years. He was born in Scotland and came to America when four years old. He was the organizer of several mining ventures in the Buckeye State.

John F. Hunter, general manager of the Clover Bar Coal Co., Ltd., Edmonton, Alta., died suddenly of heart failure on Feb. 16 at the age of 45. He came from Winnipeg to Edmonton in 1910, where he engaged in the coal business and was one of the largest shareholders of the Clover Bar Coal Co. He leaves a widow.

Col. Reese A. Phillips, aged 55 years, former general manager of the Delaware, Lackawanna & Western R.R., Coal Department, died at his home in Scranton, Penn.,

on Feb. 22. Colonel Phillips started with the company as a breaker boy, and gradually advanced until he became general manager of the mining department. He directed the interests of the company until a few years ago.

Industrial News

Washington, D. C.—The executive committee of the International Railway Fuel Association has offered the services of the association to the conservative division of the fuel administration for such use as can be made of them.

Youngstown, Ohio—President S. Kerr, of the Sharon Steel Hook Co. announces that the construction of an additional blast furnace, a byproduct coke oven plant and houses for workmen are contemplated, but no definite action has been taken by the company.

Lexington, Ky.—The Garey Coal Co., 144 Short St., Lexington, recently organized by W. M. Hayes, C. E. Duff, J. T. Garey and others, to install a coal mine at Chavies, Ky., will receive bids in April for machinery for an open type of mine; daily capacity, about five cars.

East Pittsburgh, Penn. — The Westinghouse Electric and Manufacturing Co. announces the removal of its office from Phoenix, Ariz. to Tucson, Ariz. Its representatives, J. H. Knost and W. G. Willson, will have headquarters in the Immigration Building at the latter point.

Birmingham, Ala.—Operations have begun at the new shaft mine of the Birmingham-Tuscaloosa Coal Co., at Shiras, in the Blue Creek field, about 30 miles from Birmingham. The opening is on the Louisville & Nashville Railroad, and work has been in progress since last November.

St. Louis, Mo.—Five assistants to H. N. Taylor, fuel administrator for St. Louis, have been appointed by Federal Fuel Administrator Garfield. They are D. F. Cushing, Des Moines, Iowa; Charles Markham, Kansas City, Mo.; J. G. Puterbaugh, McAlester, Okla.; J. W. Hinton, Ada., Okla., and W. H. John, Bridgeport, Texas.

Columbus, Ohio—The Reliable Coal and Supply Co. is the name of a new retail concern located at West Broad St. and the Hocking Valley tracks. J. W. Bresnahan, formerly with the West Virginia Coal and Coke Co., is in charge as secretary and treasurer. Carl M. Deardorf is president. The authorized capital is $15,000.

Columbus, Ohio—The Hocking Valley Ry. Co. has been allotted about a dozen locomotives which were manufactured for Russian delivery. These locomotives are now in the railroad shops having finishing touches put on before being put into service. They will increase the efficiency of the road's motive power to a large degree.

Charleston, W. Va.—Government engineers are listening to the river coal men and boat men in considering plans for new locks and dams in the Ohio and Monongahela Rivers, as it is being urged that new locks should be made at least 700 ft. long, so that they can take through a complete coal tow without breaking it up.

St. Louis, Mo.—A judgment for $6000 has been given in the St. Clair County Circuit Court against the St. Louis & O'Fallon Coal Co. in favor of Mrs. Marguerite Eichhorn, of Belleville, for the death of her husband, Louis Eichhorn, in the so-called "Nigger Hollow" mine. She sued for $10,000. The company has filed notice of appeal.

St. Louis, Mo.—The Western Fuel Distributers Association, consisting of 26 jobbing concerns in St. Louis, which has been in existence since last summer, decided to disband this week in view of the fact that the jobbers' commission has been eliminated by Dr. Garfield. There were about 35 jobbing concerns in St. Louis, with a capital of about one-half million dollars invested.

St. Louis, Mo.—The ten municipal coal stations, which have been in operation since early in December, from which coal has been distributed to the poor at 16c. a bushel, were closed Mar. 1. The experiment is regarded as a success and the Board of Estimate and Apportionment has been asked to include in next year's budget an appropriation of $25,000 for the coal station next winter.

Indiana, Penn.—According to the annual report of State Mine Inspector Thomas S. Lowther, for the year 1917, there were 5,818,138 tons of coal produced with a total number of 5777 persons employed. There were 21 fatal accidents or a production of 277,054 per fatal accident. There were 11 new mines opened and an increase in production of 577,016 tons. The district comprises about one half of Indiana County.

Columbus, Ohio—Vigorous objection to lake shipment priority orders was made by county fuel administrators at the meeting held with Homer H. Johnson, Ohio Fuel Administrator in Columbus last week. A resolution protesting against any such orders, unless provision is first made to supply Ohio consumers with coal, was adopted. The national fuel administration at Washington will be advised of the action taken.

St. Louis, Mo.—The City Plan Committee of East St. Louis has recommended that the city grant to the Polar Wave Ice and Fuel Co. a permit to develop as a coal terminal 3½ blocks of property recently purchased by the company near the east approach to the Municipal free bridge. The plan is to install large concrete coal bumpers, sheds and tracks, from which to serve the business section of St. Louis with motor delivery.

Sedalia, Mo.—The coal dealers of this city have petitioned State Administrator Crossley that the Missouri zone to which Illinois coal is to be distributed be extended to include Pettis County. The western boundary of the zone is now just west of Jefferson City. Normally about 75 per cent. of the coal consumed in Pettis County comes from Illinois, and the dealers declare the supply from other sources is inadequate.

St. Louis, Mo.—The Coal Service Bureau is preparing to launch a "buy-early" campaign. Posters and literature will soon be issued urging householders to purchase their next winter's supply of fuel during the early spring and summer. State Administrator Crossley has given assurance that all the energies of the administration will be lent to the campaign and the St. Louis Fuel Committee will appoint a committee to coöperate.

Frankfort, Ky.—The Kentucky Railroad Commission has heard the protests of the Paducah Board of Trade, Mayfield and Fulton, Ky., relative to the increase in rates on western Kentucky steam and domestic coal. Steam coal was recently increased from 60 to 90c. a ton, and the railroads are endeavoring to increase the rate on domestic coal from 80 to 90c. a ton. The hearing was at the Paducah Board of Trade rooms.

East Pittsburgh, Penn.—The Westinghouse Electric and Manufacturing Co., has recently secured the exclusive sales agency for the United States for Frankel solderless connectors, widely used for joining electrical wires and cables. Manufacturing facilities have been increased by the Frankel Connector Co., in order to care for the new business to be secured through the Westinghouse sales organization. The Westinghouse company will act also as a distributor of Frankel testing clips.

Jefferson City, Mo.—Every town and city in Stone County, Missouri, will be "off" of coal next winter. Dr. C. D. Craig, fuel administrator for the county, has notified State Administrator Crossley that the entire county is pledged to wood until the war is over. There is an abundant supply of wood in the county and wood-chopping bees will be held during the summer. Dr. Craig says that by next fall the woodsheds of the county will have enough stovewood piled up in them to do for the winter.

St. Louis, Mo.—P. H. Greenlaw, Secretary of the Fifth and Ninth Districts Coal Bureau, has been appointed distributor for those districts, which supply most of the fuel needs of St. Louis. He will be in direct charge of the output of the two districts under the supervision of Dr. H. G. Honnald, of Chicago, fuel distributor for Illinois. Missouri Fuel Administrator Crossley and the St. Louis Fuel Committee have contended that the distribution from the Fifth and Ninth districts should be in the hands of a St. Louis man.

St. Louis, Mo.—St. Louis coal jobbers met Thursday, Feb. 21, and voted to dissolve their organization, the Western Fuel Distributors' Association, because of the order of Fuel Administrator Garfield abolishing the profit of 15c. a ton which they have been receiving since the Government fixed the prices. A suggestion that the organization join with the national organization in fighting the order was vetoed or account of the expense that would be involved. St. Louis jobbers expect to be forced out of business unless the order is rescinded or modified.

Hazard, Ky. — Due to the freight-car shortage, over 75,000 tons of coal which could have been shipped out last week was held up, according to a report of District Fuel Administrator A. R. Hord, who stated that the report of the week showed that the companies of the Hazard field were able to fill approximately 470 cars, while only 208 cars were received on average days. About 44 per cent. of the amount that could be shipped was actually moved. Mr. Hord stated that it was not a real shortage of cars, but a shortage of cars at the mines, due to the inability of the railroads to move the coal.

Rockdale, Texas — Henry G. Butler & Sons, of Hillsboro, Texas, have purchased 1238 acres of lignite lands near Rockdale, in Milam County, and will soon begin mining operations there on a large scale. The land purchased lies about 9 miles southwest of Rockdale and has long been recognized as virgin lignite fields, heavy veins having been found as near as 25 ft. of the surface. Of the land purchased, $30,000 was paid for a tract of 629 acres and $24,000 for another adjoining tract of 609 acres, giving 1238 acres in one solid block. Announced plans of the Hillsboro firm contemplate building a railroad from the nearest point on the International and Great Northern R.R., a distance of about 5 miles, and installing large steam shovels for stripping purposes.

Milwaukee, Wis.—To insure service and every possible assistance to the various departments of the U. S. Government in Washington, D. C., the Cutler-Hammer Manufacturing Co. has arranged to locate H. W. Knowles, of their New York office, permanently in Washington for the period of the war. Mr. Knowles entered the service of the Cutler-Hammer Manufacturing Co. shortly after graduating from Cornell University in 1912. He spent nearly five years in the shop, engineering department and sales department at Milwaukee. Since May of last year he has been connected with the New York district office, Hudson Terminal Building. The Washington Cutler-Hammer branch will have its headquarters at The Bradford, corner 18th and K Sts., telephone, Main 8426.

Cincinnati, Ohio—Members of the Cincinnati branch of the National Coal Jobbers' Association met at the Hotel Sinton on Feb. 21 to consider what action should be taken by them in connection with the plan of the Fuel Administration, as reported, to eliminate the jobbers' profit and, therefore, the jobber. The elimination of the permitted 15c. profit now allowed jobbers would force the operators to sell direct to large consumers, and to leave small consumers to their own devices, in the opinion of Cincinnati jobbers, thus causing considerable distress by leaving small consumers without means of getting coal. Fred Legg, of the Logan and Kanawha Coal Co., presided as president of the Cincinnati jobbers. A telegraphic protest was sent to Washington, and the jobbers will await the result of conferences which have been held with Fuel Administrator Garfield.

Cincinnati, Ohio—The stimulus given by Washington to the cause of water transportation has been felt more directly in the Ohio Valley, perhaps, than anywhere else in the country, and action looking to more extensive use of the river, especially in coal transportation, is being planned by several organizations, notably the Ohio River Imporvement Association and the Chambers of Commerce of the several principal cities along the river. A company with a capital stock of $600,000, with a fair return on the investment to be guaranteed by the Federal Government, has been proposed, and another plan contemplates Federal control of such a company. All interests agree that Federal support is necessary for the success of a venture large enough to handle traffic on a large scale, and to compel railroad coöperation, lack of which has been one of the chief causes of the decline of river traffic during the past generation.

Cincinnati, Ohio—The United States Circuit Court of Appeals, after hearing the arguments of all interests involved, is considering an application of the Central Trust Co., of New York, trustee of the bonds of the Continental and of the Kanawha & Hocking Coal and Coke companies, for instructions from the court as to the proper manner of making collection from the Hocking Valley Railway Co. of judgments against that company obtained by the New York Central Railroad Co., owner of the bonds, aggregating $2,500,000.

MARKET DEPARTMENT

Weekly Review

This Winter's Coal Troubles Almost Over—Transportation Improved, Though Cars Are Still Short at Mine—Trade Awaits Announcement of New Prices

A SURE sign that fuel troubles are almost over for the present is evidenced by the fact that the country as a whole is now laying plans for next season's requirements instead of worrying about immediate needs. Even the situation in New England shows signs of improvement, better weather having enabled the movement of more coal from the southern tidewater ports via all-rail and Long Island Sound. Beyond Portland, however, the ports are still closed by ice. The shortage of vessels also continues to be a deterrent.

Though transportation conditions in general show marked signs of betterment, much of the freight congestion having been cleared away, there are still well-founded complaints of a shortage of empty cars at the mines.

Receipts of anthracite at tidewater are more plentiful; but the demands for this, as well as for any grade of coal, are still strong. Bituminous coal is extremely short. The output in January was the lowest for any month since September, 1914, owing to inadequate car supply and railroad congestion. "Give us more cars, and we'll flood the country with soft coal," say the bituminous operators; and statistics show that they can do it.

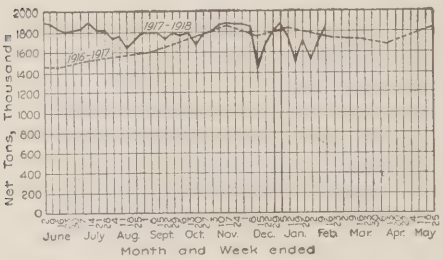
Prices for the most part are based on contracts entered into before the Federal price regulations went into effect, and there is little, if any, spot coal offered. No new contracts are reported, the trade evidently waiting for the announcement of the new price schedule promised before Apr. 1.

The anticipated elimination of the jobbers' commission has caused much criticism, as it is considered that this branch of the trade performs an important function.

Great care is still necessary in distribution and consumption, as no large reserve stocks of coal exist. Bunkers and bins were scraped bare during the past three months, and coal will neither be cheap nor plentiful this year.

COAL PRODUCTION

Production returned almost to normal during the week ended Feb. 16. The total bituminous output, including lignite and coal made into coke, is estimated at 11,084,000 net tons, nearly a million tons greater than in the preceding week. The average production per working day was 1,847,000 tons, as compared with 1,753,000 tons, the daily average for February of last year. The performance per working



day was better than at any time since early December, except during New Year's week. Indeed, because New Year's week contained but five working days, last week's total production exceeded that in any week since Dec. 8. Beehive coke shared in the recovery experienced by the bituminous industry as a whole. The total production for the week is estimated at 557,000 net tons, an average per working day of 93,000 tons.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

	Jan. 26	Feb. 2	Feb. 9	Feb. 16
Bituminous, shipments, 121 roads	181,471	170,552	181,586*	199,136†
Anthracite shipments, 9 roads	33,406	34,482	32,011*	35,486†
Beehive coke shipments, 4 roads	10,408	9,655	10,470*	11,425†

*Revised from last report. † Subject to revision.

Atlantic Seaboard

BOSTON

Situation less acute and Monday holidays discontinued. Naval collier turned over to Fuel Administration opens gate to manufacturers for limited supplies. Large tonnage still being distributed for domestic use. Army quartermaster's department helps secure ships for New England. Receipts by water gradually increase, but far behind requirements. Railroads still on narrow margins and large textile and other plants are able only to get coal for a few days at a time. Panama R.R. colliers to stay in coastwise service for the present. Rail shipments very disappointing. Several mines previously shipping on "New England order" are having output diverted on Government requisitions. Outlook not very hopeful for spring shipments unless more bottoms are secured.

Bituminous—"Blue Mondays" are given up and those industrials having coal on hand have resumed operations on a normal basis. Many of the very small plants have been able to get fuel for a week or two ahead, but the larger the plant the more difficult it is to be assured a continuing supply. Mills burning 1 to 3000 tons weekly are patching along from day to day with the liberal use of culm and other substitutes, but unless arrivals show material increase there will be small chance of steady operation. What hope there is lies with the different departments at Washington, where officials are enough interested in the output of various New England plants to bring pressure to bear upon the authorities who have the disposition of ships. It is impossible to get sufficient supply all-rail under present conditions. Cars are taking six weeks to reach destination from the mines in many cases and all hope of early relief in that direction has long since been given up. It is fair to say, however, that the general situation is less acute, due largely to the mild weather and partly to somewhat better receipts of water coal. In Boston, deliveries have been resumed to all steam users, although in Portland, Maine, Springfield and Worcester, Mass., there is still great anxiety over the immediate future. The quantity of bituminous available for retail distribution is small, although domestic requirements have priority over practically everything but railroads. Local fuel committees vary in their handling of the problem, but all of them will go to most any lengths before permitting a factory to shut down at the expense of hundreds of operatives.

The naval collier "Jason," 10,500 tons, turned over to the New England Fuel Administration, by Secretary Daniels, for one trip, was a boon to manufacturers who are working on Government contracts. Practically half the cargo was distributed to munition plants and others rated 80 to 100 per cent. on army or navy requisition and centers like Lowell and Lawrence were spared a period of enforced idleness. Several mills elsewhere were closed until this supply reached them, and almost the entire balance was used to help the Boston & Maine R.R. in operation. This one cargo accomplished a great deal of good, coal being sent from it as far as Rockland and Newport, Maine, and to St. Albans, Vt. The eagerness with which applications were received showed that consumers all over New England were but waiting for the slightest sign of encouragement to make their demands heard. The fact that the fuel authorities are actually distributing on a comprehensive scale is leading many to conclude that a large volume of coal is likely to be handled in this way for several months to come and consumers of all kinds are anxious to get their names on the "emergency list." So long as receipts continue on the basis of last week, there will be enough to keep a large proportion of the "essential industries" at least in partial operation.

Retail dealers are unable to supply the demand for bituminous for household use. Should this continue it will have a material bearing upon the situation. People are finding out that even the high volatiles can be used and until some encouraging program of anthracite distribution is adopted, there will be many who will try to secure soft coal while it can be had. It is being made plain that New England's supply is dependent more than anything else upon ships, and the appearance of any surplus of bituminous in dealers' yards will be the signal, it is believed, for active buying on the part of the average householder.

The war department, through the quartermaster-general and its interest in the output of New England mills, is a most powerful factor in getting coal for this territory. Officials at Washington are now somewhat impressed with the slogan, "No coal, no supplies"; and within a few days the shipping control committee has put at Mr. Storrow's disposal the "Proteus," 11,000 tons, the "San Francisco," 8300 tons, and the "Angasea," 4300 tons, all available for prompt loading. At best, however, these ships can hardly make more than three trips a month, if that, and the tonnage thereby added is only a help. Several more moves of the same order are necessary to keep industries here up to normal efficiency.

To Feb. 16 receipts since Jan. 1 aggregated only 739,000 tons, while current needs are at least 2,000,000 tons a month. At this rate the individual reserves which have kept many plants running will soon melt away. A railroad which has always considered it unsafe to have on hand less than 60 days' supply in winter is now dependent upon emergency deliveries through the Fuel Administration.

At the same time receipts here have gradually increased beyond the January figures; the difference is that consumers in general have far less on hand. Every week sees a larger number of manufacturers and utilities joining in the demand for current supply.

If the delegations of labor men and textile manufacturers accomplished nothing else at Washington they secured a promise that the Panama R.R. colliers would continue in the coastwise service. Two of them will bring 25,000 tons every week, or approximately 100,000 tons monthly. While that is not an overwhelming supply its regularity is a real factor. It enables distributors to spread the coal over a wider area and therefore serve the greatest possible number of cases. Could there be several more such units the problem would be simpler.

Rail movement is not improving to the extent relied upon. The long hauls to which a large proportion of cars for New England is subjected have a bearing on the number allowed to come in this direction. As Government needs become more urgent, because of other mines falling in arrears, operations hitherto passed over by the authorities are now receiving their full share of department requisitions. This is particularly true of mines designated to ship to New England on the Garfield-McAdoo orders of Jan. 3, and it is true that mines called upon to ship a percentage of foreign railroad fuel now have that percentage increased. The net result is reduced shipments all-rail for consumers not railroads or directly concerned in war activities.

The wholesale trade is in a helpless state. The standing of the "jobber" is apparently subject to later developments and to what extent the "zoning system" is to be adopted remains undetermined. No program of distribution is outlined and a new "season" is supposed to open a month hence. Nothing has been heard about contracts the past week, there being a decided lull in that respect. For all the eager inquirers there is no answer at this writing.

L. A. Snead, of the U. S. Fuel Administration, visited Boston last week on his country-wide tour of investigation. He explained his errand to the press and stated his belief that a rational system of distribution would soon be in effect.

Anthracite — Domestic sizes are very scarce and even the retailers in most favorable position are without anything like a continuous supply. A large volume of silt and other classifications of "anthracite" help swell the tonnage, but are of advantage only to steam plants that are especially equipped to burn this kind of fuel in connection with bituminous. Shipments coastwise are also intermittent, loading at Philadelphia and New York being hampered by light receipts.

NEW YORK

Local situation shows improvement. Jobbers up in arms against Garfield's proposed order eliminating them. Strong opposition develops and consumers enter the fight. Plans considered for preventing a repetition of this winter's shortage. Car supply improves.

Anthracite—The local situation has been enlivened this week by a number of conferences concerning the future of the coal business in this city, some reports of civic and business organizations and the beginning of the Board of Aldermen's inquiry looking to future prevention of a coal famine such as existed in this city this winter. In addition one of the Brooklyn retail dealers has submitted a plan whereby a consumer can be prevented from hoarding coal; in other words, it is a plan for proper distribution of coal.

A week of moderate weather has resulted in a slight improvement in the anthracite situation. Demand has not been as urgent, but dealers find a waiting market for all the supplies they can get. Movement toward tidewater from the mines is somewhat better, but even at that there is no surplus at the docks and the retail dealers have little in their bins. Everybody is being cautioned against a too optimistic view of the situation and are told to be conservative in the use of fuel for some time to come.

With a view of preventing a repetition of this winter's conditions, L. A. Snead, one of Dr. Garfield's assistants, who has been placed in charge of coal distribution, held a conference here on Washington's Birthday with a committee of wholesale and retail dealers. Plans were discussed which provide for the storing of coal during the summer by the retail dealers, this coal to be used in an emergency. Details concerning these plans will not be made public until they are submitted to Dr. Garfield. It is known, however, that they provide for the storing of the coal in a spot where it will be available without towing it through waters that might be filled with heavy ice. Another matter discused was Dr. Garfield's proposed order affecting jobbers. The retail dealers expressed themselves as being decidedly against the decision of Dr. Garfield and were asked to submit a brief setting forth their views to the Fuel Administrator.

The Merchants' Association, through its Committee on Inland Waterways and Water Storage has asked the War Department to make a survey of the Delaware & Hudson Canal and the Morris & Essex Canal with a view of resuming their use as anthracite coal carriers. The Broadway Association has submitted a report to Mayor Hylan recommending among other things an enlargement of the bins of apartment houses, hotels and manufacturing plants to accommodate larger supplies of coal.

The inquiry of the Board of Aldermen's committee which started on Monday of this week, is expected to develop a plan by which the city can go into the coal-selling business. It was said by one of the witnesses that by licensing the dealers and buying and selling coal the city could stabilize the price and in that way benefit the public. It was also testified that during the four weeks ending Feb. 16 the coal delivered to cellar dealers amounted to 41,536 tons.

In the proposed plan for the proper distribution of coal suggested by the Brooklyn dealer an authorization card is issued for each building or subdivision thereof; 1000 lb. of coal shall be the maximum seasonal allowance for every 1000 cu.ft. of building, and 1000 lb. of coal shall be the maximum seasonal allowance for every 1000 sq.ft. of exposed wall area.

Taken as a whole, the New York market shows an improvement. Receipts, with the exception of one day when there was a heavy storm, show daily increases and most dealers have been able to take care of their trade in fairly good shape. Unless there should come a severe storm or intense cold weather no serious condition as the trade experienced a few weeks ago, is expected again this winter.

There continues to be little change in the anthracite steam coal situation. Owing to the moderate temperatures, consumption has not been heavy and dealers have a little more freedom in delivery.

Current quotations, per gross tons, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buckwheat	4.30@5.00	5.50@5.80
Rice	3.75@3.95	4.50@4.80
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous — Jobbers are thoroughly aroused over the proposed order which will practically put out of the coal business about 10,000 jobbers throughout the country and who, it is estimated, handle about 85 per cent. of the coal supply. The jobbers doing business in this market are bending every effort possible to secure a change or a cancellation of the proposed order, which, it is said, Dr. Garfield has decided to issue, or in ascertaining some means whereby, without violating the rulings of the Fuel Administration, they can continue in business and maintain the trade which had been built up, probably after many years of hard work.

With this latter idea in view a largely attended meeting of jobbers was held at the Whitehall Club on Monday of this week (Feb. 25), which was addressed by Gibbs L. Baker, a Washington, D. C., attorney, and who is the Washington council for the Wholesale Coal Trade Association of New York. Mr. Baker explained in detail the Fuel Administration law and what the proposed order, if issued, would mean. He said that he was of the opinion that with the order promulgated, the only way the jobber could remain in business and not violate the law was to act as a purchasing agent for the consumer, by making an agreement to purchase the coal at the fixed Government price, the consumer to compensate the purchasing agent for his services. It was further explained that the purchasing agent must have the orders for the coal before attempting to make the purchase from the mine operator.

It was suggested that Dr. Garfield be asked to fix a definite percentage per ton, or other compensation to be paid said purchasing agent and that licenses be issued for such agents.

Local conditions show some improvement. There is no surplus supplies at the docks, but receipts have been larger. Demand continues heavy and all coal received here is apparently under orders as free coals remain out of the market.

Production which was reported as showing a 15 per cent. increase for the week ended Feb. 16 was slightly interrupted this week by floods; but these were not as serious as expected. Several mines, however, were closed because of high water.

Car supply is better, the mines along the Pennsylvania lines reporting about 10 per cent. of their requirements being received while those along the Baltimore & Ohio got about 20 per cent. of their needs. The mines along the New York Central received about 60 per cent. of their requirements. Some operators say that with 60 per cent. of the full car requirements available they would be able to flood the market with coal.

Nothing is heard regarding the making of new contracts for the coal year beginning Apr. 1, and it is the belief of many dealers that few, if any, will be signed, the operators deciding apparently to sell their product to anyone who desires it. The same rule, it is believed, will apply to the railroads, although it is expected the mine producing the quality of coal desired by the roads will naturally receive sufficient cars to furnish the coal needed.

Many plants in this vicinity continue to be short of supplies, but there is not the worry over future receipts that existed a couple of weeks ago.

The order issued by State Fuel Administrator Wiggin under date of Jan. 1 providing for six lightless nights each week was rescinded on Monday of this week to take effect Mar. 1, but Mr. Wiggin reminds the public that the order from Washington calling for two lightless nights each week, Sunday and Thursday, remains in force. Mr. Wiggin also rescinded his order of Jan. 2 in regard to reductions of light and heat for buildings.

PHILADELPHIA

Anthracite improvement continued by better weather. Demand still exceptional, with receipts fair. Authorities insist on good preparation. Public lessons in fuel conservation. Dealers annoyed by calls for statistics. Opposition to April reduction. Bituminous shipments short. Future promises improvement. Much coal confiscated. New price meeting with favor. Brokers at sea. Government distribution plans cause interest.

Anthracite—Springlike weather early in the week and quite liberal shipments, especially from the largest operating company, caused the dealers to think the winter's troubles had passed. Some of the smaller yards where the tonnage is not heavy were rapidly catching up with their deliveries. Late in the week another cold wave started the cry for coal all over again. Nevertheless conditions in general are much easier than at any time since last October, and the retailers as well as the fuel authorities are giving much thought to the new coal year, which commences Apr. 1. Mr. Lewis seems determined not to allow the present large number of 230 yards to be increased, and again expressed the wish that they could be reduced to a dozen large, well-equipped plants scattered through the city.

This week the preparation of coal has been given more attention and publicity than for many months. Federal Trade Agent Sherman A. Cuneo is on the trail of dealers and anthracite operators who would disregard the orders against poorly prepared coal. Special efforts are now being made to have the coal properly prepared, inasmuch as the State Fuel Administrator is out with a strong statement to the public advising them to "store coal in the summer, the quicker the better." He says he is determined to spread his buy-coal-early propaganda so efficiently that more cellars than ever will be filled with next winter's supply during the spring and summer, when railroad conditions are ideal.

Dealers who accept inferior coal from the shippers will be obliged to prepare it properly and charge the cost of it to the operators. The battle for good coal is on and Mr. Potter assures the consumers they can safely buy it from now on. Already the inspectors are active and this week numerous dealers had shipments condemned and were forced to rescreen and otherwise prepare it before delivery

to the consumer. The news reached the city this week that the fuel authorities in Luzerne County had closed down six small breakers because of failure to heed the injunctions to cleanly prepare coal.

The committee has also issued rules covering the amount of small coal allowed in the sizes from pea down as follows: Nut coal not to exceed 3 per cent. No. 1 buckwheat; pea coal not to exceed 3 per cent. No. 2 buckwheat; No. 1 buckwheat to be free from No. 3 buckwheat; No. 2 buckwheat to be free from dirt through $\frac{1}{16}$-in. mesh. Smaller sizes to be considered dirt in these four sizes if exceeding the limits named.

This week the retail trade received letters from Chairman Lewis advising of word from Washington to the effect that local dealers will probably receive during the year commencing Apr. 1, 1918, the same amount of prepared coal and from the same sources, as in the corresponding period beginning Apr. 1, 1917. Then they are asked to supply promptly exhaustive figures showing all shipments in sizes and naming the shipper from April, 1916, to date. Most dealers are disgusted at being compelled to furnish so many details of their business, requiring as it does many extra hours of clerical work. While these calls for information have been many and varied, they are always responded to.

No definite information is obtainable as to whether there will this year be the usual spring reduction of 50c. per ton. In this connection it is important to bear in mind the statement made in the letter of Dr. Garfield to President Wilson, recommending the increase of 35c. in anthracite prices on Dec. 1 last, which letter was issued as a part of the order signed by the President. This statement is as follows: "In this connection I desire to say that it is my expectation to order the reduction in anthracite prices which has been regularly given, beginning Apr. 1, 1918." Despite this the dealers are decidedly against it, for as soon as such an announcement is definitely decided upon the dealers will be flooded with more orders than they can handle. With no positive assurance of what tonnage to expect and with the advance of 10c. each month for five months, they claim they would be placed in the same false position as last year. It is known that the various coal exchanges are opposing the reduction. Chairman Lewis, too, in answer to the question whether consumers could expect lower prices, tersely answered: "I hope not. It would result in great confusion." The question of reducing the gross margin of $2.50 allowed retailers is still under discussion, but as yet the committee does not feel justified in reducing it.

While the agitation is on over the April prices many dealers are taking the opportunity to endeavor to align themselves with new shippers, beginning with the new coal year, with the hope that they may possibly be able to add at least another shipper to their list. While the calls of this kind are increasing of late, little encouragement is given, as no one knows at this time just what regulations the Government will put into effect.

Once more the question of reducing the number of prepared sizes to two has bobbed up. This time it was started by the recent convention of the retail coal men in Baltimore, who went on record as favoring it. It would be an innovation if the Government should order this change, which it is declared could be made with little trouble, as the screens for the new sizes are mostly on the ground, since the fiasco when the operators attempted it about two years ago.

Complaints from West Philadelphia consumers that local dealers are charging over $10 a ton were analyzed by the local administrator and in each case it was found that with everything added, including jobber's commission of 20c. and independent's premium 75c., the rate could be justly charged under the law. There are some who claim the greatest questions before the fuel administration are the premiums allowed the independents and the commissions to brokers.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5 90	$6 05	Buck	$3 15	$3 75
Egg	4 80	6 00	Rice	2 65	3 65
Stove	5 05	6 35	Boiler	2 45	3 55
Nut	5 15	6 40	Barley	2 15	2 40
Pea	3 75	4 65			

Bituminous—The receipts of bituminous are still meager, with conditions about as they have been for a week past. The one encouraging feature is that the improvement in car supply that began about ten days ago gives evidence of continuing, but most mines are still without an adequate supply. As has been the rule for some time, the operators are receiving the greatest number of cars to load for railway fuel and priority orders. Some operations complain that they have received barely any cars for free loading and claim it is unjust to confine them to orders of this kind, as they are thus compelled to neglect their commercial trade which has taken them years to build up.

All coal, except such as is still under contract, is now being sold at the new Government price of $3.05 per net ton, including smithing coal, which now comes under the same price-fixing order. As times goes on the new price seems to meet with more general satisfaction, and it is thought it will do a vast amount of good in stimulating production. The brokerage trade also is using this price as a basis for their sales, with the commission added, but there continues to be much confusion among the commission trade regarding their status after Apr. 1, following the Fuel Administration order as to this feature of the trade. So far there have been no indications that the larger operators who, while maintaining sales offices of their own also sell a portion of their tonnage to brokers, will sell brokerage coal at less than the $3.05 price. While there is much anxiety on the part of the brokers, we seem to feel that before Apr. 1 the situation will be adjusted to their satisfaction, as they have always formed a most essential part of the bituminous trade.

The news that the Government is working on a comprehensive plan for fuel distribution, by dividing consumers into four classes, was received here with a great deal of interest. It is understood the plan is being worked out jointly by the Fuel Administration, the Shipping Board and the Army and Navy Departments. It is presumed also that any such scheme as they adopt will conform to the plans already developed for shipping according to the zone in which the coal is mined. The zoning committee for this district is still busily at work in their office here, but progress has been much slower than expected, as the further they get into the subject the more complicated it has become.

It is also rumored that under the new shipping plans there will be a heavy curtailment of lake tonnage, especially that portion destined for re-shipment to the Far West, such as the Dakotas, which section of the country will be expected to draw their supplies from the mines in near-by states.

This week the United States District Attorney caused the arrest of the local sales agent of a West Virginia mining company, claiming that sales had been made at prices in excess of the Government maximum. The outcome of this case will be closely watched, as it is thought it will bring out rulings on many technical points of the price-fixing order which have not been clearly understood from the beginning.

The demand for coke continues to be far in excess of the supply, especially since the production for January was much below normal. However, it is thought that with better conditions as to price prevailing at the mines there will be a corresponding increase shortly in this branch of the trade.

BALTIMORE

Roseate statements from Washington about improved coal tonnage are not reflected in supplies here, where industries are barely skating through. Many schools still closed for lack of coal.

Bituminous—The coal trade here fails to reflect through actual fuel supplies the optimism of the roseate statement made from Washington at the outset of the present week that milder weather has brought an almost normal tonnage movement. For this territory the story is told at the diversion points of the Government in West Virginia and western Maryland, where Government preferential orders so far exceed the coal awheel at the eastern gateways that there is little or no chance for directly consigned industrial contract coal to get through unchanged from its original marking. In this city numerous industries are just barely getting enough coal to operate, and a number have undoubtedly curtailed production through lack of fuel. The fuel administrator's local committee is still hard pressed at times to find enough fuel to go around to meet even the worst needs. One of the oddities of the past week was that at times there was much more coal on tracks here for export than for all other business combined, and yet this coal could not be loaded because there were no bottoms to receive it and much of it had been standing at tide for two weeks or more. Because it was export-price coal and could not be sold locally without a big loss, it had to remain idle while local industries went without fuel. The jobbing interests here are still at sea over Garfield's commission-eliminating order, except that they feel that it will put jobbers out of business. Legal advice has been generally sought and the whole affair is likely to be plunged into the courts shortly.

Anthracite—Supplies here have been a little easier, but the demand is far in excess of the supply. Much milder weather brought less urgent call, and there was not so much necessity to divert industrial coal for domestic use. Thousands of homes here are still without coal of any kind, however. The lower grade schools of Baltimore have all been closed since before the Christmas holidays. Mayor Preston has appealed to Washington for fuel so the schools can be reopened, but while relief has been promised the coal has not as yet arrived.

Lake Markets

PITTSBURGH

Operators disappointed by continued poor car supplies. River open and supplies adequate locally. Opinion on prospective new price regulations.

Railroad conditions in the past week have been decidedly disappointing from the viewpoint of the coal operator, whom the reports of constantly improving traffic conditions had led to expect a large increase in car supplies. Instead, there has been practically no increase, and some mines have fared worse in the past week than previously. That the railroads have improved their own position is not denied. Doubtless they have done so by clearing up much of the congestion caused by loaded cars, but they have not improved the position of the shipper, who does not receive materially larger supplies of empties than formerly.

The Monongahela River continues open and coal is coming down rather freely, the mills depending on river coal now having little difficulty. With mild weather demand for domestic coal has slackened and there is not much difficulty in that quarter, so that the local situation is in fairly good shape. R. W. Gardiner, district distributor, has had added to his territory the mines on the Pan Handle division of the Pennsylvania. This covers the branch of the Pittsburgh seam that runs due west from Pittsburgh into Ohio.

The coal market is narrow, scarcely any free coal coming into the open market. It is ruled that when diversions of coal occur by order of the Fuel Administrator the recipient shall pay either the set price, plus the brokerage if a broker figures, or the contract price in case the coal had already come under the ownership of the original buyer, against a contract enforceable at law. The market remains quotable at the set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, subject to the addition of brokerage up to 15c., in case the sale is made by a regular broker.

There has been much discussion in local coal circles of the announcement that Apr. 1 prices will be revised and brokerage, to be added to the set price, eliminated. Some jobbers state that they are well satisfied with the prospect, thinking it probable that in the near future there will be a good supply of coal and some producers will be quite willing to pay a commission. In one quarter the prediction is even made that the open market will eventually decline below the set price. In the past, while consumers have not objected particularly to the paying of a brokerage, the difficulty has been to find the coal to sell him.

TORONTO

Coal situation still serious. Shipments coming in freely but insufficient for demand. Dealers generally refuse new orders. Local deliveries difficult and expensive.

The coal situation remains serious, several days of severe weather having greatly increased the demand. Coal is coming in freely at the boundary, and as the movement from there to Toronto is given preference over all other freight, considerable supplies are arriving. Dealers, however, generally refuse to accept orders on the ground that receipts are insufficient for new business and the filling of accumulated outstanding orders. In some cases coal is obtainable where purchasers are able to arrange for delivery, but the price is almost prohibitive, as teamsters in some instances charge as high as $3 and $4 per ton, as they are frequently obliged to wait for hours at the yards before they can

obtain loads. The city bureau is giving out small lots in cases of extreme necessity, but supplies for this purpose are so limited that many applicants are turned away.

Nominal quotations per short ton are as follows: Retail anthracite egg, stove, nut and grate, $9.85; pea, $8.85; bituminous steam, $9, slack, $8 to $8.50; domestic lump, $10; cannel, $11. Wholesale f.o.b. cars at destination, three-quarter lump, $7 to $7.50, slack, $6.85 to $7.

BUFFALO

Return of mild weather helps the situation, but actual scarcity continues in all sorts of coal. Difficulty is laid to the railroads. Jobbers uneasy over last price order.

Bituminous—The supply is not good, but the situation improves slowly, owing to warmer weather. It is not likely that the scarcity of the past month or two will return right away, though the uniform report from the coal offices is that it is as hard to get a car of coal as it ever was. This section does not appear to have suffered much from the shortage. Some jobbers say that such factories as did run short occasionally would have done so anyhow, in order to make repairs and the like.

The main reason for the coal shortage—the lack of cars—does not appear to be improved, and it is still confidently affirmed that no regulation of the consumption or distribution can accomplish anything permanent till the car supply is better. The heavy snow is gone, and the zero weather is probably past for the winter; but with normal weather the movement is not enough to meet the demand. During the zero weather the car movement ran down alarmingly.

The latest coal order appears to have dropped the former regulation for thin vein slack and lump and now only mine-run is recognized. The mine price of $3.20½ recognizes no sizes, so no screening will be done of course. The Buffalo price will be $4.30½ on Allegheny Valley rail rate, $4.40½ on Bessemer district rate, $4.45½ on Pittsburgh rail rate, all per net ton f.o.b.

Anthracite—The supply has not been what it should be lately, but with the disappearance of freezing weather the consumption has dropped off about half and the distributors manage to keep ahead of the demand. It is a hard matter, with the consumers making it as bad as they can by ordering much more coal than they need.

DETROIT

Partial relaxation of restrictions follows easier condition in coal supply. Detroit pool will continue operations.

Bituminous—Favorable weather conditions throughout the week, with temperatures that have removed considerable of the snow, are reflected in a marked improvement in transportation conditions. Much of the freight congestion has been cleared away, permitting freer movement of coal shipments on roads south and southeast of Toledo. The result is an easier feeling among consumers of domestic and steam coal, with a satisfactory improvement in supply.

Because of the better condition of affairs, the Michigan fuel administration has partly rescinded the regulations that were put out Jan. 25. The order restricting operation of business places, stores, office buildings and other establishments to nine hours a day is revoked. Mr. Prudden, however, recommends that its observance be continued in smaller towns of the state. He retains in effect the rule restricting electric lighting and illumination Sunday and Thursday nights, and advises everyone to use coal as sparingly as possible.

Detroit's terminal coal pool is to be continued in operation. This announcement was made by Ford R. Cate, chairman of the pool committee, following conference with other pool representatives in Cleveland. Mr. Cate says many of the objections raised against the pool plan have been cleared away and that the records show the Detroit pool's efficiency was greater than that of similar bodies in other cities.

Anthracite—Shipments of anthracite are coming to the city in small volume, but improvement in weather conditions contributes in making the supply provide for a larger number of householders than heretofore, by making a smaller daily consumption possible in domestic heating plants. The coke supply continues scarce and not very much wood is available for fuel use, the larger part of the supply being green.

COLUMBUS

Continued mild weather still further relieves the stress of the fuel situation in Ohio. Railroads are hauling a larger tonnage.

The coal trade in Ohio has been in a much less precarious condition because of a larger tonnage being handled by railroads and reduced requisitions to take care of the domestic trade. Both factors have combined to relieve the strenuous situation that prevailed during the zero temperatures. Private users now have sufficient stocks, and manufacturing plants are able to accumulate a surplus. On the whole the situation is in much better shape, although another protracted cold snap would cause much inconvenience.

The retail trade is still attracting the attention of fuel committees in the various counties. Retailers are often compelled to limit deliveries to small lots and are prohibited from giving each customer all that is wanted. But there are many fewer cases for the county committees to investigate and stringent transportation orders are not now necessary. Retail prices are firm at the levels which prevailed for some time. Pocahontas is scarce and the same is true of anthracite.

Steam coal is also coming into the market in larger quantities. Practically all plants which were compelled to reduce production or suspend are now in operation. Schools now have sufficient fuel and some surplus stock. In fact steam business is in pretty fair shape, considering the war conditions and emergencies. Railroads are taking a large tonnage for the movement of trains.

Production in the state during the past week has been fairly good. Floods in the Hocking Valley have not passed, and the output in that district is estimated at 75 per cent. of normal. Jackson and Pomeroy Bend districts are producing about 65 to 75 per cent. of normal. In eastern Ohio the railroad situation is still bad and the output is correspondingly curtailed. About half of the coal loaded in that district is used for railroad fuel. In Massillon and Cambridge the output has been slightly increased.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.70	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

Milder weather has checked demand, but the supply of coal remains extremely limited. Great care is necessary in distribution and consumption.

While milder weather now prevails, and the demand for coal has not been so insistent, yet the trade has been compelled to issue warnings to the public that the winter is not over, and that the greatest care must still be exercised in the distribution and consumption of coal in order to avoid possible suffering should colder weather return. An announcement from some official source that the coal supply in Cincinnati is now ample, and that all demands can be taken care of, was promptly contradicted by leading members of the trade, who declared that the supply is still so limited, as compared with consumption, that there is no reserve whatever; and that should severe weather be experienced the city would be precisely where it was a few weeks ago. The movement of coal from the mines has been improved since the melting of the snow and the better traffic conditions generally, but bunkers and coal bins were scraped bare during the past two months. As consumption is still heavy among industrial concerns, there has been no reserve whatever accumulated. Prices, for the most part, are based on contracts entered into before the Federal price regulations went into effect, and there is little spot coal offered. Should mild weather continue, there is every reason to believe that there will be a chance to get things straightened out; but there is no chance for cheap or plentiful coal this year, coal men declare.

LOUISVILLE

Coal movement shows considerable improvement in western Kentucky field, better car supply and better movement. Eastern Kentucky field improving slowly, due largely to car shortage.

There has been much improvement shown in the movement of western Kentucky coal. One Louisville house during the week received 20 cars at one time, the largest volume of coal received at any one time in months. The labor situation in the western Kentucky district is now somewhat better than it has been, while the car supply is greater and the traffic movement faster. Local dealers have been well supplied, and practically every small dealer has two to four cars in his yards.

In the eastern Kentucky field conditions are little different from a week ago. There has been some slight improvement in the car supply and movement of cars, but labor is scarce and traffic conditions are not such that the production has shown any material increase.

Prices on all grades of coal remained unchanged during the week, but it is possible that some new prices may be announced in March to meet requirements of manufacturers and for summer stocking.

Inquiries have started coming in relative to prices on new business from manufacturers, who are now beginning to run short on their contracts, which are generally arranged to expire about Apr. 1. Heavy summer stocking is also expected from the thousands of residents who were caught without coal this year, and who have been telling the coal dealers what they expect to do this summer. However, no one apparently knows what conditions will be in the late spring, and the Fuel Administration is not figuring on summer prices this early in the year, but endeavoring to get the whole country fairly well supplied first.

The local demand for coal from the retail standpoint has been fairly active, but apparently consumers are endeavoring to run out on as little coal as possible, while awaiting a lower market. Numerous orders are coming in for 1½-ton lots. Heretofore dealers were in the habit of charging one-half of the ton delivery price, plus an extra charge of 25c. on half-ton deliveries. However, the Fuel Administration has refused to allow the dealers to make this extra charge for half-ton lots, and as a result many retailers are refusing to deliver less than ton quantities, figuring that it is unprofitable business to deliver half-ton lots on the present basis.

BIRMINGHAM

Inquiries for lump coal not so insistent, but steam demand has not slackened. Production hampered by local strikes. Car supply reported good.

While domestic dealers are still urging shipments from the mines, the demand is not insistent, as all retailers now have stocks on hand and the mild weather is holding down consumption.

Inquiries for steam coal continue strong and there are no indications of any adequate relief being afforded by increased production, even if the output was normal, which is not the case at this time. There is an ample supply of cars, but the shortage of labor and irregularity on the part of mine operatives curtails production materially.

The strikes called at a number of the larger mines of the district by union leaders, which have been in effect at some collieries for two weeks or more, seriously lowered the output of the district, but conditions are now improving rapidly and the indications are that normal complements of men will report for work during the present week.

Coke

CONNELLSVILLE

Disappointment at car supplies. Coke shortage 100,000 tons weekly. Railroads clearing congestion rather than furnishing empties. Light market offerings.

Car supplies in the Connellsville region last week averaged little, if any, better than in the two weeks preceding, and this week opened with somewhat lighter supplies than at the beginning of last week, only about 60 per cent. on the Monongahela R.R., against 70 per cent. Monday of last week, this being a poor augury for the rest of this week. It appears, therefore, that there have now been three weeks of shipments averaging 280,000 tons a week, which is about 100,000 tons a week less than conservative estimates of the amount of coke regularly required to supply the blast furnaces dependent upon the region. As to the proportion of foundry coke to requirements there are no precise estimates. With the widespread inquiry in the open market for foundry coke, coupled with the fact that the leading foundry coke producer has had very light car supplies for weeks past, the position is rather complicated.

Coke operators were decidedly disappointed last week at the poor car supplies, after nearly a fortnight of very favorable railroad weather, and this week the feeling is turning to one of discontent. For a time operators were patient and were quite willing to accord the railroads a fair amount of time in which to get into good running order with the favorable weather that has prevailed, but now the appearance is that the railroads have been putting their whole effort upon moving cars through and paying little attention to getting back empties. Doubtless they have greatly reduced congestion on their lines, but this does shippers no good when they cannot ship increased quantities of material.

The market is a narrow one. There is scarcely any coke offered, loaded on Pennsylvania or B. & O. equipment. Frequently there are offerings of P. & L. E. cars, but few consumers are in position to take coke thus loaded. These, however, generally find a place for any coke that is offered. The market remains quotable at the set prices: Furnace, $6; 72-hour foundry, selected, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The Connellsville "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 16 at 240,772 tons, an increase of 16,627 tons, and shipments at 285,359 tons, an increase of 9452 tons.

Buffalo—The jobbers in the coke trade find it practically impossible to obtain a supply from the regular ovens, as to do so would be to obtain it at the Government oven prices of $6 and $7 per ton. So far none seems to have been sold in this territory at those prices. The furnaces all depend on their contracts for their supply. Jobbers sell quite an amount of byproduct coke to all sorts of consumers, for the purpose of piecing out the coal supply. Prices run from $1.50 for the lowest form of coke breeze to about $3 for the assorted sizes. The demand far exceeds the supply.

Middle Western

GENERAL REVIEW

Prominent coal jobbers see danger ahead if the contemplated price differential is eliminated between producer and jobber.

The decision of the Federal Fuel Administrator to wipe out the spread of 15c. per ton that has existed between the producer and jobber is causing much speculation and considerable discussion throughout the Middle Western section. For several months it has been no trouble for the producer to get all for his product that the Government would allow him to charge. His sales office, however, had to be careful, or else his organization would become loaded with orders that could not be filled, because of the constant placing of embargoes by transportation companies. Many producing operators who have always maintained an expensive sales organization have felt that there should be no differential, and that they should be allowed as much for performing the same service as the jobber got, 15c. per ton. If the jobber is to maintain a place in the coal industry it would seem that it would be necessary that he become allied with some producing company, and arrange to handle its coal, or at least a portion of it.

The market throughout the Middle West is somewhat relieved because of the improvement in transportation, the direct result of the warm weather that has prevailed during the past week. The domestic demand appears to be easy, but there is a strong market for any grade of coal among the manufacturing industries. The trade feels that the crisis is past and that there will be a decided improvement in the situation.

CHICAGO

Warm weather saves domestic fuel and improves transportation.

The tense fuel situation that has prevailed for weeks has been relieved by the advent of milder weather. Household requirements averaged less than they have for any previous week since Dec. 1. Industries have been able to buy more Illinois and Indiana steam coal than at any other similar period for a long time. Many large industries have been on a hand-to-mouth ration for months, and have been able to get only an occasional car—when it happened to escape the eye of some fuel administrator, either at destination or en route.

No noticeable improvement in the supply of coal from the East is evident. The receipts of Eastern bituminous coal are particularly limited, with a little better supply of hard coal from that direction.

A determined movement now seems to be under way to get a better supply of Eastern coal for Chicago. The Chicago Association of Commerce and the Building Managers Association are working in harmony with the retail dealers toward this end.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	.....
Washed egg	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	.....	.....	2.15@2.30	2.85@3.00

	Smokeless					
	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West Va. Splint
Dom. lump.	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.40@2.55	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Springlike conditions improve the coal situation. Future supplies to be closely controlled.

The close of February finds the coal situation in this section of the country much easier. The return of warmer weather has relieved the tension of apprehension engendered by the prolonged cold spells of the past; and dealers and consumers are seemingly satisfied that the days of trial are over, for the present at least. Transportation conditions are growing better daily and coal is going forward to the interior more freely. Roadway conditions in the city and vicinity are still poor.

Anthracite, which was pronounced sold up two weeks ago, is still being delivered, and cases are reported where people who had been refused hard coal on former orders had been voluntarily offered anthracite by dealers. This would indicate that the anthracite stock had been too strongly conserved under the stress of continued below-zero weather.

The failure of Illinois to furnish its usual quota of coal at this season of the year has increased the draft upon stocks at Lake Michigan docks to such an extent that they will have to be supplemented liberally if vital industries are to be maintained until the opening of Lake navigation about Apr. 25. At a conference in the office of W. H. Fitzgerald, state fuel administrator, which was participated in by representatives of every dock company on the west shore of Lake Michigan, it was decided that about 40,000 tons will be needed to accomplish this end. A telegram to that effect was accordingly sent to the Federal Fuel Administrator at Washington, D. C. The coal desired amounts to 850 carloads, divided as follows: 300 cars Youghiogeny or splint screened lump; 350 cars Hocking screened lump, and 200 cars Hocking or No. 8 screened lump

ST. LOUIS

Coal more plentiful from Standard fields, owing to warmer weather. Railroad facilities show little improvement. Car supply not good and working time consequently short. No outside coals coming in.

Whether conditions in this territory have eased the local situation, and there is apparently plenty of Standard coal to take care of normal requirements. In a general way storage coal is being acquired by both dealers and steam plants.

Railroad facilities are not so good as were to be expected in view of the weather, and in some instances coal has been delayed for four or five weeks. The terminal situation shows little signs of improvement. There is some improvement on all roads, except the Louisville & Nashville and Illinois Central. The Illinois Central still shows a lack of efficiency in the handling of full loads and the return of empties to the mine.

The Carterville field shows some improvement, but not to the extent that any great tonnage of this coal is coming into this market. The railroads are still drawing heavily on that tonnage, and the Government requirements seem to increase instead of diminish. Working conditions are fairly good.

In the Mt. Olive district there is plenty of domestic coal for the St. Louis market for the first time in many months, largely because the equipment is restricted to St. Louis proper and that on the short-line roads equipment is somewhat plentiful.

The railroad tonnage still continues heavy from this district, and the demand for the Omaha & Western territory is good. Close by, however, there has been a falling off in the demand.

The condition in the Standard field is somewhat complicated on account of the car supply, but shows improvement in a general way. The Mobile & Ohio is short of equipment. Much of this is in the south and there is lack of motive power to bring it north.

Retail conditions are easy, and the coal situation in this territory is one that does not occasion any worry on the part of those charged with its supervision.

The prevailing market, per net ton, f.o.b. mine, is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

General Statistics

NORFOLK & WESTERN RAILWAY

Below is a statement of the coal tonnage from mines on the Norfolk & Western Ry. and from other railroads, for the month of January, 1918:

From	Net Tons
Pocahontas field	958,057
Tug River field	208,122
Thacker field	207,397
Kenova field	94,139
Clinch Valley field	127,802
Other Norfolk & Western fields	14,283
Total Norfolk & Western fields	1,609,800
Williamson & Pond Creek R.R.	123,118
Tug River & Kentucky R.R.	43,796
All other railroads	91,802
Grand Total	1,868,516

COAL AGE

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THE COMING TEST

BY FLOYD W. PARSONS

THE Government is fully aware that a lack of transportation facilities is the danger point in our war activities. This restriction on our efforts is certainly going to be removed. We will soon have ships, locomotives and cars. Also, each passing day will see the further development of a national transportation plan that will soon put America on an efficient coöperative basis.

What relation has all this to coal mining? Just this:

With plenty of locomotives and cars available, will our coal mines meet the test that will surely be put upon them? The Nation proposes to spend 15 billion dollars for war in 1918. This is all in addition to our peaceful pursuits. It means the consumption of millions of tons of coal more.

WE HAVE boasted of our coal-production capacity. "No cars" has always been our answer to those who charged there was deficient output. The last nine months of this year we will have to average better than 62 million net tons monthly to meet the known demand.

The request of the Fuel Administration that coal miners be placed on a preferential list has been denied by the military authorities. More men will be taken by Uncle Sam. Already close to 40,000 miners have been enlisted, and competent men to fill the vacancies created are not secured and trained in a day.

Is the industry properly organized to draw labor from less essential fields if the need becomes urgent? Individualistic action does not get far these days. Powerful concerted effort alone counts. Watch must be kept on other industries as never before. Wage advances in other lines will quickly reduce mine labor.

THE mines are not exactly the place for women. However, we must remember that five men are needed here to supply each soldier in France. Two million men at the front mean a withdrawal of 12,000,000 men from productive industries.

It follows then that we are withdrawing from peaceful and constructive pursuits for war work one-third of the total number of wage earners in America. How else can we supply the labor deficit thus created if not by drawing from the ranks of the 26,000,000 idle women in the country? Such help might not be used largely underground, but it could be employed in most lines on the surface. Objections worth considering in normal times are out of order now; we must finish the job on hand no matter what the cost.

THERE is but one way for the coal-mining business to avoid landing in the lap of Government ownership, and that is by making good in such substantial fashion that all criticism of coal production will be stilled. Let us ship clean coal. Every per cent. additional ash in the nation's output means an added requirement of 126,000 railroad cars, without any increase in heat values. Let us not relax the observance and enforcement of safety measures. Remember 1917 showed an increase of 21 per cent. in mine fatalities! Let us keep mine development ahead of requirements—see that at least one-eighth of the tonnage comes from narrow work. Let us also keep up repairs and increase productive capacity by the installation of every machine or mechanical device that will serve that end.

The test may come sooner than we expect. Are we ready?

IDEAS AND SUGGESTIONS

Mine Telephone Systems

BY FRANK HUSKINSON
Lafayette, Colo.

It is important that a coal mine should possess a reliable telephone system, one that makes connection also with the outside works. In fact such a system is a necessity.

The saving in time and money which such a system effects by reliably transmitting routine orders or instructions when there is a temporary suspension of power, a shutdown of some part of the plant, an accident, or an emergency affecting either life or property, justifies many times over the investment required.

Mine telephone systems usually consist of several instruments connected to one pair of wires (or one wire and the ground), forming a party line. Local-battery magneto telephones are used, and signaling is effected by a code of rings. The severe conditions encountered underground because of moisture, gases, acidulous water, etc., make it necessary to provide un-

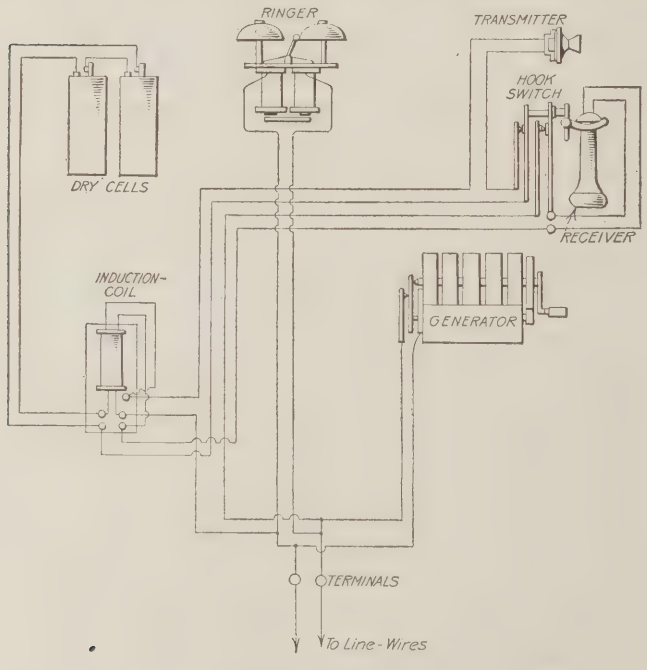


FIG. 1. CONNECTIONS AND PARTS OF STANDARD MINE TELEPHONE

usually well-protected telephone instruments for this service. For use aboveground a standard wall or desk telephone is practical.

All telephones underground are inclosed in a heavy metal case, which is fireproof, moisture-proof, and foolproof. The gongs on all mine telephones are extra large and loud-sounding; they emit a distinct ring which can be heard a long distance. In Fig. 1 is shown the connections and various parts of a standard local-battery magneto mine telephone.

With the local-battery magneto telephone system any number of instruments can be connected in multiple to one pair of wires. It is not advisable, however, to connect more than 8 or 10 telephones to the same set of wires, as it will make the ringing code of signals too complex. Also, in case of trouble, it is more difficult to locate.

In mines where there are a number of telephones it is advisable to have the instruments separated into

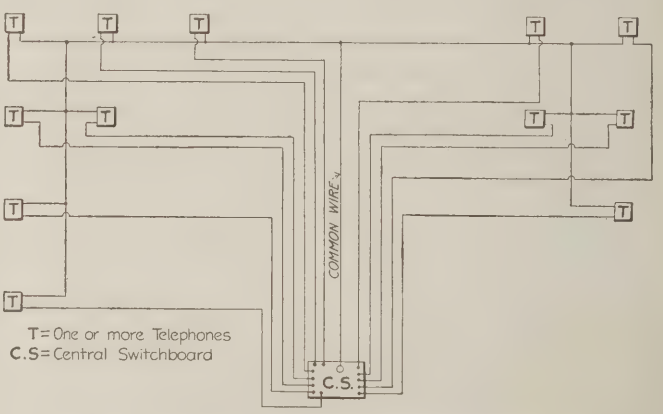


FIG. 2. WIRING DIAGRAM, TELEPHONES AND SWITCHBOARD

groups of one, two, or more, each group having one line wire to the central switchboard, also one line wire to the common wire that runs from the switchboard to each group of telephones (see Fig. 2). The use of the common wire is to save material. It gives as satisfactory service as though there were two line wires from each group of telephones. In a system with several telephones connected to one pair of wires, each station may call and talk to any other station on the line without the aid of a switchboard and operator; also, in this system, where the telephones are in groups the lines from these groups run to the surface and are centralized upon a switchboard. Any one group of telephones may be operated independently and without the services of the switchboard operator. The object of the switchboard is to make a connection between any two telephones in different groups.

An injury to a telephone, an open-circuit or a short-circuit in a section of the line will not interfere with the operation of the rest of the system, and it is a more simple matter to locate any trouble in the system than if all the telephones were connected to one pair of line wires.

The telephones used in the local-battery magneto system are equipped with two or three dry cells. The current furnished by these cells is used for talking purposes only. The current for ringing the bells on the other telephones on the same line and also for signaling the switchboard is generated by the hand generator,

more commonly called the magneto. The current thus generated is alternating and has nothing to do with the talking and hearing parts of a telephone. The dry cells similarly have nothing to do with the ringing of the bells.

Local-battery magneto telephones will operate on a circuit consisting of one wire and the earth, but this is not recommended. For various reasons ground-return circuits are objectionable, especially in mines where electricity is used, since the telephones become noisy owing to foreign currents. The metallic circuit is to be recommended in all installations. This is more expensive to install, but the difference is more than offset by the reliability and efficiency gained.

There is a tendency to neglect telephone lines. The idea is prevalent that almost any kind of wire and material is good enough for a telephone line. This is a mistake. Telephone-line construction should receive as much attention as any other class of wiring; telephone lines underground should be carefully and securely installed to insure satisfactory results. The use of No. 12 weatherproof iron wire is recommended for all underground installations. The wires should be supported on porcelain knobs or glass insulators. Care should be taken to insulate and secure the lines from contact with other lines or pipes that may parallel or cross them. In the case of power lines that parallel telephone lines for any considerable distance, the foreign currents caused by induction make the telephones noisy. To

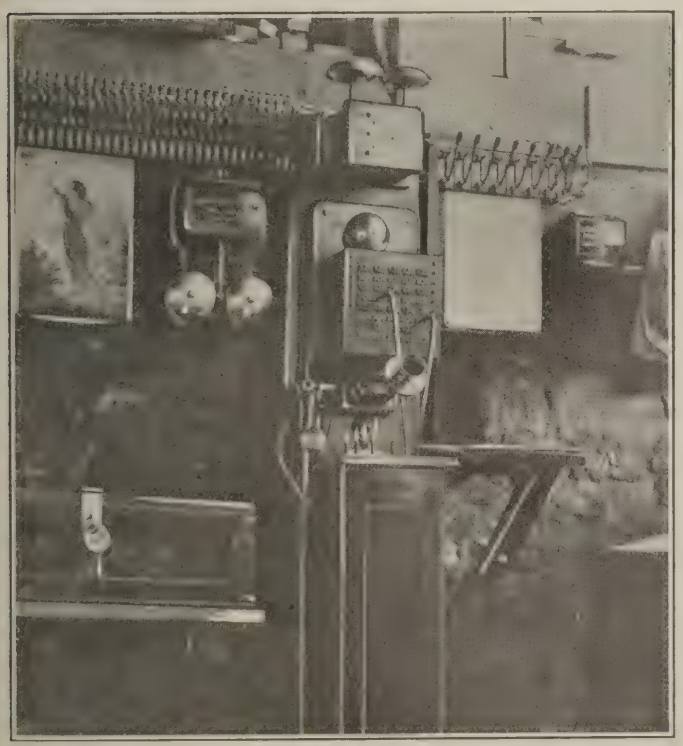


FIG. 3. MINE TELEPHONE SWITCHBOARD

diminish this noise it is necessary to transpose the telephone lines at frequent intervals and keep them as far away as practical from the power lines.

All joints in telephone lines should be securely made, soldered and insulated. In Fig. 3 is shown a satisfactory mine telephone switchboard that is in use at one of the largest mines in the State of Colorado. This system was the only system that ever gave satisfactory results at this mine. The switchboard has 15 drops, and two sets of connecting plugs. At the left is the fuse, lightning arrester and terminal board. To this board all the various line wires come, and in case of trouble it can easily be determined from this point just what line the trouble is on. The fuse is then taken out, thereby cutting off the line that has the trouble on it.

When a call comes in on the switchboard the drop falls out, closing a local bell circuit. This bell rings until the drop is restored by inserting the plug. The operator answers the call and makes the proper connection. At the right of the switchboard are several small single-pole switches, the object of which is to connect all or part of the various groups of telephones at night, or whenever the switchboard operator is absent.

This installation is located in the electrical repair shop, and the calls are taken care of by the shop foreman in the day time, and at night the switches are put in, thereby connecting all the telephones together, allowing any station to call and talk with any other station without the services of the switchboard operator.

A Convenient Table for Draftsmen

By P. A. Arnold
St. Marys, Penn.

In figuring areas from maps, either by scale or planimeter, the accompanying table will be found convenient and quite a time saver. Requests for areas of tracts of land and also sections of underground workings continually come to the engineering department of any large coal company.

This table is, of course, small in itself; but nevertheless it is a short cut in calculating that which is not often tabulated and ready for use.

An explanation for the use of the table is hardly necessary, but to illustrate: Suppose one wishes to find

TABLE OF AREAS

Number of Square Feet and Number of Acres per Square Inch at the Following Scales

Scale	Square Feet	Acres
100 ft. = 1 in.	10,000	0.2296
200 ft. = 1 in.	40,000	0.9183
300 ft. = 1 in.	90,000	2.0661
400 ft. = 1 in.	160,000	3.6731
500 ft. = 1 in.	250,000	5.7392
600 ft. = 1 in.	360,000	8.2644
700 ft. = 1 in.	490,000	11.2488
800 ft. = 1 in.	640,000	14.6924
900 ft. = 1 in.	810,000	18.5950
1,000 ft. = 1 in.	1,000,000	22.9568
¼ Mile = 1 in.	.....	40.0000
½ Mile = 1 in.	.....	160.0000
¾ Mile = 1 in.	.....	360.0000
1 Mile = 1 in.	.....	640.0000

the acreage of a piece of land which by measurement shows 12.7 sq.in. of area, the scale of the map being 200 ft. to the inch. He refers to the table and finds that 1 sq.in. at the above scale is equal to 0.9183 acre, and that therefore 0.9183 × 12.7, or 11.66+ acres, is the required answer.

In the Building of Fires in locomotives, a considerable saving of wood and coal can be made if the following method is used: On top of the grate place a layer of dry shavings 1 in. thick. On top of this place a layer of 4 or 5 in. of coal, and on top of the coal another layer of dry shavings 1 in. thick. As this method of laying the fire prevents the passage of air through the material, it is necessary to make an opening down the center of the fire for the passage of air. The bottom layer of shavings prevents coal from falling through the grate, therefore saving fuel and preventing it igniting in the fire pan and shortening its life.



The Utilization of Anthracite Culm

By M. S. HACHITA
Chemist, Lehigh Valley Coal Co., Wilkes-Barre, Penn.

THE insistent demand for more coal during the past year, and particularly this winter, has been beyond the capacity of the mines to supply. This inability to increase the output has taught the anthracite operators to practice a more strict economy at their power plants, to stop all wastage of fuel, to prevent leakage of steam and to utilize a byproduct that was previously considered as waste. In accord with this idea, the Lehigh Valley Coal Co. has perfected a method by which the anthracite culm mixed with bituminous coal can be utilized as a commercial fuel.

It is due to the foresightedness and unfailing enthusiasm of F. M. Chase, vice president and general manager of the company, that the utilization of anthracite "slush" has become an accomplished fact. The slush mixture has brought out another factor which was heretofore never thought of—that is, the evaporative power of this fuel does not depend entirely on the heat content of the coal, but directly upon the mechanics of a more complete combustion. This is clearly shown by the results of tests made on stationary boilers and on locomotives.

Culm Formerly Considered Useless

In the mining and preparation of anthracite a certain amount of fine material is produced which is known as culm, slush or silt. This is material which passes through a screen of $\frac{1}{8}$- or $\frac{1}{16}$-in. mesh and is so fine that, heretofore, it was considered as a useless byproduct of the industry, except in some instances where it is taken into the mine and deposited in old workings in order to support the roof. It is also used to a small extent in making briquets. Aside from these uses it has been a nuisance to the operator, as he experienced great difficulty in disposing of it.

This material contains approximately 80 per cent. of combustible matter. It therefore has a fuel value approximately equal to that of commercial anthracite. In 1913 the Lehigh Valley Coal Co. conducted a series of experiments at its Spring Brook boiler plant, near Hazleton, Penn., with the view of utilizing this culm.

For this purpose were arranged four cylindrical boilers, 33 in. in diameter and 30 ft. long; one smoke stack, 33 in. in diameter and 33 ft. high; a total grate area of 132 sq.ft., having an air space of 19.8 sq.ft., or 15 per cent. of the total area.

The feed water was measured in three barrels, elevated 10 ft. above the ground. Directly under these were five barrels, connected in series, into which the measured water was discharged. The water was fed into the boilers by means of an injector. The steam was exhausted into one of the stacks through a 2-in. pipe. The pressure of the steam was maintained at 60 lb. throughout the tests. Forced draft was produced by means of a small fan, with a pressure of $\frac{1}{2}$-in. water gage. The temperatures of the feed water and air were recorded; that of the stack averaged 750 deg. F. The amount of CO_2 in the flue gases was determined by the Orsat apparatus.

TABLE I. ANALYSES OF FUEL

	Hygro. Moist.	Moist.	Volatile	Carbon	Ash	B.t.u.
Coking coal	0.0	0.71	24.48	60.07	14.74	13,005
Noncoking coal	4.90	2.14	25.06	62.45	10.35	13,210
Culm	8.50	1.85	4.40	68.70	25.05	10,772
Spring Brook boiler fuel	0.0	3.25	2.99	75.80	17.96	11,304

In this test the fuel consisted of culm and bituminous coal. These were weighed on a platform balance before being fired, and the ashes were weighed after each test.

From Apr. 23 to 26 inclusive the fuel was fired in alternate layers of soft coal and culm, also a thorough

TABLE II. ANALYSES OF ASHES

	Moisture	Volatile Matter	Carbon	Ash	B.t.u.
"A" Coking coal	0.79	1.45	33.73	64.03	4,834
"B" Noncoking coal	0.99	3.84	45.10	50.07	7,216
"C" Culm	1.32	1.09	54.04	43.55	7,888
"D" Anthracite boiler fuel	0.67	1.51	38.23	59.59	5,642
"A" 30 per cent.—"C" 70 per cent., run-of-mine	0.96	0.77	40.83	57.44	5,904
"A" 50 per cent.—"C" 50 per cent., run-of-mine	1.12	2.01	39.75	57.12	6,048
"A" 70 per cent.—"C" 30 per cent., run-of-mine	0.84	0.72	31.24	67.20	4,428
"A" 30 per cent. pulverized "C" 30 per cent.	0.78	1.28	35.41	62.53	5,383
"A" 50 per cent. pulverized "C" 50 per cent.	0.67	1.26	32.15	65.92	4,768
"A" 70 per cent. pulverized "C" 30 per cent.	0.32	0.34	17.03	82.31	2,628
Noncoking coal 50 per cent. "C" 50 per cent.	0.57	1.80	43.52	54.11	6,662
Noncoking coal 70 per cent. "C" 30 per cent.	0.78	2.20	42.77	54.25	6,591
Noncoking coal 80 per cent. "C" 20 per cent.	0.50	1.28	42.03	56.19	6,453

mixture of both fuels in various proportions. It was soon discovered that the thorough mixture of culm with bituminous coal was the better method, and it was therefore used throughout the tests. Tables I and II show the analyses of the fuels used in the tests and also of the resulting ashes.

In order to determine the basis for comparison, each fuel was burned alone. Table III shows the results of these tests. The figures in the first column were obtained from burning coking coal alone; the second column, noncoking coal alone; the third column, culm alone. To compare these figures directly, the temperatures of the draft were corrected to 60 deg. F., and the fuel is calculated on a dry basis.

The first series of tests consisted of 30, 50 and 70 per cent. of run-of-mine coking coal mixed with 70, 50 and 30 per cent. of culm from the Hazleton shaft colliery. The results of these tests are found in columns E, F and G. Since the soft coal contained a great many lumps, the large pieces were crushed with a hammer, and the biggest ones in the mixtures were not larger than the size of egg coal. Both fuels were thoroughly mixed in the proper proportions with shovels before firing.

After the foregoing tests were over, the soft coal was crushed to pass through a 1-in. screen. It was then mixed with culm in the same proportions as before and fired. The results of these tests are found in columns H, I and J. At the conclusion of these tests, the old Spring Brook boiler fuel was fired to determine the relative values in evaporation of the water. The results of this test are found in column D.

Results of Second Series of Tests

The second series of tests consisted of noncoking coal mixed with the culm in the following proportions: 50, 70, 80 and 100 per cent. of bituminous with 50, 30, 20 and 0 per cent. of culm. The results of this test are given in columns B, K, L and M.

The figures on line 16 show the number of pounds of water evaporated from and at 212 deg. F. per pound of dry fuel, the temperature of the draft being corrected to 60 deg. F. After deducting the water evaporated by the soft coal in the mixtures, the remainder is credited to that which was evaporated by the culm (see line 17). It will be noticed that the best results were obtained when the culm was mixed with pulverized coking coal. The amount of water evaporated, shown in column J, was 5.92 lb., or 99.38 per cent. of the water evaporated by the soft coal alone, which was 5.957 pounds.

The reason why coking coal is better adapted to mix with culm lies in the fact that the coking coal fuses at a comparatively low temperature and the fusion takes up the particles of the culm, forming a homogeneous mass of fuel which burns uniformly. It was also noticed that the mixture was easier to burn than was soft coal alone. This is due to the fact that when soft coal alone is burned, the fuel bed becomes a hard mass requiring considerable poking to effect complete combustion, whereas in the case of the mixed fuel the coked mass is more easily handled by the fireman as it breaks up into small pieces with less labor, thereby increasing the speed and quality of the combustion. The noncoking coal on the other hand does not fuse and therefore burns independently of the culm. It will be observed from the results of these tests that the culm can be commercially utilized in a furnace where bituminous coal is now being used, such as large factories, railway locomotives and ocean liners.

In September, 1917, the Lehigh Valley Railroad Co. tried the formula of mixed fuel on its stoker engines running between Hazleton and Lehighton, a distance of 26.2 miles. Both Standard and Street stoker engines were used. The train consisted of 50 cars of coal taken from the Hazleton region to Lehighton, the return to Hazleton being made with 65 empty cars.

The condition of the tracks between the points above mentioned was such that all the haul to the east was down grade while that to the west was up grade. All eastbound trains stop at Hazle Creek Junction and inspect and test air brakes. On leaving Hazle Creek Junction, the hand brakes were applied 100 per cent. Both hand and air brakes were used to control the train from Hazle Creek Junction to Black Creek Junction, the grade being such that both devices were required in order to control the train between the points mentioned. The hand brakes were released at the latter



MIXING PLANT AT HAZLETON, PENN.

junction and from there on east the train was controlled by air brakes.

On the return trip from Lehighton, the engine pulled the train to Penn Haven Junction by its own power. At this point one engine helper was added to the train on the rear. This helper was necessary on account of the grade up to Black Creek Junction, at which point a second engine helper was required to push the train against a heavy grade up to Hazle Creek Junction. This made a total of three engines to the train. At the latter junction the second engine was taken off and the train proceeded to Ashmore with two engines, where the first engine helper was also taken off. This description is made to show the physical condition of the tracks on which the tests were conducted.

When the train first started from Hazleton on the first trip, the fireman seemed to have a little trouble in maintaining the steam pressure. This was due to two causes; first, the fireman was not used to this grade of fuel, and second, the stoker apparatus on the locomotive was not in good working order. As a result the mixed fuel was not properly distributed in the combustion zone and the thickness of the burning fuel bed was not sufficient to obtain the full burning capacity of the coal. However, the fuel burned well and the pressure of the steam was maintained between 140 and 185 lb. until the

TABLE III. RESULTS OF CULM-BURNING TESTS WITH BITUMINOUS COAL

Spring Brook Boiler Plant, Lehigh Valley Co., Wilkes-Barre, Penn.

	A	B	C	D	E	F	G	H	I	J	K	L	M
					Coking Coal—Run-of-mine			Coking Coal—Pulverized			Noncoking Coal—Run-of-mine		
	Coking Coal	Non-Coking Coal	Culm, Hazleton Shaft	Spring Brook Boiler Fuel	30 Per Cent. A 70 Per Cent. C	50 Per Cent. A 50 Per Cent. C	70 Per Cent. A 30 Per Cent. C	30 Per Cent. A 70 Per Cent. C	50 Per Cent. A 50 Per Cent. C	70 Per Cent. A 30 Per Cent. C	50 Per Cent. B 50 Per Cent. C	70 Per Cent. B 30 Per Cent. C	80 Per Cent. B 20 Per Cent. C
1. Weight of fuel, lb.	4,200	10,200	3,500	4,200	5,400	4,800	4,200	5,400	4,800	5,000	5,700	11,000	5,400
2. Weight of dry fuel, lb.	4,170	9,492	3,215	4,063	5,080	4,588	4,076	5,080	4,588	4,853	5,206	10,124	5,008
3. Weight of feed water, lb.	22,518	42,534	6,260	13,761	15,846	18,780	19,599	17,514	20,016	24,603	13,176	39,824	20,850
4. Water evaporated from and at 212 deg. Fahr.	25,716	48,950	7,236	15,823	18,379	21,707	22,653	20,209	23,093	28,363	15,308	45,752	23,995
5. Water evaporated from and at 212 deg. Fahr. and temperature of air corrected to 60 deg. Fahr.	24,841	50,602	7,420	15,728	18,519	22,032	21,815	20,569	23,119	28,867	17,315	46,368	24,745
6. Weight of ash, lb.	933	2,329	1,332	1,231	1,625	1,229	1,115	1,514	1,165	1,338	1,411	2,609	1,185
7. Per cent. of ash	22.21	22.28	38.06	29.21	30.09	25.60	26.55	28.04	24.27	26.76	24.75	23.72	21.94
8. Steam pressure, lb.	60	60	60	60	60	60	60	60	60	60	60	60	60
9. Temperature of feed water	70	61	56	62	56	56	66	58	58	59	50	63.1	61
10. Temperature of air	81	54	64	66	65	59	83	61	66	50	42	62	55
11. Percentage of CO_2 in F gases	7.2	7.1	6.0	6.4	7.0	8.0	7.5	6.4	7.0	8.0	7.0	8.0	9.0
12. Efficiency of combustion	91.68	86.89	70.22	84.88	83.77	86.82	90.34	85.74	89.98	94.20	85.19	87.11	86.78
13. Percentage of heat converted into steam	45.53	39.55	21.03	34.28	31.33	39.09	42.71	36.02	41.76	47.66	27.15	36.02	38.01
14. Percentage of heat lost in ash	8.32	13.11	29.78	15.12	16.23	13.18	9.66	14.26	10.02	5.80	14.81	12.89	13.22
15. Percentage of heat lost through stack, etc.	46.15	47.34	49.19	50.60	52.44	47.73	47.63	49.72	48.22	46.54	58.04	51.09	48.77
16. Pounds of water evaporated from and at 212 deg. F. per lb. of dry fuel. Air condition corrected to 60 deg. Fahr.	5.957	5.331	2.308	3.871	3.646	4.802	5.352	4.049	5.039	5.948	3.326	4.580	4.941
17. Pounds of water evaporated from and at 212 deg. Fahr. per lb. of dry culm. Air condition corrected to 60 deg. Fahr.	.....	.....	2.308	.....	2.575	3.553	3.824	3.166	4.046	5.920	1.243	2.759	3.311
18. Pounds of fuel burned per sq.ft. of grate per hr.	5.30	6.54	4.42	5.30	6.82	6.06	5.30	6.82	6.06	6.31	9.59	7.39	8.18
19. Boiler-horsepower developed	120.0	117.0	36.0	76.0	89.0	106.0	115.0	99.0	112.0	139.0	112.0	119.0	125.0

train was pulled into Hazleton, thus completing the first trip.

The second trip was started late in the afternoon of Sept. 28, using the same engine. A representative of the Standard stoker firm was present on this trip and adjusted the defects in the stoker. The train, consisting of 50 cars of coal, was pulled out of Hazleton in the usual manner with the stoker in proper working condition and with the same fireman as on the first trip. Profiting by the experience gained on the first trip, no trouble of any kind was met with in maintaining the working pressure of the steam, which was between 150 and 185 lb. The return trip was made with 60 empty cars and the run proved entirely satisfactory.

The third trip was made on the evening of Sept. 29 with the same engine, this time burning pure soft coal. This was done in order to compare the evaporation of water per pound of different fuels burned. The train consisted of 49 cars loaded with coal, with a gross weight of 3100 tons, and the return was made with 50 empty cars weighing 960 tons. During this trip the engine consumed 128,550 lb. of water at 58 deg. F., while the weight of the fuel burned was 26,550 lb. This is equivalent to 4.84 lb. of water at 58 deg. F. evaporated per pound of fuel.

The fourth trip was made on Sept. 30 with the Street stoker engine No. 341. The fuel used in this test consisted of 30 per cent. of culm and 70 per cent. of stoker coal. As it was Sunday there were only 38 cars of coal available. These weighed 2287 gross tons. The return trip was made up of 70 empty cars weighing 1222 tons. The fuel burned well, producing plenty of steam. The total amount of water evaporated in the run was 117,800 lb. at 58 deg. F., while 18,550 lb. of mixed fuel was consumed. This is at the rate of 6.35 lb. of water evaporated per pound of fuel.

The fifth trip was made on Oct. 1 on hand-fired engine No. 337, burning a mixture of 40 per cent. culm and 60 per cent. of run-of-mine coking coal. The load consisted of 50 cars of coal weighing 3394 tons, and the return was made with 66 empty cars weighing 1200 tons. The fuel burned well and the working pressure of the steam was maintained throughout the trip. The total amount of water evaporated during this trip was 126,250 lb. at 58 deg. F., while the consumption of fuel amounted to 20,550 lb. This is equivalent to 6.14 lb. of water evaporated per pound of mixed fuel.

Table IV is a tabulation of the evaporation tests made on the different engines with the various fuels.

It will be noticed in Table IV that the fuel burned on engine 351 contained more heat units than that contained in the mixed fuel used on the other two engines. Yet the amount of water evaporated by this locomotive is much less than the other engines Nos. 341 and 337, both burning mixed fuel having a less theoretical quantity of heat.

A reduction of the amount of smoke now being produced by ocean steamers can be accomplished through the use of a mixture of soft coal and anthracite culm; furthermore the use of such a mixed fuel would not only reduce the amount of smoke but also the cost of the fuel

From experiments, the best results can be obtained from 30 per cent. of culm thoroughly mixed with 70 per cent. of pulverized coking coal. This proportion of the fuel mixture will produce a heat efficiency equal to or greater than that produced by the same weight of soft coal. This is due to the fact that, as pointed out above, the mixed fuel burns more evenly so that the volatile matter in the soft coal has a better chance for more complete combustion. As a consequence, the mixed fuel, containing the above proportions, produces approximately 50 per cent. of the smoke made by bituminous coal only. The more culm the mixture contains the less will be the smoke produced.

The culm contains more ash than does the average bituminous coal, but this disadvantage is more than balanced by the fact that when mixed in the proper proportions it gives a better combustion and consequently produces more available heat than is produced by burning soft coal alone. This fact has been ascertained by experience.

Soft coal consists of two chief combustible ingredients—namely, fixed carbon and volatile hydrocarbons. The hydrocarbons contain approximately 85 per cent.

carbon and 15 per cent. of hydrogen. The evolution of hydrocarbon from soft coal is begun at a comparatively low temperature. This means that when a shovelful of soft coal is fired the quantity of smoke emanating from the smoke stack will be noticeable immediately. The reason for the appearance of this smoke lies in the fact that the volatile constituents in the fuel come out rapidly while at the same time the supply of oxygen in the combustion zone becomes so deficient directly over the fresh fuel that a greater part of the volatile combustible matter is distilled, liberating the carbon in a free state in the combustion zone; and as this travels toward the flues and thence to the smoke stack, its temperature falls. Under these conditions the carbon particles, thus distilled, condense and each particle attracts others to it and becomes larger and larger. Finally the resulting "flakes" have grown so large relatively that they become collectively visible as smoke.

Each particle of smoke that passes through the flues means that so much heat is lost. This is the actual condition found today on railroad engines using soft coal. The incomplete combustion of the volatile constituents in the bituminous fuel was responsible for the low efficiency of water evaporation in engine 351 given in Table IV. A cure for this defect in soft coal has been found in the anthracite culm mixture.

The culm consists of approximately the following sizes: Over 20 mesh, 50 per cent.; over 40, 22 per cent., and through 40, 28 per cent. The culm is unlike other grades of anthracite in that it is extremely fine; and when it is mixed with slack or stoker coal the subsequent handling would not disturb the homogeneity of the mixed fuel. Again the culm has per unit weight a larger surface exposed for combustion than barley, rice or buckwheat coal. Consequently the culm burns more quickly and evenly than commercial anthracite.

TABLE IV. TESTS OF DIFFERENT ENGINES WITH VARIOUS FUELS

	Engine 351	Engine 341	Engine 337
Kind of fuel used	100 per cent. soft coal	30 per cent. culm, 70 per cent. soft coal	40 per cent. culm, 60 per cent. soft coal
Weight of water used	128,550 lb.	117,800 lb.	126,250 lb.
Weight of fuel used	26,550 lb.	18,550 lb.	20,550 lb.
Water evaporated per pound of fuel	4.84 lb.	6.35 lb.	6.14 lb.
Temperature of feed water	58 deg. F	58 deg. F	58 deg. F
Heat contained in each pound of fuel, B.t.u.	13,689	12,783	12,755
Fuel efficiency based on evaporation of water with 100 per cent. bituminous coal	100 per cent.	131 per cent.	127 per cent.

ANALYSES OF FUEL

	Hazelton Shaft Culm, Per Cent.	Soft Coal, Run-of-mine, Per Cent.	Soft Coal Stoker, Per Cent.
Moisture	2.15	0.75	0.32
Volatile matter	7.40	34.25	23.78
Fixed carbon	64.45	55.80	62.60
Ash	26.00	9.20	13.30
Total	100.00	100.00	100.00
B.t.u. (dry coal)	10,617	14,181	13,689

Since coking coal and culm were used in these tests, the burning fuel produced a mass of porous, spongy coke; and being porous, the coked mass burned out in a comparatively short time. Right at this point it was observed that the culm and the bituminous coal in the mixture burned at the same rate. With an addition of anthracite culm in the soft coal, the mixed fuel contains less volatile ingredients than does raw bituminous. Furthermore, with a fuel consisting of one-third culm and two-thirds soft coal, every two particles of soft coal has as its neighbor a particle of culm. Consequently the soft coal particles have a greater opportunity to obtain oxygen in the combustion chamber necessary for a more complete combustion. Thus the culm in the mixed fuel reduces the excess of volatile matter, which, if not diluted, will be distilled and a part of it expelled from the stack as smoke. The function of the culm addition to the bituminous coal, therefore, is to give the volatile constituents of the soft coal a more complete combustion, thereby preventing the emission of unburned hydrocarbons and securing more heat.

At the conclusion of the runs made on the different engines the railroad company decided to build a mixing plant. Construction began on Oct. 11, 1917, at Hazleton, Penn., and was completed in eleven days.

Upon arrival the bituminous coal is unloaded into a pit, from which it is raised to the plant by means of a dragline. After passing over the bar screens, with ⅞-in. openings, the coarse material is fed onto a crusher where it is sufficiently reduced to pass through a screen of 1-in. mesh. Both the screenings and the crushed coal are then dropped into a bin. The silt is brought from the slush bank at the Hazleton shaft operation in 5-ton cars and dumped into a bin at the plant.

The material from each bin is then gravitated to a revolving table located directly under the bins. The proper amounts of bituminous coal and slush are scraped from the tables and both ingredients drop onto a third revolving table where they are thoroughly mixed. It is again scraped off and discharged onto a chute; thence to elevator buckets where the mixed product is loaded into the cars from which the soft coal was unloaded. The machinery is driven by a 50-hp. motor.

The present capacity of the plant, under normal conditions, is approximately 100 tons per hour, but it is the intention of the company to make slight alterations this spring so that the capacity may be increased to from 150 to 200 tons per hour.

In Lighter Vein

High Cost of Mule

An Englishman came to this country some years ago on a visit. He was impressed with many things he saw, but particularly with our vast mineral resources, and expressed his opinion that he would like to invest in American coal lands. This news received good circulation, and soon he was presented with many opportunities for investment.

After going over sheaf after sheaf of legal and engineering data of a certain operation, he bought. One day the idea seized him that he might go and look over his purchase. Arriving at the mine, he saw a driver using his persuader on a mule, and the general appearance of the place prompted the following remark from the Englishman: "Say there, driver, quit abusing that mule; he cost $40,000."

Coal Conservation

By DAVID MOFFAT MYERS
Advisory Engineer, United States Fuel Administration, Washington, D. C.

SYNOPSIS — *The coal shortage does not necessarily call for a power and heat shortage. If coal now available to the factories of the country were burned in such a manner as to extract from it the greatest amount of power possible, they would be confronted by no lack of fuel. The practice of true conservation, use without waste, can avoid the necessity of further interruptions to industries.*

THERE is an enormous and needless waste of coal in the United States. Coal is literally being thrown away in industrial plants, simply because it has been cheap, while coal in Italy is costing $100 per ton and people in our own country are freezing because of coal shortage. Factories essential to the proper conduct of the war will have to shut down unless scientific methods for boiler management throughout the country are adopted, and unless private homes coöperate with and are guided by the Fuel Administration. The popular support accorded to Mr. Hoover and his food-saving campaign has made possible the great results accomplished. The same loyal support of Dr. Garfield and his conservation program will relieve the present shortage of coal. The new program is to "Hooverize" coal.

The factory power plant has heretofore been neglected. It has not received the close analytical attention which the management has bestowed upon the other departments of its business. In these other departments the intake and output are carefully and continuously recorded and exhaustive studies made to discover those means which will result in the maximum efficiency of production. The United States Fuel Administration warns all plant owners and managers that if they do not apply to their power plants the same degree of intelligent skill and attention which have produced high efficiency in other phases of their business, there will again come a time when it will be necessary to shut down a part of the industrial plants of the country on account of a shortage of fuel.

When that time comes some owners will by intelligent effort have succeeded in obtaining a high efficiency of operation in their steam plants. Others will still be running with great wastefulness. Strict limitation in the distribution of coal will be necessary. Obviously it will not be fair to the efficient plants to shorten their coal supply, while the bad plants continue to waste. All plants, then, may be classified by the Government either as "efficient" or "wasteful," and this classification used as a basis of coal distribution and limitation. Quick and concentrated action alone on the part of plant managers will prevent serious shortage, and this threatened regulation and limitation. Now is the time to get your plant into the "efficient" class.

The power plant of the factory has been neglected largely because even when run with a tremendous waste of coal the cost of that coal constituted an extremely small portion of the total cost of production of the commodity manufactured, often less than 1 per cent. Hence, managers have neglected their power problems and have concentrated their attention on the more costly items of production, such as labor, material and machinery, and in these departments they have effected great economies by the application of scientific analysis and reform.

It is now imperative that they immediately shoulder the task of bringing their power, light and heating equipment and operation up to the highest plane of efficiency made possible by the best engineering practice.

Two considerations, that is, two factors, govern the efficiency of any process. These two factors are excellence of "equipment" and of "operation," and the resultant efficiency is equal to their product.

The efficiency of a steam plant is the product of the efficiency of its physical equipment, and this of the methods by which it is run. Thus you may have a good boiler and furnace, but if the fireman doesn't operate them properly your coal will be burned wastefully; you will obtain less steam than you are entitled to for the coal consumed, and the efficiency of the combination of equipment and operation will be low. On the other hand, it is possible to obtain a big saving by good handling of mediocre apparatus.

Efficient Firing Means Greater Steam Production

For example, in one plant investigated the steam production was increased 50 per cent. with the same amount of coal. Not a dollar was spent to improve the equipment, but the fireman was taught how to operate his furnace efficiently. As soon as he learned the new method of firing his pay was increased so that he was given the necessary incentive to continue the improved performance. A simple accounting system was installed so that at the end of each day both the fireman and the manager knew how many pounds of steam had been produced for each pound of coal. This figure which had been six, now became nine, so that one-third less coal was used than formerly. This meant good money in the pocket of the factory owner.

The above plant is typical of hundreds, and similar economies can be effected all over the country. This example is quoted to show how immediate savings can be made without delay for improved power equipment.

It will be necessary, ultimately, to tackle both ends of the situation, that is, both the equipment and the operation of industrial plants. But there is a right way to start the work, and this right way is first of all to get the highest efficiency obtainable from the present existing furnace, boiler and engine equipment. This means learning how to operate the present plants so that the saving of some 50,000,000 tons of coal per year may go into immediate effect.

The first thing for every plant owner to do is to ascertain how many pounds of water are being evaporated per pound of coal. In 99 plants out of 100 this information is not at present available. It will therefore be the specific business of the plant owner to make it available. This entails accurate measurements of coal and water. There are a number of good and sufficiently accurate devices on the market for accomplishing these objects. Continuous records of the feed water and a system of observing the furnace combustion by means of flue gas analysis should be employed. Primarily flue gas analysis indicates the quality of the combustion taking place. If the combustion is faulty, it should be corrected. The services of a chemist are not required. Any person of average intelligence can operate the hand machines, and there are automatic analyzers on the market, some of which give a continuous record of furnace performance. Fuel engineers are thoroughly familiar with the various types of apparatus, for this purpose, and if necessary their advice should be obtained. In every plant, the water fed to the boiler can, and should be, measured continuously and accurately. There are no excusable exceptions to this rule. When the owner has ascertained the number of pounds of water made into steam per pound of coal, his next duty is to find out whether this is the best that can be done with his equipment and if not, how the result can be improved.

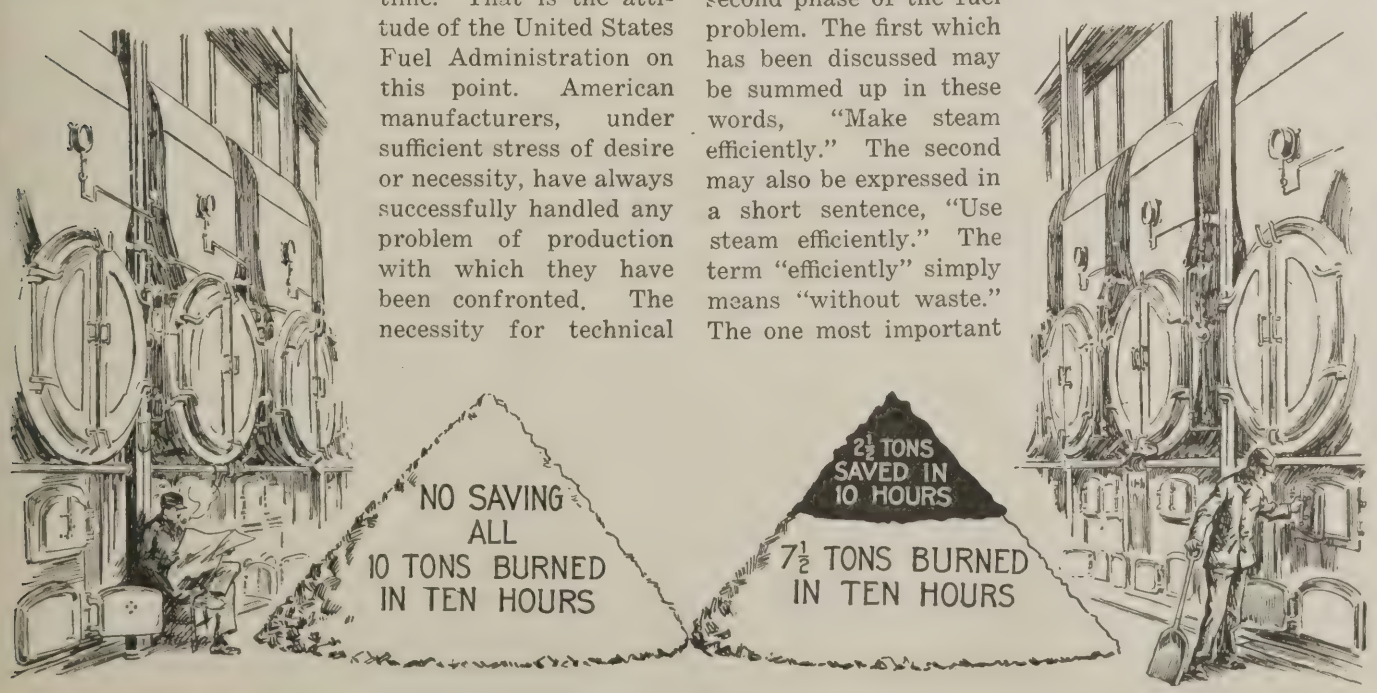
If an owner wishes his equipment to be classed as an efficient plant, so that he may receive the preference in coal delivery if shutting down of bad plants becomes necessary, then let him find out from the best sources of information how to test his boilers and make them more efficient.

Plant owners should at once call in the best authorities on steam and fuel economies. The large savings that will be accomplished by following the advice of truly competent fuel engineers will put additional income into the pockets of the plant owners. Experience has shown that this practice always brings profitable results. Ignorance of fuel economy requirements cannot be considered as an excuse at this critical time. That is the attitude of the United States Fuel Administration on this point. American manufacturers, under sufficient stress of desire or necessity, have always successfully handled any problem of production with which they have been confronted. The necessity for technical knowledge, almost always involved, has not stopped them. They not only have weeded out the requisite knowledge from its sources but what really counted was their ability to apply it effectively to produce results. The present problem is no more difficult or complex than those which have gone before.

The illustration below shows graphically the saving that can frequently be made by the ordinary fireman in a single day of ten hours if he uses the correct methods of handling his boiler and furnace. Thus one fireman can save 750 tons of coal in a year for Uncle Sam. Some can save more. But that is not all. The plant owner receives ordinarily the full benefit of the saving the fireman makes by virtue of his skill and faithfulness. In the above instance, one fireman might earn for his employer $\$750 \times 5 = \$3750$ a year in coal saved. It is only fair to divide these profits with the fireman. Furthermore, a fireman being human will probably lose his interest and the employer his profits unless a fair division of these profits are accorded to the man upon whose direct efforts the saving depends. Firemen's bonus systems have been developed to meet this situation.

A power plant is a factory. Its output is power, heat and light, and like any other factory it should be so designed and operated as to give the maximum of these commodities for a minimum expenditure of raw material, which in most cases, is coal. These conditions call for a thorough investigation of the entire plant to determine the location and extent of all preventable waste of steam and fuel. And then, when all the indicated corrections are accomplished the power plant, like any factory, must be put under a daily system of accounting and supervision to insure the maintenance of its efficient performance.

This is nothing more than common sense. Yet not one power plant in a hundred can render a true account of the production obtained from the coal consumed. Neither do the owners know how much, in terms of steam, power, heat and light should be produced for each pound of coal properly used. Yet this knowledge is available to those who seek it. Now comes the second phase of the fuel problem. The first which has been discussed may be summed up in these words, "Make steam efficiently." The second may also be expressed in a short sentence, "Use steam efficiently." The term "efficiently" simply means "without waste." The one most important



factor on this side of the factory problem is the utilization of the exhaust steam. After passing through an engine, although the pressure of the steam is reduced, it still contains 88 to 97 per cent. of its original heat.

Hence, all exhaust steam possible should be utilized in order to prevent a tremendous waste of fuel. If conditions are such that all of the exhaust cannot be used then install more efficient engines, or turbines, to reduce the production of exhaust to a point where it will just supply the demands for heating and process work. Never blow away exhaust steam to the atmosphere. This is of the utmost importance. Millions of tons of coal are being wasted in clouds of exhaust steam. Conversely, never use live steam for heating when exhaust steam can be employed.

More Horsepower with Same Coal Consumption

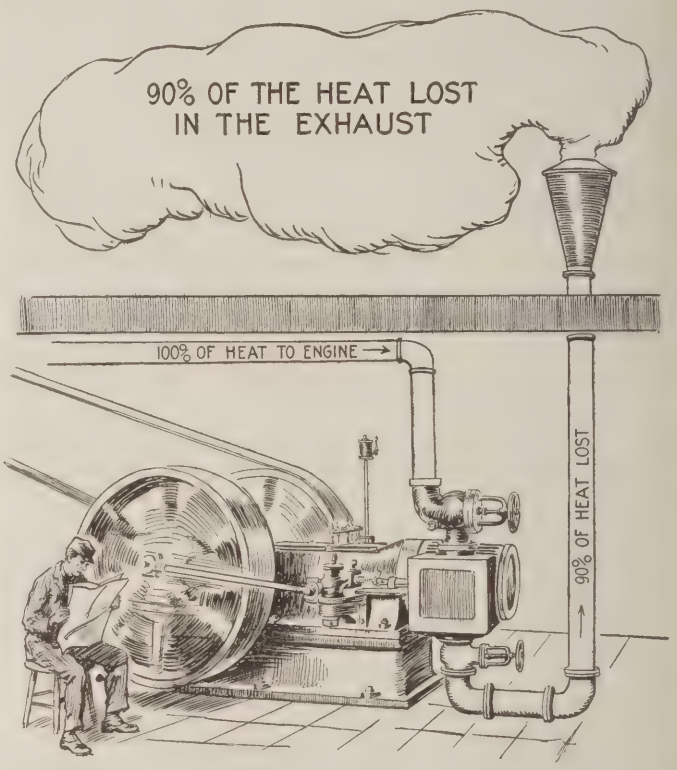
Let me give you an example of the failure of a factory plant "to observe these laws." One hundred and twenty boiler horsepower of live steam was being used for heating and process work while the company was buying electric power to run its machinery. Upon the recommendation of the consulting engineer, who was called in to investigate and report on the conditions of steam and fuel economy, a Corliss engine driving an electric generator was installed. The steam from the boilers now went to the engine, the exhaust from which was sufficient for all heating requirements. Enough power was produced by the engine entirely to displace the formerly purchased electric energy. All direct steam from the boilers was cut off from the heating system. Thus an additional 100 electrical horsepower was generated purely as a byproduct of the heating system, and the coal consumption remained the same as when this amount of electric current had to be purchased in addition to the coal for heating.

Conversely, the exhaust steam from an engine will furnish heating steam not only for its own building, but may have enough to supply several surrounding buildings. There has been developed a system known as "block-heating," whereby one central power plant, economically and efficiently operated, supplies steam heat to entire blocks of city business buildings, thereby doing away with a number of small wasteful boilers and their necessary multiple attendance. The exhaust steam is transmitted through carefully covered piping, and the heat loss in transit is practically negligible. Such a system is obviously advantageous.

In some small plants where a large waste of exhaust prevails, and where conditions do not permit its utilization, coal will usually be saved by electric power from a public service or water power company. Public service companies can perform a great service to the country, if they will coöperate with private plant owners, and make special rates for electric current, so that the small plant owner can afford to buy electric current, particularly during the non-heating season, and in many cases at night. This can usually be done to the advantage of the public service company.

The steam-using public must learn the value of exhaust steam, and that a heating system which requires 100 b.-hp. of steam may have a steam engine inserted between the boiler and the heating main, and obtain nearly 100 mechanical or electrical horsepower in addition to the required heating, with no increase in the consumption of coal. In cases where this can be done continuously no central power station can compete with the private plant for efficiency in the production of power, light and heat.

The amount of coal required to produce an electrical, or mechanical, horsepower-hour varies all the way from a little over 1 lb. to 8 or 10 lb. This consumption which has such a wide range of values depends upon the mechanical equipment of a plant and the skill employed in its operation. Thus, speaking first of equipment, it is true that there are certain kinds of steam pumps which use as much as 150 lb. of steam per horsepower-hour; certain engines which use as much as



60 lb. of steam per horsepower-hour, whereas it is possible by electrifying the steam pumps to reduce their steam consumption to 15 or 20 lb. per horsepower-hour, and the main power producers in the form of modern engines and turbines under favorable conditions can produce a horsepower-hour for 8 to 15 lb. of steam instead of the 60 lb. which is now consumed by many engines in actual operation.

This wide range in the steam economy of prime movers combined with a difference in coal consumption of some 25 to 50 per cent., as governed by the degree of intelligence with which boiler and engine plants are operated together with a great waste and needless production of exhaust steam, indicates roughly the enormous saving of coal which is possible in the industrial plants of the United States, if their equipment and operation is raised to standards made possible by the best known engineering practice.

This country has been wastefully and heedlessly drifting along the lines of least resistance, until all of a sudden this war crisis has called for a radical change of policy.

Previous to this period, all improvements in power plant efficiency were impelled by a desire to save money. That is why the public service corporations have better

plants than power equipment of the usual factory. Their coal cost constitutes roughly 50 to 60 per cent. of their total cost of operation, whereas this item with a factory may be less than 1 per cent. of its total cost of production.

But the new reform which is now to begin will be impelled not by the incentive of expense reduction, but by an infinitely stronger and more vital force—the force of necessity. Unless efficient equipment and efficient methods are installed, there will not be coal enough to run the industries. Make your plant efficient or shut down. That is the new, the present, aspect of the fuel problem.

Heating of Coal in Piles*

By C. M. Young, E. M.
Assistant Professor of Mining Research, University of Illinois, Urbana, Ill.

Bituminous coal piled in heaps or bins frequently undergoes a process of spontaneous heating as the result of the absorption of oxygen. It seems probable that the first absorption of oxygen by coal which has not previously been exposed to the air may occur as a condensation or a combination of oxygen in some form which does not result in the production of carbon dioxide, but slow combustion soon begins. The absorption of oxygen is accompanied by an increase of temperature, and this by an increased rapidity of absorption; hence the dangerous condition proceeds from bad to worse, until the kindling point is reached, unless the process is interrupted.

A dangerous rise of temperature can be prevented by excluding oxygen, by increasing the bulk of coal in proportion to its surface exposed, or by circulating enough air to dissipate the heat produced. The storage of coal, in practice, varies from almost complete exclusion of oxygen, by storing under water, to such freedom of access as exists when the coal is stored in open piles.

Oxygen available for absorption by coal is supplied by the air in the interstices between lumps and by additional air which may enter the pile through circulation. The size of the coal largely affects both of these supplies; for if the fragments are small the spaces between them constitute a small percentage of the total volume, and little oxygen will be available unless the circulation of air brings in a fresh supply, while with large fragments the percentage is relatively large; circulation also is much easier through a pile of coarse lumps. In the case of lump coal, although a large amount of air may be present, the exposed surface is comparatively small and there is little opportunity for the absorption of oxygen to be so rapid as to cause dangerous heating. Attempts have been made to prevent heating by allowing a sufficient circulation of air to carry off the heat generated; obviously this method cannot be applied to fine sizes or mixed sizes.

When storing coal at the University of Illinois, an attempt has been made to use so much fine coal and to pack it so thoroughly as to prevent circulation of air, while also reducing the original air in the pile so as to prevent heating. This method has been fairly successful, but in some cases the piles have heated. An investigation made when a pile was opened for the removal of portions which had begun to heat indicated that heating had occurred only in those parts of the pile which contained comparatively small proportions of fine coal.

To confirm the impression given by the appearance of the pile, samples of coal were taken from the spots where heating was evident, and from neighboring regions in which there was no evidence of heating. These samples were then sized on screens ranging from 2-in. to ⅛-in. round hole, giving the following results:

Size, In.	Heated Region Per Cent.	Heated Region Cum. Per Cent.	Unheated Region Per Cent.	Unheated Region Cum. Per Cent.
Over 2	0.0	.....	0.0	.....
1–2	32.6	32.6	6.3	6.3
½–1	36.4	69.0	22.9	29.2
¼–½	12.2	81.2	24.8	54.0
⅛–¼	7.4	88.6	18.5	72.5
Below ⅛	11.4	100.0	27.5	100.0
	100.0	.....	100.0	.....

It appears from this examination that the portions of the pile in which fine sizes were present in large proportion did not contain sufficient oxygen to heat the coal to any noticeable extent. The close packing had also so obstructed circulation that little fresh oxygen could have been brought in even if the temperature had been raised to such an extent as to favor circulation of air.

This indicates that one comparatively safe way to store coal is to use enough of the fine sizes to occupy the space as completely as possible, and to pack the coal tightly in order that the air space may be reduced and the circulation of air restricted. Apparently the most dangerous condition exists when the coal is of such sizes as to present a large aggregate surface for absorption, and at the same time leave sufficient air space to provide the oxygen required for heating; this condition is found in a loosely packed pile of mixed sizes.

*Presented at the New York meeting of the American Institute of Mining Engineers, February, 1918.

Production of Companies in Indiana County, Pennsylvania, in 1917

The following table has been compiled by Thomas S. Lowther, inspector for the twenty-fifth bituminous district, Indiana County, Pennsylvania, and gives the output in 1917 of the various producing companies in that district:

Company	Tons
Jefferson and Clearfield Coal and Iron Co	1,717,519
Pittsburgh Gas Coal Co	1,309,545
Russell Coal Mining Co	495,582
Penn-Mary Coal Co	439,020
Coal Run Mining Co	407,701
Clearfield Bituminous Coal Corporation	339,574
Tide Coal Mining Co	167,720
Empire Coal Mining Co	156,383
Seneca Coal Mining Co	152,975
Inland Coal Co	124,836
Idamar Coal Co	107,546
Meco Coal Co	70,000
Pennsylvania Coal and Coke Corporation	56,981
McCombs Coal Co	56,794
Glenside Coal Co	38,546
Dixonville Coal Co	36,369
Williams & Griffith	35,050
Savan Colliery Co	34,599
Marion Center Coal Mining Co	30,019
Clymer Brick and Fireclay Co	12,272
Jones Coal Co	9,086
Punxsutawney Coal Mining Co	8,578
Eliza J. Smith & Brothers	4,875
J. H. Bicknell	4,155
Estep Brothers Coal Mining Co	2,413
Total	5,818,138

New England Coal Dealers Association will hold its annual meeting Mar. 20 and 21, at the Municipal Building, Springfield, Mass. Secretary, C. R. Elder, Boston, Mass.

Supporting the Roof in Coal Mines—III

By R. D. BROWN
Harrisburg, Ill.

SYNOPSIS — *Steel roof supports are here considered. The advantages of steel supports are prominent and are noted fully. Standard designs are described and illustrated, and methods of setting them up in the mine are enlarged upon. A table summarizes the characteristic features of concrete, steel, untreated wood and treated wood when used to support top. Rules and limits for efficiency and good workmanship are specified. Concludes with discussion of cost of maintaining roadways under different conditions.*

STEEL, as a substitute for wood, will often prove the most economical, when permanency is desired, for supporting mine roof. The ultimate cost of the timbered roadway will depend on the natural conditions, the relative prices of materials and the life of the installation. The ideal condition is to choose a material of sufficient durability, which shall have the same life as the roadway without a renewal; the labor cost of renewals is usually very great, due to adverse working conditions. With temporary roadways timber can probably be used to advantage, if it is obtained at a reasonable cost. If timber is treated, its life will be increased greatly and the necessity of early replacement eliminated.

In general, we may say that if the life of timbering is to be greater than ten years, then wood will be found to be more costly than steel. If properly painted and cared for, steel will last a long time; it may be taken down and reërected, but the labor cost of doing this may offset any apparent saving, due to its length of life. Knowing, therefore, the estimated life of the installation, the cost of various materials and the local natural operating conditions, the type of construction adopted should be chosen to secure low ultimate cost. The chief advantages of steel timbering are as follows:

1. *Low Ultimate Cost*—The ultimate cost consists of first cost plus interest and maintenance. A low first cost will depend on the current price of steel at the time of installation and the natural operating conditions under which it is erected. The most potent factor is the price of steel, which may vary greatly in short periods of time. If the sets are painted before being erected, the maintenance cost will be negligible and will include nothing but periodic painting.

2. *Steel Is Not Inflammable*—The danger of a disastrous fire, such as may occur when wood is used, is practically eliminated by the use of steel. A fire which may originate in materials along the roadway, or in the coal itself, may cause complete failure of steel sets; but the probability of such an occurrence may be reduced to a minimum by intelligent supervision.

3. *The Sets Are Easily Erected*—Unskilled labor may be employed to erect the sets, on account of the simplicity of the design. Each set is an exact duplicate, therefore no time is lost in assembling.

4. *Adaptability of Design*—There need be no waste of material in designing a support for any weight, or any particular condition. Specified lengths are supplied to the manufacturer and each piece is so made that it exactly fulfills the duty for which it was designed. If the seam of coal is thin, the head room obtained by using a steel crossbar is greater than if a wooden bar is used. This may prove to be quite an advantage if the vertical clearance affects the capacity of the mine cars.

5. *Ventilation Is Not Affected*—The presence of wood in the mine will affect the purity of the air. If the timber is not treated, it will decay soon after being placed; if it is treated, the time of decay is simply deferred and in the meantime the air may be affected by the chemicals used as preservatives.

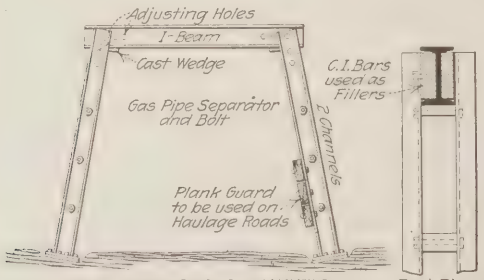


FIG. 12 STEEL SET, 2 CHANNELS AND I-BEAM PIN CONNECTED

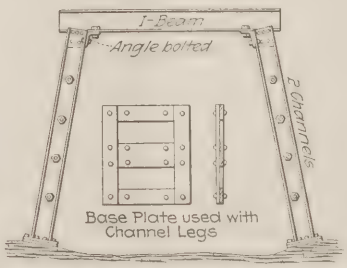


FIG. 13 STEEL SET WITH 2 CHANNELS, I-BEAM AND ANGLES RIVETED

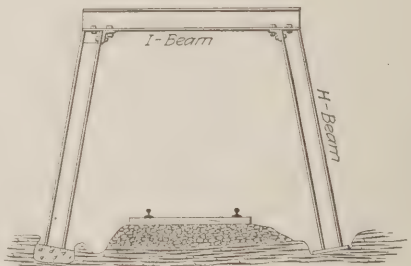


FIG. 14 3-PIECE STEEL SET, I-BEAM, 2 H-BEAM LEGS ANGLE LUGS

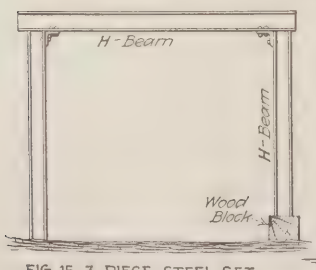


FIG. 15 3-PIECE STEEL SET, H-BEAM, 2 H-BEAM LEGS AND LUGS

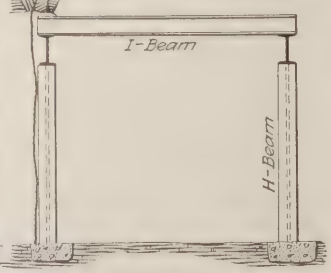


FIG. 16 I-BEAM BARS ON I-BEAMS, SUPPORTED BY H-BEAM LEGS

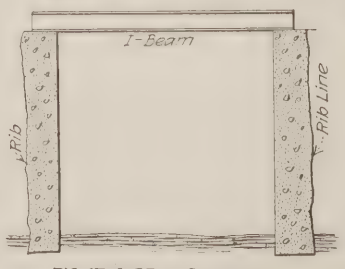


FIG. 17 I-BEAM BAR ON CONCRETE WALLS

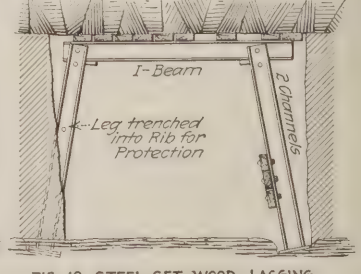


FIG. 18 STEEL SET, WOOD LAGGING

6. *Renewals Are Not Often Necessary*—The renewal of timber sets is usually a dangerous undertaking, on account of the weight of loose rock which must be supported during the operation, or else taken down before replacing the set. Only skilled labor should be used in making renewals. Steel supports may, therefore, be considered as a matter of insurance and safety.

The disadvantages of steel as roof supports are high first cost, their destructibility due to the action of mine water and their unadaptability to temporary construction. For main haulage roads, where the roof must be supported, these disadvantages are more than offset by the many advantages above enumerated; and, unless the price of the metal has increased disproportionately, steel timbering will be found to give the best results.

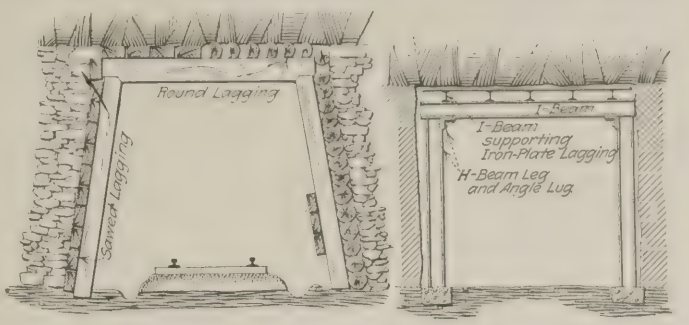
Standard Designs of Steel Timbering

There are several standard designs for steel timbering, as shown in Figs. 12 to 17 inclusive. Each has its merits and represents good practice. Ordinarily the I-beam collar and the H-beam legs, with bolted lugs, will prove entirely satisfactory; this set is simple, easily assembled and erected, but not adjustable. If two channel sections are used for each post their effective length may be adjusted, as shown in Fig. 12. Channel posts are more expensive than H-beam posts and require a special steel baseplate. If H-beam or I-beam posts are used, baseplates are optional, depending on the nature of the bottom. The legs of a three-piece set must be protected from injury or displacement by derailed cars. This may be done by using guards, or by setting the legs back into the rib (as shown in Fig. 18). The trenched recess is practical and should be used when not too costly.

With certain conditions steel I-beams may be used as collars or crossbars without legs; they may be supported on the coal, by hitching into the rib. This cannot often be done as the coal frequently rashes under the influence of the air, thus weakening the support. If the rib will not sustain the weight, concrete or brick walls may be erected, as a permanent and safe structure, to carry any weight which might come on them in the future. The expense of such an installation will usually be in excess of that of the standard three-piece set, but it has the advantage of being more stable, fireproof and permanent.

If the roof spalls freely, a tight lagging (as shown in Fig. 19) is necessary to prevent injuries from falling slate. The moving current of air may thus be kept from immediate contact with the roof, whereby its cutting action will be reduced. When steel sets are used, steel plate lagging (as shown in Fig. 20) will prove economical where conditions relative to corrosion will permit. The thickness of the plate should be decided in each case, but it should vary between a minimum of $\frac{1}{10}$ in. to a maximum of $\frac{1}{4}$ in. The life of the lagging should be the same as the life of the set; and if wood lagging is used with steel sets, the wood should be so placed as to be removed easily.

When steel or timber sets are used, the spacing of the sets and the design of the lagging should receive due consideration. When increasing the spacing of the sets, the strength of the lagging must be increased in proportion. With ordinary weights to be supported, where lagging is required, a spacing of six feet will effect a saving in both labor and material. If steel plate is used as lagging, a thickness greater than $\frac{1}{4}$ in. will make the cost prohibitive. A spacing of three-piece sets more than 2 ft. apart requires that longitudinal beams be placed over the collars to support the thin plates, which do not have sufficient stiffness to uphold the weight.



FIGS. 19 AND 20. DETAILS OF TIMBER AND STEEL SETS
Left—Timber Set with Tight Wood Lagging. Right—Steel Set with Steel Plate Lagging

These auxiliary longitudinal beams should be continuous over several collars to give them additional strength; they also support the weight of any loose slate if a set is accidentally removed.

The results of working out a definite problem involving various spacings are shown in Fig. 21. The conditions assumed are typical, common and within the limits of usual practice as to the weight cared for. If existing conditions differ greatly from those assumed in the chart referred to, separate calculations should be made.

Packwalls are built in longwall mines to support the roof along the haulage roads, as shown in Fig. 22. These walls are constructed of gob and mine waste, which accumulate from brushing and from falls of rock and slate. In order to build a permanent wall, the face

TABLE VIII. COMPARATIVE ADVANTAGES OF DIFFERENT MATERIALS FOR TIMBERING HAULAGE ROADS

Comparative Conditions	Material			
	Concrete	Steel	Untreated Wood	Treated Wood
Adaptability....	Can be used to suit almost any conditions	Adapted to all but wet places	Used universally	Not well adapted to wet places
Cost.....	First cost is great. Ultimate cost for long periods shows a saving.	First cost less than concrete. Ultimate cost shows a saving.	Least first cost. Greatest ultimate cost for long periods	Medium first cost. Ultimate cost shows a saving
Salvage value...	None	Small	None	None
Renewals.....	Permanent	Life of 15 to 20 yr.	Life 1 to 6 yr.	Life 4 to 12 yr.
Effect on ventilation.....	Aids	Does not materially affect it	Vitiates air when rotting	Affects air when first installed
Imflammability	Not inflammable	Not inflammable	Burns readily	Burns readily when creosoted. Not readily inflammable when treated with zinc chloride
Risk due to fire..	None	Fire will melt steel	Burns readily. Insurance and fire protection costly	Same as for untreated timber
Risk of accidents due to derailments, etc.....	None	If legs are not trenched they must be protected by shields of some kind	Legs must be protected	Legs must be protected
Risk to men making renewals, taking down rock, etc.....	None	Renewals in only a very few cases	Risk is continuous. Only skilled workmen may be employed on account of the danger	Renewals are not as frequent as with untreated wood, but the risk is about the same

should be laid up like rubble masonry thoroughly tied into the interior. The large flat pieces should be used to bond the face course to the main body of the pack, to prevent bulging when the weight comes on. The clearance between the wall and the roadway is generally specified in the mining law. In addition manholes may be constructed at frequent intervals for the safety of men using the haulage road for a traveling way.

Packwalls afford a lodging place for large quantities of dust, which may prove dangerous. It is difficult to remove this dust, and sprinkling is not effective if it is not done with a hose. Unless it is necessary to locally stow away large quantities of gob and slate, the cost of packwalls will make them impracticable. Filling areas worked out by room-and-pillar methods of mining, by flushing with sand or culm, has been practiced in the anthracite districts of Pennsylvania and in Europe. A caving roof may thus be supported. When necessary a roadway may be excavated through the filled areas, after the material has had ample time to settle. This roadway may be used to remove coal from pillars in the flushed area, or it may be maintained as a haulage-way.

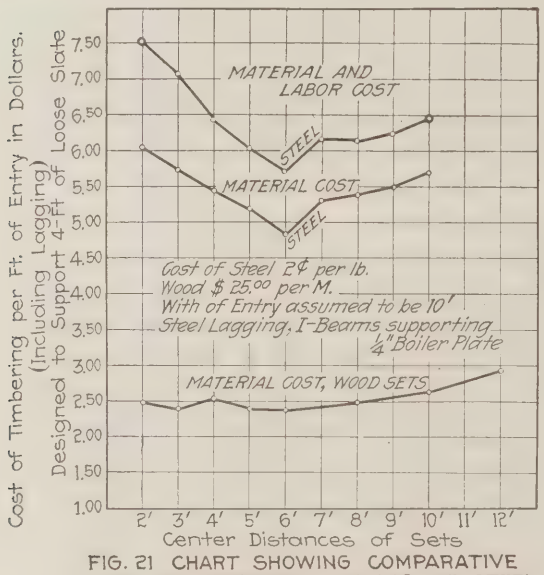


FIG. 21 CHART SHOWING COMPARATIVE COST OF DIFFERENT SPACING OF STEEL AND TIMBER SETS, 10-FT. SPAN

The lives of others depend on the judgment and workmanship of the timbermen, who should at all times keep this fact in mind and be governed by it while performing their duties around the mine.

Report any dangerous condition found along the roadway to the management.

If roof is reported dangerous and must be timbered, do not work under it until it is temporarily made safe by props or other means.

When retimbering or removing weight above timber sets already in place, proceed cautiously, removing only small quantities or pieces at one time. Secure any loose rock before attempting to go further.

If timber sets are being taken out for renewal, place a temporary set and remove the old legs only after the weight has been caught.

Always select a sound piece of timber of sufficient strength.

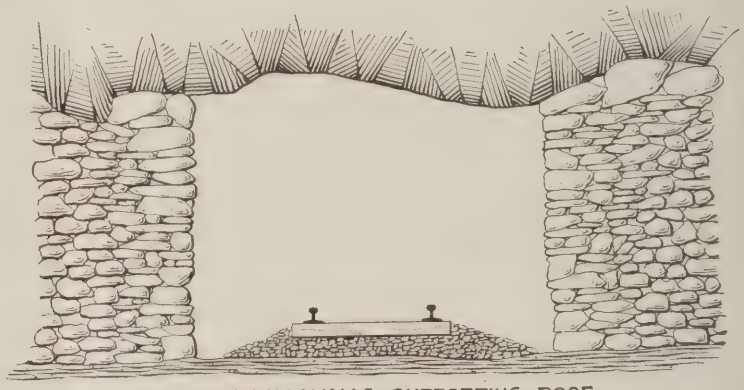


FIG. 22 PACK WALLS SUPPORTING ROOF

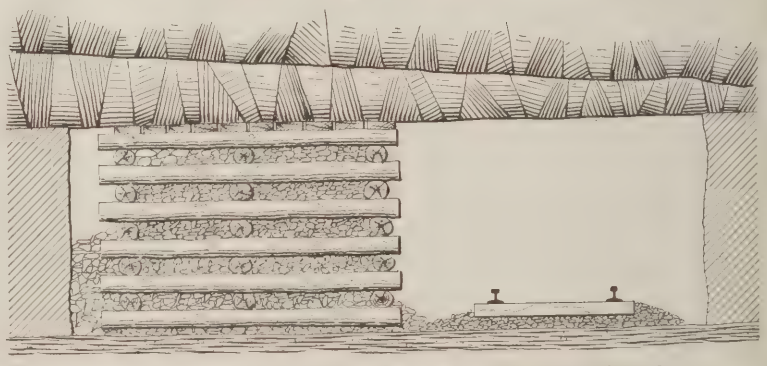


FIG. 23 TIMBER CRIB SUPPORTING LOOSE ROCK

Cribs, or cogs, are built of layers of timber laid together much as in building a loghouse; the interior is then packed with loose rock and slate around the logs. If properly built, cribs will take great weight, but they will not prove substantial unless the gob or slate is closely packed around the timber. (See Fig. 23.) Timbering of this kind is used to support large openings or thin pillars along haulage roads, where entries cross, or at roomnecks. The crib is commonly used where the roof is strong and breaks in large slabs, instead of shelling off in small pieces. If a squeeze or a creep develops and the overburden is not great, cribs are useful to preserve a roadway; in some cases the rock movement may be arrested, or else it may be sufficiently controlled to make it possible to maintain a safe roadway.

The following rules and hints are for the benefit of timbermen who work on haulage roads:

Green timber has only approximately two-thirds the strength of seasoned timber.

Collars should be wedged tightly against the legs to hold them in place until the weight comes on the set, but never wedge the collar at the center.

If there is any side pressure, the legs of the set must be inclined to make them stable.

Inclined legs or posts of a set should be well hitched at the top and bottom to prevent displacement.

The legs of timber sets should be trenched into the rib or otherwise protected in some instances; for example, on curves on haulage roads.

Never have timber or supplies left under questionable roof or in a place where it would be necessary to go under bad roof to obtain the supplies.

All material should be delivered to the place where the work is to be done before the timbermen report for work.

Proper tools in good working order are necessary for rapid and efficient work.

Before framing, square the ends of the legs. If the legs are to be set with a batter, do not cut the squared ends until the bevel is marked off and then make one cutting suffice.

Lay off the bevel as shown in Fig. 7 by using the following formula:

$$S = \frac{(A - a)d}{2h}$$

in which S is the bevel to be marked off.

Never use a bent or crooked piece of timber to support weight.

If the piece of timber is crooked at one end, it may be squared as follows: From the center of the straight end, lay off equal distances on the other end on opposite sides of the stick. A cut through these points will square the timber.

Never work near bare live wires.

All wiring near steel timbering must be insulated.

Steel beams are easily cut by first chiseling across about $\frac{1}{8}$ in. deep, next placing the beam over two solid supports with the chiseled groove midway between, and finally shooting a small shot of dynamite directly over the cut.

All material such as wood or steel beams and posts should be ordered in proper lengths to avoid waste of both labor and material.

Maintaining Roadways Without Timbering

In many cases it is unnecessary to support the roof along roadways if all loose rock is removed before it becomes dangerous; or if the roof is protected from the air by using a cement coating; or by maintaining an airway separate from the roadway, this airway to be cleaned periodically. Thus the problem of continuous maintenance may have more than one solution.

The cost of maintaining the roadway and also a separate airway will, with ordinary conditions, be from five to ten dollars per foot of entry for a twenty-year period. These figures are based on actual costs of cleaning air-courses in several mines where the roof was seriously affected. They include the cost of periodical removal of all loose and fallen rock, the cost of yardage on the additional entry driven and the construction of necessary crosscuts and also interest on all expenditures up to the end of the twenty-year period. Any disadvantage or additional power cost, caused by air-courses being choked with falls of rock or slate during early periods of operation, will be offset by the fact that later on less power will be required, due to an increase in cross-sectional area at the time most needed, when the length and the resistance of the air-course is reaching its limit.

The cost of maintaining the roadway and the air-course together will vary with different conditions, but the amount which may be spent annually in continuously protecting lives and property should not exceed a definite amount. We estimate that the least cost of effectively timbering 500 ft. of entry, 12 ft. wide, will be approximately $6930 for a twenty-year period. The annual expenditure for the maintenance of a safe roadway, which will amount to $6930 in twenty years with interest compounded annually at 5 per cent., is $209.30. Therefore, if the sum to be spent annually for the maintenance of 500 ft. of roadway is greater than $209.30, some form of timbering will eventually cost the least.

There is one other proposition to be considered, and that is the protection of the roof with a cement coating by the use of a cement gun. In some cases such a method of protection would be impracticable, but in others it has not only proved to be practical but also economical. A few failures have resulted from the use of too thin a coating, and it is recommended that this coating shall not be less than $\frac{3}{4}$ in. in thickness. If the cement will not stick to the roof, it may be found necessary to use metal lath secured tightly against the roof with steel pins, or supported on light I-beams. The object of the cement coating is to prevent the disintegration of the roof by exposure to the air current.

An Old Anthracite Landmark

The accompanying illustration shows one of the old anthracite landmarks near Wilkes-Barre, Penn.—the Woodward breaker of the Delaware, Lackawanna and Western R.R., Coal Department. It is located along the Susquehanna River at Kingston, about a mile west from the City of Wilkes-Barre.

Today this colliery employs about 1000 men and boys inside and around the plant, the capacity of which is 3000 tons a day of eight hours. The history of this old breaker must have been a most interesting one, the illustration suggesting many additions to the original building, which has spread out to accommodate the increasing demands made upon it from time to time.



WOODWARD BREAKER, DELAWARE, LACKAWANNA & WESTERN R.R., COAL DEPARTMENT

This is said to be the first breaker in the Wyoming Valley to work nine hours since the eight-hour day went into effect. This is being done every day, and the men at the mine say "they are doing their bit."

The last chapter in the history of this old landmark promises to be its most interesting one, for the Woodward breaker is to be replaced by a larger one of reinforced concrete. Some of the concrete forms are in and the new breaker is to be built around the old one. The colliery officials predict that not a week's work will be lost in the reconstruction work. The new breaker is to be of concrete and steel, much of the latter material being on the ground. The capacity of the new plant will be 4000 tons a day.

Mining Engineers Consider Industrial Relations—II

By R. DAWSON HALL
Associate Editor, "Coal Age"

SYNOPSIS—*Remarks on the New York meeting of the American Institute of Mining Engineers. The members held nine technical sessions, viewed interesting tunneling features in the subway construction and held a patriotic smoker in the Engineering Societies Building.*

AS STATED, the morning session of Feb. 18 terminated with the discussion of the paper of C. F. Wang, a paper which might have elicited extended comment had not the lunch hour intervened. The paper was more or less adequately discussed in the last issue, but one interesting feature still deserves comment. The company, the Pen-hsi-hu Coal and Iron Co., Ltd., whose operation Mr. Wang describes, increased its capital to $7,000,000.

This $7,000,000 plant is full of mysterious anomalies. The coke is still made by building a cone of coal, setting fire to it and shutting off the air by a covering of stone. Loading coal to the oven takes 10 men and getting stones for it five men. The covering and unloading of the coke takes 20 men and the water quenching one man.

Mountain Labored and Brought Forth a Mouse

They are two to three days building the oven and 10 to 10½ days coking the coal, and when the work is done by these 36 men working 12 hours a day, there is 70 tons of coke to reward their pains and to pay for their labor and for the labor of the mine workers. From each "oven" 96 to 105 tons are obtained each month.

Work as inefficiently performed as this coke-making is bound to result in coke of a high price even where wages are low. Countries which do business in a way so uneconomical of labor are sure to pay inadequate wages. Where the product of labor is small the wage must also be small, or economic law is a fraud and a deceit.

In the afternoon a visit was made to two parts of the subway; one near Times Square where shattered rock was encountered, and the other in Brooklyn where the material to be handled was a loose running sand. The problems were pointed out by competent guides. In each case there were tall buildings adjacent which could not with safety be subjected to the most insignificant settlement.

In the Times Square section a tunnel was being excavated under an old subway. Fortunately, the supports in the upper subway terminated with broad cast-iron baseplates. In consequence it was possible to excavate narrow ways under these supports, put girders in the place excavated and then, by further excavation, provide space for brick walls. These walls when erected could, by the insertion of iron shims, be made to carry the weight without the least semblance of subsidence. In the sand section twin tunnels had been driven by the shield method. It was purposed to connect them so as to form a station. Both tubes had to be cut. When cut neither would have enough strength to sustain the immense weight above it, for the shape would be too unstable. By careful forepoling a tunnel was driven over the top of the twin tubes. This heading was heavily timbered by 12 x 12-in. timbers. The end of the tunnel had in the main to be kept sheeted, otherwise sand in the front of the tunnel would have run into the excavation and the effect on the street and the buildings adjacent would have been disastrous.

The work was a revelation of careful tunneling where single eighths of inches in settlement counted, and where the material encountered, a beach sand, would run almost to an angle of 45 deg. to the horizontal. The upper tunnel was not completed at the time of the visit. After its completion the floor was to be gradually extracted and steel supports introduced to strengthen the tubes.

The first morning session was the annual business meeting and the new institute officers were announced: President, Sidney J. Jennings; vice presidents, Henry F. Drinker, Robert M. Raymond; directors, F. G. Cottrell, Hennen Jennings, George C. Stone, S. A. Taylor and Arthur Thatcher.

The amendment, which provided for more stringent standards of membership, passed by a vote of 1123 votes for, 59 votes opposing and 6 ballots invalid. The unanimity was not unnatural, as the requirements made were not unreasonably severe. Unless a finer screen is used than that now proposed there is no risk that any bona fide mining man will be rejected.

Coarse Screen and Bypass Lets Them All In

A member must be at least 27 years of age. He must have had six years of employment, graduation at a college being accounted as equivalent to two years of employment. For three years during that time he must have occupied a position of responsibility.

But though these restrictions are not severe a number of loopholes have been provided. Employment as a teacher is allowed to count as a position of responsibility in mining work, even though mining be not taught, but engineering, geology, metallurgy or chemistry. Moreover research work and scientific literary work is placed with teaching as a post of responsibility. Finally those who have done notable experimental work in mining, geology and metallurgy can be admitted without other qualifications. The institute is still a broad and democratic institution, open rather to talent than to mere success, and no one would wish surely to make it more exclusive.

The paper on "A New Method of Separating Materials of Different Specific Gravities" was an important event of the Tuesday morning session. This paper was read by H. M. Chance on behalf of the author, Capt.

Thomas M. Chance, who is now in the national service. Briefly, the method consists of the use of a floating medium having a specific gravity between that of the gangue and the valuable mineral. In a miniature apparatus the floating of coal from slate was demonstrated, the floating medium used being a mixture of sand and water.

With a centrifugal pump a circulation of water under small hydraulic head was maintained through a perforated plate in the bottom of the "jig" or apparatus. This made, Mr. Chance explained, a "true fluid mass" of sand and water, about 12 in. high, having a specific gravity of from 1.2 to 1.8. Above this there was about 6 in. of clear water, which was kept circulating by the centrifugal pump.

Coal and slate were put into the apparatus. The coal sank only to the level of the "fluid mass" of sand and water, while the slate sank to the bottom of the apparatus. By using heavier sands, a heavier medium may be secured. Preparations are being made to install an apparatus at one of the anthracite breakers. The work has not been carried into other fields as yet, though Mr. Chance was of the opinion that it might be applied to other separating problems upon further development. Material to be separated should be appreciably coarser than the sand used in the "fluid mass."

With Air Absent Floating Is Not Flotation

Discussion as to the patentability of the method brought out some humorous comment as to royalties and cost of the apparatus, J. Parke Channing adding the final quip in warning the inventor that he should be very careful not to let the least bit of air get into his centrifugal pump unless he were prepared to entertain a long lawsuit with the Minerals Separation, Ltd.

For lack of space, it is necessary to pass over the interesting sessions of the afternoon, held by the iron and steel section and the petroleum and gas section. Similarly all reference to the illustrated talk in the auditorium, on the "Devasted Districts of France," given under the auspices of the Women's Auxiliary, must be passed without comment. While the ladies went to the Metropolitan Museum of Art, Mark R. Lamb showed motion pictures of Bolivian tin mines. Later in the afternoon President-elect and Mrs. Sidney J. Jennings held a reception at their home.

In the evening a smoker with speeches, mostly serious, brought the members more closely in touch with each other. It was held in the Engineering Societies Building. Captain Hodder-Williams, of the British Army, now training prospective American officers at Columbia University, made a humorous speech, ending his remarks with an appeal for a discipline of the civilians in the rear equal to that of the army in the trenches. He said that the other Allies feared more that the men at home would weaken in their devotion and service to the nation than that the men at the front would fail to do their duty. He called on the men behind the lines to support all those measures making for an effective answer to the attacks of the enemy.

Other Allied speakers were Capt. E. E. Dulieux, representing France, and Lieut. Col. Boorman, of the British and Canadian recruiting organization, who said he hoped that if any members of the institute knew of slackers who had slipped into the country to avoid the draft they would inform the British recruiting agencies. Samuel A. Taylor, of the technical division of the Fuel Administration, spoke at length on the purposes of the administration, commending the work of H. A. Garfield most highly and saying that no one had put the cost accounting of coal mines on a more accurate basis than R. V. Norris, who was now a part of the Fuel Administration. He put the blame for the shortage of coal on the inadequacy of the railroad rates ordered by the Interstate Commerce Commission. He also said that the country would be divided into 20 producing and 11 consuming districts and that consequently during the war coal would not be "cross-hauled."

M. L. Requa, the head of the petroleum division of the Fuel Administration, deplored the restrictions under which administrators and bureaus worked. He said that all manner of subterfuges had to be used to do those things which Congress wanted the administrations to do, but for which it had, by an oversight, not provided the needed powers of accomplishment. He said that owing to the lack of railroad transportation there were 3 bbl. of oil needed for every 2 bbl. of railroad-tank capacity available.

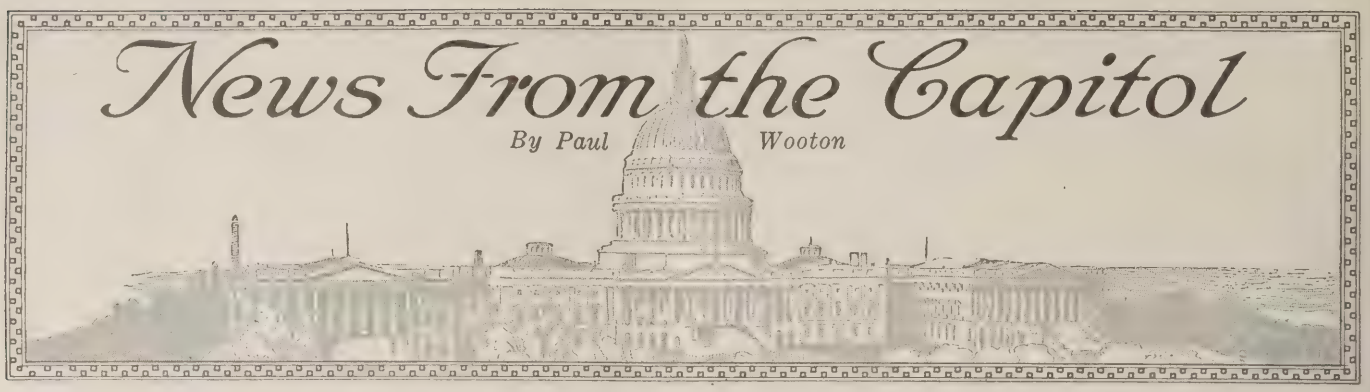
W. L. Honnold, of the Commission for Belgian Relief, said that a minimum requirement for the support of the people of Belgium and of the occupied portions of France had been figured out. They are only getting 60 per cent. of that minimum at present. There has been expended for the relief work nearly $400,000,000, of which $180,000,000 has been provided by France, $91,000,000 by Great Britain and $91,000,000 by the United States. The people are in terrible need of clothing, as 80 per cent. of that commodity, outside of personal apparel, has been commandeered by the Germans. Even the wool mattresses have been taken.

For clothing $11,000,000 is needed. Only 40 per cent. of that amount has been supplied. Second-hand clothing would be most welcome. The situation daily becomes more serious, as we learn from the Spaniards and Dutch who now have the work in hand. Along the Dutch frontier still stretch three barbed wire fences 10 yd. apart, the middle one charged with electricity. The people, while they have faith in the outcome, are becoming terribly out of heart, and are suffering severely from lack of food and clothing while unable to break through the ominous line which separates them from Holland. W. G. Westervelt and W. O. Hotchkiss, of the War Minerals Committee, also gave short addresses.

(To be concluded)

On Getting Ahead

If you're not forging ahead, you're falling behind. There's no such thing in times like these as marking time or standing still. The Annual Success Number of *Coal Age*, to be issued Apr. 13, will embody the experiences of men who are moving forward. Every man in the coal-mining industry who has anything worth while to say ought to contribute a "get-ahead" article for this number—a story of success in men, material and methods. The "other fellow" will get as much inspiration and benefit from your story as you will from his. Copy, photographs and diagrams should be in our hands by Mar. 25.



Fuel Administration Makes Clear Its Attitude Regarding Jobbers

The United States Fuel Administration has received numerous protests from consumers, as well as from jobbers and other coal dealers, against the proposed revocation of the regulation under which jobbers are now allowed to add a commission, or margin, to the prices of coal at the mines.

These protests are based upon the false assumption that the revocation of that regulation will drive the jobber out of business.

The Fuel Administration disclaims any intention to eliminate legitimate jobbers from the coal business. It has not only recognized their importance to the conduct of the trade, but has announced its intention to so fix the prices of coal at the mines as to enable the mine operators to compensate the jobbers for their services. The Fuel Administration insists that bona fide jobbers will not be forced out of business by the proposed change. They will simply be compelled to look to the operator for their compensation as they were accustomed to do before the allowance by the Fuel Administration of the margin.

In view of the protests, however, the Fuel Administration has deemed it advisable to make a more detailed statement than it has done heretofore, of the circumstances that impelled it to take the proposed action.

Prior to the entrance of the United States into the war and for nearly three months thereafter, the jobber had always bought from the operator for less than the retailer could buy direct. In other words, the price to the retailer was the same whether he bought direct from the mine, or through the jobber. The so-called jobber's margin was an innovation.

After the Fuel Administration had been organized, and the President had fixed the prices of coal, the practice of allowing the jobber to add his commission to those prices was continued.

Under the regulations issued by President Wilson, Aug. 23, 1917, a jobber is defined as "a person (or other agency) who purchases and resells coal to coal dealers or to consumers without physically handling it on, over or through his own vehicle, dock, trestle or yard."

After several months of operation under the practice of allowing the jobber to add a commission, or margin, to the price of coal at the mine, it developed that this margin was being charged and collected in many ways not contemplated by the Fuel Administration. Agencies which, while technically jobbers, were not such in fact, or were closely affiliated with the operators for whom they acted, collected the jobber's margin, which thus became a mere increase in the profit of the operator.

One of the methods by which this profit was obtained by the operator was the practice of "swapping coal." Two operators would agree to act as jobbers for each other in the sale of their output, each collecting the jobber's margins.

Another practice was that of organizing subsidiary companies, the sole function of which was to act as the ostensible jobbers of the producing companies by which they were owned, and to collect the commission allowed by the Fuel Administration.

The effect of these practices was to add from 15 to 30c. a ton to the cost of coal to the consumer for services that were merely fictitious, and to give operators indulging in such practices a greater profit than that obtained by those of their competitors who employed bona fide jobbers. The business of the bona fide jobber suffered materially by reason of these practices.

Officials of the Fuel Administration felt that a continuance of the commission allowance to jobbers would be tantamount to a tacit consent to the operation of these fictitious jobbers. Effective supervision of the business of individual operators and jobbers, and investigation of their relations could not be undertaken by the Fuel Administration because of the expense and the amount of labor that would have been entailed.

After a thorough investigation of every phase of the situation, which included conferences with representatives of every branch of the coal business, the Fuel Administration decided that the only solution was to recommend to the President the revocation of the regulation allowing the commission or margin to the jobber, and as a substitute the fixing of prices of coal at the mine that will enable the operator to compensate the bona fide jobber for his services.

Engineering Department Hopes To Effect Fuel Economies

Acting on the belief that no other such opportunity to teach conservation of fuel ever has been presented, the Fuel Administration has established an engineering department which hopes to effect during the coming coal year economies which will save 50,000,000 tons of coal. The new engineering department is in charge of David Moffat Myers. A specialist in railway fuel will have charge of a campaign for coal economy on the railroads. Another specialist will direct work looking to economies in the industries. A third specialist will have charge of

a plan looking to the consolidation of steam and hydro-electric plants. More intelligent firing methods in the homes will be urged in coöperation with the Bureau of Mines.

The organization of the engineering department will be extended into each state. A fuel engineer is being recommended in each state. It is hoped to make this position a permanent one, so that fuel economy may be continued after the war.

Since the railroads and the industries use two-thirds of the coal produced in the United States, the most active efforts looking to conservation will be in that field. Having the power to favor plants which use their coal efficiently, the Fuel Administration has a tremendous leverage that will help toward securing compliance with its desires. As limitation of fuel probably will be necessary, plants with a high percentage of waste will be the more severe sufferers.

An order to become effective Apr. 1 will provide for sworn statements from consumers as to the amount of coal on hand, the amount ordered from dealers, the total amount used during 1917 and the amount necessary to meet the requirements of the coal year of 1918. The Fuel Administration has practically decided that such a course is necessary to insure equitable distribution.

Conference on Railroad Fuel Supply

A general conference on questions arising in connection with the supply of fuel coal to railroads was called by the United States Fuel Administration on Mar. 1. Representatives of coal-mine operators, eastern railroads, the office of the Director General of Railroads and the Fuel Administration attended.

The conference selected W. K. Fields, president of the National Coal Association, as chairman and began a general discussion of recommendations to the Director General of Railroads and the Fuel Administration designed to secure the following results: (1) To provide a definite and dependable supply of good fuel for the railroads. (2) To avoid excessive use of transportation in obtaining rairoad fuel. (3) To retain for other uses some coals of special quality which are now being used as railroad fuel coal. (4) To so distribute railroad fuel in connection with all other distribution as to obtain as nearly equal running time for all mines.

The matter of the distribution of coal cars to the mines was the subject of extended discussion, some of the operators contending that there should be no preferential allotment of cars, but that all the mines should share equally.

A committee was named consisting of one member from each of the railroads represented in the conference and one member representing each of the coal districts present, which should consider the questions they had been called to discuss and report its recommendations to the conference.

The railroads appointed the following committeemen: Delaware & Hudson, J. White Spray; New York Central, S. B. Wright; Erie, W. R. Collins; New York, Ontario & Western, Charles A. Draper; Norfolk & Western, George Dunglingson, Jr.; Lehigh Valley, F. L. Blendinger; Bangor & Aroostook and Boston & Maine, Frank C. Wright; Pennsylvania and Long Island, C. M. Sheaffer; Delaware, Lackawanna & Western, C. C. Hubbell; Canadian Northern, H. T. Rawlings; Central Railroad of New Jersey, J. F. Hinterleiter; Chesapeake & Ohio, D. T. Jellison; Baltimore & Ohio, W. L. Robinson; New York, New Haven & Hartford, George G. Yeomans; Philadelphia & Reading, E. B. Crosley.

The West Virginia coal districts named the following committeemen: Fairmont, C. H. Jenkins; Clarksburg, V. E. Goeke; Coal & Coke, R. B. Isner; Preston County, E. H. Gilbert; Scott's Run, S. D. Brady; Maryland, F. W. Wilchire; Irwin and Guyan, S. P. Hutchinson; Kanawha, W. M. Puckett; K. & M., Robert Buka; Smokeless, T. F. Farrell; Thacker, Keyser Hood.

Pennsylvania coal districts named the following: Mr. Field, chairman exofficio; Conemaugh, T. L. Eyre; New York Central, T. H. Watkins; Cambria, C. H. Jacobs; Reynoldsville, J. W. Trounce; Tyrone and Clearfield, Charles A. Owens; Somerset, Edward B. Chase; Broad Top, C. J. Langdon; Greensburg and Latrobe, W. G. Ireland; Irwin, S. B. Hutchinson; Somerset (Baltimore & Ohio), T. W. Guthrie; Pittsburgh, J. P. Walsh.

Weekly Production Statistics

Bituminous coal production decreased sharply during the week ended Feb. 23. Total production was 10,612,000 tons, as compared with 11,122,000 tons during the week preceding. Production of beehive coke increased to 568,000 tons. Anthracite shipments declined 10 per cent. Total forwardings were 36,612 cars. Production of byproduct coke totalled 403,296 tons, as compared with 381,972 tons during the week ended Feb. 16.

New Prices in Tug River Field

Forty cents has been added to the President's schedule of prices in the Tug River field. The new prices therefore are: Run-of-mine, $2.40; prepared sizes, $2.65; slack or screenings, $2.15. Fifty cents has been added to the old price in the Upper Clinch Valley district, making the prices there as follows: Run-of-mine, $2.50; prepared sizes, $2.75; slack or screenings, $2.25. Forty-five cents may be added to these prices by all operators who will comply with the Washington wage agreement.

Plan for Cheaper Domestic Fuel

What the Smithsonian Institution describes as a "practicable means whereby the householder eventually may obtain his domestic fuel supply at a fraction of what he now pays," is outlined in a report by Chester G. Gilbert and Joseph E. Pogue.

The gist of the plan lies in the fact that bituminous coal, instead of furnishing heat alone, can be made to yield five products—artificial anthracite, gas, ammonia, benzol and coal-tar—all of commercial value. It is proposed that the municipal gas plant, operated as a public utility, be enlarged so as to treat all the coal used by the community, with the production of the five products mentioned. Thus by centralizing the utilization of coal and employing all of the values contained in it, such great economies can be effected as to yield a really cheap domestic fuel, the authors state.

Anthracite Distribution Plan

Although no definite announcement has been made regarding the plan considered by the special committee of the General Committee of Anthracite Operators providing for an equitable distribution of anthracite this spring and summer, it is learned that a plan has been decided upon which is to be submitted to Dr. Garfield for his approval.

The committee, it is said, has had compiled figures showing the tonnages by sizes that were shipped between Apr. 1 and the present, and that by use of the shipments made between Apr. 1, 1916, and Apr. 1, 1917, will be able to notify the various state fuel administrators just how much coal will be shipped into their respective territories during the coal year beginning Apr. 1.

The proposed plan provides that each retail dealer will be supplied with order blanks by the Fuel Administrator, and that these blanks are to be distributed to consumers to be used when placing orders. By this means it will be possible for each dealer to distribute his supply of coal equitably.

Deliveries are to be divided into units; that is, all dealers are to deliver to each of their customers a unit which is to consist of a certain number of tons—say two tons or whatever other amount has been decided upon in any community—and no further delivery is to be made to that customer until such time as each customer willing to accept it has received a unit. As soon as each customer willing to accept it has received a unit, then a second unit may be delivered to any customer desiring it. The same procedure following the delivery of the first unit follows the delivery of the second unit.

When a consumer gets six tons he will be asked to accept 85 per cent. on the orders above that amount. It is hoped that in this way there will be the best possible distribution of fuel.

The proposed plan provides, however, that where, in any community, a different plan has been adopted which will accomplish the result desired by the Government, that plan will be satisfactory to the Fuel Administration.

Persons buying from more than one dealer without the permission of the local fuel administrator will be penalized, according to the proposed plan, and dealers who deliver more coal to any one person without similar permission than is represented by 85 per cent. of the amount necessarily used by such person in the year 1916-1917 will likewise be penalized. It is provided, however, that exception is made where the requirements are less than six tons. It is also provided that carloads may only be delivered to one consumer or divided among a number with permission of the local fuel administrator.

New Single-Deck Cage Hoist Record

The State of Illinois has an enviable reputation for good work in hoisting coal in shafts. Recently a mine in this state made a record by raising 5527 tons of coal in eight hours on a single-cage hoist. On Feb. 25, 1918, the American Coal Mining Co., of Brazil, Ind., broke this record by loading 5911 tons of coal in eight hours on a single-cage hoist. The American Coal Mining Co. states that when its No. 2 plant is completed and fully developed a much better record will be made. The company will do it, too, for the slogan on its letterhead reads, "Energy, economy, efficiency."

Explosives Act Leads to Savings

Important savings of explosives are being reported to Frances S. Peabody as a result of the operation of the Explosives Act. Mr. Peabody is in charge of the administration of this act for the Bureau of Mines. The strict accounting required by the law for all explosives has led to much more careful use, with the advantages that considerable saving has been made in explosive expense and the conservation of this much needed product.

Readjustment of Coke Prices

Important readjustment of coke prices has been made as follows: Pocahontas district, $8; Preston County, West Virginia (stations on Baltimore & Ohio R.R., Tunnelton to Grafton) and Meriden, Barbour County, $6.75 for blast furnace and $7.75 for selected 72-hour foundry; Indiana County, Penn., $8, if from washed coal exclusively from the lower bench of the upper Freeport seam with ash in excess of 10 per cent. or sulphur in excess of 9 per cent. If the ash is less than 10 per cent. and the sulphur less than 9 per cent., $8.50 may be charged; byproduct coke made at Chattanooga, run-of-oven, $8.25; crushed coke above 1 in., $8.75; selected foundry, $9.25.

Brief Washington Notes

W. M. Symmes, Jr., and G. T. Hoar, New York lawyers, have been added to the staff of H. D. Nims, who is in charge of the legal division of the Fuel Administration.

"Where cannel and bituminous coal are mixed," says the Fuel Administrator in a recent order, "the maximum price for the mixture shall be the mine price for the bituminous coal in the mixture."

All coal fields in Maryland and those in Mineral, Grant and Tucker Counties, in West Virginia, have been added to the producing territory over which John C. Brydon will have jurisdiction as district representative. Mr. Brydon's territory originally was Somerset County, Pennsylvania.

Producers of bituminous coal now under contract to furnish railroad fuel coal to the New York, Ontario & Western R.R. are required to give priority to the filling of these contracts under an order issued Mar. 4, by the Federal Fuel Administration. The order is intended to provide an adequate supply of coal to this road at all times and directs that the operators under contract shall ship and distribute coal regularly each week and in so far as is practicable in regular daily quantities.

The appointment of W. H. Groverman, at Minneapolis, Minn., district representative for the bituminous and anthracite coal supply on the docks of Lake Superior and the western shore of Lake Michigan, to serve as representative of all individual dock companies, was announced Mar. 4, by United States Fuel Administrator Garfield. Mr. Groverman will facilitate the apportionment and distribution of coal and supervise the prompt and equitable allotment of emergency orders among shippers.



To the Few Miners Who Still Drink: Save Your Money for Your Boy at the Front—

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The mine workers in the anthracite region are working along steadily. The Lehigh Valley Coal Co. has conceded the demand of its men at the Centralia colliery, at Mount Carmel, and will pay them hereafter, as demanded, for the driving of double manways to breasts.

The Lehigh Valley Coal Co. received an adverse decision from Charles P. Neil, the umpire of the conciliation board, on Feb. 25. That company at the Hazleton No. 1 colliery had steam locomotives at work and was paying the men 27.2c. per hour for this skilled work. The company decided to do away with the steam locomotives and replace them by electric, which require less skill in operation. It desired to pay the motor men 23.1c. per hour.

If there is no profit in a substitution of a type of machine requiring less care, attention and training there may be little incentive to make the change. It is the natural disposition of labor to oppose improvements unless labor gets the full benefit. However, no one can feel regretful that men getting only 27.2c. per hour are not to be replaced with men getting as little as 23.1c. per hour, for 27.2c. in these days is not any too large a wage.

ATTITUDE OF UNION MEN ON LIBERTY BREAD

Howard Heinz, the food administrator in Pennsylvania, has won over the representatives of the United Mine Workers of the Lykens Valley by his clear exposition of the necessity for the flour and bread orders of the Food Administration. He took the mine workers to a bakery and induced them to taste Liberty Bread. No wonder it looked good to them, for American war bread is a great deal more tasty than bleached-flour bread and much more nutritious.

The mine workers let Mr. Heinz know that there was no disposition to slack among them. To convince the mine workers that the food in the laboring man's dinner pail was not the only kind of food to be regulated, he took the delegates to a meeting of restaurant keepers. The mine workers are now rooting for Mr. Heinz.

In Central Pennsylvania the miners are worried that they are not to share in the increase in price, which was granted by the Fuel Administration for the purpose of relieving the necessities of the operators, and the Broad Top mine workers are opposing the reduction of wages of 10c. which they will automatically sustain Apr. 1 as the outcome of a contract into which they entered knowingly last fall. It seemed, on Mar. 5, as if there would be action taken by the convention toward a further revision of the existing contracts, though all changes are opposed by the international union, the public and the Fuel Administration as in bad faith and undesirable.

NO LONGER HARRIED WITH CAR-PUSHING PROBLEM

Apparently the pushing question is not the issue it was, and much of the expense for which an increase has been granted may have been in the elimination of the conditions at the mines which made the pushing of cars imperative and in the steady cost involved where coal is gathered from the face by men in the employment of the operating company.

W. O. Smith, on behalf of the United Mine Workers of America, is said to have visited Clay, Ky., and promised that on Mar. 1 offices would be opened by the union for the purpose of organizing the western Kentucky field and doubtless, in particular, the mines of the West Kentucky Coal Co., which is a nonunion organization. J. T. Moore, the Webster County fuel administrator, has written to State Administrator Bryan, informing him of the plans and asking for instructions.

The men who work in the No. 8-A seam of Ohio, a rider of the Pittsburgh, or No. 8 seam, want a scale made to cover that bed because it is thinner and more difficult to work. The bed is mined in No. 5 subdistrict, in Belmont, Harrison and Jefferson Counties. The mines involved are those of the Western Coal Co., the Massillon-Belmont Coal Co., the Ohio and Wheeling Coal Co., the North Belmont Coal Co., Theodore E. Jordan, W. C. Lough and H. W. Watson, William Beynon and W. C. Rouch. President William Roy, of subdistrict No. 5, offers the following scale to the conference:

	Loader	Cutter	Total
All coal over 4 ft	0.5815	0.1125	0.6940
All coal between 3½ and 4 ft	0.6300	0.1300	0.7600
All coal between 3 and 3½ ft	0.6875	0.1500	0.8375

MICHIGAN'S MINES HAVE LABOR TROUBLES

Michigan coal mines are small and inconsequential, but Michigan with a shortage of fuel, about as bad as that in New England, cherishes its coal mines as much as if they were large. Thus it is that Fuel Administrator Prudden has been much put about because the mine at Albion, Calhoun County, Michigan, has been idle for a long time with a bitter wage dispute in progress.

Acting Warden Frensdorf, of Jackson prison, has offered the services of prisoners to keep the mine going. But this offer, which if accepted would have caused a strike in all the Michigan mines, did not appeal to the authorities. President John C. Crutchfield, of the Michigan district organization, telegraphed International President Frank P. Hayes for permission to call a state-wide strike to secure the terms of the Washington agreement with 10c. a ton added. Needless to say, this request has not been granted.

Michigan's mine workers only number 2400 men, but they are frequently disaffected. The coal of the state is not of the best, the mining of the coal involves much labor, the thickness is uncertain and the profit of operation unusually dubious. All these facts have made the lot of everyone in the industry unfortunate.

KANSAS HAS UNHORSED PRESIDENT HOWAT

We publish in another column an account of the troubles in the Kansas district. The relation is from the point of view of the operator. He believes that a new attempt is being made to evade the penalty clause. It is only fair, however, to present the point of view of the mine workers.

Four of the Jackson-Walker Coal and Mining Co.'s clerks were discharged, we are told in a communication from another source. The offense was demanding a wage increase. The weighmen and office men then unionized and demanded the reinstatement of the four men. This being refused, they demanded a $1.40 daily increase for all their members. Alexander Howat has promised to defend their interests. It is also said that several big coal companies gave the weighmen and office men an increase in November when the miners received their increase, but that the Jackson-Walker Co. did not.

More recent information assures us that Kansas is no longer faithful to Alexander Howat. The men will not continue their strikes at his bidding. The Smith, Scott and White mines are working again, and the members of the new National Bookkeepers and Company Weighmasters Union wish that the companies who were employing them would permit them to accept the jobs they threw away. Alexander Howat is alleged to have published unveracious copies of the union agreements.

The various districts of the United Mine Workers have all made their contributions to the $800,000 fund to give bond for the judgment in the Coronado case and to cover the court costs and other charges. Missouri is, however, an exception. D. A. Frampton, the president of that district,

claims that the Missouri district was completely ignored and not consulted and that no one pledged a contribution. The committee appointed in proper form by the biennial convention to obtain this fund invited all the district presidents and secretaries to meet with it, and the Missouri mine workers certainly have no standing at all in refusing to pay the $10,000 requested of them. The other mine workers have without a single failure thrown into the fund the $790,000 demanded of them.

It is reported from Alabama that H. C. Selheimer, the arbitrator between the operators and their employees, will not arbitrate in the dispute between the Tennessee Coal, Iron and Railroad Co. and the Republic Iron and Steel Co., and their employees. Mr. Selheimer's work is to interpret disputes about the contract, and there is no contract in the case of these furnace corporations.

On Feb. 27 a new union of mine workers, to be known as the Independent Union of Miners of America, was organized at a Pueblo meeting of dissentients from the United Mine Workers of America. John R. Lawson, president of the Colorado State Federation of Labor, and former president District No. 15 of the United Mine Workers of America, comprising Colorado, New Mexico and Utah, is to be president of the new union.

He hopes to make it a national organization and to dispossess the United Mine Workers of America which, he claims, by crooked election methods, prevented his reëlection to the presidency of District 15. He has resigned from the Colorado State Federation of Labor. He could not hold office if he was to become an officer in an organization not affiliated with the American Federation of Labor.

The delegates to the convention demanded in a telegram that President Hayes of the United Mine Workers immediately remove President James F. Moran, the present incumbent of the presidential chair in District 15, and his right-hand man, Warren Pippin. When Hayes failed to reply, the vote for a new organization followed. At the headquarters of the United Mine Workers in Indianapolis it was said that the insurgent element was small and the new union not important.

The Drumheller mine workers in Alberta, Canada, are in bad odor with other parts of district No. 18, recently in session in Fernie, B. C. The local union of Drumheller suggested that the district as a whole demand that the coal companies supply all powder, tools, lights and washhouse lockers and pay all smithing charges. They proposed in their resolution that the director of coal operations be asked to establish a standard wage scale based on a $6 per diem rate for underground employees and $5 for top or outside workers. The convention turned a cold ear to all these proposals.

The delegates deplore the fact that the Drumheller local is opposing Commissioner W. H. Armstrong and has asked for his removal. On Feb. 24, they resolved unanimously that they had the "fullest confidence in his ability in filling his office of trust with honor and justice to all concerned." Prior to this the biennial convention decided that the Drumheller mine workers should be ordered by the union to return to work and representatives were sent to the Drumheller region to convey these instructions. But the Drumheller men were obdurate. An order from Premier Borden about the same time supported that sent by the union. Unfortunately some doubt was put on its authenticity, but the director of coal operations, W. H. Armstrong, declared that the order of the Premier was really authentic. The mine workers at Lovett, Alta., who went on strike Feb. 18 went back to work Feb. 22. On Feb. 28 the only idle mine workers remaining were those at the Rosedale mine, where the trouble commenced.

Clever Scheme To Burk Penalty Clause

Eight Kansas mines were down Feb. 16, with a total loss of production of 5000 tons a day. This is the largest loss of production due to strikes for two months. All of the strikes are of the same type; they are the result of activities of Alexander Howat, president of the Kansas miners, in opposition to the penalty clause of the contract. The Smith, Scott and Waite mines which closed in December, and the Packard-McWilliams-Tripp mine, shut down last week by the miners, are inactive because of controversies that come outside the contract, the miners alleging that they are not striking but have individually resigned temporarily.

The newest development which would seem ludicrous were it not so serious, is the effort of Mr. Howat to organize the office men and the companies' weigh bosses. A so-called union has actually been organized and Mr. Howat has been elected the national president. Miners are actually now striking in several mines refusing to work in establishments which do not employ union office men and weigh bosses. The first trouble of this kind was in the mines of the Jackson-Walker Coal Co., where the pit committee demanded the employment of union office men and weigh bosses.

H. N. Taylor, zone fuel administrator, has taken this matter up with the United Mine Workers, as well as with Dr. Garfield. Representatives of the mine workers are now in Pittsburg, Kan., trying to cool this matter down.

While the purpose of Mr. Howat in organizing the office men and weigh bosses cannot be officially announced, it is obvious what the effect would be if, by any chance, the weigh bosses should be organized. The striking of one man would obviously shut down the entire mine, since the miners could not work without the presence of the checker on their output. Consequently, only one man would have to pay a penalty; and two dollars a day would be insignificant compared with the $200 or $300 a day that the mine workers of a mine would have to pay under the penalty clause if they struck.

Union Attitude on Clean Coal

The attitude of the United Mine Workers of America on clean coal is best exhibited by an editorial entitled "As to Dirty Coal," appearing in the *United Mine Workers' Journal.*

In every contract entered into by operators and miners in every district under the jurisdiction of the United Mine Workers of America there is a provision penalizing the loading by the miners of any impurities with the coal that could, in reason, be kept out.

The enforcement of these penalties is, as much as ever it was, in the hands of the operators. Safeguards have been placed in the contracts to protect the miners against persecution on the part of petty bosses for personal reasons, and to protect active union workers from discrimination that might be made possible through the "dirty-coal" penalty clause.

The miners have absolutely no sympathy with those who load dirty coal. They recognize in that a local menace. The quality of the coal loaded, absence of dirt and other impurities determine the desirability of their product in the markets. Their opportunity to work is, in normal times, dependent upon the comparative cleanness of the coal they produce, in a competitive and often over-stocked market.

At a time like the present the miner may recognize that any kind of coal can find a ready sale; he also recognizes that the desirability of the coal he produces now will determine its standing in the market when the country returns to normal industrial conditions.

Therefore the miner, whose home is near the mine at which he works and whose entire possessions and interests are represented by that home, does not wish for any slackening in the enforcement of the disciplinary provisions of the contracts dealing with dirty coal.

The loading of dirty coal is, if anything, more reprehensible now than ever it was; not only does it menace the reputation of the value of the product of the mine and therefore the miner's opportunity to work, but dirt in coal today, when every industry is running at high tension, means inevitably a slackening of production; trains stalled; factories hindered.

We do not ask the operators to refrain from enforcing in full the penalties provided for in the contracts for loading impurities in coal. On the contrary, we believe it is to the interest of both operators and miners that not only the miners shall be required to keep their coal as free from impurities as possible, but that the operators, through their managers, also exercise the same care to try to do their part, on top, to keep coal clean, as they found it necessary to do in the not far-distant past, when the buyers exercised discriminating choice when ordering their coal supply.

EDITORIALS

What British Labor Wants

A SUBCOMMITTEE has been appointed by the British Labor Party to write out the demands of the British workman for reforms to be put in operation after the war is over. The demands are well written. Apparently the persons chosen were not animated with any fierce class hatred. They had ever in their minds, it would seem, the greatest good for the greatest number. Couched as their program is for the most part in sober, dignified language, it would not be well to discuss it in any other mood.

After declaring that all public utilities companies should be nationally and not municipally (much less privately) owned, the manifesto proceeds as follows:

"But with railroads and the generation of electricity in the hands of the public, it would be criminal folly to leave to the present 1500 colliery companies the power of 'holding up' the coal supply. These are now all working under public control, on terms that virtually afford to their shareholders a statutory guarantee of their swollen fortunes.

"The Labor Party demands the immediate nationalization of mines, the extraction of coal and iron being worked as a public service (with a steadily increasing participation in the management, both central and local of the various grades of persons employed); the whole business of the retail distribution of household coal being undertaken, as a local public service, by the elected municipal or county councils."

To those who accept the proposition that railroads and public-service corporations be nationalized and are disposed to believe that economy and progress would accrue under national management there is no difficulty in going one step forward and advocating the nationalization of coal mines. Coal is a necessity like railroads and public-service corporations.

In Great Britain it is probably a hard matter to find a place to open a new mine. Despite all the difficulties thrown around the building of a new railroad by the British Board of Trade, the Houses of Parliament and the landlords, it seems it might be almost as easy in Great Britain to locate and build a new road as to open a colliery. That being the case, in Great Britain coal-mine operation is as much a monopoly as railroad operation. If one is to be nationalized, the nationalization of the other inevitably follows.

It is not strange then that nationalization of coal mines is advocated. Perhaps it will be useless to point out instances where the coal from government mines has not proved as cheap as that mined by private corporations. It will be equally useless to show that the mines have not been better conducted. It will be unavailing to demonstrate that the rates of pay to the employees are no higher. Nor will any good be done by showing that public employees are quite often extremely dissatisfied with the terms of their employment. People who desire nationalization are rarely open to argument. The mine workers of central Pennsylvania assembled in Dubois in biennial session have demanded nationalization. One is confident that a little experience with it would work a ready cure. But, as has been said, argument is useless. Only those who have a disease appreciate perfect health, and till we experience nationalization of industry we cannot estimate what disadvantages it will entail.

The next clause of the manifesto runs as follows:

"And there is no reason why coal should fluctuate in price any more than railroad fares, or why the consumer should be made to pay more in winter than in summer or in one town than another."

It can readily be granted that with nationalization of coal mines the stimulation of higher prices is less needed to correct shortages of coal. The nation can and doubtless will conscript workers when it needs them. It need not pay therefore any more to get them. So why need the price of coal be raised when a larger tonnage is desired? If, however, the big demand calls for opening abnormal places where the coal is thin, contorted, disturbed, broken or unusually deep or wet, then it will be necessary to put a higher price on coal; but it will be granted readily that the price will not fluctuate as much as it does with unnationalized mines, for the price now has to rise on all coal to make the less favorable coal operable.

But the last clause, relating to uniformity of price without regard to seasons or locations, is not so easily accepted; for it would seem that nothing is more essential to the whole interests of mankind than some arrangement of price that will balance the seasonal variation in the use of coal. If the price is kept uniform, winter and summer, men will buy all their domestic coal in the winter; and to meet the demand in the cold weather huge storage facilities must be provided.

With nationalization Great Britain could manage to store large quantities of coal. If stored at the mines, the railroads and the coastwise boats would be glutted in the winter. Coal delivery by auto transport would be overworked in the towns at the same time. In the warmer months large numbers of railroad men would be idle, fleets of colliers would tie up and there would be little use for coal heavers or coal wagons. A large waste of equipment would inevitably result, and the problem of idle workers and the loss of national wealth consequent thereon would be large.

Nor is this all. Any scheme which depends on storage more or less remote from the point of use is subject to breakdowns. Not only may the equipment prove, as it has in the United States, inadequate to meet the demand, but there may be storms causing a failure of the railroads or the sinking of colliers. This would be a far greater menace here, however, than in Great Britain. Only a prudent householder with a reserve in his cellar is protected against such an event, and it seems that

only a variation in price will make men prepare against the unexpected interferences with coal transport.

But it will be argued that local storage and not mine storage is the cure. But this does not remove the problem, it only reduces it. A glut of coal truckage every winter still has to be confronted, the coal trucking equipment is still kept idle in the summer and there is still a risk that a heavy snow will block the streets.

Moreover, the size of the coal pile would be immense. It involves too large an area to be conceded within the boundaries of any city; the possibilities of fires are too great and the cost of storage is prohibitive if the coal is to be so stocked that fires will be entirely eliminated. Of course, we assume that the coal is piled deep, as it must be in a large city; and also that it is not like anthracite or Georges Creek smithing coal, which are little subject to fire.

After all, the man who supplies storage and who does without the use of his money for months is entitled to a concession. Let those who oppose the differential be required by law to put in a cellar and buy their coal in the summer. Let them run the risk of wanting to sell the property or of having the coal stolen or the house burned, and when all is done we believe they will not think that the man is unfairly rewarded who gets the rebate and who concurrently keeps the coalheaver, the coal trucker, the railroad employee and the mine worker busy during the summer months and uses equipment that would otherwise be idle; and uses it, moreover, when it gives a maximum service.

Some Advantages of Railway Electrification

THE country is now emerging from a coal famine that was not caused by a lack of productive capacity. It is freely admitted that the mines had enough capacity to meet requirements, with more or less of a margin to spare. It was the distributive agencies, the transportation lines, whose failure to meet the extreme demands placed upon them precipitated the abnormal shortage.

This is not written with the intent of belittling the work that confronted the common carriers or of maligning their performance. In fairness be it said that the task before the railroads was Herculean. There are, however, certain limitations of duty and performance beyond which rolling stock and locomotives cannot be driven. Unfortunately, also, adverse weather conditions—that is, extreme cold—exert a decidedly depressing influence on the performance of a steam locomotive. Radiation from the boiler is of no mean consequence, while trouble is liable to result from the freezing of water both in the tender tank and in various pipes. The thermodynamic efficiency of the locomotive power plant, always low, is especially so in severe cold weather.

The electric railway locomotive wherever it has been employed exhibits characteristics in marked contrast to those of the steam-driven machine. For various reasons, extreme cold increases rather than diminishes the hauling capacity of an electric locomotive, and this, together with the reliability of the electric motor, has resulted in increased performance for the same trackage of as much as 50 per cent. over steam operation. Had this increased capacity been available to the railroads during the past year or so there would have been no such congeston of freight as to demand the observance of "Heatless Monday" to untangle.

Another economic aspect of railway electrification lies in the savings of coal made possible. Where the ordinary steam locomotive will evaporate possibly 4 lb. of water per pound of coal consumed, the stationary plant will evaporate 9 to 10 lb. of water per pound of the same fuel. Furthermore, where the average locomotive will deliver one horsepower-hour to the tender drawhead for an expenditure of 30 lb. of steam, the stationary plant can deliver one horsepower-hour to the switchboard busbars for, say 15 lb. of steam; assuming that losses in transmission of energy from the busbar to the locomotive drawhead amount to 33 per cent., the consumption of steam per horsepower-hour delivered to this latter point would be equal to 20 pounds.

The savings in coal consumption which would be made possible through the electrification of American railways are thus estimated to amount to 100,000,000 tons per year. Nor is this all the saving. An increased hauling capacity would be made possible through a diminution of what might be termed the internal work of the roads. That is, railway fuel would not have to be hauled in such large quantities nor for so great distances as at present. Power plants where hydro-electric energy was not available would so far as possible be placed near the mines. Fuel would thus be transported only short distances, while high-voltage electric current would be transmitted long distances. This change would release large amounts of equipment for the movement of commercial fuel or commodities other than coal. It is estimated that at least 10 per cent. of all freight movement now consists of railroad fuel. Without increasing track or yard facilities in the least, therefore, electrification would increase the carrying capacity of the roads by a goodly fraction of this 10 per cent.

Of course, in any extensive railway-electrification project development of available water-power should not be neglected. Water-power, however, is unevenly distributed throughout the country, and it is probable that in the greater portion of the land it would be necessary to rely as now upon energy derived from coal. In the mountainous regions both East and West, doubtless large amounts of hydro-electric energy could be developed.

While the amount of coal with which Nature has blessed this country is enormous, it is by no means infinite. Up to now, so far as our land-transportation system is concerned, we have "wasted our substance in riotous living"—the amount of fuel we now burn yearly in steam-locomotive fireboxes would produce approximately three times the useful power it now does if burned under stationary boilers and its energy transmitted to the motors of electric locomotives.

Railroad electrification would therefore appear to offer the most speedy and effective means of increasing the capacity and efficiency of existing trackage and yard facilities. The results obtainable are well known, having been secured in several installations already made. It is to be hoped then that the alteration of the roads from steam to electric energy will proceed as rapidly as the necessary finances, materials and labor can be secured.

DISCUSSION BY READERS

Mining Equipment

Letter No. 1—For some time past I have been an interested reader of the Discussion and other departments of *Coal Age* and can testify to their helpfulness. It is in no spirit of criticism that I make the suggestion, however, that there are many items in which mining men are interested that are quite generally overlooked.

Take, for example, the subject of roller bearings and ball bearings for mine cars. We are fed up on information from the man who sells the equipment and furnishes us with catalogs, pamphlets, letters, costs, besides giving us the results of one or two days' tests in the mine. But let us hear from the man who actually has bought and used these bearings for one, two or three years. He is the man we want to hear from.

Those of us who may be contemplating the construction of new plants or the installation of new machinery or other equipment costing perhaps hundreds of thousands of dollars; or, it may be, considering a simple investment of a few thousand dollars in mine cars, would be glad to know the experience of others along the same lines. While projects are yet dreams, the discussion of their merits and demerits is most valuable to the prospective buyer.

What Purchasers Want to Know

Then there is the storage-battery haulage locomotive. The words sound good but some of us have not been able, as yet, to get inside news as to their capabilities. When we inquire in regard to the haulage capacity, length of charge and cost we are told it depends on the type of battery used.

Ask the battery men and each one has the "best on the market," which same we knew before being told. It would be of greater interest to know from men who have used this equipment what work is performed, on what grade the machines can haul, and the upkeep per ton-mile.

One realizes that it is possible to take an unfair advantage of advertisers, by making comparisons of similar equipment under widely varying conditions; but the field of competition is open to all and the selection of valuable equipment, suited to one's conditions, is of prime importance to users.

The need of accurate information in respect to mining equipment, and its competing value in practice, was brought forcibly home to me recently. In our mines we are using two makes of cutting machines, one being an early type having none of the recent alleged improvements while the other was a modern, up-to-date machine. We had always supposed that the modern machine would prove to be a money-saver; but, as a matter of fact, its cost of maintenance, on a tonnage basis, was double that of the older type.

During the past two years I have been called upon to overhaul this plant and, among other improvements, I have installed a complete cost-record system in the supply house. This system shows the cost of supplies for each machine and class of equipment; and the results, dating back a period of six months, have upset many of our preconceived ideas in regard to the relative economy of certain portions of our equipment.

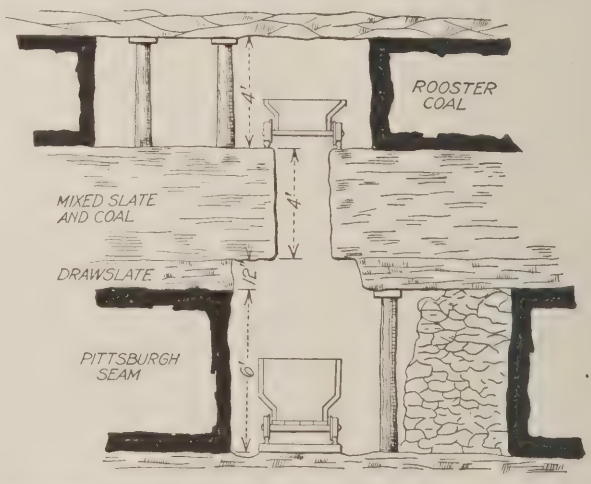
The information gained by thus tabulating the cost of supplies in detail have been of untold value in guiding us in the selection of future equipment. Especially was this the case, recently, when we came to order new cutting machines. The selection of the type of machine best adapted to our particular work and conditions was determined by a careful inspection of our record and previous experiences. We now have a third type of machine that we hope will prove more economical in upkeep, as based on tonnage mined.

Let me say, in closing, that reviewing my own past record as mining engineer in charge of construction work, and mine superintendent in five different states, I find that experience has taught me many things; but most important of all is the fact that there is yet more and still more to be learned every day of our lives.

Noblestown, Penn. PROGRESSIVE.

Working the "Rooster Coal"

Letter No. 2—Kindly permit me to submit my plan for extracting the rooster coal of the No. 8 Pittsburgh seam. Although the working of this seam is generally conceded to be a tough proposition, I feel sure that the



PROPOSED PLAN FOR WORKING THE ROOSTER COAL

following plan can be worked out successfully if proper care is observed in timbering the openings:

Drive all headings and airways 10 ft. wide, in both the Pittsburgh and the rooster seams, keeping the working faces in the upper seam a few yards in advance of those in the lower seam. The heading in the rooster coal, however, must not be driven directly over that in the Pittsburgh seam; but, as shown in the accompany-

ing figure, the upper heading is set over to one side, so that one rib in the upper seam corresponds to or is vertically above the center line of the heading in the lower seam.

Holes are shot in the strata separating the two seams, at intervals of 40 or 50 yd., or as found most convenient, to permit the coal mined in the upper seam to be loaded into cars running on the track in the lower seam. In the upper seam a low truck is used to transport the coal to the point where it is dumped through the hole in the floor and falls into the car standing beneath in the lower seam.

Same Plan Adopted in Driving Rooms

The same system is followed in driving the rooms as in driving the headings. The rooms are driven 20 ft. wide in both seams, keeping the working faces in the upper seam a few yards in advance of those in the lower seam. Here, also, one rib of a room in the upper seam is carried over the center line of the corresponding room in the lower seam. This system will afford a substantial roof and bottom for timbering in both seams. If desired, holes can be shot in the floor of the rooms in the upper seam, to permit of the loading of the coal mined in that seam directly into the cars standing on the room tracks in the lower seam.

All entry pillars should be made 50 ft. in width, while room pillars are 40 ft. wide. This is important, in order to afford ample support for the overlying strata and avoid the danger of a squeeze.

When the rooms are driven up a distance of say 200 ft. as a limit, the work of drawing back the pillars between the rooms must be started. The pillars in the upper seam should be brought back a little in advance of those in the lower seam, say 8 or 10 yd., which will probably be sufficient to induce a fall. Then cut into the lower pillar and split it to the face or fall, driving the place 10 ft. wide, thus leaving a stump 15 ft. wide on each side. These stumps must be drawn back together. If the line of pillar work is not kept uniformly straight much coal will be lost.

Both of the seams can be ventilated by the same air current, using the holes cut from one seam to another as crosscuts between the airways. J. H. Tipton.

Hooversville, Penn.

Letter No. 3—The queries put by Mine Foreman, regarding the practical working of the rooster coal associated with the Pittsburgh No. 8 seam, *Coal Age*, Feb. 16, p. 349, have interested me, since I have just been handling a similar proposition.

Having had a wide experience in working coal, both on the room-and-pillar system and by longwall, I am firmly convinced that the only method that can be economically applied to the working of these seams is the longwall method of mining. Before describing the application of this method to the working of the rooster coal, let me answer briefly the four questions asked by Mine Foreman, as follows:

1. In my opinion, it is not practicable or possible to work the rooster coal in rooms 24 ft. wide and, at the same time, comply with the requirements of the Pennsylvania Mining Law.

2. Assuming that the coal has been taken out from the Pittsburgh seam, which underlies the rooster coal and is separated from it by 4 ft. of mixed coal and slate, there is no doubt but that this loose material separating the two seams will have caved in the rooms. If that is the case it will be impossible to maintain safe conditions and properly ventilate the workings when taking down the rooster coal. The state mine law requires that there shall be a minimum of 150 cu.ft. of air, per man per min., and to maintain this circulation at the working face would be well nigh impossible under the conditions that would then prevail.

3. When it has been attempted to recover the rooster coal, in the room-and-pillar system, it has seldom happened that more than 30 per cent. of that coal has been removed.

4. The Pennsylvania mining law for the bituminous field (Art. 4, Sec. 6) requires the mine foreman to see that every working place is properly secured by posts or timbers. It is quite evident, however, that it would be impossible to comply with this requirement of the law if there was 4 ft. of loose slate lying on the floor of a room 24 ft. wide, especially when it is remembered that the roof of the rooster coal is 15 ft. above the floor of the Pittsburgh seam.

Recommends the Longwall System of Mining

It is with some satisfaction that I recommend the use of the longwall system of mining in both of these seams, since I have proved its practicability and have succeeded in recovering 100 per cent. of the rooster coal by that method.

Briefly stated, my plan has been to develop a considerable area of the Pittsburgh seam by the longwall method and, having done this, to work out the rooster coal on the retreating system, by applying the same longwall method, starting from the faces of the abandoned roadways in the lower Pittsburgh seam.

It has been found that, in the extraction of the coal in the lower seam, the roof settlement has been so gradual and uniform and rests so solidly on the waste material separating the two seams, that there is no difficulty in extracting the coal in the upper seam and obtaining a recovery of practically 100 per cent. of that coal.

Advantages Gained in Longwall Working

Among the advantages offered by the longwall system of mining may be mentioned the following: (1) A constant supply of pure air, as the current travels the working face. (2) Complete control of the roof settlement, assuming that the packs have been well built in the lower seam when working that coal. (3) Concentration of haulage and a maximum output from a minimum area of workings. (4) Fewer daymen required. (5) Cleaner coal is obtained, as the slate and other waste material is thrown back in the gob, the coal being loaded on a solid bottom, instead of on the top of the mixed coal and slate. (6) No large slate hills or runways to climb, but a level bottom. (7) The recovery of, at least, 99 per cent. of the rooster coal.

In closing, let me say that when the Pittsburgh seam and the rooster coal are worked in this manner by the longwall system of mining, there is an increase of over 50 per cent. in the tonnage per acre, over the usual room-and-pillar method of working.

South Burgettstown, Penn. Andrew Orr Bain.

Shotfiring re Explosion

Letter No. 7—In connection with the interesting discussion on this subject, allow me to give my experience in a Cape Breton coal mine, about twenty years ago. At that time I was taking a mining course in the Scranton Correspondence Schools or the experiment I made would never have suggested itself to me, although that is not to say that the schools were responsible for leading me into dangerous practices, or causing me to violate the mining laws of Nova Scotia, which were not then, however, as rigid as they are today.

Being employed as a shotfirer, I had a large section of rooms at the top of a headway. The mine was a new one and was only down a short distance, as mines go today. The ventilation was good and, no gas having been discovered in the headway where I worked, open lights were used. The rooms were 22 ft. wide. Three shots placed one in the center and one on each side of the face were used to bring down the coal, the charge being black powder. As no crosscuts had to be driven from the toproom it naturally went ahead faster than the rooms below where crosscuts were required.

Getting off the air, my place was a little close, and I began to hear second or after reports when I fired the two side shots together, which was the common custom. As time went on and I advanced farther from the air, the after reports grew louder. I knew, or thought I knew, the cause of these second reports having often heard them before. It was the explosive mixture of gases produced by the explosives used, and fired under conditions favorable to their explosion.

A Warning That Was But Partially Heeded

This was a warning to me to stop firing two shots together; but, after thinking the matter over, I decided that the danger point had not been reached and that it was an excellent opportunity to experiment under fairly safe conditions. I therefore continued firing the two shots together, until satisfied that the danger limit was near, as the after reports kept growing still louder as the room advanced and I stopped the practice, finally. Even then the last of the two shots, if fired before the fumes were allowed time to cool down, began to give a low after report, which satisfied me as to the cause of the after reports.

One day, after I had fired the middle shot the underground manager and the overman came in and, as usual, we had a social chat for some minutes. When they had gone I proceeded to fire the side shots. The force of habit being strong and without thinking what I was doing, I drew the needle from the second shot, before firing the other side. Seeing my mistake when too late and knowing that it would be dangerous to force it back in again, I decided to fire the two shots together.

Having never been in the habit of overloading my shots, I feared nothing but a loud and heavy after report. My fears were realized, for the sound and force of the after report was heard and felt far out on the lower levels. The two officials who had just visited me came running back up the headway to ascertain what had taken place. They did not find out the whole truth; but that was the last time that I fired two shots together, in the same room, and I advise all other shotfirers to stop the practice. Occasionally in the lower rooms there were after reports very low and at irregular intervals; but these rooms were better aired and the fumes were carried away quickly.

This experience leads me to differ from former Inspector Verner as to the condition of a place where shots are to be fired. I prefer the pure air when coal is being blasted. The gases liberated from the firing of explosives, especially black powder, form an explosive mixture much to be feared where the ventilation is weak and coal dust and heat are present in the mine atmosphere.

John Moffatt.

Dominion, Cape Breton, N. S., Canada.

Surveying and Mapping

Letter No. 4—The several letters that have appeared recently in *Coal Age* relating to surveying practices have struck a responsive chord in my heart, and I am led to offer a few suggestions.

Judging from what has already been written, there is apparently a similarity in the attitude of different engineers toward the methods they employ, and the attitude of automobile owners toward their own machines. Every owner of a car swears by (sometimes at) his car as being "the best on the market." In like manner every engineer, as far as I have observed, is willing to swear that his method of surveying and tabulating notes is superior to any in use.

Referring to the claims that have been set forth in regard to the respective advantages of the continuous-numbering system for stations, in mine surveying, and the system of numbering stations so that the number will indicate the distance of the station from a starting point, it appears to me that neither of these systems can claim absolute superiority over the other.

To my mind, one of the advantages of the continuous method or system of numbering stations advocated by W. L. Owen, *Coal Age*, Dec. 8, p. 960, is that any station number can be quickly found in the notebook where they occur in regular order. On the other hand, it might be more difficult to locate a given station in the notebook where the other method of numbering is employed.

Combining Two Methods of Numbering Stations

In my experience I have known at least one coal company to have used a partial combination of both of these systems. For example, all stations whether located in rooms, air-courses or headings were numbered in rotation as they were placed. In addition those located in headings also carry a distance number painted alongside of their rotational number.

Besides these transit stations, levels were run with a wye level, taking elevations at each 100 ft. and, occasionally, at intermediate points. These 100-ft. level stations were also painted 8 + 00, 9 + 00, etc., on the ribs. Eventually, however, the taking of distances at transit stations on the headings was discontinued, as it was found that the level distances answered all requirements in the mine or when inspecting the map in the office. I would say, however, that this method of leveling is hardly feasible in other than fairly flat coal seams.

In my opinion the most annoying and troublesome system for a stranger to encounter, in an unfamiliar

mine, is that in which the previous survey has duplicate station numbers, as when the first station in a pair of headings is numbered 1, the next 2, etc., and the same system is duplicated in the other headings of the mine. In that case a number on the mine map contains almost no information for a stranger in the mine when attempting to extend a survey previously made. The attempt, in some cases, is a positive nightmare. I recall but one worse case, which resulted from the numbers painted on the ribs not corresponding with the numbers printed on the mine map.

In regard to plotting true rib-lines, let me say that if the management believes in developing the entire work on transit sights, it is safe to assume that, having gone to this expense, it will see that all places are driven a uniform width, and the rib-lines can then be made with a ruling pen. Where a management is indifferent in this respect, it will generally be found that they do not care for any accurate delineation of the rib-line in the rooms. A ragged looking mine will then present a ragged appearance on the map.

In closing, let me say that, in running a large survey, I prefer the continuous vernier or azimuth system, using a transit graduated from zero to 360 deg., as well as in quadrants. By taking the azimuth, quadrant and needle readings, a triple check is obtained on the survey. However, when extending a survey and projecting lines straight ahead, in an entry, the continuous-vernier system has no superiority over deflection angles.

Albert, W. Va. J. A. SMITH.

Overlooking the Salaried Man

Letter No. 2—I was pleased to read the letter of George N. Lantz, *Coal Age*, Feb. 16, p. 344, again drawing attention to the unfair discrimination generally made in different classes of workers. Like Mr. Lantz, I read with interest the reference made to this subject some time since in *Coal Age*, and was sorry that it attracted so little attention at that time.

There is no need to dwell on the fact that the salaried employee, in any industry, occupies an unenviable position not equalled by any other class of workers. I do not refer, here, to that favored class of higher officials who have little reason to complain in respect to compensation for their time and labor.

The fact is well known to every observant person that there is a large middle class of faithful workers, who are paid small salaries that are seldom increased but remain the same, year in and year out. One is led to ask why it is that the services of this class of employees is not more generally recognized by those having power to alter their condition.

Here is a class of men, faithful and loyal to company interests and doing work that requires more or less ability and education. The failure on the part of employers to recognize, in a just and equal manner, the services of their salaried employees so that they will enjoy equal advantage, in respect to increased compensation, as the laboring classes, who compel recognition of their demands by organization, not only tends to produce dissatisfaction but destroys the efficiency of the former class of workers.

What remedy there may be for this condition remains to be seen. There appear to be two general causes to blame for the low regard of employers for their salaried workers: (1) The education and disposition of the salaried worker makes him hesitate to urge his claim for increased compensation. Modesty and pride alike keep him from advocating his rights and needs, and for this he alone is to blame. (2) The average employer regards it as a business principle to secure the most efficient man possible, and to pay him the least sum that will retain his services.

CHANCES OF ADVANCEMENT ARE FEW

In face of these two conditions, it is easy to see that the salaried man has few chances of advancement, except as opportunity may present itself in the offer of a better position. A vacancy may occur in the company, making promotion possible; or an offer may come to him from the outside, in which case the employer, rather than lose the services of a good man will generally be willing to increase his salary.

Good business management requires maintaining the overhead charges at the lowest possible minimum, and the compensation of salaried workers comes under this head. At the same time, the employer expects faithful and loyal service, and, to the credit of the salaried employee, it can be said that he gets it from the average worker of this class.

Another factor that enters into the proposition is the strong competition between industries supplying the same market, and employers are prone to compare the services of their own officials and their rate of compensation with what competing industries are doing in the same line.

In closing, allow me to say that, notwithstanding the fact that a man's services are only worth what he can get elsewhere, no one will deny the fact that salaried men should enjoy the profits of an industry in the same proportion as the wage earner, and this should not require the organization of that class of workers to secure recognition in that respect. KAPPA.

Ottawa, Canada.

Favoritism in Mine Management

Letter No. 3—Kindly permit me to reply to some of the statements of John Rose, *Coal Age*, Jan. 26, p. 213, who seems to think that I considered but one side of the question under discussion. I hope my letter did not convey that meaning to all readers of *Coal Age*, for it was not what I intended. My desire was to be fair to both sides, and to state only actual facts from my own observation and experience.

Referring to the suggestion that men who have been employed for a long time in a mine fall into ruts and use wasteful and expensive methods, let me say: Show me a mine where the officials have held office a number of years, and I will show you a mine that is paying the operator. On the other hand, in my experience, the mine that is constantly changing officials will generally be found to be running behind.

What Mr. Rose says in regard to a new man bringing new ideas and experiences is true; but it is my belief and opinion that, in nine cases out of ten, the company would have profited had he left those ideas and experiences where he gained them. No two mines are alike and must be studied separately.

To my mind, it should not require a new superintendent to discover whether the underofficials are keeping up to date and performing their duties in a most efficient manner. If the superintendent is worth while and equal to his job, his years of service have given him a better knowledge of the conditions existing in the mine than a new man could possibly gain for years to come.

Again, Mr. Rose quotes me as saying, "Many men do not take kindly to working under a new boss." The meaning I intended to convey was that many of the old men would fear that the new superintendent would give the best jobs and places to his own favorites whom he would bring with him. Such a fear would naturally make the old men suspicious of a new boss, until they came to know him and understand his methods.

Old and Disabled Miners

I regret to say that, in this county, there is little chance for a man to get "old on his job" in the four or five years that he ordinarily holds his place. In England, such a statement could hardly apply to men until they have been in service 20 or 30 years. But the mines in the old country, I claim, are as up to date as any of our mines in the States.

Again, in regard to "disabled miners," Mr. Rose's long experience in mines makes it unnecessary to remind him that there is much work that this class of men can do efficiently; and, while I would not object to his idea of pensioning such men instead of continuing to employ them where they could work, I believe that few companies would be willing to do this. The case mentioned in my previous letter was one where the man was not pensioned but was refused further employment.

Like Mr. Rose, I try to look at things broadly, but one cannot help seeing what is constantly occurring before his eyes. I freely admit that, as he suggests, changes in management are frequently necessary, but a change in superintendents should not mean a sweeping change in the working force employed in and around the mine.

The Coming of a New Superintendent to a Mine

A new man coming to take charge of a mine should study well the conditions before attempting to introduce new ideas and methods. This will take time, and, in many cases, the men must be educated to realize the advantages to be gained by adopting a new scheme with which they are more or less unfamiliar. Too often it happens that a new superintendent puts his plans into operation at once, and this gives him an excuse for placing his old men in good positions, because they are familiar with the methods he wishes to adopt.

In strong contrast with this condition, however, I have seen changes of superintendents when the old hands have been retained and their confidence won by the sincere manner in which they were treated. When a new superintendent secures the confidence of the underofficials, it is not long before he will gain, likewise, the confidence of every man in the mine, which is of the utmost importance in successful operations.

While there are exceptions, it is my belief that an old hand is frequently worth a dozen new ones. Only a few days ago I received a letter from the general manager of the mine where I was employed, in the North of England, 15 years ago. In his letter he mentioned the names of several of the underofficials that were there when I left and are still holding their positions. It is facts like these that argue against the necessity of making sweeping changes in our mines every few years.

Heilwood, Penn. Thomas Hogarth.

Examination of a Mine

Letter No. 4—For one, I could not agree with the description of the work of a fireboss given by Robert A. Marshall, *Coal Age*, Feb. 2, p. 256. Mr. Marshall states that, in Colorado, the duties of a fireboss, in his official capacity, end when he has completed his early examination of the mine, returned to the shaft bottom and entered his report in the book kept for that purpose. He is then said to turn the mine over to the mine foreman. On his return from breakfast, the fireboss reports to the foreman for instructions and, during the remainder of the day, performs whatever work may be required of him.

In my opinion, a fireboss should devote his entire time to the removal of any gases that he may have discovered on his first examination of the mine in the morning, and to otherwise making the places safe for work. To my mind, he is the proper person to do this class of work, as he understands better than anyone else the condition of the mine.

If the first examination of the mine shows no gas or other dangers to remove, the fireboss can well devote his time to the inspection of various details relating to the ventilation of the mine, such as erecting brattices where these are needed to conduct the air closer to the working face, inspecting breakthroughs to see that they are of proper size and the required distance apart, both in rooms and headings.

The fireboss is also charged with the duty of measuring the quantity of air in circulation at regular stated periods and recording this in a book kept for that purpose. These and other matters requiring attention, together with giving the needed instructions to the workmen, in regard to timbering their places and mining and blasting their coal, will fully occupy his time throughout the day.

Mr. Marshall's reference to the "Grim Reaper, who so unmercifully takes away many of our good miners," is well timed; and would appear to better advantage had he been able to set a higher standard for the fireboss' work in Colorado than that which he has described. Throughout his letter, Mr. Marshall has failed to make any reference to the responsibility that should rest on the fireboss for the examination of old abandoned workings where there is always a chance that the Grim Reaper is lurking.

To sum up, let me say that it is my candid opinion that as long as firebosses are made the goat and the importance of their work discredited, just so long will we hear of terrible catastrophes occurring in the mines. I want to repeat, here, what I have urged previously, in *Coal Age*, that the only way the death list or fatality rate in mining can be decreased is by the appointment of firebosses in all coal-mining states to act as and with the authority of assistant mine inspectors.

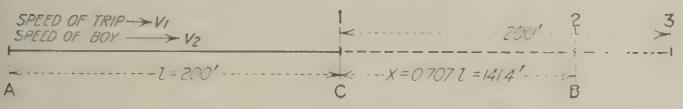
Poston, Ohio. James H. Taylor.

INQUIRIES OF GENERAL INTEREST

Haulage Problem Corrected

Kindly permit me to refer to the answer given in *Coal Age*, Feb. 23, p. 389, to the question of "Student," who asks for the distance that a boy will run, in delivering a note given him by the foreman, who was riding in the rear car of a trip 200 ft. long and told the boy to run forward and hand the note to the motorman.

In replying to this question, it was assumed that the running speeds of the trip (v_1) and the boy (v_2) are uniform and that the boy, starting from A (see accompanying figure), after delivering the note to the motorman at B, immediately starts to run back and reaches the rear car just as it arrives at C, the place where the locomotive was when the boy started from A.



To the casual reader, the question appeared easily solved by arithmetic, and verified by the formula given. A little investigation, however, shows that the solution offered has only considered one condition; namely, that the time which the boy takes to run forward to the locomotive, deliver his note and return to the rear car is equal to the time that the trip advances through a distance equal to its own length. This condition is true but is not the whole story.

Allow me to suggest that the second condition is that the time which the boy consumes in running forward and reaching the locomotive at B is equal to the time that the locomotive takes to go from 1 to 2, as marked in the figure, or advances through the distance x. The first of these conditions is expressed correctly in the formula given on page 389, the time being found by dividing the distance passed through by the speed of running, in each case, which gives

$$\frac{l}{v_1} = \frac{l + 2x}{v_2} \qquad (1)$$

In the second condition, the trip hauled at a speed of v_1 passes through a distance x, while the boy running at a speed of v_2 covers a distance $l + x$ in the same time, which gives

$$\frac{x}{v_1} = \frac{l + x}{v_2} \qquad (2)$$

Then, dividing equation 1 by equation 2 gives

$$\frac{l}{x} = \frac{l + 2x}{l + x}; \text{ and } 2x^2 = l^2$$

$$x = \frac{l}{\sqrt{2}} = \frac{200}{\sqrt{2}} = 141.4\ ft.$$

Now, since the boy runs a total distance $l + 2x$, he runs in all $200 + 2 \times 141.4 = 482.8$ ft.

From this solution can be given the arithmetical rule, by which to solve similar questions. It is as follows:

To the length of the trip add twice the quotient obtained by dividing the length of the trip by the square root of 2, and the result will be the distance traveled by the boy in delivering his message and returning to the rear car, in the time the trip advances a distance equal to its own length.

EDWARD HILLERY.

Matherville, Ill.

A number of letters have been received, drawing attention to the oversight in the solution to this question. It is quite evident that substituting the assumed values $l = 200$ ft., $v_1 = 8$ ft. per sec., and $v_2 = 14$ ft. per sec., in the equations 1 and 2, given by our correspondent, and which represent correctly the two conditions controlling the problem, will not give like values for x, the distance the locomotive advances while the boy is running forward. When these values are substituted in the first equation, $x = 75$ ft., while in the second equation, the same values give $x = 266$ ft., or a distance greater than the length of the trip, which is contrary to the statement of the question.

A little reflection shows that the problem is not susceptible of any simple arithmetical solution such as that first given on page 389; but must be worked out algebraically to conform to two conditions, which are as follows:

1. The first condition is that the trip advances through a distance equal to its own length l, running at a speed of v_1, in the same time that the boy covers a distance $l + 2x$, running at a speed v_2.

2. The second condition is that the trip advances a distance x, running at a speed v_1, in the same time that the boy covers a distance $l + x$, running at a speed v_2. equations 1 and 2 express these two conditions, respectively. Then, by transposition, equations 3 and 4 are derived from equations 1 and 2, each from each and we have

$$\frac{v_2}{v_1} = \frac{l + 2x}{l} \qquad (3)$$

$$\frac{v_2}{v_1} = \frac{l + x}{x} \qquad (4)$$

Equating the second members of equations 3 and 4 gives

$$\frac{l + 2x}{l} = \frac{l + x}{x}; \quad 1 + \frac{2x}{l} = \frac{l}{x} + 1; \quad \frac{2x}{l} = \frac{l}{x};$$

$$2x^2 = l^2; \ x = \frac{l}{\sqrt{2}} = 0.707l$$

The last equation shows that the distance x is a fixed decimal part of the length of the trip l, and is independent of the speed of the trip or that of the boy.

Finally, substituting this value of x in either of the two equations 3 and 4, giving the ratio of the speed of the boy to that of the trip, shows that this ratio, $v_2/v_1 = 2.414$, is fixed. Hence, in order that both conditions of the problem shall be fulfilled, the boy must run at a speed 2.414 times as great as the trip is running. In other words, assuming the trip is running at a speed of 8 ft. per sec., the speed of the boy is $2.414 \times 8 = 19.312$ ft. per sec.

EXAMINATION QUESTIONS

Indiana Firebosses' Examination, Vincennes, Jan. 17, 1918

(Answered by Request)

Ques.—(a) What is firedamp? (b) What is the lowest explosive point of firedamp? (c) What is the highest point of firedamp? (d) What is the maximum explosive point of firedamp?

Ans.—(a) Correctly speaking, the term "firedamp" should refer to any inflammable or explosive mixture of mine gas and air, although the term is commonly applied to a mixture of methane or marsh gas and air in inflammable or explosive proportions.

(b) The lower explosive limit of pure methane and air is reached when the proportion of gas to air is 1: 13, the firedamp then containing 7.14 per cent. of gas.

(c) The higher explosive limit of pure methane and air is reached when the proportion of gas to air is 1: 5, the firedamp then containing 16.67 per cent. of gas. The mixture still continues to be inflammable, though not explosive, until the proportion of gas to air becomes 1: 2.4, and the mixture then contains 29.5 per cent. of gas. With a larger percentage of gas, the mixture is no longer inflammable.

(d) The maximum explosive point of a firedamp mixture, consisting of pure methane and air, is reached when the proportion of gas to air is 1: 9.57, and the mixture then contains 9.46 per cent. of gas.

Ques.—What effect, if any, does mixing carbon dioxide with firedamp have?

Ans.—The mixing of carbon dioxide with firedamp renders it less explosive than before, carbon dioxide being an extinctive gas. Firedamp at its most explosive point is rendered inexplosive by the addition of one-seventh of its volume of carbon dioxide, assuming that the firedamp is pure methane and air.

Ques.—What effect, if any, does mixing carbon monoxide with firedamp have?

Ans.—The addition of carbon monoxide (CO) to firedamp has the effect to increase its explosive condition, since carbon monoxide is an inflammable gas. In other words, it widens the explosive range of the firedamp.

Ques.—What effect, if any, does bituminous coal dust suspended in the mine air have on an explosion of firedamp?

Ans.—The presence of fine bituminous coal dust suspended in the air, and acted on by the flame of an explosion, has the effect to greatly extend the explosion and increase its force. This is due to the inflammability of the carbon monoxide (CO) distilled from the dust by the heat and flame of the explosion. An otherwise local explosion of gas is thus frequently propagated throughout the mine when fine coal dust is present.

Ques.—(a) What is afterdamp? (b) What gases are found after an explosion of firedamp at its maximum explosive point?

Ans.—(a) The term "afterdamp" describes the variable mixture of extinctive gases that remain after an explosion of gas or dust in a mine. Although the composition of afterdamp is very variable, it consists chiefly of carbon dioxide and nitrogen, together with varying amounts of carbon monoxide and, at times, some unburned methane is present.

(b) The explosion of a firedamp mixture consisting of pure methane and air, at its maximum explosive point, produces carbon dioxide and water vapor. These gases are mixed with the nitrogen of the air remaining after the explosion.

Ques.—(a) What is a dangerous atmosphere? (b) How would you proceed to extinguish a mine fire at different stages of the fire?

Ans.—(a) A dangerous atmosphere is one that will expose workmen in the mine to danger, because of its inflammability, explosibility, or poisonous character. An atmosphere is also dangerous when it contains too small an amount of oxygen to support life and maintain a healthy condition of life.

(b) The means to be adopted for the extinction of a mine fire will depend on its location, the headway it has gained and other conditions. A gob fire, caused by the spontaneous ignition of fine coal and slack in the waste, can often be loaded out of the mine before it has gained much headway; but when such a fire has spread over a considerable area, it will often be necessary to seal off that portion of the mine workings, so as to prevent air from reaching the fire. The fire is thus permitted to smother itself.

A fire that has gained considerable headway must always be approached and fought from the intake side, in order to avoid the men being overcome by the gases produced by the fire. Before starting to fight a fire, under these conditions, all the men should be withdrawn from the mine, while steps are being taken to secure an adequate supply of water for fighting the fire. When it is evident that a live fire cannot be extinguished by the application of water, it must be sealed off by building air-tight stoppings at all entrances to that section of the mine or workings. If it is not possible to isolate a single section of the mine where the fire is located, the plan is often adopted of sealing off the mouth of the mine, for a period sufficient to extinguish the fire. As a last resort, recourse is had to flooding the mine so as to drown out the fire.

Attention has been called to a clearly evident error, in the calculation of the sectional area of the semicircular arch forming the roof of the airway, in the reply to the sixth question on page 390, *Coal Age*, Feb. 23. That portion of the answer should read, The area of a semicircle whose diameter is 9 ft. is $\frac{1}{2}$ $(0.7854 \times 9^2) = 31.8$ sq.ft.

COAL AND COKE NEWS

Harrisburg, Penn.

Stipulations were filed on Feb. 27 in the Dauphin County Court by the Attorney General and attorneys representing various anthracite coal companies in which it is agreed that the Locust Mountain Coal Co.'s suit to test the anthracite tax act of 1915 shall govern all the cases growing out of the act. The case is now in the Supreme Court.

A census by the police in every city and town in the state of all persons more than 50 years of age for the purpose of obtaining information for the granting of old-age pensions was proposed at a hearing of the State Commission for the consideration of Old-Age Pensions, recently appointed by Governor Brumbaugh. The census was suggested by James H. Maurer, chairman of the commission and president of the State Federation of Labor. It was also suggested that the labor unions take the census instead of the police, as then it would be more accurately and fully performed. Reports from poor directors of each county show the average cost of maintenance per capita is $2.80 a week. It was the consensus of opinion that the monthly pensions should be $25. The commission will report to the next Legislature.

With the state gaining revenues from the regular coal industry, the question has been raised as to the possibility of some returns being secured from the river coal industry. Attorneys and other persons familiar with state and municipal taxation are not wholly in accord on the question of title to the coal, or the right to tax. On the one hand it is held that by legislative enactment it might be possible for the state to impose a tax on the river coal industry, which at present is not being taxed. It is, of course, generally agreed that until some such law is actually enacted the industry probably cannot be made to produce any revenue to the state treasury.

As to a city or municipality's part of the taxation matter, it is asserted that possibly the only way to secure revenue from the industry would be to impose a wharfage tax or charge. River coal generally retails at from $1.25 to $1.75 a ton, the lower figure being the prevalent charge where there is not a long haul for delivery; but during the shortage of anthracite coal which has characterized the present winter, the cost of the river brand of coal leaped to prices above $2. The Capitol Building, the Harrisburg Light and Power Co. and quite a number of the local industries use river coal either entirely or in part.

The Susquehanna River is dotted with coal fleets in a number of places from Pittston to Harrisburg, a distance of 130 miles. The careful attention which has been bestowed in recent months upon culm banks, once thought to be worthless, has raised another question as to the ownership of the coal which is washed down the river from the mines and gives rise to the extensive river coal industry. Attorneys say as a matter of law it would probably be true that title to the coal would remain in the concerns from whose culm banks or mines it was washed down—provided it could be traced.

But tracing the identity of the particular particles of coal which happen to be washed downstream is quite another matter and, as can easily be seen, it is a pretty safe matter to gather it from the bed of the river without any mining concern from some distant point above where it was taken from the stream endeavoring to prove the coal to be its property.

There seems to be no question but that the title to the coal rests under existing conditions in the individual or firm who first takes it.

Odd features of the compensation law were brought out at a session of the State Board during the week. The most interesting one came from the anthracite region, when it was contended that a check-docking boss is not an employee of a coal company and that injuries sustained by a check-docking boss while lending a hand to workmen at the head of a shaft or slope do not make the company liable. Attorneys for the Lehigh & Wilkes-Barre Coal Co. argued against the decision of the referee in the appeal to the Board. The testimony showed that the check-docking boss at the Nottingham colliery had suffered a strain while assisting company hands in tipping a car of coal. The contention was raised by the company that the injuries did not result from this incident; and a second, and more unique point, was raised, when it was contended that the docking boss was not employed by the company. It was the contention of the company attorney that if assistance is given by a docking boss and injury results the company is not liable as the boss is employed by the men and occupies the same position as would a bystander who voluntarily renders assistance. The board reserved its decision.

The three companies controlling the canals that link Philadelphia with the anthracite mining regions have pledged their support in the movement which is to be sponsored by the Philadelphia Bourse, with a view of bringing about greater utilization of these waterways for coal-carrying purposes.

The Pennsylvania R. R. controls the Delaware and Raritan Canal, the Philadelphia & Reading Ry. operates the Schuylkill Canal and the Lehigh Coal & Navigation Co. controls the Lehigh Canal. It is the idea of the Bourse that if these waterways were used to their capacity for coal-carrying purposes, sufficient coal would be brought to Philadelphia during the summer to keep Philadelphia and other towns warm throughout next winter, and thus avert another famine.

PENNSYLVANIA

Pottsville — Notwithstanding numerous strikes during 1917, the Lehigh Coal & Navigation Co. increased its production 1,112,162 tons over that of the year 1916. The total production in 1917 was 4,579,571 tons.

Harrisburg—Dredges are again at work on the Susquehanna River, bringing up from the river bottom coal washed down from the anthracite fields. The "coal suckers" were laid up at the appearance of the first ice.

Pittston—Mines of the Eighth and Ninth inspection districts of Pennsylvania established new record productions for 1917, according to the reports of the inspectors, Robert Johnson and Edwin C. Curtis. The Eighth district produced 4,537,049 tons for 1917, an increase of 21 per cent., or 780,423 over the 1916 output. There was a reduction in fatalities, 168,000 tons being mined for every fatality in 1917, as compared with 124,000 per death in 1916. In the Eighth district, the output of 3,322,972 tons is 14 per cent., or 418,081 tons more than in 1916. In this district there was also a falling off in fatalities. In each district there was a slight increase in the number of employees despite the general exodus of mine workers for munition centers. The production in the Eighth district is considered a high record for an anthracite district.

North Pittston—As the result of a mine settling on Feb. 27 under the Lackawanna & Wyoming Valley R. R. bridge, traffic was blocked for several hours. The concrete walls that support the bridge and the tracks of the railroad were damaged. The bed of the tracks settled several feet and were rendered impassable. The settling is about 6 ft. deep and is due to a cave in the workings of the Heidelberg mine of the Lehigh Valley Coal Co.

Wilkes-Barre—Fire on Mar. 1 destroyed a large part of the machine repair shop of the Lehigh & Wilkes-Barre Coal Co. in the Empire yards and caused considerable damages. Although the loss amounts to thousands of dollars, a more serious aspect of the fire at this time is the fact that repairs are made at these shops for all collieries of the company in this vicinity.

Wilkes-Barre—On account of the vacancy caused by E. J. Newbaker, who left the Lehigh & Wilkes-Barre Coal Co. to become assistant general manager of the Berwind Coal Mining Co. in the bituminous fields, C. F. Huber, president of the Lehigh company, announces the following appointments to become effective on Mar. 4: Douglas Bunting, chief engineer, appointed general superintendent; A. H. Lewis, of Jeddo, chief engineer for the G. B. Markle Co., appointed mining engineer; H. G. Davies, formerly efficiency engineer for the Delaware, Lackawanna & Western Coal Department, appointed division superintendent of the Wilkes-Barre division; J. B. Tamblyn, district engineer, appointed division superintendent of Ashley division; R. G. Carpenter, district engineer, appointed division superintendent of Plymouth division; Walter Fahringer retains his position of division superintendent of the Honey Brook division, where the official organization will be maintained without change. The positions of chief engineer and district engineer are both abolished.

Stockton—The Lehigh Valley Coal Co. is planning to reopen the mines when labor and supply conditions become normal. The Hazleton Shaft colliery adjoins the workings at Stockton. Boreholes connect the Stockton flooded workings with the shaft and are controlled by valves. Whenever the water gets too high the valves are opened and the water is allowed to flow out of the Stockton mine through the boreholes into the shaft mine, where pumps remove it to the surface. More holes will be bored and the shaft pumphouse enlarged to cope with the water that will be removed from the old workings, which contains large quantities of unmined coal that was left by the Linderman and Skeer interests when they abandoned their lease of the mine in the early '90s.

Bituminous

Smithfield—Bad roads prevented the Prospect Coal Co. from supplying coal to its ovens by its motor-truck service. A tramroad is nearly built and the coal will be delivered by cars and a small locomotive.

Indiana—Job McCreight, who holds options on 1500 acres of coal in Washington township, southeast of the village of Willett, has disposed of his options to B. M. Clarke, of Punxsutawney, purchasing agent for the Rochester & Pittsburgh Coal and Iron Co. A spur will be built from the Ridge Branch to this new field by which to get the coal to market.

Surface of half-dozen farms in Cherry Run Valley have been optioned by a Rochester & Pittsburgh Coal and Iron Co. representative. A branch will be built from the Buffalo, Rochester & Pittsburgh R.R. tracks just south of Homer City up Cherry Run to a new coal town and tipple to be erected at that point.

Somerset—George H. Hay, of Milford township, recently sold his coal operation and 40 acres of mineral lands to W. D. Dillman, of Huntingdon County, for $10,000.

WEST VIRGINIA

Morgantown—Employees of Mine No. 1, of the Elkins Coal and Coke Co., at Richard, raised two flags and held an interesting program recently. The flags, one the Stars and Stripes, and the other a service flag with 12 stars, were raised on a 70-ft. pole. None of the men represented by the 12 stars was drafted, all volunteered.

Bluefield—The Hampton Roads Colliery Co., a new mining operation in the Pocahontas district which has recently been opened at Big Sandy, McDowell County, has started to ship coal. All sidings for the new operation have been installed and placed in service.

Huntington—The Main Island Creek mines, at Omar, Logan County, recently loaded 151 railroad cars of standard 60-ton capacity in one day. This is believed to be a new record, and shows what might be done in this field if the car supply were adequate.

The Long Fork Ry., a branch line of the Baltimore & Ohio, built on the left fork of Beaver Creek and extending to Weeksbury, opens up a rich coal deposit in the Big Sandy field. As soon as the railway begins to accept freight the Milquakee Coke and Gas Co. will start to load with steam shovel the 250,000 tons of high grade coal it has piled up close to the tracks.

Elm Grove—The Century Coal Co. has already started work on a new operation in this vicinity. The mine will be located on what is known as the Raymond farm directly across the creek from Elmwood. T. J. McNamee and A. C. Thomas, of St. Clairsville, Ohio, are interested. The staking out of grades for switches running from the Baltimore & Ohio R.R. to the mine entrance has already been attended to, and local parties were awarded contracts for hauling and grading.

Charlestor—With the completion of its tipple, the Northwestern Coal Co., which has large holdings at Horner, will be ready to begin mining coal. The Baltimore & Ohio R.R. will coal its engines at the tipple now nearing completion.

INDIANA

Fairmount—The Fairmount Mining Co. has filed a final certificate of dissolution with the Indiana secretary of state.

Sullivan—A small locomotive used in pulling cars of coal from a strip mine on the Frank Hale farm near this city jumped the track, plunged down the bank and was wrecked. The engineer, Edward Dailey, jumped as the engine left the rails and alighted in the water in the pit below. He was knocked unconscious and was almost drowned before he was rescued by mine workers. As the engine turned over in its fall, William Mills, a mine worker, jumped and fell, suffering a broken collar bone.

Bloomington—An old abandoned coal mine 10 miles southwest of Bloomington, which was worked some 35 years ago and which was reopened a month ago by George Timberlake and Richard Hall, has developed into a 42-in. vein. The coal is now being tested at Indiana University and the grade is expected to be much higher than the ordinary Indiana coal. There is an iron ore deposit near the coal mine which was successfully worked years ago, and Timberlake and Hall propose to reopen it.

ILLINOIS

Greenfield—The Greenfield Coal Co., which has been operated for several years by a group of local shareholders, has been leased to J. F. Dolan, of Springfield, for a period of one year. Dolan will pay a royalty of 20c. to the company on each ton mined. He has announced all coal will be sold cash at the mine, reversing a policy of wide credits allowed by the original company.

Carlinville—The Standard Oil Co. will sink four shafts in the vicinity of this city, according to Evan John, director of the Illinois State Department of Mines and Minerals. The company will use this coal for its plants at Wood River, Ill., Whiting, Ind., and Kansas City, Mo. Over 400 men are now employed in work preparatory to the sinking of the first shaft.

The Superior Coal Co.'s No. 3 mine here claims the distinction of being the greatest coal-producing mine in Illinois. Figures recently compiled show 1,158,796 tons of coal was mined at this operation during the 200 working days of 1917. The mine has a daily output of 4457 tons and employs 680 men.

The Standard Oil development is not the only one which is being promulgated in the Carlinville district at the present time. It is said that local interests expect to begin mine operations on a large scale, while a large railroad company is also considering entering this field. With the increased activity of the Standard Oil Co. in this territory the Chicago & Alton R. R. must enlarge its yards. The local Chicago & Alton yards have had new tracks installed to accommodate the Standard mines in Carlinville, but the main yards for the mines north of the city will be three miles north of the Carlinville station and will be located on the John C. Anderson land. The railroad company has purchased a tract from Mr. Anderson, upon which it will construct seven parallel tracks each ¾ mile in length.

Taylorville—Fire broke out recently in the third southwest section of Mine No. 8 at Tovey. The fire was brought under control the following day, but on account of the smoke in that section the men were not permitted to work in it for several days.

Mrs. Mary Ormsby, who is at present residing in California, has sold the coal rights on her farm of 328 acres just east of this city to the Peabody coal interests for $25 an acre, or a total of $8200. It is not known whether the Peabody interests intend to connect their field with this new mine or whether the purchase was made to break up the plan of another coal mine about to be launched and which included the farm which Mrs. Ormsby owned.

Belleville—It is reported that the St. Ellen Mining Co., of O'Fallon, was fined $100 by Justice Beineke recently for failing to properly equip the warehouse at the mine. The evidence was that the heating and the hot and cold water system were not according to the mining law.

John Downing, a shotfirer employed in the so-called "Nigger Hollow" Mine No. 2, had an unusual and dangerous experience when the lamp upon his cap became extinguished just as two charges of explosives were about to be discharged. Downing became confused after his light failed, and realizing that he was lost threw himself upon the ground face downward. He was painfully burned and also injured by flying particles of coal and debris. He was removed to a hospital where it is thought he will recover.

Springfield—Andrew Smaller, employed in Klondike Mine No. 5, was arrested by United States deputy marshals when it was reported he had told two other miners "he'd just as soon drop a fuse into that keg of powder and blow up the mine." He professed innocence of any intent of wrongdoing, but was held for investigation. He is a native of Austria and came to this country 24 years ago at the age of 19. He was naturalized in the County Court here 14 years ago.

Four kinds of negligence are alleged in the verdict of the coroner's jury into the deaths of four men in Mine A of the Citizens' Coal Co., on the morning of Feb. 23. The verdict was that the explosion was caused by a blownout shot, that the shot was improperly placed, that the shotfirer did not properly report the shots, that the mine was not sprinkled at proper intervals and that the shots were fired while employees were still in the mine. There was also testimony at the inquest that the ventilating fans were not stopped before the shots were fired. The regular shotfirers had placed three shots in one of the rooms and had not fired them because a car was off the track in the room. The night boss and six men replaced the car and the fuses were lighted under the direction of the night boss. The bodies of the men were found several hundred yards from the room where the explosion occurred.

Benton—J. E. Jones, ex-State Mine Inspector, 11th District, states that the annual coal report of Illinois shows that Franklin County produced 11,317,657 tons with 21 mines during 1917. This would make Franklin County rank first in the production of Illinois coal for last year, and not Williamson County, as mentioned in these columns on Feb. 23.

Danville—A new transformer has been placed in the Electric mines, near Missionfield, Ill., to replace one recently destroyed by fire. The burning of the transformer threw several hundred miners in mines Nos. 1, 2, 3 and 4 of the Hartshorn interests out of employment and curtailed production 24,000 tons.

Virden—Following are the details of how the four men were killed in the Royal Collieries mine here on the morning of Feb. 22, when 28 kegs of powder exploded on the 300-ft. level: The men had lowered the powder on the cage and loaded it on a mine car. An electric motor was attached to haul it into the entry which was being worked. The wheels of the motor skidded. This formed a short-circuit and set off the powder. On account of the stacks at the mine having been blown down a few days before, the men were working half shifts day and night and few were in the mine. The coroner's jury held the mine officials responsible in that the powder had been unlawfully let down into the mine and left standing on the switch track while the power was on, and it was recommended that the company be held liable. The explanation of the manner in which electricity reached the powder is that it entered the car through the axles and the drawbar and ignited the powder through the metallic kegs. G. G. Gordon, superintendent of the mine, says that when the powder was lowered at 2:30 a.m. it was put on the entry track out of the reach of electricity.

Gillespie—The Superior Coal Co. has discontinued its coal train between Benld, Ill., and the Sangamon River, owing to recent thaws which filled the reservoirs and which also assisted in operating the coal washer which had been shut down since last December.

KENTUCKY

Madisonville—The recently organized Grapevine Coal Co. announces that it is ready to commence loading cars at once, but that the output at the start would be small as most of the coal will come from the entries as they are driven.

Two coal companies have started a big boom at the mining town of Mannington, where 50 miners' houses are being erected. The Memphis Coal Co. is building a large commissary, while the Williams Coal Co. is planning operations on a large scale.

Hellier—It is reported that the huge plant and coal mines of the Allegheny Coke Co. have been sold to the Elkhorn Coal and Coke Co., in a deal involving an even million dollars. J. L. Morgan, superintendent of the Allegheny company's operations, has resigned to open mines of his own in the same vicinity.

Clay—The Ward Coal Co. has sold its mine here to the Boone & Boone Coal and Ice Co., of Louisville, Ky., the latter concern announcing that it would operate as the Fairmont Mining Co. The Ward company has been operated for several years by Luke Mitchell.

Providence—Edgar M. Young and James E. Morgan have purchased the coal mine and plant of S. K. Luton, located on the Illinois Central Ry. The new owners are planning to enlarge the capacity of the mine.

IDAHO

Boise—The Teton Valley Coal Co. has been sold to Seattle and Spokane investors, according to R. N. Bell, state mine inspector and one of the principal stockholders in the original company. The purchase price is given as $100,000. The property is the only commercial deposit of any size in the state and has a main shaft which is being driven to a depth of 500 ft. It is located near Driggs.

MONTANA

Bozeman—The Moxey Bros. at Storrs have uncovered a 10 ft. vein of coal which is believed to be the vein the Amalgamated Copper Co. abandoned after losing it several years ago. The coal is of excellent quality, a load of it having been burned by a local greenhouse with excellent results.

WASHINGTON

Bellingham—Anderson & Johnson and John C. Eden, the latter a prominent capitalist of Seattle, are opening a coal mine near here on Clayton Bay.

The Bellingham Coal and Coke Co., recently incorporated for $150,000 by F. W. Kittle, C. M. Skelton and F. I. Gater, has leased a recently discovered coal mine on the Samish road 1½ miles south of the city and development work has been started. The coal is said to be high-grade bituminous. Mr. Kittle was for years operator of the Issaquah coal mine in this state.

Cle Elum—The Independent Coal and Coke Co. has just completed the construction of an $8000 washhouse for the men of the local mine. The structure is said to be one of the finest in the state and has 34 shower baths.

Seattle—Dr. Bailey Willis, professor of geology of Leland Stanford Jr. University, of California, is in the state to continue work undertaken for the Carbon Hill Coal Mining Co. several years ago. For several days he has been making a study of the coal beds of King and Pierce Counties. "A very thorough investigation of the coal and iron resources of the Pacific Coast from Alaska to Mexico has been made," he states. "One of the objects has been to determine whether or not this main coast could become independent of the Eastern iron and steel manufacturers."

Spokane—Far-famed Alaska coal will undergo the severest commercial tests in Tacoma in a few days. A shipment of coke from the Alaska coal has been received, and will be tried out in the Puget Sound Iron and Steel works plant. The coke is from the coal shipped from the Chickaloon district in the Matanuska fields on the government railroad in Alaska to the Wilkeson Coal and Coke Co. for cooking in the company's big ovens at Wilkeson. This is said to be the first attempt to coke the coal on a scale sufficient to test its value for this purpose. The coking has been done by Supt. Joseph Lee of the Wilkeson Coal and Coke Co., and those who have seen the coke, and who can pass as judges, say it is a good grade of coke and should show satisfactory results from the tests. The Alaska coal fields were examined by the United States Government in 1912. The first steaming tests were made on the battleship "Maryland," and the coal proved to be 98 per cent. as efficient as the Pocahontas coal of West Virginia.

ALASKA

Cordova—The Katalla Anthracite Coal Co. has opened its property to such an extent that as soon as the railroad now building from Controller Bay to the mine

is completed it will ship at the rate of 200 tons of coal a day. The Government engineers have pronounced the coal the equal of Pennsylvania.

The Moose Creek line of the Alaskan Engineering Commission is now shipping coal at the rate of 50 tons a day.

Joseph Jandos and George Athans, of Anchorage, have driven a 50 ft. tunnel into their coal property a mile northwest of the crossing of the Little Susitna River, exposing a vein of coal 6 ft. thick.

John Lofstrom and Eser Wikholm, of Anchorage, are also proceeding with the development of their coal property near the Jandos and Athans mine and have shipped 20 tons of coal to the Anchorage market so far.

Foreign News

Paris, France—France mined 28,960,000 tons of coal in 1917, or 7,000,000 more than in 1915, an increase of 25 per cent. on 1916 and 45 per cent. on 1915. For the year imports declined to 18,470,000 tons, or 1,500,000 tons less than 1915.

Montreal, Can.—The International Coal and Coke Co., the mines of which are near Coleman, Alta., reports a profit of $84,565 for 1917, as against $48,250 for 1916. The balance at credit of profit and loss account is $86,583. This is regarded as a satisfactory showing in view of prolonged labor troubles.

Halifax, N. S.—A verdict has been rendered by the coroner's jury on the explosion at the Allan mine, Stellarton, N. S. The jury finds that the explosion occurred on the 1200-ft. level in one or two places. They recommend that a commission of mining experts be appointed to make a careful inquiry into the working of the Pictou County coal mines.

Sydney, N. S.—An agreement has been reached between the Dominion Coal Co. and the miners in its employ on the wage basis decided on at a conference some weeks ago in which Hon. T. W. Crothers, Minister of Labor, and Senator Robertson took part. The increase of wages granted will average about 17 per cent. and will increase the expenses of the company by nearly $1,000,000 per year. About 5000 men are affected.

Personals

Thomas L. Healy, of McRoberts, Ky., has accepted the position of superintendent of mines Nos. 1, 2 and 3 for the Main Island Creek Coal Co., at Omar, W. Va. Mr. Healy will be located at Micco.

J. Noble Snider has been appointed acting coal traffic manager of the New York Central R. R., in the absence of G. N. Snider, who has been assigned to the staff of the Fuel Administration at Washington.

W. P. Beveridge, of Beryl, W. Va., has resigned his position as mine superintendent of the Lower Potomac plant of the Davis Coal and Coke Co., to accept a similar position with a large operating company in Virginia.

Harry B. Christ, of Hazleton, Penn., chief engineer for the Dodson Coal Co. at the Beaver Brook mines, has resigned to become affiliated with the Lehigh Coal and Navigation Co. He will have headquarters at Lansford.

Merle I. Terwilliver, formerly of the mining engineer's department of the Lehigh Valley Coal Co. at Wilkes-Barre, has been appointed to the post of division engineer for the Mahanoy division of the company. He fills the post made vacant by the resignation of F. Nervain.

W. M. Chase has been appointed general superintendent of the Union Coal and Coke Co., Pittsburgh, Penn., to succeed Harry J. Meehan, now managing partner with Cosgrove & Co., Johnstown, Penn. Mr. Chase has been identified with the coal industry in central and western Pennsylvania during the past 20 years.

Garner Fletcher, who for several years has been manager of the Van Lear operations of the Consolidated Coal Co., has been promoted to the management of the company's larger operations at Jenkins, Ky. **E. R. Price,** who for several years was chief clerk at Van Lear, has been made manager at that point.

J. C. Messenger, of Beryl, W. Va., has been appointed mine superintendent of the Lower Potomac plant of the Davis Coal and Coke Co., to take the place of W. P. Beveridge, resigned, as mentioned elsewhere in these columns. Mr. Messenger is known as a progressive and efficient man, and one who is in every way qualified for his new position.

Paul T. Norton, Jr., former division engineer of the Somerset division of the United Coal Corporation, located at Boswell, Penn., who for the past three months has been in the Signal Department of the Government at Washington, D. C., has been transferred to the Officers' Aviation Training Camp at Fort Sill, Okla. Mr. Norton's home is in Columbus, Ohio.

R. Z. Virgin, who was recently mentioned in these columns as having accepted a chair in the College of Engineering of the West Virginia University, Morgantown, W. Va., was appointed instructor in Mining Extension, with headquarters at Elkins, W. Va. The head of the Department of Mining of the University is **A. C. Callen,** who on Nov. 1, 1917, succeeded Professor Zern.

Joseph Sinnotte, who for a number of years was mine foreman for the North East Coal Co., at Thealka, Ky., and later with the Consolidated Coal Co., at Van Lear, Ky., has been named as general manager of the Big Hollow Coal Co., of Pike County, with headquarters at Pikeville. Mr. Sinnotte has been prominent in the Sandy Valley operations for a number of years.

Obituary

J. D. Gibson, 74 years of age, a prominent coal operator of Kentucky, recently died at his home in Pineville. The funeral services were conducted by the Odd Fellows. Mr. Gibson is survived by two sons and two daughters.

John Woolcock, of Pottsville, Penn., a coal operator in the Schuylkill region, died on Mar. 2, aged 73 years. He was born in Ireland, but came to this country at an early age and engaged in coal mining on an extensive scale. After succeeding in the mining of anthracite he developed successfully soft-coal operations in West Virginia.

William Osborn, manager and part owner of the Osborn Machine Co., Dubois, Penn., manufacturers of overwind devices, soot cleaners and mine equipment, died at Dubois, Mar. 1, of pernicious anaemia, after a sickness lasting four years. He was born at Falls Creek, Sept. 15, 1855, and opened up his foundry and machine shops in 1900.

Thomas Sprague, one of the most prominent men of the Pennsylvania anthracite region, died suddenly at his winter home in Altamonte Springs, Fla., on Mar. 1, from heart failure. Mr. Sprague came from New England to Scranton in 1886 to develop the Mt. Pleasant and Sterrick Creek coal companies. When these operations were sold in 1900 Mr. Sprague formed a partnership with Walter L. Henwood in the diamond drill business. He was 73 years of age and is survived by his widow.

Industrial News

Wheeling, W. Va.—The Richland Coal Co. has purchased the towboat "D. A. Nisbet," of Evansville, Ind., and will ship by river. A costly tipple is now being built on the river near here.

Philadelphia, Penn.—The Philadelphia & Reading Coal and Iron Co. is installing a fleet of motor ambulances at all its collieries throughout the Mount Carmel region. The first of the ambulances has already arrived at the Locust Gap colliery. There will be 31 ambulances in the fleet.

Columbus, Ohio—With a view of securing adequate coal supply for next winter, the Columbus Railway, Power and Light Co. has purchased a mine in West Virginia, a stripping plant in the Hocking thin-vein district, several slack piles in the Hocking Valley, and is negotiating for a Hocking mine.

Columbus, Ohio—J. B. Dugan, chief inspector of the Ohio Utilities Commission, and other state officials are urging that general track connections be made between the Hocking Valley, Detroit, Toledo & Ironton and the Baltimore & Ohio in the Jackson field, with a view to securing three roads to serve every mine in that field.

Princeton, W. Va.—The Battleship Coal Co., recently incorporated with a capital of $150,000, is planning for the immediate development of 500 acres of coal lands to have a capacity of approximately 1200 tons daily. It is said that the company is considering the installation of a new 2300-volt central power plant and the construction of fifty miners' residences.

Charleston, W. Va.—The Consumers Smokeless Coal Co. has been issued a charter by the Secretary of State to develop 45,000 acres of coal lands on Gauley River, Fayette County. The company has an authorized capital stock of $1,400,000. Its headquarters will be in Charleston. Among those interested are former Attorney General Abraham A. Lilly and S. A. Moore, of Charleston. The company expects to break ground within the next 90 days.

Pittsburgh, Penn.—The Pittsburgh Coal Co.'s gross receipts last year amounted to $50,025,017, an increase of $20,649,219 over the preceding year. Of this expenses and taxes absorbed $31,555,468, according to the income account issued recently, and the net income after interest and depreciation charges had been met, was $14,076,853, a gain of $10,932,927. This was far and away the best profit the company ever had, the balance for dividends being equal to $20.66 a share of stock outstanding.

Huntington, W. Va.—At a meeting of representatives of Ohio River cities held here on Mar. 1, plans were perfected for the organization of a $300,000 corporation to build and operate a line of boats between Huntington and Cincinnati. The company will be known as the National Steamboat Co., and stock has been allotted to each city in proportion to its size and wealth. Four towboats, three passenger steamers and fifteen covered wooden barges will constitute the company's initial fleet.

Charleston, W. Va.—The State Council of Defense has appropriated $4000 to be used along with $20,000 donated by coal companies of the state for the purpose of having moving pictures made of the coal industry of West Virginia. The object is to have these pictures shown in various sections of the United States and foreign countries to show the conditions under which the coal is mined; the plants where the coal is handled; how it is transported by the railroads and what kind of homes and business houses are found in the mining communities, with the purpose of advertising the state's chief industry to the world.

Louisville, Ky.—According to reports from the eastern Kentucky field, in the Elkhorn district, the Louisville & Eastern and Louisville & Nashville lines will build at least six branches into as many new coal fields to be developed this summer. In several cases it is reported railroad building and development work has already started. One of the most important branch lines will be a six-mile section up Rockhouse Creek to Caudill's Branch, which will tap the operations of some six or seven new coal-operating concerns, including the Middle West Coal Co.'s mine. Adams & Sullivan, general construction engineers of Louisville, are building this branch.

Cleveland, Ohio—The Short Creek Coal Co., which has holdings of 7000 acres of coal lands in No. 8 fields, has been reorganized with the following officers: C. F. Branson, president; E. B. Thomas, vice president; R. Cunningham, treasurer; E. W. Long, secretary. The new directors are E. G. Tillotson, H. C. Robison, W. H. McFarland. The company now operates its Short Creek coal mine on the main line of the Wabash & Lake Erie and is planning for extensive developments of its land, on which the company has completed 7 miles of its own railroad. The Short Creek Coal Co.'s new mine, which is equipped to handle 4000 tons a day, will begin operations within the next 30 days.

New York, N. Y.—The Worthington Pump and Machinery Corporation, 115 Broadway, announces that the following appointments have been made, effective as of Mar. 1, 1918: James E. Sague, vice president, in charge of engineering and manufacturing; Leon P. Feustman, vice president, in charge of general commercial affairs, including contracts, prices, purchases, traffic, etc.; Frank H. Jones, vice president, in charge of sales; Edward T. Fishwick, general sales manager; Charles E. Wilson, assistant general sales manager; William Goodman, assistant to vice president; William Schwanhausser, chief engineer. The offices of the foregoing will be at 115 Broadway, New York. Neil C. Lamont has been appointed works manager, Laidlaw Works, with office at the works, Elmwood Place, Cincinnati, Ohio.

MARKET DEPARTMENT

Weekly Review

General Easing Up of the Coal Situation—Car Supply Still Hampers Production—Anthracite Not So Scarce as Bituminous—Little Contracting for Next Year's Requirements

PREVAILING good weather has brought about a general easing up of the coal situation. The worst of the domestic distress is now over, and there is practically no suffering. New England, however, is still facing the problem of procuring an adequate coal supply—a problem that will not be solved till more ships are pressed into service. The shipping now available totals about 216,000 tons, as against the 351,000 tons considered necessary to meet the normal needs of this territory.

Though showing progressive improvement from week to week, the supply of cars to the mines is still not what it should be, and operators are unable to produce at maximum capacity. The bituminous mines in the central Pennsylvania district are the greatest sufferers from this lack of cars, the miners in that region working only part time. The loaded coal cars that figured in the recent rail congestion are now being returned from tidewater, and the near future should show a decided increase in the number of empties sent to the mines.

Deliveries of anthracite by rail continue to pick up, though river shipments are little better than the February average, and receipts at tidewater are about normal. There is an active demand for steam sizes, with no free coal to be had from the large operators. The Western markets are insistent in their plea for every pound of hard coal, as the Government has intimated that after Apr. 1 these markets will be asked to use bituminous coal from nearby regions.

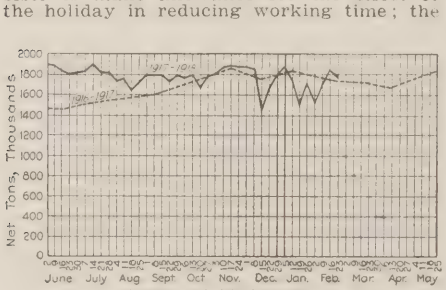
Owing principally to the shortage of cars, the supply of bituminous coal continues to be unequal to the demand. True, there is a slight increase in production over previous weeks, but every ton is being quickly swallowed by a hungry market. Dealers are unable to accumulate reserve stocks as in former years, and it is hard to say when the shortage in soft coal will be overcome. Not until the mines get more cars will the situation change.

Much speculation exists regarding the many plans for zoning and distribution. The Government's new price schedule is also awaited anxiously by the operators; and as for the dealers, they are marking time and wondering what will be in store for them after Apr. 1, the Government having shown that it is actually in control of both the wholesale and retail branches of the business.

There is practically no contracting for the new year, which begins Apr. 1. Consumers, of course, are eager to provide for their next winter's requirements, but Government regulations are against contracts unless the operators are willing to sign up at the present Federal prices. Furthermore, another hindrance to the making of contracts is the fact that they are subject to cancellation if the authorities desire to confiscate the coal for Government purposes.

COAL PRODUCTION

A decrease of 510,000 tons as compared with the preceding week marked the total bituminous output during the week ended Feb. 23. While this decline in gross output amounted to 4.6 per cent. it is difficult to interpret the rate of production per working day because of the unequal observance of Friday, Feb. 22, as a holiday. In plotting the curve of average production per working day, Washington's Birthday has been counted as a full working day. Next week, when reports will have been received from individual operators, it will be possible to make allowance for the effect of the holiday in reducing working time; the



decline in production from the week of the 16th to that of the 23rd from them appear less marked. The total production of beehive coke is estimated at 568,000 net tons, an average of 95,000 tons per working day. Shipments of anthracite amounted to 36,612 cars, a decrease of 9.9 per cent. as compared with the preceding week. Contrary to the custom of the anthracite districts, an effort was made to operate the mines on Washington's Birthday, but the number of men reporting for work was small.

Continued mild weather has effected a material improvement in operating conditions in the beehive-coke industry. Sixty-seven of the principal operators in the Connellsville and adjacent districts of Pennsylvania reported a production of 253,855 net tons during the week of Feb. 23. The ratio of tonnage produced to capacity as rated by the railroads was 58.1 per cent., as compared with 53.2 per cent. during the preceding week. Indeed, the week's performance was the best since the week of Jan. 12. The same operators shipped 149,900 tons of coal.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS WEEK ENDED:

	Feb. 2	Feb. 9	Feb. 16	Feb. 23
Bituminous shipments, 121 roads	170,552	181,586	199,984*	189,562†
Anthracite shipments, 9 roads	34,482	32,011	40,661*	36,612†
Beehive coke shipments, 4 roads	9,655	10,470	11,357*	11,657†

*Revised from last report. † Subject to revision.

Atlantic Seaboard

BOSTON

New England still faces problem of getting enough ships. Outlook continues discouraging. Little change in local restrictions. A steamer cargo intended for gas companies through Massachusetts had to be diverted for Boston local distribution. Much interest in "next season." Anthracite rail deliveries improve, but water shipments continue only a little better than the February average.

Bituminous—Present activities of those interested in getting coal for New England are centered upon more ships. If about 115,000 tons more can be allotted, and the coal can be produced for loading, it is estimated that the industries here can be kept running and have enough for emergency needs in communities where the supply of anthracite fails. Aside from the importance of their output, in which the Government is vitally interested, there is a pronounced feeling that any enforced idleness in large mill centers like Lowell, Lawrence and Fall River would result in grave complications. While no manufacturer is being given more than a week's supply from the emergency receipts at the disposal of the fuel authorities, it is believed there will be no shutdowns for the present, unless calculations are upset.

Receipts have not appreciably increased during the past fortnight and most of the hopefulness one hears about is directly due to the less severe weather. Meanwhile, the plants and railroads where stocks were "ample" Jan. 1 are fast getting to the end of their tether. The number of distress cases will increase rather than otherwise as we near Apr. 1.

Large plants like the Bath Iron Works are working on very narrow margins and several of the pulp mills essential for newsprint paper are down to a fortnight's supply. The whole State of Maine, industrially, is in a very serious situation for lack of fuel. The Great Northern Paper Co., for instance, using 185,000 tons annually, is so far in the pulp wood country that it takes coal a long time to get there after ships are unloaded. To add to the complications, rehandling facilities at Portland are congested with other traffic, sulphur for paper mills and supplies for the Allies, and with quick discharge so vital an element in the supply of ships, it is feared that several cargoes relied upon for Maine points will not be delivered there.

The New York, New Haven & Hartford is now among the railroads showing anxiety over fuel supply. The Maine Central has more on hand than at any time since Jan. 1, due to ships being diverted from other consignments, but the Boston & Maine, the Central Vermont and the Boston & Albany are all dependent upon receipts almost from day to day. In order to give the Central Vermont an emergency supply the coal will have to be hauled over New Haven tracks from Providence to New

London because the ship available is too deep to berth at New London.

The matter of ships is being constantly kept before the Washington authorities, but other than two or three more "army boats" secured through the allied shipping control body at the request of the Quartermaster-General's department there are no important developments.

The Hampton Roads situation shows steady improvement. Over Saturday and Sunday, Feb. 23 and 24, 1305 cars were dumped. All of this was by no means for New England, but it shows that New England can rely upon better dispatch for the present, although there are signs of slackening again in the movement from the mines to tide.

All-rail deliveries have not increased in the same proportion, although reports are daily more encouraging. An effort is being made by the railroads to have an increasing tonnage flow to New York loading piers to be forwarded by boat to Bridgeport, New London, Providence, and even Boston, for distribution to inland points ordinarily reached all-rail. J. J. Storrow, New England Fuel Administrator, approves of this plan and looks to see it increase the volume of coal for New England. The supply of box barges is sufficient, it is said, and of course one of the great hindrances to shipment all-rail into New England is the long haul to which cars are subjected, with no return load.

The Boston retail situation is still acute. A steamer cargo with high volatile that had already been parceled out on paper to gas companies was diverted to a Boston retail wharf for distribution, largely to domestic users. There are a number of Boston retail dealers with only a few tons of bituminous on hand and no anthracite. Fuel cards are now a regular institution.

The trade is much concerned over contracts and prices for "next season." Everything seems to hang on decisions of the fuel administration, although doubtless there will be a great many cases where buyers will place themselves in the hands of their usual contractors, leaving details to be worked out as the season develops. No contracts are heard all-rail, although on water business that can be handled over wharves owned by interests that also control coastwise tonnage there is still some quiet canvassing.

Anthracite—The movement of domestic sizes by water both from New York and Philadelphia is only slightly better than the February average, even though there seems to be a general impression that conditions are a lot improved. Loading has made a better showing the past fortnight, although in ordinary times it would be considered very poor. The outlook seems still unsettled, although a meeting of the operators' committee this week is expected to forecast some line of policy that will be followed by the companies during the year beginning Apr. 1. The trade here is entirely at sea over what is to happen, except that coal will certainly be hard to get in sufficient quantities.

NEW YORK

Entire coal situation is improved. Demand has lessened, but supplies are low. Dealers are optimistic and expect that the rush is over. Retail interests take hand in anthracite steam-coal situation. Investigation may result in closing up of private power plants. Dealers in bunker coals warned.

Anthracite—Conditions are far from normal, but the coal situation in this market is much easier as regards the domestic sizes, due in most part to the temperature and improvement in transportation facilities. Everywhere one hears of a freer movement of coal and there is not that insistent demand that predominated the market for several weeks past. However, wholesale dealers and shippers complain of the lack of supplies at the loading docks. This they account for in part by the heavy deliveries made to retail dealers, which in itself keeps the stocks on hand down to the minimum.

So far as the retail interests are concerned they are optimistic of the future. Most of them have small tonnages in their yards, and with the demand remaining as it is now they expect soon to have full bins. The demand upon them has lessened owing to the weather conditions, which as usual regulates the New York market probably more than any other coal market in the country. With warm days consumption dwindles and the dealers soon begin to feel the effects.

The trade is anxiously awaiting information concerning the plan formulated for distributing anthracite this spring and summer. While it was originally intended, according to an announcement, that the East should be taken care of first, it is understood that other sections of the country, particularly the West and Northwest, have put in their claims before the Fuel Administration officials and the special committee of anthracite operators selected to arrange the plan.

The matter of dirty coal continues to command the attention of national and state fuel administrators. It is understood that inspectors attached to their offices have received explicit instructions regarding poor preparation and that shipments not coming within requirements will be rejected. Reports from the anthracite regions are that since the fuel administrators have begun an investigation of the preparation of coal the shipments have been of a much higher quality.

Regulation of the anthracite steam-coal prices is likely to be urged upon the Fuel Administration by the retail interests here. Much complaint has been heard of the conditions surrounding this phase of the market and there are murmurings that some individual operators are asking for their product higher prices than the companies and other individual operators are quoting. There continues to be shortage of these coals, and as about everything coming here is already under contract the buyer looking for free coal finds it difficult to pick up a cargo.

No advices have been received so far with regard to the usual spring reduction of 50c. It is safe to say, however, that whether or not there will be a discount consumers will place their orders early.

The inquiry into the coal situation being conducted by the Board of Aldermen has developed testimony to the effect that the cellar peddler system ought to be controlled, if not entirely abandoned, and that a central plant where the poor could go and get their fuel would be better. The control of the peddler and cellar dealer was urged before the committee conducting the investigation by County Fuel Administrator Reeve Schley and by Harry T. Peters, who is chairman of the State Fuel Conservation Committee. It was also suggested that a good plan would be the establishment of a central heating plant for the distribution of heat and electricity.

There was a hearing before the Public Service Commission on Monday of this week with a view to looking into the advisability of closing down all private electric plants, thereby conserving the fuel supply. There was considerable opposition to the promulgation of the proposed order.

There were shipped for export from the Port of New York during January of this year 490 tons of anthracite as compared with 7934 tons exported in January of last year.

Current quotations, per gross tons, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buckwheat	4.30@5.00	5.50@5.80
Rice	3.75@3.95	4.50@4.80
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—The situation is somewhat easier, but there is practically no free coal to be picked up in the New York harbor. Jobbers continue to anxiously await the official word from Washington which they believe will put them out of business. While it has been stated from what appears to be authoritative sources that Dr. Garfield intends to sign the order, there were rumors early this week that the final order would not be promulgated at this time. However, there was a much stronger belief that the order will be put into force on Apr. 1 as originally announced, notwithstanding the many protests.

The attention of the members of the Wholesale Coal Trade Association of this city has been directed to the complaints made of inferior coal furnished for bunkering purposes, both in New York and Philadelphia, and urging upon them the imperative necessity of furnishing only the best qualities of coal. It is recommended that coal be supplied only from the following pools: South Amboy, No. 9 and No. 10; Port Reading, No. 9, No. 10, No. 22 and No. 23; St. George, No. 22 and No. 23; Port Liberty, No. 9 and No. 23.

Operators in the Central Pennsylvania fields whose coal is wanted by the United States Shipping Board for bunker and export, and those whose coal is subject to priority orders, are receiving a better supply of cars than others. There is said to be practically no distribution of coal for commercial purposes, the car supply for that purpose averaging between 10 and 15 per cent. Conditions along the Baltimore & Ohio are about the same, but along the New York Central car supply is much better.

It is likely that there will be little done toward closing contracts for the new coal year beginning Apr. 1. Consumers are anxious to provide for their requirements for the next year, but Government regulations are against contracts unless the operators are willing to sign up at the Government prices; and then the stipulations are subject to cancellation if the authorities desire to confiscate the coal for Government purposes.

The bunkering situation shows much improvement. There are comparatively few ships in the harbor and none of these is being detained because of the failure to secure coal. There is no spot coal here and contract coal is not moving freely, although most contract holders are obtaining enough to keep their plants in operation.

PHILADELPHIA

Anthracite retailers catch up with orders. Commission rules against stocking now, but modifies later. Shipments near normal. Hope 50% discount will be passed. New card delivery system. Coal inspections grow more drastic. Bituminous shows slight improvement. Situation still serious, with car supply the factor. Brokerage discussion continues.

Anthracite—Dealers are marking time and wondering what is in store for them after Apr. 1. They have been forced to realize that the retail as well as the wholesale branch of the business is now practically under Governmental control. This was again impressed upon them when the Chairman of the Federal Fuel Administration for Philadelphia on Feb. 27 issued a circular letter to all local dealers instructing them not to attempt to stock cellars, but to deliver coal for immediate use only.

In the same letter they were reminded that the whole system of coal distribution for the year beginning Apr. 1, 1918, will be regulated by the Government prior to that date and that the local fuel administration will not recognize or allow delivery of orders accepted prior to that date. This letter proved most disconcerting to the trade and immediately there was a storm of protest. After several representative dealers had carefully explained all the facts to Mr. Lewis they were given permission to use their own judgment and to commence delivering gradually, but were advised not to complete any large orders.

Receipts from shipping companies have assumed almost a normal aspect and are running from 12,000 to 14,000 tons of domestic sizes daily. Egg coal continues to accumulate to a limited extent in dealers' yards and stove displays just the least tendency to drag. The real demand, as is usual at this time of the year, is for chestnut and pea. With this falling off in demand for certain sizes has come a certain uneasiness among the individual shippers as to whether they can still maintain their prices at 75c. above the company shippers right up to the end of the month, when new prices are expected to be announced. Usually at this time the independents are compelled to quietly shade prices to move their entire output. The dealers are placed in a peculiar position, for they are anxious to buy their coal as cheaply as possible and naturally would cancel their high-priced orders, but when they consider that next winter they will need all the coal they possibly can get regardless of price, they hesitate to cut off any independent shipments.

Every one remains hopeful that the usual 50c. reduction will not be put into effect this year. The local fuel administration has been quoted as being opposed also to the 75c. differential allowed the smaller operators, but it is a noticeable fact that as a whole the retail dealers oppose any concerted action on their part as objecting to it. At a recent meeting of the dealers it was apparent that none was keen to request the authorities to equalize the prices.

Despite the greatly augmented shipments recently, numerous retailers who have been interviewed are practically unanimous in their determination to procure all the coal they can this month regardless of price. The possibility of a 50c. reduction will not deter them from buying all the coal they can store. At present quite a number of the smaller yards are carrying full stocks of certain sizes and requests to suspend shipments are growing more common. Of course, this will quickly cease when spring deliveries commence. These cancellations are not bothering the larger shippers for

outside markets continue extremely anxious for every pound of coal, especially Western points, which have been threatened by the Government with curtailment after Apr. 1, with the understanding that they must use bituminous coal from nearby regions.

At the suggestion of the local fuel administration a new system covering the retail deliveries of coal is to become operative with the first of next month. It is to be based upon information to be developed by a card questionnaire radically different from the one now in use. Complete data concerning household coal consumption will thus be obtained. The Coal Exchange, the local retail organization, will be delegated to keep the new cards and assume the responsibility for operating the bureau. In order to meet the expenses of the bureau a tax of 2c. a ton will be levied against the retail dealer on every ton delivered. The card will contain blanks to be filled with all details as to tonnage and sizes formerly used; whether hot-air, hot-water or steam-heating system is used. Every time coal is delivered the dealer will be required to make a report and each delivery will be tabulated. In this way a check will be had on every consumer; and it is hoped hoarding will be prevented and a stop put to the practice of "shopping" from dealer to dealer and leaving an order with all. It is also planned to make a survey of the city's industrial plants to determine how many are using domestic sizes and to what extent steam sizes or soft coal may be substituted. A great saving of family coal is expected from this investigation.

The dealers are greatly encouraged with the prospect of receiving more of Philadelphia's most popular size—pea coal—during the coming year. It has been learned that shippers who have contracts on this size expiring Mar. 31 will not renew them, but will reserve the coal for domestic use. The contracts were all with industrial plants and the fuel administration will not consent to their renewal.

Coal inspection by the Fuel Administration representatives continues. Dealers who delivered coal of inferior preparation to homes are being compelled to refund money or send an extra supply to their customers, gratis. This was done in seventeen cases in one day at the direction of the State Fuel Administration. Following this the dealers are refusing to receive poorly prepared coal from the shippers, and one dealer reported that because he had done this further shipments had been cut off. The fuel officials warned the shippers that this was a violation of the law and made themselves liable to prosecution under the Lever Act. In order to offset this phase as much as possible the State Administration has increased the number of inspectors at the breakers in the region.

Late in the week it was learned that in distributing coal to the trade during the coming year the tonnage shipped to the various dealers from April, 1916, to March, 1917, will be made the basis on which all calculations will be made for the coming fuel year.

Steam sizes continue in very active demand, with no free coal to be had from the large operators, and with the individuals making sales of the few cars of this kind they may have at the prices that have practically prevailed all winter, with $4.15 being the highest price asked for buckwheat and very little to be had at this figure.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—The supply continues unequal to the demand. It cannot be overlooked, of course, that weather conditions have been a wonderful help, but whatever increased production there has been has been quickly absorbed by a market long since bare. Yet while it is intimated that there has been a slight increase in production this output is far from what could be accomplished if the car supply were adequate. The greatest shortage continues to be in the Central Pennsylvania district, although there has been a considerable improvement over a month ago. From the Fairmont district and other southern fields entering this market the report of car supply is somewhat better, but far below what it should be. Taken in all its aspects the soft-coal situation continues to be extremely serious.

There seems now to be no particular objection to the new Government price, except only when it is considered in question with the brokerage problem. As is well known, practically all companies mining coal and who at the same time operate a sales department had quite a little tonnage for the brokers, which tonnage they were willing to continue, even though they could have marketed it all direct under present conditions. The brokers are making a hard fight and the outcome of their efforts is awaited with much interest.

There continues to be two prices for coal in this market, as so far there has been no change in the prices of coal from the southern fields. Some authorities consulted feel that a smaller allowance than the 60c. granted in Central Pennsylvania may be allowed there, but others, basing their opinion on the fact of less difficult mining conditions, believe that there will be no change in the immediate future.

BALTIMORE

The coal trade wonders how consumers are to take advice to lay in coal. Warmer weather aids movement, but many bins are entirely empty.

Bituminous—The milder weather has caused a let-up in the rush of domestic consumers for bituminous coal to take the place of anthracite. Many who tried soft coal in stoves and grates that were unsuited for burning that product have had more or less woeful experiences with soot-ridden homes and injured stoves, and are back to a "hard coal or nothing" basis in their demands. This lightened domestic demand and the fact that public service corporations and city emergency departments have been a little better supplied this week, has led to some diversion of bituminous to those industries hardest hit by fuel shortage. A number of firms, however, are still traveling on the narrow edge of supply and some are claiming that they are not able to get out full production because of lack of coal.

Anthracite—Supplies to arrive here are still vastly short of needs. The trade is wondering how the public is to take the advice of the Government and purchase coal for next winter. There is not a chance to get enough coal for even immediate needs, much less for storing. There may be relief under a new Government distribution plan after Apr. 1, but there is not a coal man here but would venture the prediction that next winter will be entered with consumers vastly short of needs.

Lake Markets

PITTSBURGH

Broader market. Jobbers are making sales. Supplies good in Youngstown district and fair in immediate Pittsburgh district. Uncertainty regarding new prices.

The most trustworthy evidence of the greatly improved relation between supply and requirements now obtained is found in the fact that some coal jobbers are now transacting a very fair amount of business. In the great majority of cases they are operating under a brokerage paid by the consumer, the producer receiving the full fixed maximum price; but in an occasional instance a brokerage is now being paid by producers, out of the set price.

The steel mills in the Youngstown district are now well supplied with coal, except that an interest here and there might be disposed to purchase a limited tonnage of high-grade gas coal. The immediate Pittsburgh district is fairly well supplied, but this condition is due chiefly to the resumption of river coal movement since the ice ran out. Rail deliveries to Pittsburgh are only moderately improved.

The trade has been unable to form any definite opinion as to what sort of price revision will occur Apr. 1 pursuant to the recent announcement of the Fuel Administration that there would be a revision by that date. The specific statement was that the allowance of a brokerage to be paid by the buyer, over and above the set price, would be discontinued, the brokerage in future to be paid by the producer, out of the set price, and that there would be an increase in the set price to cover selling expense. That would mean raising the present set price of $2.45 for mine-run in the Pittsburgh district by all or part of the 15c. brokerage now allowed.

Nothing definite and practical has thus far been announced as to putting in operation the proposed general zoning system for distributing coal. There is a regular trading market, although rather a narrow one, now in existence, and of course at the set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70; per net ton at mine, Pittsburgh district, with 15c. extra permitted to be charged in the case of sales made by brokers.

BUFFALO

Situation still perplexing. Coal more plentiful, but not well distributed. Anthracite demand not so keen, on account of the mild weather.

Bituminous—No change for the better is to be seen, for the mines still refuse to sell at the Government price if they can avoid it. The operators and the jobbers have a way of establishing offices in Canada and shipping a big percentage of their coal there, where the price is higher. This cuts down the amount to be had in the border towns, like Buffalo, and makes it hard to get coal enough to use. Everybody is dissatisfied; and the complaint against the regulations or practices without much regulation, is as great as it ever was.

Coal is still standing in quantity at railroad junction points and the rules have cut out the wagon production to a great extent and increased nothing, so that the situation can hardly be called promising. Mild weather and nothing else has averted a big disaster, as the local trade looks at it.

It is not easy to quote prices, especially as the bulk of the coal still goes on contract figures, but thick-vein Pittsburgh coal still is quotable on the basis of $4.25 on cars here for lump and thin vein at $4.45½, Pittsburgh rail rate, for mine-run. So little attention is paid to these prices that jobbers hardly know how to quote them.

Anthracite—The situation does not change much, but the warm weather has so reduced the demand that the mines have been able to get along by cutting down the amount shipped this way. The local fuel authorities are now finding that most of the coal can be trusted to the retailers for distribution, though the disposition to hoard is still common. But for that there would not have been much shortage. There has been little or no suffering here in that line.

The lake trade, and especially the fixing of next season's terms and prices, is a source of much discussion in the anthracite trade now, but it is all uncertainty. There is a surplus of bituminous on the upper lake docks and the anthracite supply is supposed to be good there also, but the coal is all in the hands of consumers and the amount is not easy to determine. Nothing will be loaded for the lakes right away. The local consumers would complain of such tying up of fuel.

DETROIT

Transportation conditions improve with continuance of favorable weather. Fuel administration restrictions are partially relaxed.

Bituminous—Moderate temperatures continuing through the week have contributed materially in placing the transportation situation on a better basis, facilitating the clearing away of freight in congested districts along the coal carrying roads south and southeast of Toledo and releasing shipments of coal that have been delayed long in transit. This has the effect of increasing temporarily the quantity of coal coming into Detroit. Jobbers and wholesalers, however, are directing attention to the probable diminution of supply, within a week or 10 days, which is likely to result from shortening of car supply at the mines, while cars now being unloaded or awaiting unloading are being taken back for loading.

The present supply in the Detroit market, though of more satisfactory volume than for many weeks past, merely makes provision for day-to-day requirements of steam plants. Little or no opportunity has been afforded yet for stocking up and free coal on tracks is still conspicuously absent.

Weather conditions, besides effecting an improvement in transportation and supply, have brought relief from the pressing demands of domestic consumers, thus increasing the proportion of coal available for industrial consumption. The improvement in the general situation has been so marked that the Michigan fuel administration has revoked the nine-hour limit on business establishments and most of the drastic restrictions designed to save coal.

Anthracite—There has been a slight improvement in quantity of anthracite coming into Detroit. The supply still falls short of normal requirements. Warning has been issued to retail dealers by the Michigan fuel administration to guard against selling to individual consumers a larger amount of anthracite than is necessary for reasonable requirements to Apr. 1. The fact that the Federal Fuel Administration on the same date issued a recommendation that coal users at once make provision for future needs is an interesting coincidence.

COLUMBUS

Better supply of coal arriving in the local market and the stringency is now passed. Steam business is attracting considerable attention.

The coal trade in Ohio has been rather active during the past week, both in domestic and steam lines.

Pocahontas coal is exceedingly scarce and only a small amount of West Virginia splints are coming into the local market. The trade is depending largely on Hocking, both thin and thick vein, and on Pomeroy grades. Some Jackson is arriving, but it is not being used as extensively as formerly.

The steam business is active to the extreme. Manufacturing plants which were compelled to suspend operations for some time owing to lack of fuel are now being operated. Schools and public institutions are fully supplied. Some steam users have been able to lay in surplus stocks to act as insurance. Public utilities are especially active in stocking-up as they do not want to be caught short-handed again.

Lake trade is being considered both by shippers and dockmen. Few lake contracts have been made as yet, but all producers have received many inquiries. The disposition appears to be to let the matter of price rest with the Government. Vessel men are casting around for all available tonnage, as indications point to a rather active lake season, right from the start.

Production in Ohio fields has again shown an increase over previous weeks. This is especially true of the Hocking Valley, where the car supply has been excellent. Pomeroy Bend is credited with about 80 per cent. production while Massillon and Crooksville had about 75 per cent. In eastern Ohio the car supply is still lax and the output is estimated at 65 to 70 per cent. of normal.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.70	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

The situation continues to improve, aided by mild weather and a better car supply. Some coal has also arrived by river. Contract inquiry is already in evidence.

With a continuation of comparatively mild weather, and a much better car supply reported from most districts serving this section, the coal situation is rapidly improving, although as long as severe weather is a possibility coal men and the fuel authorities emphasize the fact that there might be a renewal of the recent shortage. Dealers are accumulating stocks, however, warned by the situation in which they were placed during the winter months, and will probably not again be found unable to supply their trade. Industrial consumers are again receiving coal more or less regularly on their contracts; and, on the whole, the situation is more nearly normal than it has been for several months. There is every reason to believe that there will be no cessation in the active demand for fuel, however, as the public and all classes of consumers had a drastic lesson during the winter, and buying for spring and summer delivery, for next winter's use, is certain to be on an unprecedented scale, especially as the authorities at Washington are now urging that consumers buy during the summer, instead of asking them to hold off as was the case last summer and fall. Jobbers remain somewhat disturbed over the intimation that Washington may cut off their profits, but it is believed that some adjustment of this threatened difficulty will be made.

LOUISVILLE

Prevailing good weather throughout the district has resulted in much lighter consumption. Dealers are carrying fair stocks, and are able to supply all demands. Western Kentucky production good. Eastern Kentucky showing improvement. Traffic conditions generally better and car supply larger.

Due to a better car supply, the eastern Kentucky mines in some localities have been able to operate three to four days a week, whereas two to three days has been the average for the greater part of the winter. A number of coal developments are being started, and indications are that many new companies will shortly start operation.

In the western Kentucky district the labor and car supply situation has shown considerable improvement, and a fair tonnage is moving from that district. While several developments are under consideration there is no great amount of development activity in progress in the western section at the present time, it appearing as if most of the coal-land development in the state is now in the eastern section—in Perry and Letcher Counties—or in the Elkhorn district.

Retail dealers of Louisville are now enabled to make prompt deliveries on all grades of Kentucky coal, and are delivering orders placed before noon on the same day, if requested. Labor to unload and store coal is being obtained in fair quantities. The general domestic demand is fair for this season of the year, but as usual is for small quantities of from one-half to two tons for the most part.

Captain Shaw, of the Pittsburgh Coal Co., Louisville office, reports that there is practically no movement of coal tows down the Ohio this season, due to the fact that there is no coal to be had from the Allegheny district for southern or western delivery, as such coal is going into the Pittsburgh and other districts. There is an excellent boating stage on the Ohio, and plenty of boats, barges and tugs, as well as other equipment, but there is no coal to move by river at this time. Generally there is a heavy movement in February and March on high water. There may be some movement during the latter part of the month, however.

BIRMINGHAM

Tension in domestic channels has entirely disappeared and one-ton restriction has been removed. Steam situation unchanged, demand continuing strong. Slight gain in production over last week. Transportation facilities reported good.

All possibility of any further acute shortage developing in the domestic market this season having been abated, the fuel board at its last session removed the one-ton limit of sales to householders and is urging that consumers provide themselves during the spring and summer months with reasonable tonnage to carry them through next winter. The latest inventory from yards shows that stocks are gradually increasing and receipts of lump coal are improving. The demand upon the mines is good, but not so insistent as heretofore.

There is no easing up in the inquiries for steam coal and every ton that can be mined is being judiciously distributed. There seems to be no relief in sight for the tension that exists in the steam market, it being impossible under existing conditions to bring the output of the mines up to capacity production; and the supply is inadequate to meet all demands.

Coke

CONNELLSVILLE

Some price advances in other districts. Improvement in car supply is slow. More promise. New system proposed for allotting cars promises better quality of coke.

The Fuel Administration has raised the set prices 75c. and $1 a ton in the case of certain West Virginia districts, above the general level of $6 for furnace and $7 for foundry, while selected foundry coke made with washed coal from the lower bench of coal of the Upper Freeport seam, in Indiana County, Pennsylvania, is set at $8.50 if the ash is under 10 per cent. and the sulphur under 9 per cent., the price being $8 if either of these analysis limits is exceeded.

Car supplies have been improving slowly indeed, and while there is a progressive increase in shipments from week to week the gain in coke shipments in the past three or four weeks has been at the rate of not much more than 5000 tons a week, the shipments still being about 75,000 tons a week under the estimated requirements of the blast furnaces tributary to the region.

Pittsburgh & Lake Erie cars have been in practically full supply, but as they are not permitted to go off the road the number of customers is limited and occasionally it is not easy to find buyers for all the coke thus loaded. Consumers on other lines are still short of coke. The blast furnaces have been running fairly well in the past two or three weeks, at 75 per cent. or more of capacity, but were able to reach this rate only by reason of the considerable amount of coke that has accumulated along the lines and was moved forward to destination when the weather broke.

The market is rather narrow, but there are some transactions. The set prices govern: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Feb. 23 at 264,849 tons, an increase of 24,077 tons, and shipments at 297,578 tons, an increase of 12,219 tons.

Buffalo—The demand for all sorts of by-product coke for fuel is as great as ever and it promises to continue. The effort to turn out this in quantity is stimulated to the limit, though the price does not appear to have been crowded up much by the situation. No complaint comes from the iron furnaces, though they do not appear to have any understanding as to what the prices will be when the contracts run out. Many coal consumers appear to be glad that they are allowed by contract to pay more than the regulation price, as they stand a better chance of getting the coal; and it may happen that the big coke consumers will find some way still of keeping close to the ovens, as they have done right along.

Middle Western

GENERAL REVIEW

Conditions greatly improved. Car supply better. Movement of both loaded and empty cars more regular and uniform.

The past week has seen a vast change for the better in the Middle Western section. Weather conditions did not disturb transportation to any noticeable degree. During the week 2 in. of snow fell in the northern districts, but throughout central and southern Illinois the weather has been mild, thereby permitting mines that had cars to load maximum tonnage. Conditions at the large terminals, which for three months have been congested with coal, are better and the movement of both loaded and empty cars is easier and more regular. The last three days of February showed that production had reached normal again. However, production for the month is far below the corresponding month in 1917.

No contracts are being closed for the coming season. Jobbers do not know where their next season's supply is to come from, and producers are not anxious to contract, preferring to allow matters to drift for a while until they clear up the orders they have on file. Then, too, the matter of zoning has delayed the making of connections for next year.

Dr. Garfield's order eliminating the jobber's commission, after Apr. 1, still arouses much debate. The 15c. per ton allowed jobbers under the present working arrangement gives them sufficient margin to continue business. They contend that if this 15c. is eliminated and the demand continues to be as urgent as it has been for several months, there is little likelihood that they will be able to make connections with producers that have a sales organization of their own. The jobber who now has connection with a mine that has no sales organization is considered fortunate.

CHICAGO

Chicago trade easy, although there is a market for any grade of coal offered. Weather conditions favorable.

The coal trade is breathing a sigh of relief because milder weather and the ability to get a sufficient tonnage of coal to care for orders. Although most of the coal coming to this market is bituminous from the East, all classes of users are more than satisfied to be able to get high-grade southern Illinois coal. The domestic trade has eased off considerably during the week just passed, but industries are ready and anxious to replenish their depleted stocks, many of which were confiscated during January and February for the relief of distress. The volume of coal reaching this market from the extreme southern part of Illinois was never greater than now. Williamson, Franklin and Saline Counties are large shippers to this market. Eastern bituminous coal is still in demand, although there is some improvement in movement. Still the demand far exceeds the supply, and the uncertainty of the tonnage that will be available from the East continues to have the effect of helping Indiana and Illinois coal into apartment houses that heretofore would not consider storing Western coal. The anthracite market is irregular. Some dealers are getting more, others less than last year, although there is an improvement in the movement from the mine.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	.....
Washed egg	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Smokeless: Hocking	Smokeless: West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Extra delivery charge because of winter conditions abolished. Wisconsin's urgency call for additional supplies of soft coal to receive favorable response.

A practical reduction of 75c. per ton on all coal was made on Mar. 1, when the local fuel administration abolished the extra charge of that amount ordered on Jan. 17 to make up for increased cost of delivery because of snow and ice conditions. Otherwise rates remain undisturbed. About 10,000 tons of fire-damaged Pocahontas mine-run has been thrown upon the market by one dock company at $7.75 per ton.

Wisconsin's urgency call for about 40,000 tons of soft coal to supplement present stocks sufficiently to make them last until the opening of lake navigation about the middle of April will receive favorable consideration, according to advices received from Washington by State Fuel Administrator W. N. Fitzgerald. No bituminous coal is being received at present, as the preferred list in Illinois is absorbing all the coal mined in that state. Anthracite is also being withheld from the West because of the needs of Eastern coast communities.

There is a disposition on the part of consumers to put in new supplies of coal at once, and the fuel administration office is the center of inquiries in this regard. All are advised to wait until lake receipts are resumed. Meanwhile a system of supply regulation to guard against "hogging" is being perfected. In the rural districts all signs point to a revival of wood burning to an extent which will have an appreciable effect upon coal consumption next winter.

Springlike weather continues to act as a sedative in coal circles and there is a refreshing relaxation from the tension of winter's tribulations.

ST. LOUIS

An unusual situation accounted for by weather conditions altogether. Steam unusually quiet, and nothing doing in domestic lines. Railroads showing slight improvement. Little Eastern coal and no Arkansas. Condition satisfactory to the consumer.

Continued mild weather has brought about a condition in the local market that is commencing to worry the producer. Louisville & Nashville still has an embargo in effect that prevents coal from going to Chicago and many other points where it is needed, with the result that the local market is glutted.

The Louisville & Nashville seems to pay no attention to the rules that govern the railroads, and it is time that something drastic is done to make an example of some of these roads that are openly violating unwritten laws that have a tendency to ease the fuel situation in sections where it is still somewhat acute.

The Illinois Central furnishes about two day's supply of cars for the mines on its lines and its service is entirely unsatisfactory to everyone concerned. The other roads are doing fairly well, both with equipment and service.

There is some slight improvement in the equipment furnished on most roads and conditions show slight improvement, but not what should be expected. It is openly commented on here by some coal men that the roads seem to be falling down, and without any just cause, unless it might be that it is in an effort to get the public discouraged with the Government supervision of the rail lines; but the fact remains that investigations fail to find any valid reasons for some of the delays and inconveniences caused by the carriers in this section.

In the Carterville district the working time has improved and equipment is somewhat better. The tonnage from this field still continues to go to Chicago and the North, and the railroads still draw heavily, so that there is no excess tonnage offered in this market from this field.

The same condition exists to a great extent in the DuQuoin field. The situation is much easier in the Mt. Olive field, and there has been an abundance of this coal on the open market in the past few days. The retail trade in St. Louis is stocked up heavily with this grade and the producers are finding markets farther away from home.

In the Standard field there seems to be a surplus in a general way in domestic coal and some sizes of steam. During the past week several operators have had some strenuous work in order to dispose of their tonnage, and it is shortly expected that the railroads will be able to buy coal under the market price from operators who would rather not cut the commercial price.

Washington intimates that St. Louis will get no Pennsylvania anthracite this year, and what can be gathered from the Arkansas operators would indicate that they will not have enough tonnage to ship any to this market. There is some early buying on the part of domestic consumers, but this is light as yet.

The prevailing market is, per net ton f.o.b. mine:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

I. C. C. Decisions

The Commission, Division 2, in conference on Feb. 16, 1918, considered the following inquiries concerning demurrage charges and storage charges assessed by common carriers on the fuelless days designated in the order of the Fuel Administrator dated Jan. 17, 1918:

1. May the fuelless days designated by the Fuel Administrator be considered legal holidays as that term is used in the demurrage code?

2. Should demurrage charges be collected on a shipment such as asphalt which arrived at destination on Jan. 18 and which because of its consistency could not be unloaded without first being heated and which was not heated because of the shipper's understanding of the Fuel Administrator's order?

3. Should demurrage charges be collected on cars containing freight which could not be loaded or unloaded without the use of a derrick operated by power derived from fuel?

4. Should demurrage charges be collected on shipments to a large industrial concern which could not load or unload them without certain inter-plant switching which could not be performed without power derived from fuel?

5. Should storage charges be assessed on less-than-carload freight which was not removed because an industry completely ceased operation on the fuelless days as the result of its understanding of the Fuel Administrator's order and of the instructions of the local fuel administrator?

Held, as to the first question, that the fuelless days designated by the Fuel Administrator may not be considered legal holidays as that term is used in the demurrage code.

Held, as to the second and third questions, that a particular shipper's understanding of the Fuel Administrator's order is not conclusive, as different shippers may construe the order differently; and that in cases where power or heat derived from fuel is necessary and customary for loading or unloading property, cars arriving and set for loading or unloading on Jan. 18 should be treated exactly as though set for loading or unloading on Jan. 23. In other words, in the circumstances of these cases, no demurrage charge should be assessed.

Held, as to the fourth question, that demurrage charges should be collected on shipments to industrial concerns which failed to load or unload cars because it is alleged that they were prevented by the Fuel Administrator's order from using locomotives for inter-plant switching. The Commission does not consider that there was any prohibition upon the plant locomotives from using power where necessary for loading or unloading any more than there was a prohibition against the use of locomotives for general railroad business.

Held, as to the fifth question, that storage charges should be assessed on less-than-carload freight not moved because the industry ceased operation on the fuelless days as the result of its interpretation of the Fuel Administrator's order, or the instructions of the local Fuel Administrator.

General Statistics

CHESAPEAKE & OHIO

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for the month of December, 1917, and twelve months ending Dec. 31, 1917:

COAL

To	December 1917	December 1916	Twelve Months 1917	Twelve Months 1916
Tidewater (bituminous)	365,703	470,367	5,396,288	5,367,468
East (bituminous)	327,818	287,627	3,022,336	2,716,772
West (bituminous)	1,157,690	1,049,591	15,540,865	16,157,778
Company's fuel (bituminous)	183,203	203,025	2,292,363	2,308,884
From connections (bituminous)	135,123	173,898	1,756,287	2,489,365
Total (bituminous)	2,169,537	2,184,508	28,008,139	29,040,267
Anthracite	4,373	1,553	13,652	16,579
Total coal movement	2,173,910	2,186,061	28,021,791	29,056,846

COKE

To	December 1917	December 1916	Twelve Months 1917	Twelve Months 1916
Tidewater	.....	.....	207	1,211
East	11,022	10,206	138,996	151,381
West	22,771	27,887	262,198	294,198
From connections	12,394	8,391	99,939	103,373
Total coke movement	46,187	46,484	501,340	550,163

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

CINCINNATI	Mar. 5, 1918	One Month Ago	One Year Ago
No. 2 Southern foundry	$35.90	$33.00	$18.90
No. 2 Northern foundry	35.90	35.95	21.76
NEW YORK			
No. 2X Northern foundry	34.25	34.25	22.00
No. 2 plain Northern foundry	33.75	33.75	21.00
No. 2 Southern foundry	37.25	37.25	22.00
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	16.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	22.00
No. 2 Southern foundry	37.00	37.00	....
PITTSBURGH			
Bessemer iron*	37.25	37.25	24.95
Basic iron*	33.95	33.95	20.95

*These prices include the freight charge from the valley to the Pittsburgh district. †Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York, Mar. 5, 1918	New York, 1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.195	$3.25	$4.27	$4.20
Channels, 3 to 15 in.	3.00	4.195	3.25	4.27	4.20
Angles, 3 to 6 in., ¼ in. thick	3.00	4.195	3.25	4.27	4.20
Tees, 3 in. and larger	3.05	4.245	3.40	4.27	4.25
Plates	3.225	4.45	5.15	4.52	4.45

BAR IRON—Prices in cents per pound at cities named are as follows:

	Pittsburgh	St. Louis	Denver	Birmingham
Mar. 5, 1918	3.50	4.17	4.05	4.38

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$2.70	$4.30	$4.85	$4.25	$4.25	$4.60	$4.50
Cut	2.70	5.25	....	4.40	....	6.15	....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh, Mar. 5, 1918	Pittsburgh, One Year Ago	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$2.65	$6.00	$5.00	$5.30	$6.25	$5.30	$5.00
Track bolts	4.90	3.25	8.90	6.25	Premium	7.45	6.75	6.00
Standard section angle bars	3.25	2.00	....	4.50	Premium	4.65	....	....

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+10%	+35%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.25	$6.30	$6.50	$6.25	$7.50	$6.25
Assorted	5.40	6.30	6.50–7.00	6.40	7.75	6.85

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York, Mar. 5, 1918	New York, 1 Month Ago	New York, One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$58.35	$58.35	$44.50	$57.55	$57.00	$65.00	$61.00
6 in. and over	55.35	55.35	41.50	54.55	54.00	62.00	58.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh, Mar. 5, 1918	Pittsburgh, One Year Ago	Chicago, Mar. 5, 1918	Chicago, One Year Ago
Standard bessemer rails	$60–65	$38.00	$60–65	$38.00
Standard openhearth rails	63–65	40.00	63–65	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	52.00	*3.135 (100 lb.)	47.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	52.00	*3.09 (100 lb.)	46.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	50.00	*3.00 (100 lb.)	44.00

OLD MATERIAL—Prices per net ton in Chicago and St. Louis (including delivery to buyer's works and freight transfer charges):

	Chicago, Mar. 5, 1918	Chicago, One Month Ago	St. Louis, Mar. 5, 1918	St. Louis, One Month Ago
No. 1 railroad wrought	$32.80	$31.25	$30.75	$30.50
Stove plate	27.80	21.50	20.50	20.50
No. 1 machinery cast	27.80	26.00	26.00	26.00
Machine shop turnings	17.80	17.00	17.50	17.50
Cast borings	17.80	16.50	17.00	17.00
Railroad malleable cast	32.80	26.80	26.00	26.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.16	$0.13	$0.17

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	14c.	14c.	15c.
Hollow	24c.	25c.	....

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel, Inches	Black	Galvanized	Iron, Inches	Black	Galvanized
⅛, ¼ and ⅜	44%	17%	¾ to 1½	33%	17%
½	48%	33½%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	36½%			
¾ to 1½	49%	36½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2¼ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black, New York	Black, Chicago	Black, St. Louis
¾ to 3 in. butt welded	38%	42.8%	40.1%
3½ to 6 in. lap welded	18%	38.8%	36.1%

	Galvanized, New York	Galvanized, Chicago	Galvanized, St. Louis
¾ to 3 in. butt welded	22%	27.8%	25.1%
3½ to 6 in. butt welded	List	24.8%	22.1%

Malleable fittings, Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 15 and 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair-sized orders, the following amount is deducted from list:

	New York, Mar. 5, 1918	New York, One Year Ago	Cleveland, Mar. 5, 1918	Cleveland, One Year Ago	Chicago, Mar. 5, 1918	Chicago, One Year Ago
Hot pressed square	$1.00	$0.50	$1.40	$2.60	$1.05	$3.00
Hot pressed hexagon	1.00	.50	1.20	2.60	.85	3.00
Cold punched square	1.00	.50	.75	3.00	1.00	2.50
Cold punched hexagon	1.00	.50	.75	3.00	1.00	3.00

Semifinished nuts sell at the following discounts from list price:

	Mar. 5, 1918	One Year Ago
New York	40%	50—10%
Cleveland	60%	60%
Chicago	50%	65%
St. Louis	50—10%	.....

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St. Louis
⅜ by 4 in. and smaller	30%	50%	40—10%	40%
Larger and longer up to 1 in. by 30 in.	15%	40%	30—5%	35—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..$1.00 Cleveland..$2.00 Chicago..$3.00 St. Louis..$3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York..$5.00 Cleveland..$4.50 Chicago..$3.50 St. Louis..$2.75

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	30%	35%	40%*
Tinned	30%	35%	40%*

*For less than keg lots the discount is 35%.

Button heads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in., sell as follows per 100 lb.:

New York ..... $7.00 Cleveland ..... $5.85 Chicago $5.50

Coneheads, same sizes:

New York ..... $7.10 Cleveland ..... $5.95 Chicago $5.60

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	Chicago	St. Louis	Birmingham	Denver
Cup	7	5¼	6.1	7½	10
Fiber or sponge	8	6	6.4	7½	15
Transmission	7	6	6.4	7½	15
Axle	4½	4	3.3	...	5
Gear	4½	4½	6.5	7½	6
Car journal	22 (gal.)	3½	4.6	7½	6

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	1918 Mar. 5	Year Ago One	1918 Mar. 5	Year Ago One	1918 Mar. 5	Year Ago One
Best grade	90.00	60.00	93.00	53.75	90.00	55.00
Commercial	50.00	35.00	22.00	17.75	30.00	28.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	40%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade... 30% Second grade... 30-5% Third grade... 40-10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	40%
Denver	40%	40%
Birmingham	35%	40%
Chicago	30—10%	40—5%
Cincinnati	40—10%	40%

RAWHIDE LACING—40% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.65
Duck and rubber for piston packing	1.00
Flax, regular	.90
Flax, waterproofed	1.10
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.90
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.10
Asbestos wick, ½- and 1-lb. balls	.65 to .70

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+ 20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is the price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.35½	Kansas City	$0.33½
New York	.34	Los Angeles	.33½
Chicago	.32½	Seattle	.33½
Denver	.33½	St. Louis	.33
Birmingham	.37	Cincinnati	.33

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin.Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1 -in.	.30
1½-in.	.45
2 -in.	.60
2½-in.	.75
3 -in.	.90
3½-in.	1.05

85% magnesia high pressure ..... 15% off

For low-pressure heating and return lines..... 4-ply.... 58% off; 3-ply.... 60% off; 2-ply.... 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Mar. 5, 1918	One Year Ago	Mar. 5, 1918	One Year Ago	Mar. 5, 1918	1 Year Ago
Raw per barrel	$1.39	$0.99	$1.40	$1.00	$1.41	$0.98
5-gal. cans	1.49	1.09	1.50	1.10	1.51	1.08

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Mar. 5, 1918		1 Year Ago		Mar. 5, 1918	1 Yr. Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
25- and 50-lb. kegs	11.50	11.00	10.50	11.00	10.50	10.50
12½-lb. keg	11.75	11.25	10.75	11.25	10.75	10.75
100-lb. keg	11.25	11.50	11.00	11.50	11.00	11.00
1- to 5-lb. cans	13.25	13.00	12.50	12.50	13.00	12.50

CALCIUM CARBIDE—Price f.o.b. cars at warehouse points in Eastern States is $102.50 per ton for Union miners' lamp carbide, and $97.50 per ton for Cameo miners' lamp carbide. Union sells in 25-lb. cans for $1.46 per can.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$13.50	Birmingham	15.00
St. Louis, salmon	8.00	Denver	$8.50

FUEL OIL—Price variable, depending upon stock. New York quotations not available owing to this fact. In Chicago and St. Louis the following prices are quoted:

	Chicago	St. Louis
Domestic light, 22-26 Baumé	5c.	none
Mexican heavy, 12-14 Baumé	7c.	7 1/10c.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York and Chicago:

	1-Ply		2-Ply		3-Ply	
	c.l.	c.cl.	c.l.	l.cl.	c.l.	l.cl.
No. 1 grade	$1.15	$1.40	$1.45	$1.60	$1.75	$1.90
No. 2 grade	1.10	1.25	1.25	1.40	1.50	1.65

Asbestos asphalt-saturated felt (14 lb. per square) costs $6.50 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.85 per roll in carload lots and $2.10 for smaller quantities.

Shingles, red and green slate finish, cost $4.75 per square in carloads, $5 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less Than Carload Lots
Tar felt (14 lb. per square of 100 sq.ft.)	$61.00	$62.00
Tar pitch (in 400-lb. bbl.)	15.00	16.50
Asphalt pitch (in barrels)	29.00	30.50
Asphalt felt	60.00	62.00

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Jan. 30, 1918	One Month Ago	One Year Ago
$4.50 to $5.00	$4.50 to $5.00	$2.60 to $2.70

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$79.00	$135.00
Chicago	79.00	137.00
Denver, per ton	110.00	200.00
Kansas City	58.00	112.00
St. Paul	55.00	138.00
Boston	95.00	171.00
Birmingham	56.80	103.50
Cincinnati	68.80	129.00

LUMBER—Price of yellow pine per M in carload lots:

	1-In. Rough, 10 In. x 16 Ft.	2 In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$34.00	$29.00	$33.00
Birmingham	27.00	28.50	25.00

	8 x 8-In. x 20 Ft. and Under				12 x 12-In., 20 Ft. and Under	
	Y.P.	Fir	Hemlock	Spruce	Y.P.	Fir
Boston	$52.50	$52.50	....	$40.00	$60.00	$60.00
Cincinnati	35.00	....	....	....	35.00	....
Kansas City	35.25	36.00	....	....	39.75	37.00
Seattle	23.00	23.00	....	23.00	23.00	23.00
New Orleans	28.00	....	....	....	38.00	....
St. Paul	....	51.00	40.00	40.00	....	59.00
Denver	....	37.00	....	33.00	....	40.00
Atlanta	25.00	....	....	....	30.00	....
San Francisco	....	28.00	28.00	28.00	....	28.00

	1-In. Rough, 10 In. x 16 Ft. and Under			2-In. T. and G. 10 In. x 16 Ft.	
	Y.P.	Fir	Hemlock	Y.P.	Fir
Boston	$45.00	$50.00	....	$50.00	....
Cincinnati	35.00	....	....	37.50	....
Kansas City	44.75	52.00	52.00	52.50	57.00
Seattle	23.00	23.00	23.00	23.00	23.00
New Orleans	35.00	....	....	35.00	....
St. Paul	....	46.00	39.00	61.00	42.00
Denver	35.00	32.00	32.00	....	32.00
Atlanta	18.00	....	....	25.00	....
San Francisco	....	28.00	28.00	....	28.00

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$10.90	$15.15	$27.25	$13.50	$16.25	$31.25	$13.50	$16.25	$31.25
10	23.70	27.05	49.35	25.00	28.50	56.40	25.00	28.50	56.40
8	33.60	37.35	74.45	34.85	38.85	74.70	34.85	38.85	74.70
6	....	57.15	....	59.75	64.25	....	59.75	64.25	....
4	....	81.70	....	84.40	84.90	....	84.40	84.90	....
2	....	121.80	....	125.50	132.00	....	125.50	132.00	....
1	....	158.50	....	163.00	171.15	....	163.00	171.15	....
0	....	189.40	....	216.00	225.00	....	216.00	225.00	....
00	....	298.05	....	263.00	273.50	....	263.00	273.50	....
000	....	362.15	....	320.00	331.50	....	320.00	331.50	....
0000	....	448.50	....	388.50	400.50	....	388.50	400.50	....

EXPLOSIVES—Price per pound in small lots at cities named:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder*
New York	.....	$0.27½	$0.34½	.....	$2.50
Boston	.....	.....	.36¼	$0.43¾	....
Cincinnati	$0.21¾	.23¾	.28¾	.....	....
Kansas City	.20	.26¼	.33¼	.43¼	....
New Orleans	.....	.25¼	.30¼	.....	....
Seattle	.18½	.29½	.31¾	41¾	....
Chicago	.19¾	.23¾	.33	.43	2.35
St. Paul	.20	.26¼	.33¼	.....	2.45
St. Louis	.20	.24	.29	.43¼	2.025
Denver	.19	.25¼	.32¼	.42¼	....
Dallas	.25	.31½	.39	.49	....
Atlanta	.21	.27¼	.34¼	.44¼	2.40
San Francisco	.17¼*	.23½*	.30½*	40½	....

*Carload price.

FREIGHT RATES—On finished steel products in the Pittsburgh district, including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates are effective in cents per 100 lb.:

Boston	21.5	Minneapolis	35.5
Buffalo	11.6	New Orleans	30.7
Chicago	21.5	New York	19.5
Cincinnati	18.5	Philadelphia	18.5
Cleveland	13.5	St. Louis	27.0
Denver	79.0	St. Paul	35.5
Kansas City	47.0	Pacific Coast (all rail)	90.0

COAL AGE

Vol. 13 NEW YORK, MARCH 16, 1918 No. 11

THE MARCH OF JUSTICE

THERE is such a thing as the March of Justice, and it vitally concerns every mining man. A few years ago we were not so much interested in it, for then we did not realize what an important part the coal industry was to play in a world war.

Only a short time ago we had no thought that our best efforts would be required to mine coal to send ships to France loaded with our sons and the products of our toil, for the purpose of preserving justice on earth. Individualism has passed. What happens in the far ends of the earth today is our business, whereas formerly we were quite unconcerned.

We know now that the great triumvirate that will save human freedom is—the miner, the soldier and the ship-builder. If one of these three fail, all other efforts will be useless. The German attempt to enslave Russia has removed the last hope that there is any way out but to conquer by force of blood and iron.

A NATION'S vanity tells it what is honor—a nation's conscience what is justice. Justice, therefore, does not exist in a land where pride has supplanted conscience. The great aim of the mighty march of the coal-mining business is to rid the world of a menace, the like of which was never known before.

The progress of justice has been painfully slow because individuals and companies have refused to believe they could be mired in the holes they dug themselves. Its progress has also been retarded by self-interest. Few men but have at some time stood pat for personal profit, to the exclusion of all other considerations.

MANY employers and employees can recall a series of strikes that lasted just as long as one or the other of the parties was too hard-headed. That was obstructing the march of justice—and the families concerned, the community and the nation all suffered. Many men in their business relations are like the Southern sheriff who got up a crap game among the negroes in order to arrest enough prisoners to make a profit from his business of boarding the inmates of the county jail. Others of us are like Plowden, the lawyer, who gave an opinion to a client concerning an offense, but on learning that he himself was the wrongdoer said: "The case is altered." All such impede the march of justice.

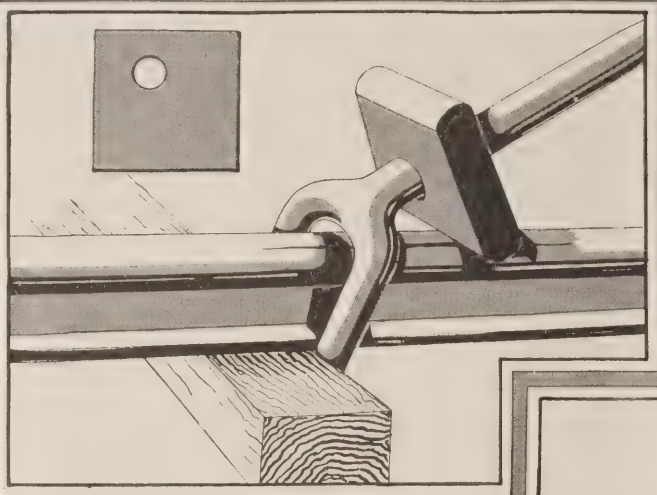
When a virtue is exercised unseen and unsung, it wears its greatest crown. That is why the coal miner in the dark and grime of his underground world has an unmatched opportunity to show character and patriotism. Here he can load clean coal and strike a fatal blow to the Hun, or he can send up slate and render an irreparable injustice to his own countrymen fighting for freedom in France.

IT IS impossible to judge a tree by its bark, a horse by its harness, or wine by the barrel that contains it. The present day of distress and sacrifice is the one time in history to go deep in testing the worth of men and things before judgment is passed. Mine operators must be patient and slow to criticise the men who have been empowered to regulate the industry. It is certain that any mistakes made will be unintentional. Correction will surely follow a persistent presentation of the truth.

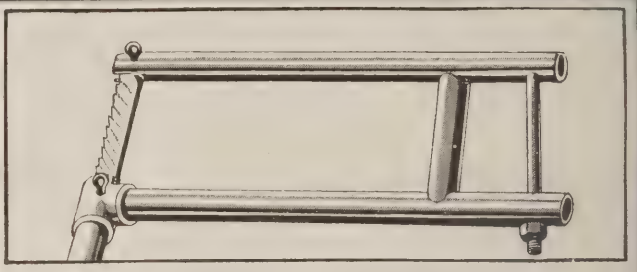
And the fuel administrators—they have the least enviable jobs of all. Nothing is more difficult than the task of catching and chastising the guilty, without also unjustly punishing those who are worthy and decent. A present case in point is the problem of the jobber. Some members of this selling fraternity have done wrong, but there are a lot of decent jobbers whose honesty and patriotism rank second to none, and who have built up businesses legitimately and in absolute conformity with the letter of the law. These men only sell three-eighths of the total coal mined. A slight increase in the ton price of our total output would exceed the commission now paid jobbers for the small part of the total production they handle.

GENERALLY there are several different ways to do the same thing. We must be careful today to see that each new plan we put into effect is better than the old system it supplants. That must be the cardinal aim of the Fuel Administration, the coal operator and the coal miner. Furthermore, let us not forget that **"every man loves justice at another man's expense; nobody cares for it at his own."**

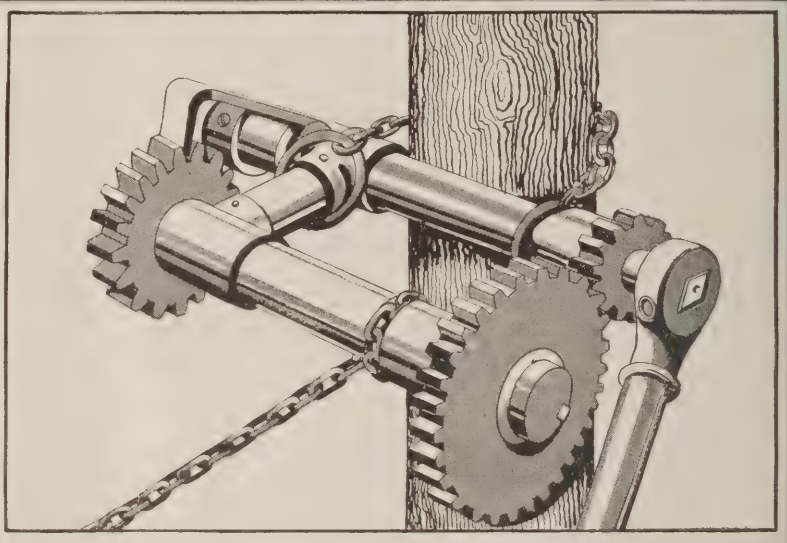
IDEAS AND SUGGESTIONS



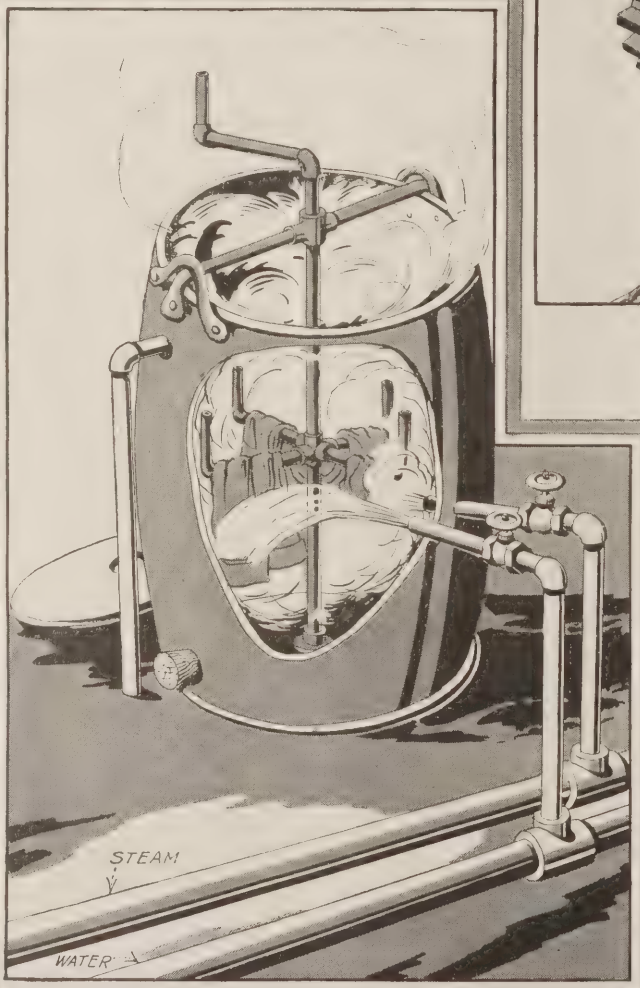
THE BLOCK ADJUSTS THE CINCH BAR TO ANY TIE RAIL



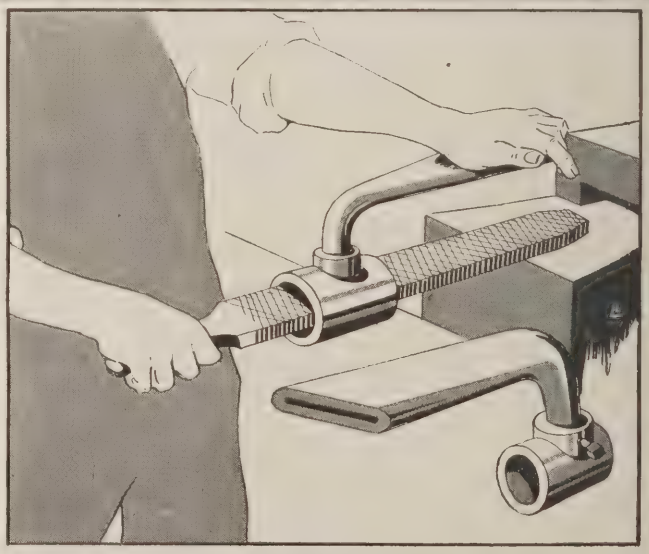
PLENTY OF CLEARANCE SPACE HERE



HOME-MADE TIMBER PULLER

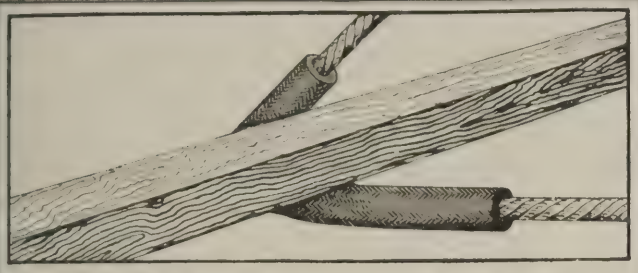


A DISCARDED WATER BARREL SERVES WELL AS AN OVERALLS WASHER

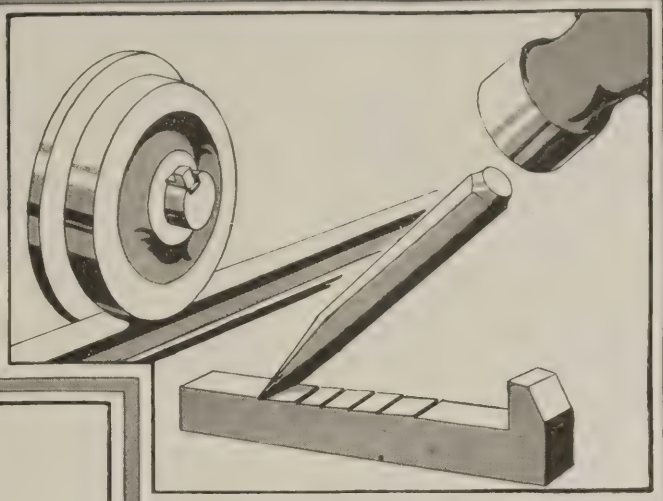


THIS MAKES FILING MORE EFFECTIVE

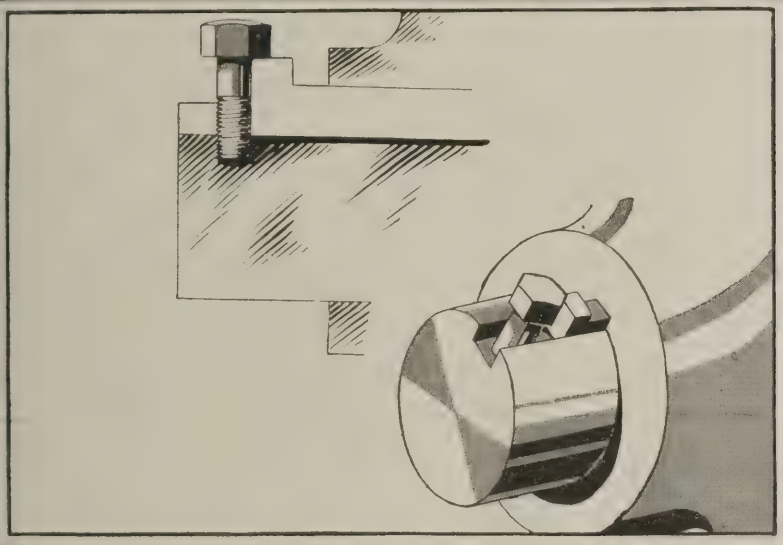
FOR USE AROUND THE MINE



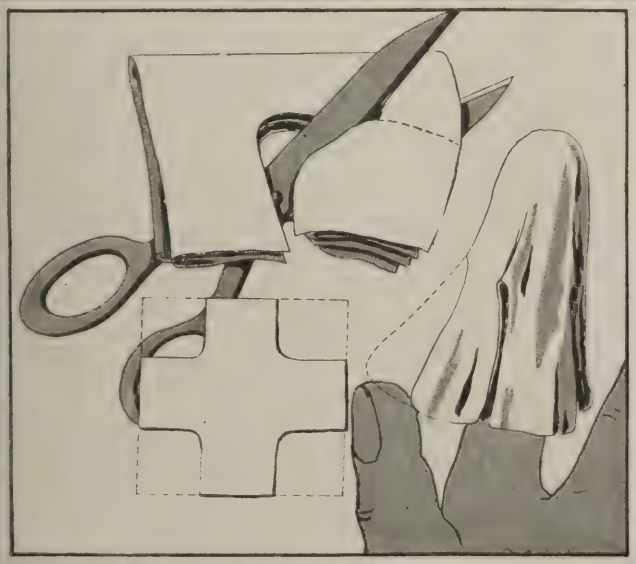
DISCARDED AIR HOSE CAN BE USED TO SAVE THE ROPE



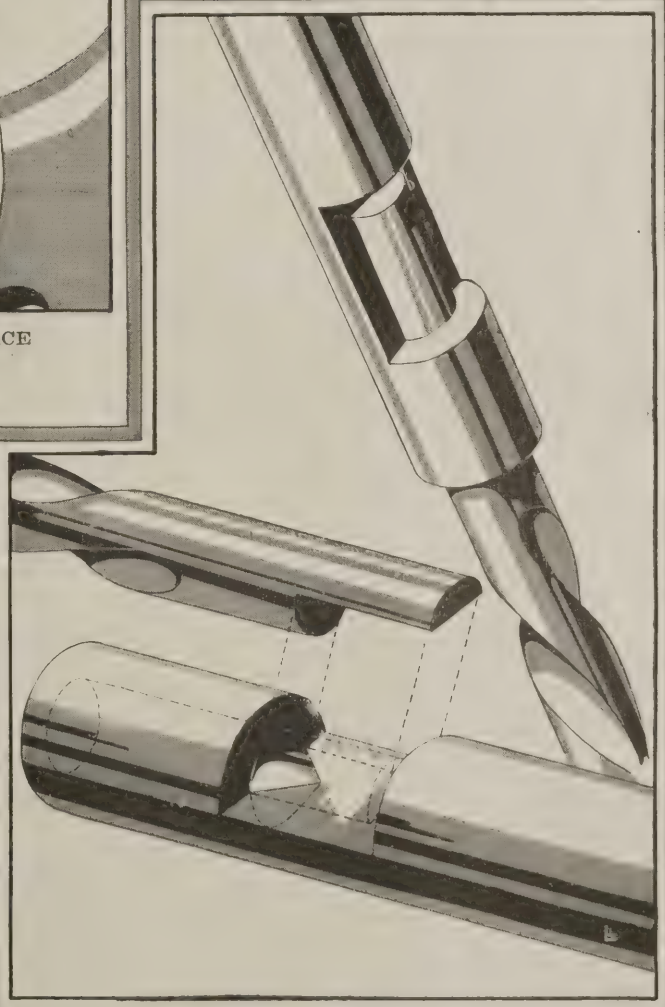
THAT KEY WILL NEVER FALL OUT AGAIN



YOU CAN USE A SCREW TO HOLD A KEY IN PLACE



A NEAT BANDAGE PATTERN FOR SORE FINGERS



AN EXTENSION THAT WILL NOT WOBBLE

The Mineral Spring Breaker

By DEVER C. ASHMEAD
Tarrytown, N. Y.

SYNOPSIS — *Description of grounds and construction of building. Wet treatment of coal from egg to pea sizes in jigs. Operation of an interesting barney plane.*

EXCELLENT in design, construction and management, the Mineral Spring breaker of the Lehigh Valley Coal Co., at Wilkes-Barre, Penn., is a credit to the city from an architectural point of view, instead of being an eyesore, as is the case with a number of other breakers in the anthracite region. The grounds of the colliery are fenced in with about 3½ miles of board fencing, painted red, the entire fence being surmounted by barbed wire.

The ground immediately surrounding the breaker and the main plant has been laid out as a park and is always kept in fine condition, favorably comparing in this respect with many city parks. The old slate dumps have been terraced and covered with a layer of good soil to a depth of one foot in which grass seed has been sown; and a well-kept lawn greets the visitor as he enters the main gate (see Fig. 1).

For the main walks concrete has been used, while the minor pathways are of cinders, the borders along the walks being correctly trimmed. On each side of the walk, and extending from the main gate to the top of the hill, is a line of shade trees. These trees do not appear in any of the illustrations to this article, as they were only planted last fall. Flower beds are laid out, adding considerably to the beauty of the grounds. A glimpse of the flower beds may be obtained in Figs. 3, 4 and 5.

In Fig. 6, which is a general view of the plant, it will be observed that the grounds about the main shafts and buildings are covered with cinders. The entire place is kept scrupulously clean, not so much as a scrap of paper being visible. No broken cars or parts of machinery are in sight, the company officials evidently being firm believers in "a place for everything and everything in its place."

The men at the plant are responsible for the appearance of the grounds, the company furnishing the neces-

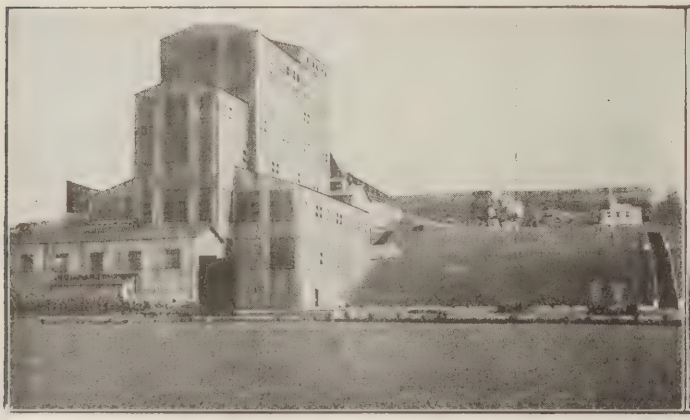


FIG. 1. SHOWING TREES AND WELL-KEPT GROUNDS



FIG. 2. SIDE VIEW OF MINERAL SPRING BREAKER



FIG. 3. VIEW OF THE LAWN AND FLOWER BEDS IN THE VICINITY OF THE LOADING HOUSE



FIG. 4. ONE OF THE MANY FLOWER BEDS



FIG. 5. VIEW NEAR THE BOILER HOUSE



FIG. 6. GENERAL VIEW OF THE SURFACE PLANT



FIG. 7. INTERIOR OF BREAKER, SHOWING SHAKERS AND CHUTES TO THE JIGS

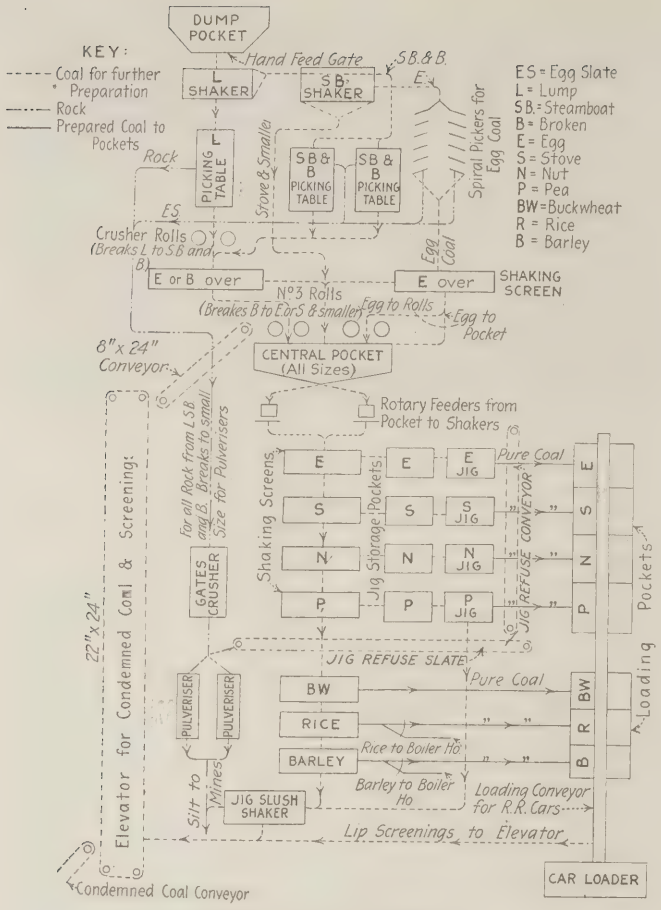


FIG. 8. FLOW SHEET

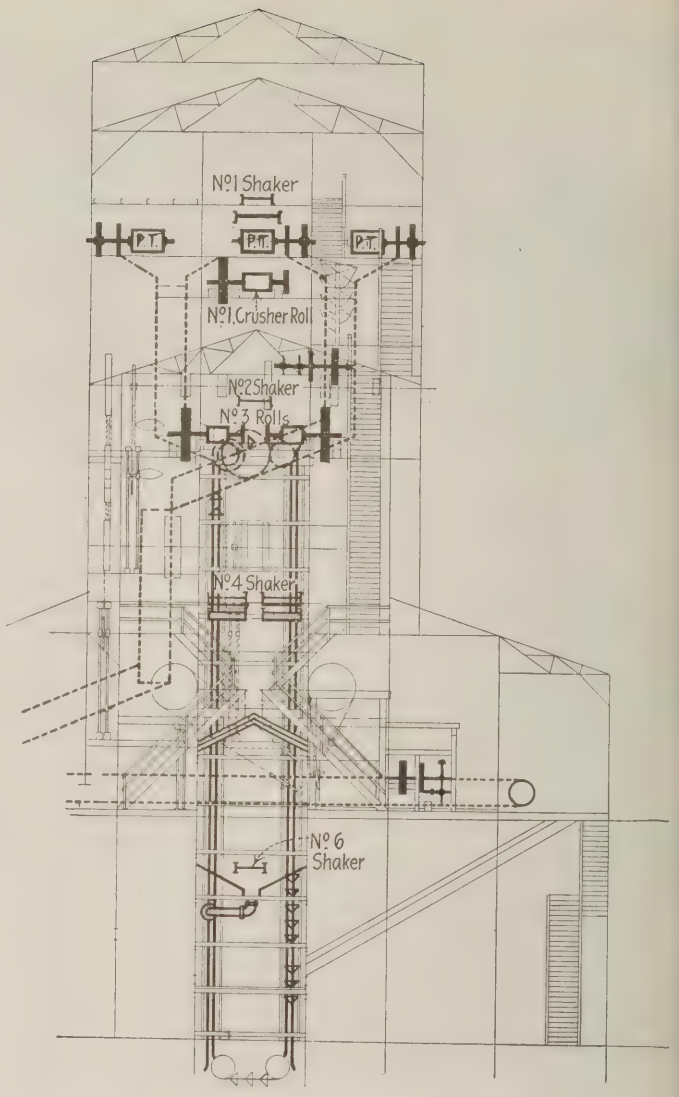


FIG. 9. CROSS-SECTION OF BREAKER (WIDTH)

sary materials and tools and the employees are paid for the time they give to the work. That this arrangement has resulted to the satisfaction of all is evidenced by the fact that the efficiency flag which the company presents yearly to the colliery with the best-kept plant has been won four years in succession by the Mineral Spring plant.

The breaker is of steel construction and is roofed and sided with galvanized corrugated sheet iron and steel sash with ribbed glass. The glass area amounts to about 75 per cent. of the total sides of the structure, affording plenty of light. The building is heated by exhaust steam to a temperature of 60 degrees with an exterior temperature of 0 degrees F. and is a comfortable place in which to work. It is also vital to the successful operation of the breaker, which has all wet preparation. If there were no heat the water would freeze during cold weather.

Figs. 1 and 2 afford two excellent views of the breaker

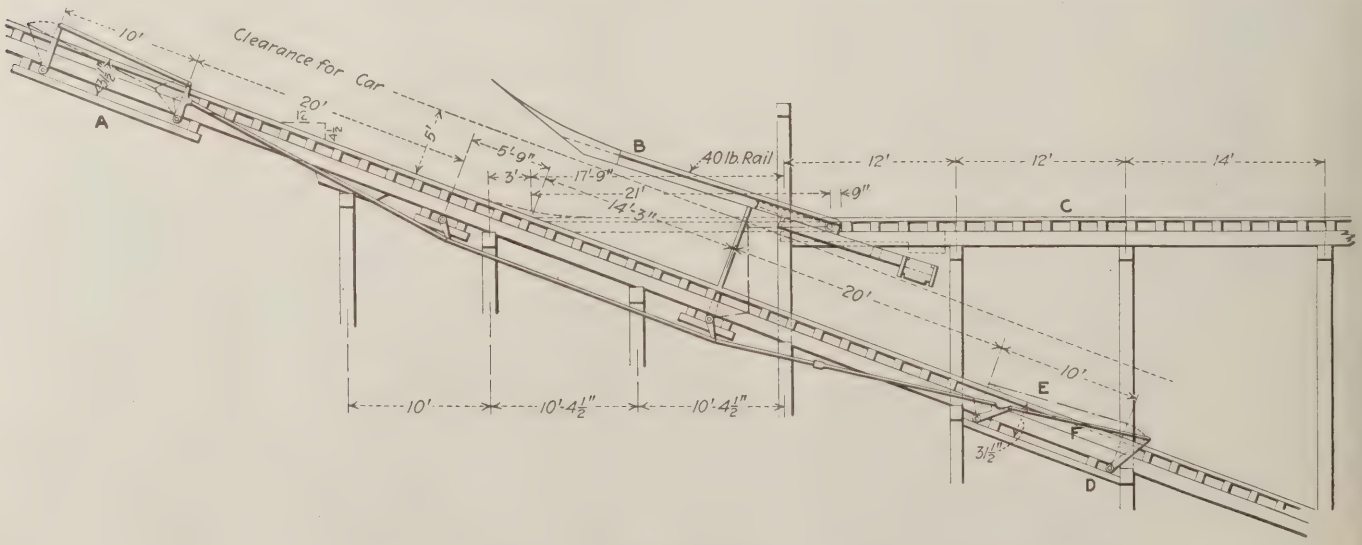


FIG. 10. DIAGRAM ILLUSTRATING OPERATION OF BRIDGE ON BARNEY PLANE

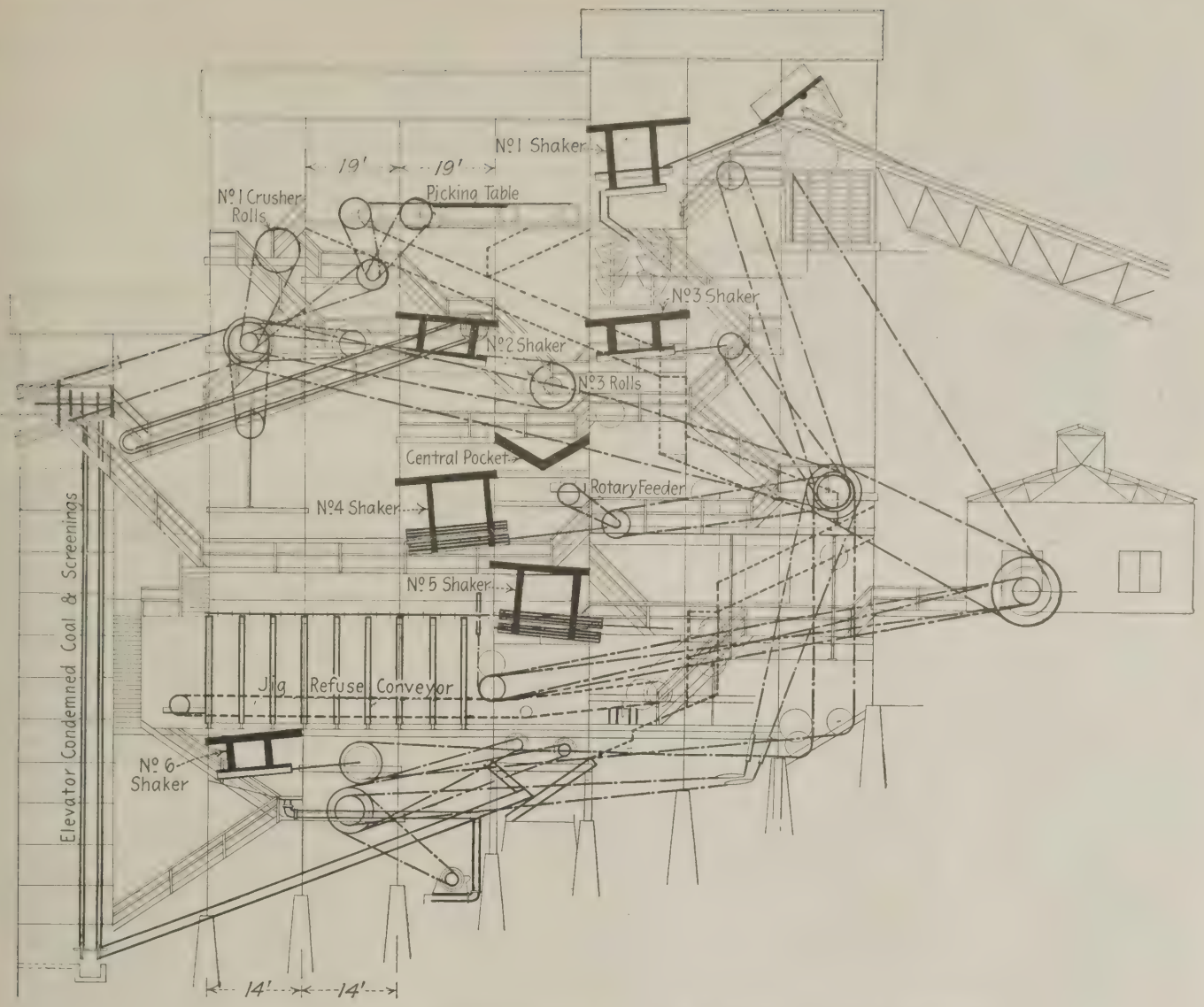


FIG. 11. ANOTHER CROSS-SECTION OF THE MINERAL SPRING BREAKER

and illustrate in particular the large area of glass surface. Fig. 3 shows the front end of the breaker and the housing over the loading track machinery.

The coal treated in the breaker is brought from the shaft shown at the extreme left of Fig. 6, and from a slope just off the edge of Fig. 6 on the right (not illustrated). The production from both shaft and slope is approximately 1400 tons a day. The shaft is about 400 ft. and the slope 600 ft. distant from the breaker. In a short time additional coal will be hauled by locomotive from a tunnel about 3 miles from the breaker. When this is done the maximum capacity of the breaker—1600 tons a day—will be reached. The shaft shown in the center of Fig. 6 is the manshaft. The mine cars from the hoisting shaft and the slope are run by gravity to the foot of the barney plane, which is illustrated in Fig. 2.

The control of these cars is excellent. No brakes are employed, nor is it necessary to use sprags, as there are two car retarders on each track which are controlled by a man at the foot of the plane.

When a loaded car is released from the last car retarder it runs to the foot of the barney plane and over the barney pit. The engineer in charge of the barney

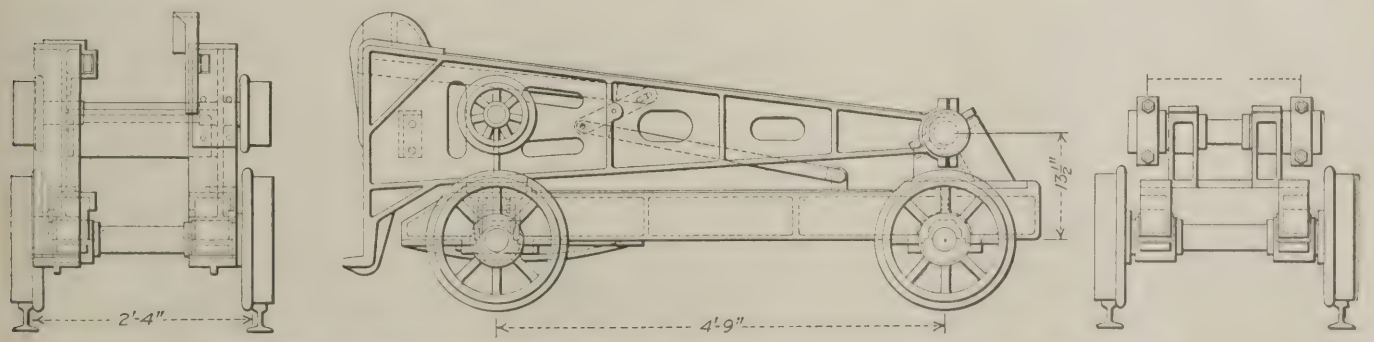


FIG. 12. DIAGRAM ILLUSTRATING CONSTRUCTION OF BARNEY USED AT PLANT

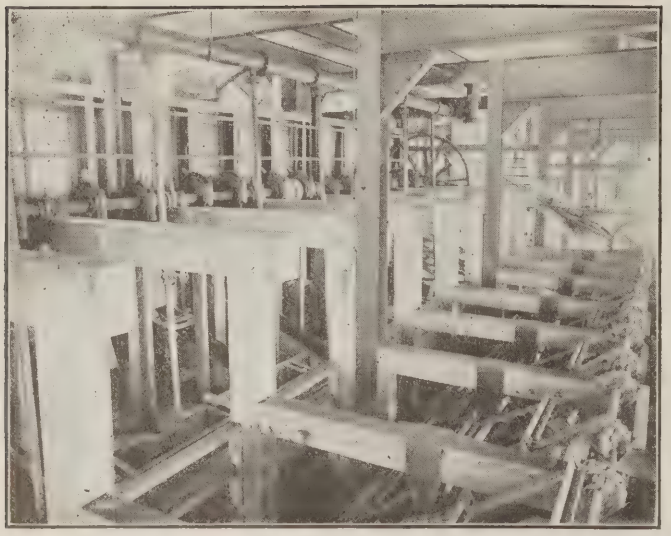


FIG. 13. JIGS FOR TREATING THE COAL

engine starts the barney (Fig. 12) and the upper part, which acts on a hinge, lifts, due to arrangement of the track in the pit. The upper part of the barney

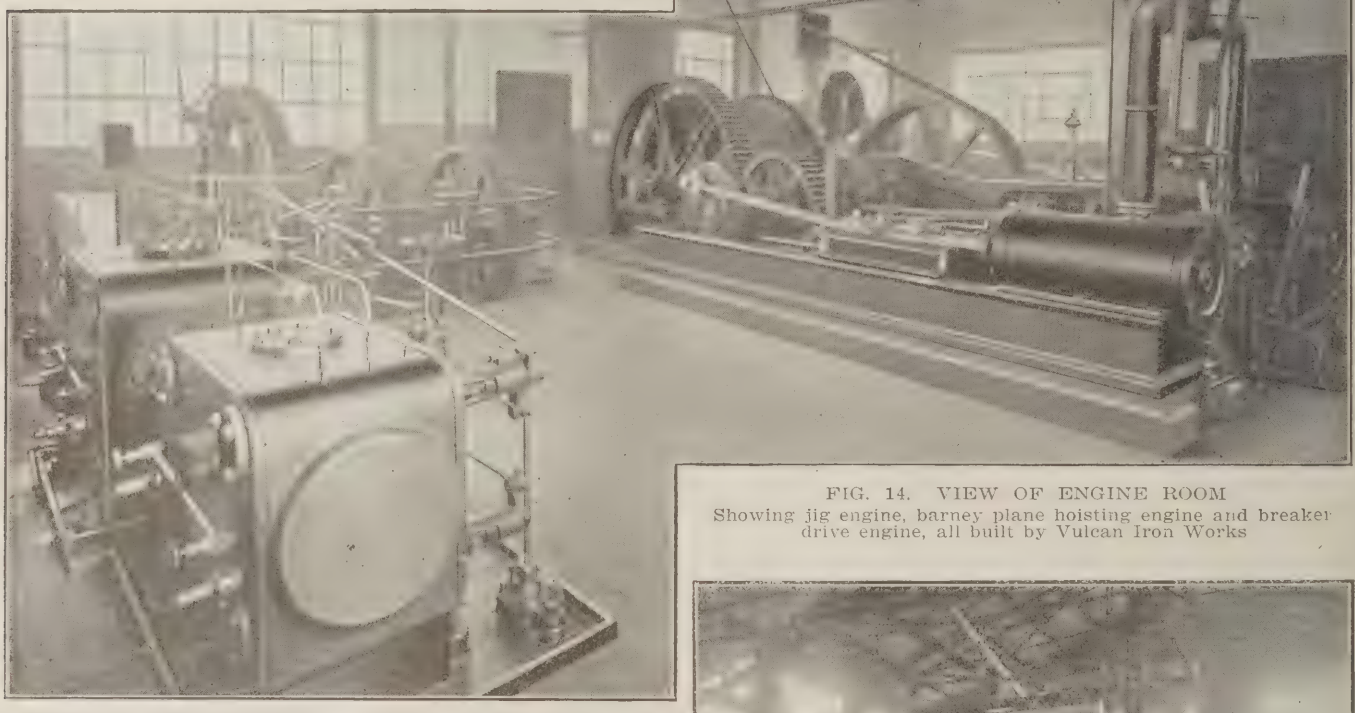


FIG. 14. VIEW OF ENGINE ROOM
Showing jig engine, barney plane hoisting engine and breaker drive engine, all built by Vulcan Iron Works

catches the end of the mine car and pushes it up the plane. As soon as the barney comes out of the pit, the track on which the lower wheels rest rises until the hinge is closed.

On reaching the point shown at *A* in Fig. 10, the car engages a trip and the bridge *B* lowers. The mine car goes to the top of the plane, where it is automatically dumped, as shown in Fig. 11. Returning to the bridge *B*, Fig. 10, the car runs over the bridge onto the empty track *C*, the barney passing between the tracks of the bridge and returning to the barney pit. Before reaching this pit, however, the barney engages with the trip at *D*, which is then in the position *E*, and troughs it to the position *F*. This opens the bridge at *B* to allow the next loaded car to pass up the plane.

From the mine car the coal passes to the No. 1 shaker, which has two decks. The coal that leaves the mine car is thoroughly wet. The lump coal passes over the top deck of the No. 1 shaker, which has a 6-in. perforated screen, and also over the lump picking tables and the larger pieces of rock are thrown out. Then the lump goes to the No. 1 rolls, where it is crushed. The coal which passes over the second deck of the No. 1 shaker goes to picking tables on the top floor and from this it is mixed with the coal from the No. 1 rolls. All this coal goes to the No. 2 shaker, which has one deck, and all coal larger than egg passes over the shaker and goes to No. 3 rolls, where it is broken to egg and smaller. The top floor of the breaker is shown in Fig. 15.

Coal passing through the second deck of the No. 1 shaker goes to chutes which carry it to the No. 3 shaker, where, if desired, the egg can be run through the No. 3 rolls; or else all the coal passes to the central pocket, as does also the coal from the No. 3 rolls.



FIG. 15. HEAD SHAKERS AND PICKING BANDS

From the central pocket the coal is fed by rotary feeders to the No. 4 shaker, which is a four-deck affair. The egg coal is taken off the top deck and sent to the jig storage pockets by means of chutes. The coal from the second deck is stove, from the third deck nut, from the fourth pea, all of which goes to their proper jig-storage pockets by means of chutes. The central coal pocket and the shakers with their chutes are very well shown in Fig. 16.

From the jig pockets the coal is fed to the jigs and the refuse separated, the pure coal going to the main storage pockets. The main jig floor of the breaker is shown in Fig. 16. This illustration also shows the jig refuse conveyor. Fig. 13 is a view of the jigs from shaker goes to the elevator for screening, being conveyed back to the central coal pocket for re-treatment.

All the rock collected from the picking tables on the top floor of the breaker goes by means of chutes to a crusher, and from here, together with the slate from the jig refuse conveyor, it passes to two pulverizers, where it is pulverized and then sent down into the mine for filling.

The arrangement of the loading pockets is different from that in most breakers, as the pockets are arranged at right angles to the railroad track rather than parallel to it. The coal from these pockets is discharged onto a belt conveyor which is 36 in. wide and 145 ft. centers. The discharge end of this belt conveyor is arranged so



FIG. 16. INTERIOR VIEW OF BREAKER, SHOWING JIGS AND JIG REFUSE CONVEYORS

above. These jigs are of the Lehigh Valley Coal Co.'s plunger type.

The coal that passes through the lower deck of the No. 4 shaker goes to the No. 5 shaker, which can be seen in Fig. 16. This shaker has three decks, separating buckwheat, rice and barley coal, each of which goes direct to its respective storage pocket. The rice and the barley coal can also be sent to the boiler house by means of a drag conveyor, which can be discerned in Fig. 6 between the breaker and the boiler house.

The slush from the jigs and what passes through the No. 5 shaker is run over a No. 6 shaker. The silt goes to the mines and what passes over the No. 6 that it can be raised or lowered to discharge at the proper height into the railroad cars. One lever opens gates for the same kind of coal on each side of the conveyor, there being seven levers in all. The Lehigh Valley Coal Co. has installed an Ottumwa box car loader, which enables the loading of box cars when other types of equipment cannot be obtained.

If any of the coal already loaded into railroad cars is condemned as not being up to standard, it is dumped into a pocket and carried to the foot of an elevator by means of a conveyor, the elevator taking the coal up to the central coal pocket for re-treatment.

The breaker engine house is a separate building in

the rear of the breaker and under the barney plane. This is shown in Fig. 2 and also in the cross-section, Fig. 11. The engine house contains a Vulcan 16 x 30-in. duplex hoisting engine, which operates the barney plane. A Vulcan 11 x 16 x 24-in. tandem compound engine drives the jig machinery. A Vulcan 17 x 26 x 30-in. breaker cross-compound engine drives the breaker machinery. The jig engine has a double rope belt, while the engine that drives the breaker machinery has a 24-in. belt. Fig. 14 is a view of the interior of the engine house.

Only 27 men are employed around the breaker, making an average of 60 tons of coal a day per man employed, or 80 tons of coal a day per man employed inside the breaker. The men employed and their positions are as follows: One on the barney plane; one man in the engine house; one man tends to the dumping of mine cars at the top; two men are on the picking table floor; one man tends to the elevators; one man looks after the shakers; one man is the breaker oiler; eight men tend to the jigs under a jig boss; two men pick all the slate from the egg coal after it leaves the jigs; one man tends to the breaker machinery and there is one slusher; one man operates all the loading machinery, including box-car loader; five men are on the outside to handle the railroad cars.

Smokeless Boiler Furnaces

The Bureau of Mines, Department of the Interior, after several years of experiments in fuel combustion in a special furnace, makes the announcement that from the results it is possible to design a furnace with considerably more assurance as to its capabilities than has heretofore been possible.

Starting with the analysis of the coal to be used and the rate at which it is to be burned, the furnace dimensions in feet and inches can be designed with a reasonable assurance of obtaining a desired degree of completeness of combustion.

The bureau has just made a report on this subject, Bulletin 135, "Combustion of Coal and Design of Furnaces," by Henry Kreisinger, C. E. Augustine and F. K. Ovitz. The publication marks a period in work approved in 1906 by a National Advisory Board appointed by the President to advise the Government concerning fuels. The bureau proposed to conduct such experiments as would make it possible to design fuel-burning furnaces on a rational basis rather than by the cut-and-try methods of the past.

The process carried on in the combustion space is influenced by many factors, the most important of which are the volume and shape of the combustion space; the kind of coal used, especially the character and amount of volatile matter it contains; the rate of firing; the quantity of air supplied over the fuel bed; the rate of mixing the air with the combustible rising from the fuel bed; the rate of heating the coal; and the temperature in the combustion space.

The qualitative effects on the rate and completeness of combustion of many of these factors have been known for a long time; but the quantitative data, presented in definite units of seconds, pounds, feet or percentages, have been lacking. To obtain such definite information a study of combustion in the space beyond the fuel bed was undertaken, and the results of extensive tests are given in this bulletin. About 100 elaborate tests were conducted in a special furnace using three kinds of coal—Pocahontas, Pittsburgh and Illinois—and at rates of combustion covering the full range found in practice. These are believed to be the most extensive tests of the kind ever undertaken.

While the bulletin is especially for those interested in the design or reconstruction of fuel-burning furnaces, it contains much of interest to the general engineer interested in fuel problems. Some of the statements sure to arrest the attention of the interested engineer are as follows:

The size of the combustion space required appears to be directly proportional to the percentage of oxygen in the moisture-free and ash-free coal.

The percentage of excess air that gives the best results varies with the size of the furnace and the kind of fuel. This fact explains why in one plant the highest efficiency may be obtained with 14 per cent. of CO_2 in the gases, and in another plant with only 10 per cent. of CO_2.

There is a definite relation for each coal between the excess air supply and the percentage of CO_2 in the furnace gases.

Soot is formed at the surface of the fuel bed by heating the hydrocarbons in absence of air. It is not formed by the hydrocarbon gases striking the cooling surfaces of the boiler. As a matter of fact only a small trace of the hydrocarbon gases ever reaches the surface of the boiler. Hydrocarbons that do so are prevented from decomposition by the cooling effect of the contact. The cooling surfaces do not cause the formation of soot; they merely collect soot and prevent its combustion.

It seems that most mechanical stokers are smokeless not because they burn the smoke, but because they burn the coal in such a way that little soot or smoke is produced. Hand-fired furnaces are smoky because soot is produced in or near the fuel bed, and can not be burned in the limited combustion space of the furnace.

Copies of this publication may be obtained free of charge by addressing the Director of the Bureau of Mines, Washington, D. C.

Bud's Boss

By Charles L. Fay

Sociological Superintendent, Davis Coal and Coke Co., Cumberland, Md.

I like a boss who is bigger than me,
With a head made fer thinkin' an' eyes that can see.
I want him jest common, but with that somethin' there
That tells you he's bigger an' right on th' square.

I want a boss who knows how to say "No!"
Th' sort of a man that makes everything go,
Th' side-steppin' boss, who allus gives in,
Jest gets me nowhere—he's weak as his grin.

I want a boss who can show where I'm wrong,
An' point out my failin's so I can get strong.
Why should his salary be big as it be,
If he cannot show plainly he's bigger than me?

I want a boss that I can respect;
A man on his job, who will never neglect
To tell me my faults or give praise when I win it;
That kind of a boss gets my best every minute.

I'm climbin' life's ladder th' best that I can,
With th' patience an' pluck of a red-blooded man;
An' d'you know, sir, to me 'twill be a big loss
When I can't make a teacher out of my boss.

Cement Gun in Mining Work—I*

By GEORGE S. RICE
Chief mining engineer, Bureau of Mines, Pittsburgh, Penn.

SYNOPSIS—*A partial history of the early use of concrete and cement grout in mines and of the introduction of the cement gun. Its use in the experimental mine. A description of the gun and its manner of operation and an account of the results obtained in tests of the gunite.*

THE use underground of hydraulic cement, and the scope of its uses increased almost as rapidly as in surface construction. One of the early underground applications was for the filling of the cavities behind the linings of tunnels, this being accomplished by pumping cement grout into the open spaces. In France in later years the "cementation process" of impregnating broken water-bearing ground by forcing in cement under high pressure was successfully employed, revolutionizing the method of shaft sinking through water-bearing chalks and marls in the north of France and Belgium. The employment of concrete for making massive linings of shafts and tunnels in place of timber framing and brick arching has been very extensive. The development of thinner, reinforced lining came into use later. In 1906 I waterproofed the air shaft of a mine in central Illinois by placing a thin but reinforced concrete lining, rectangular in section, inside a wood cribbing. The shaft passed through water-bearing ground.

About 1907 one of the large colliery companies of northern France, Mines de Béthune, began, in a new colliery, the use of a light, reinforced-concrete lining for all its cross-strata tunnels. When I visited this colliery in 1908, two miles of this lining had been constructed. It was only 5 or 6 in. thick, and the mixture was lean. Moreover the reinforcement was so very light that the cement work seemed to be hardly more than self-supporting and probably bore little of the weight of the encompassing strata. In other words, it apparently served merely to protect the strata from weathering.

The lining served its purpose satisfactorily as I found out when I again inspected it three years later (1911), by which time more lining had been built. On the other hand timbered tunnels in the same formation had given much trouble. This demonstration convinced me that the important factor was to protect the strata from the action of the air. The cost of the lining in the Béthune mine was relatively low under the conditions then prevailing in France, only $5 per lineal yard, which figure would have to be doubled if an estimate were to be made of the cost of such lining in this country, even prior to the war. The general method of lining seems an admirable one, although the first cost was considerable, but, in the long run, it should be economical because it eliminates the cost of timbering and of cleaning up of falls of roof inseparable from the maintenance of a roadway and it also serves as a protection for the men against injury from roof and rib falls.

Concluding that the protection of the natural roof and ribs against weathering, a process for which oxidation is principally responsible, was probably the important factor in preventing subsequent falls, I studied the problem carefully in the hope of determining what sort of inexpensive coating might be applied to a shale roof to prevent its coming in contact with the air currents with the hope of thereby saving expensive work later on and furthermore of lessening accidents from falls.

In many mines, when the mine entries are first driven, the top or bony coal roof seems admirable. It appears as if it would stand forever; but in a year or even less the weathering action begins, falls occur and timbering and retimbering follow. Finally you find the roof has dropped until the entry is twice as high as it was originally, and more or less filled with timber. When this condition has to be met it involves a great annual expense for the maintenance of the roads, and should a fire start there is plenty of fuel to feed it. Also the timbers provide places for the lodgment of the dangerous coal dust which floats in the air. In this manner timbering increases the explosion hazard.

In 1910, when I saw the cement gun exhibited at the convention of the National Association of Cement Users, held in New York, I thought that here was an apparatus that would furnish the agency I sought for the placing of a more or less impervious coating on the mine walls. I made reference to its availability for that purpose in an address on concrete in mining (which appeared in the transactions of the 7th convention in 1911). After showing how much safer was a smooth, concrete lining as compared with timbering, I made the following statement which appears to be as true now as then:

"The apparatus for applying cement mortar by means of compressed air, commonly known as the 'Cement Gun,' offers great possibilities for the lining of passageways, etc., with cement. By protecting from weathering the roof and walls of a passageway with a thin coating of cement, it is possible that the heavy expense of timbering in many cases may be avoided. The machine also offers possibilities of use in the fireproofing of timber and board stoppings and in the erection of firewalls in places difficult of access, since the material can be pumped for a considerable distance."

For many years grout has been pumped into cavities behind tunnel and shaft linings. However, G. L. Prentiss, in a paper given at the meeting of the cement users above referred to, on the "Use of Compressed Air in Handling Mortars and Concrete," stated that compressed air was first used for the transporting agent in placing concrete and mortar in France, for the repairing of tunnels on the Paris-Lyons-Mediterranean Ry., France. This was in 1906. The linings of

*Paper read before the Coal Mining Institute of America at its Pittsburgh, Penn., meeting, Dec. 6, 1917, and entitled "Weatherproofing Mine Roof and Walls and Making Tight Stoppings with Cement Gun."

the tunnels were leaking and the arches were thereby becoming weakened. The engineers attacked the problem by using a machine consisting of a charging hopper connected with a pressure tank, into which air was forced by a compressor at a pressure of 40 to 50 lb. per sq.in. The tank was first charged with a grout composed of cement, sand and water, and after the pressure had been put on the material was forced out through a line of flexible hose to a discharge nozzle, which was applied to holes drilled through the arch of the tunnel. It is stated the results from an engineering standpoint were satisfactory, but the machine gave trouble, as it and the hose became clogged with grout, and the process was therefore tedious and expensive.

Various other attempts were made to use compressed air for blowing cement or concrete mixtures through pipes, and according to Mr. Prentiss, J. W. Buzzell and W. H. Larkin, in 1909, undertook work in this country as 1910. The method was used for applying stucco and cement-sand mixtures, thus it was used for coating a frame building with stucco. Brick walls and fences were by this means covered with stucco or cement. He also instanced its use in the construction of the General Cement Products Co.'s buildings; the coating of structural steel, with and without the addition of reinforcing wire mesh; the fireproofing of the interior of wood-lined buildings; the building up of sections of cement pipe from a wire-mesh skeleton; the use for tree surgery; and the very important application of lining the iron syphons in the water supply system of New York. These syphons were 11 ft. 3 in. in diameter, and the total length to be treated was nearly 14 000 feet.

In that same 1910 meeting there was some talk of using the cement gun in mines, but it was with the idea of pumping concrete or cement into an excavation and filling it solid. In this manner it was suggested that a



FIG. 1. THE MACHINE BEHIND THE GUN



FIG. 2. THE MAN BEHIND THE GUN

of that nature. They found that they could force a mixed concrete through a 4-in. pipe a distance of 400 ft. with a pressure of 40 to 50 lb. per sq.in., a higher pressure than this not being found advantageous.

The predecessor of the cement gun appears to be the long-used spraying device employed for the painting and whitewashing of rough work, like railroad freight cars. Here the paint or whitewash is ejected from a nozzle by means of compressed air. Nevertheless, this method like those previously described used the compressed air to transport the grouting, concrete, or whitewash in liquid mixture, whereas the cement gun operates on a different principle; namely, to transport the cement and sand dry, wetting it only at the nozzle. It is not, of course, possible to employ crushed stone in the mixture, which must be composed of cement and sand only.

As the cement gun is a patented machine, I feel it is necessary to explain that I have never had any financial interest in it, and that I am concerned in it only as a means of obtaining a certain practical result in the mines.

Mr. Prentiss described in the paper, to which I have just referred, a variety of applications of compressed air to the placing of cement mixtures, some as early deposit of cement mortar might be placed which would later serve as a pillar. Men not familiar with mining thought that as concrete was so much stronger in compression than coal, no coal pillars would be required, if much smaller concrete pillars were substituted. Manifestly with the ordinary roof or floor the concrete blocks would be pushed into the roof or floor before the full strength of the concrete was developed, or else the roof spanning the excavated area would fail. So far as known, this futile project was never tried.

After seeing the demonstration of the gun in the exhibition of 1910, and the way the cement coating, sometimes termed "gunite," would stick to steel and stone, I concluded that here was a machine which offered a means of applying a thin cement coating to the roof and ribs of an entry or tunnel before weathering took place.

When the experimental mine of the United States Bureau of Mines, located near Bruceton, Penn., had been fully developed for its purposes, a cement gun was loaned in 1914 to the bureau by the Cement Gun Co., for trial applications. The manufacturers at that time, not having turned their attention to its mining possibilities, could not be induced to lend the gun without considerable negotiation. It was found, after ex-

perience had been gained in handling the gun, that a cement-sand covering, varying from a thin coating to one several inches thick, as desired, could be placed without difficulty on the coal ribs. It would even stick to the "draw slate" or clay band. Moreover, a thin to a ¾-in. coating could be made to stick to the roof without the use of wire mesh.

It was also found to be of great advantage in making stoppings practically air-tight. In October, 1914, when the American Institute of Mining Engineers met at Pittsburgh, an exhibit was given at the mine of the use of the cement gun for these purposes. The cement-sand lining has been extended in the mine entries from time to time until now nearly 1000 lin.ft. of entry has been thus lined, the roof coating being from ¼ to ¾ in. thick and the rib covering from 1 to 2 in. thick.

These coatings have been found very successful in the prevention of weathering on the sides and roof. It is true that from time to time repairs have had to be made on the roof coating, but this, in part at least, seems to have been due to the effect of the violent explosions produced in our experiments, of which over three hundred have been conducted. After many of these the coating would shell off the roof in patches, particularly where a void had developed behind the coating. These voids, or spaces, are caused by the concrete shell pulling away from the main roof where it is shaly, taking some scale with it. The concussion or rush of the explosive blast later knocks off the shell.

Gunite Withstood All Except Explosions

In offsets, where the work is protected from the explosions, the coating has rarely come off. As a result of these experiments it was thought that if the coating was well put on, particularly when the roof was fresh and sound, it would stick tight for a long period under ordinary mine conditions. Since the conditions at the experimental mine were abnormal, the failures in patches of the roof cannot be considered to condemn the system and there has been no trouble whatsoever from the coating on the ribs and draw-slate. This is most important, as those who have operated in the Pittsburgh beds well know. Usually disintegration which leads to falls in the roof come about through draw-slate over the coal softening, thereby widening the roof span. Then the roof falls and the widening and cutting back goes on, making the timbering more and more expensive.

These tests at the experimental mine were brought to the attention of leading mining men, and this caused some of them to try experiments of their own. Trial of the method was made slowly at first, but the representatives of the bureau constantly urged further experiments as the change seemed to promise increased safety as a result of better lighting, the reduction of falls and the danger of coal dust explosion propagation. Now the development is proceeding more rapidly.

Fortunately the cement gun can be used for other purposes than to prevent the weathering of the mine roof. For example, it can be used in the fireproofing of wooden stoppings, the sealing off tightly of fires, something which much appealed to the metal mining companies, operating large bodies of rich sulphide ores which are prone to spontaneous combustion in stopes. The cement gun is also most useful wherever iron or steel beams or posts are employed underground or in shafts as it prevents the metal from rusting.

An excellent description of the cement gun was presented by Carl Weber in a paper before the Western Society of Engineers of Mar. 9, 1914. It described the gun as it appeared in earlier stages of its development. A good description also appeared in *Engineering* (London) for June, 1916. These articles show the remarkably wide adaptability of the cement gun to other uses than those already mentioned, such as the repairing of concrete walls in subways, the rehabilitation of retaining walls, the lining of reservoirs, the repairing of street-car tunnels and the lining of coal bunkers.

The cement gun (see outline drawing) consists of two hoppers, an upper and a lower one, the upper one being the receiving hopper for the mixture of sand and cement. This mixture is made on the ground and shoveled into the hopper in a dry state. The receiver has a cone stopper in the top and one for the discharge of material from the bottom, thus the feeding material is "air locked" into the lower hopper which is

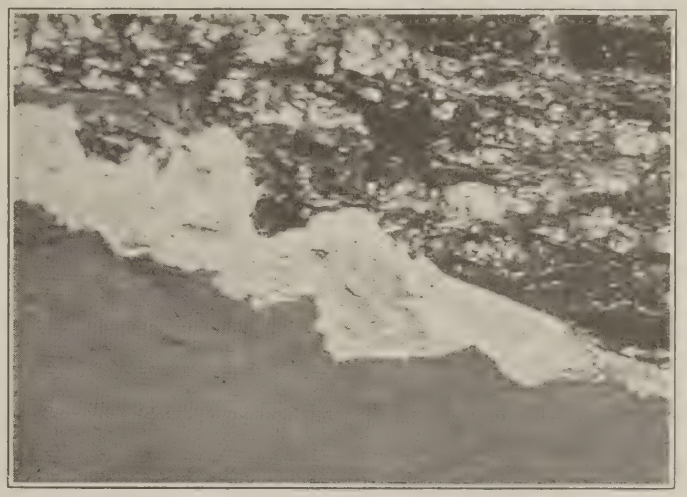


FIG. 3. SHOWING THE GUNITE PICKED DOWN
The gunite adheres closely to the coal surface

under air pressure of from 20 to 50 lb. In the bottom of this hopper there is a feeding wheel, which is turned mechanically. As it revolves, it delivers the right quantity of cement material opposite the outlet. Here the pressure of the air in the lower hopper forces the measured material out. As the dry mixture is forced into the flexible hose, additional air is injected and this aids in carrying the material onward to the nozzle. The hose may be of considerable length—50 or 100 ft. or even more. At the end of the discharge tube there is a nozzle where water is supplied at a pressure about 20 lb. per sq.in. higher than the pressure of the air. This is delivered in such a manner that it immediately mixes with the sand and cement. The nozzle is handled like a water hose and pointed approximately at right angles to the wall or surface to be covered. The sand is mixed with the cement in proportion of 3 to 1, but about 20 to 25 per cent. of the sand, after impinging on the wall, drops to the floor so that the coating put on is about 2½ to 1. The surplus sand can be shoveled up and used again. It is surprisingly clean.

The wheel is turned by a worm which is driven by a small air motor. The compressed air and the water under pressure are usually furnished by the mine plant,

but if the mine is not equipped it would be necessary to have a portable compressor and also a pump with a supply of water for the operation of the cement gun.

A cross section of the machine is shown in Figs. 4, 5 and 6. *A* and *B* are cone valves operated by control lever *C* and *D*. *E* is the air-supply valve. The air-supply hose is connected at *F*. *G* is the supply cock for the air motor; *H*, an air pipe, controlled by cock *A*. The main air-supply pipe to the lower main hopper is controlled by the cock *K*. *L* is discharge tube of the machine and it is shown in Fig. 5 at *M*.

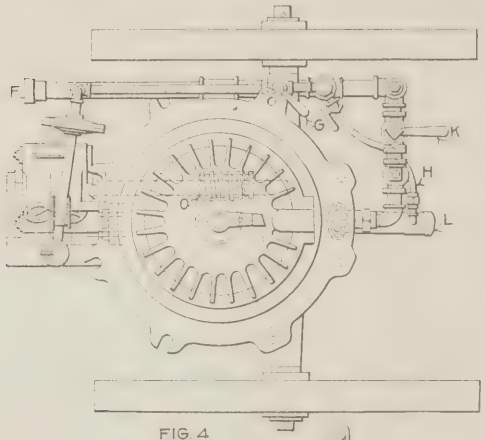


FIG. 4

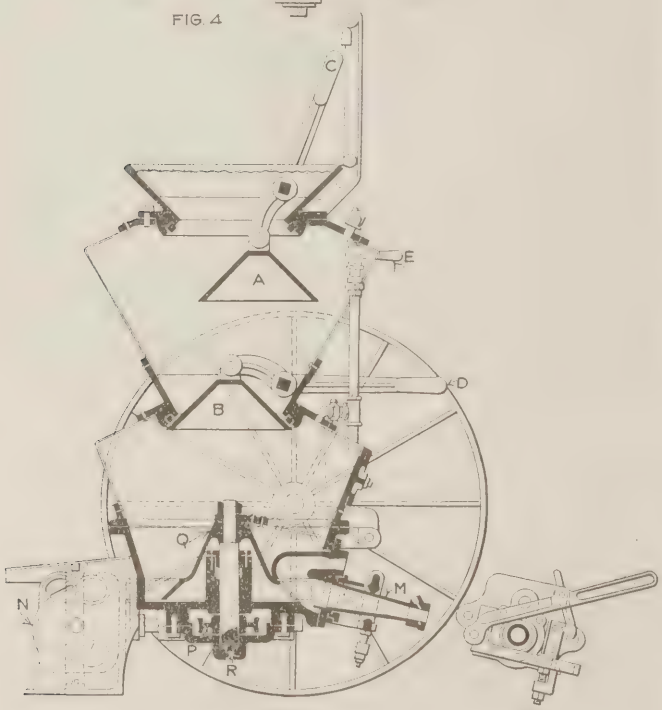


FIG. 5 FIG. 6

FIGS. 4, 5 AND 6. SECTIONAL PLAN, SECTIONAL ELEVATION AND DETAIL OF PINCHING LEVER

The tube is flexible and may be throttled by the pinching action of a lever shown in the small detail drawing, Fig. 6. *N* is the air motor and *O*, a worm, driving through gear *P*, the feed wheel *Q*. *R* is the footstep of the vertical shaft of the rotating wheel. It is to be noted that the discharge tube *L* is of rubber and the hose is rubber lined, there being no metal exposed to the sand blast except a little at the nozzle.

According to Mr. Weber, the sand-cement material leaves the nozzle with a velocity of about 300 ft. per second. In striking a hard surface the sand rebounds and falls down, only the neat cement adhering until a coat is formed thick enough to hold the sand. Then the rebound lessens and the coat is built up until the desired thickness has been obtained. The tightness by which the sand-cement coating is placed by this method is of great value. A report was made by Westinghouse, Church, Kerr & Co., testing engineers, which was quoted at length in the paper just referred to. It bears testimony to the quality of the cement-sand coating produced by the cement gun. Their conclusions were:

In all of the tests made the products of the cement gun were shown to be superior to good hand-made products of the same kind. The degree of superiority varied between wide limits.

In tensile strength the gun work excelled hand work in every case by amounts ranging from 20 to 260 per cent.

In compressive strength the excellence of the gun work was even more marked, ranging from 20 to 720 per cent. better than hand work.

In the matter of surface permeability the gun work absorbed from 7-10 down to 1-20 as much water per hour, per unit of area as the similar hand-made surfaces.

As regards absorption of water, the hand-made mortars took up from 1.4 to 5.3 times as much as the gun-made mortars.

The percentage of voids of the gun-made product ranged from 52 to 75 per cent. of that in the hand-made product.

The adhesion of the gun-applied mortars was on an average of 27 per cent. better than that of the hand work.

I will not attempt to take up at length the many uses other than those already cited, for which the method may be employed, except to quote from Mr. Weber's paper that a large reinforced-concrete power house with a chimney 150 ft. high was coated with a thin gunite coating, the chimney receiving the same coating as that used on the building, thus providing a uniform finish for the entire structure. There was no difficulty experienced in shooting up the sand-cement mixture through the hose to the nozzle in working on the high chimney, with the gun standing on the ground level.

The foregoing description refers to a specific machine. There are other machines which are said to accomplish similar results, one called the "Concrete Atomizer." These machines use a different principle, forcing out a wet or liquid mixture with steam or compressed air. A concrete atomizer was employed, in 1914, on the Delaware, Lackawanna, & Western R.R., in the repair of honey-combed and cracked concrete piers, girders, beams and slabs. No doubt there are other workable machines, but I have only had experience with the cement gun. It is presumable that there be a great variety of forms which might meet the needs of the mining industry, but the essential requirement for that service is the delivery of the mixture under considerable pressure through a nozzle with a flexible hose which may be over 100 ft. long if desired.

(To be continued)

BLIND LUCK

IT may be true that some men are fated to reach enviable positions in life. There are those who will tell you that if the stars were scattered about the heavens in some mystic, lucky way when you were born you're bound to get there—regardless. It may be true. But you can be sure that the chap who thumbs his nose at horoscopes and pitches in to carve a niche for himself way up on top is going to beat your "lucky" fellow who waits for his dreams to come true. The Annual Success Number of "Coal Age" will contain a number of articles about men who are carving niches in the coal-mining world. Perhaps you, too, know of someone whose story should be told—of some man who has left his impress on the coal-mining industry of your district by successful methods, successful management, or the successful adaptation of machinery. If so, tell us the story of the man or his methods, and send us the article by Mar. 25, accompanied by the necessary photographs or drawings.

Mining Engineers Consider Industrial Relations—III

By R. DAWSON HALL
Associate Editor, "Coal Age"

SYNOPSIS—*The American Institute of Mining Engineers discusses the losses sustained by employer and employee from the preventible sickness of the latter. Addresses are made on the abnormal workman and on the percentage of accidents resulting from human fallibility, the greenhorn and the chance-taker.*

As has been said it was the session on employment problems which attracted the most general and most favorable consideration. The session held the day before had been dominated by no less a person than Hudson Maxim—whose fame would probably not be enhanced even by saying that he is a member of the Naval Consulting Board, for the members of that Board are all more distinguished in themselves than even in their association.

Nevertheless, Hudson Maxim did not seem to create the interest that was aroused by Dr. Thomas Darlington, formerly commissioner of health of New York City and now secretary of the welfare committee of the American Iron and Steel Institute and consulting surgeon to the American International Shipbuilding Corporation. The remarks of Dr. Darlington in briefing his paper were eloquent and forcible.

In fact, cold type taken from the paper itself can hardly convey any idea of the strength of his presentation. Moreover, he added extensively to the material presented in the paper to cover some matters in industrial hygiene which do not look well in print. After saying that compulsory health insurance may introduce an interest in the employees' health such as compensation laws have already introduced in regard to safety, he adds in his paper:

Gain To Industry in Steady, Healthy Workman

"Illness in industry already has an effect on operating costs that is far from being generally realized. When a man is absent from his work because of illness it is usually necessary to have someone else take his place.

"The substitute, as a rule, is a less efficient workman; he makes a smaller output for the day's wages, he spoils more raw material, he requires more supervision from the foreman, who is thus distracted from more important work. Moreover, procuring and sending the substitute to the work needed involves a cost and usually a delay in the operations.

"When labor is abundant, it is customary to maintain a working force that is at times larger than is actually necessary, in order to avoid interruption of operations when men fail to report for work at the usual time. It is evident that this adds to cost, and now that labor is generally so scarce that industry is unable to maintain a reserve supply this cost is represented by loss of efficiency in plant operation.

"The illness of the workman is not, therefore, a matter which concerns himself only, but is a source of direct loss to his employer. The cost of health supervision is relatively not large, as is shown by a comparison of the cost of health supervision in 99 industrial establishments, employing altogether 495,544 men, made recently by M. W. Alexander, for the Conference Board of Physicians in Industrial Practice.

"The figures vary rather widely, since some plants reported only the medical cost, while the majority included the cost of clerical assistants and even of janitor and scrubwomen. The average cost per man per year for the half million employees was $2.50, or about ¾c. per day. Two of the companies not only give medical and surgical attention to injured employees, but furnish all the medical attention required for the families of workmen, as well as for the men themselves. In the case of an iron- and coal-mining company employing 11,000 men, the cost of giving all the medical attention required for the men and their families amounted to $11.82 per man per year or less than 4c. per man per day."

Conflict of Human Needs with Economic Law

The remarks of Dr. Darlington bear forcibly on a subject that we will all have to consider more definitely in the future than in the past—the opportunity and ability of the workingman for steady employment. The workman needs pay enough to compensate him for the time in which he has to be idle. The need for such pay is quite obvious, but it is equally obvious that, as his pay is derived from production, he cannot be paid for his idle hours. The workman will eternally wrangle from the point of view of his needs; the employer will equally tenaciously argue from the law of nature that the ration of the world in the average is the quotient of persons producing into product produced.

The argument brings us nowhere. The need of the workman is insatiable, and the economic law which the employer advances is likewise inexorable. The immovable mass has met the infinite force. But in a degree we can sidestep the whole matter. When we do away with the idle days by promoting good health and industrial continuity we increase product and so meet the workman's needs. It is true, however, that eventually—yes, in less than a generation—the needs of the workmen will grow till they equate themselves to the earnings and then a new source of betterment must be sought. That source we must find in greater industrial efficiency during the working period which is the outcome of machinery and industrial education.

Dr. Darlington is a warm advocate of the garden as a corrective of many of our social ills. In this connection he says:

"Of distinct economic value has been the encouragement given by employers to those living in industrial or mining villages by fencing in plots for gardens, assisting

when necessary in plowing and fertilization, and stimulating the employees and encouraging them in thrift and industry by offering prizes for the gardens. These gardens reduce the cost of living—some yielding vegetables enough for the family and also a surplus for sale—and they promote health by bringing members of the family into the fresh air and sunshine.

"They mean cleaner yards and better care of drainage and waste, thus preventing odors and the breeding of flies and mosquitoes. They provide a greater variety of food, and this is good for many workmen eat too much meat, and an excess of flesh diet is not conducive to the best work, growth or health. They tend to the abolition or the confining of domestic animals. They promote morality, keep the owner from the saloon and advance his own self-respect. They help to make homes and have a refining influence on the family."

After brief remarks from Dr. L. A. Shoudy, the paper was supplemented by a talk by Dr. E. E. Southard who spoke on the "Psychopathic Employee." Dr. Southard directs a psychopathic institute in Boston, and he has made a careful study of persons who are on the borderland of insanity. He was able, therefore, to discuss most interestingly the abnormal mentality of moody and simple-minded employees.

In the afternoon he presented a resolution that met with ready response calling on the board of directors of the institute to appoint a committee to study with a similar committee of the National Committee on Hygiene, if such should be appointed, the problems of employment in relation to mental disease and deficiency, said committee to report as a joint committee to the two organizations a year from date.

Part of Human Fallibility in Mine Accident

The first paper of the session was, however, that of Herbert M. Wilson, the point most insisted on being that the "human element" in accidents is the leading cause of their occurrence. Unfortunately there is no denying that fact. It was realizing it which held back compensation so many years and that made the courts construe the laws as they did as regards contributory negligence. It is for this cause largely that we tend to keep down compensation to a percentage rate of earnings.

Still it is to be questioned whether 40 per cent. of all accidents occur under conditions which could not have been avoided had the employer used every possible safeguard. Some concerns like the United States Coal and Coke Co. may be able to prove the blame for 40 per cent. or even two-thirds of the accidents is on the human element, but it is hard to believe that at the general run of plants of the 40 per cent. of accidents attributed to the human element not one of them is attributable in part, not perhaps to contributory negligence of the employer, but to the lack of his contributory defense against the accident. Mr. Wilson remarked:

"In connection with the inspection of mines for the fixing of merit-premium rates for insurance under workmen's compensation, it has been the practice of the Associated Companies to allow 60 per cent. of the credits for the safeguarding of the physical hazards of the mine and 40 per cent. for the human element. By 'human element' is meant that inherent tendency of the industrial worker to be careless, negligent or disobedient, in respect to his own safety, and after that also of his fellow workman. This is a tendency not only of the laborer or of the skilled miner, but of all human beings, working or traveling anywhere.

"This element of mine safety, sometimes called the moral hazard, has been admirably shown by statistics compiled from the records of the Department of Mines of the Union of South Africa to be due in about equal measure to the carelessness of the miner and to that of the operator. These statistics show that about one-half of the fatalities in mines are due to the so-called hazard of the industry, or what is sometimes called the dangers inherent to work or misadventure.

Operator and Miner Almost Equally To Blame

"Of 2497 fatalities investigated, including over 200,000 employees, for a period of over 2½ years, it was found that 17.5 per cent. were due to faulty plant or material, fault of foreman, or of management—in short were due to the operator; 17.1 per cent. to disobedience of orders, carelessness or ignorance of injured persons; and 5.9 per cent. through fault of others, including fellow workmen.

"The fault of the operator is evidenced by failure to give proper warning, failure to inspect, failure to furnish proper equipment, and neglecting to comply with the recommendations of the inspector. That education and training of the mine operator as well as of the mine worker is essential to any material improvement in the safety of mining is beyond question, and the system of schedule-rating insurance premiums under workmen's compensation which has been adopted by the Associated Companies takes cognizance of this to the fullest possible extent.

"While The Associated Companies has accepted 40 per cent. as a reasonable measure of the proportion of accidents due to the human element, a careful study of accident causes in the last two years for over 2000 mines has convinced me that the human element is responsible for a much larger percentage of accidents. J. S. Herbert, Superintendent of the Safety Department of the Cambria Steel Co., says that the statistics of that company convince him that 93 per cent. of its accidents have had no relation to mechanical defects, and that 73 per cent. of their injuries are chargeable to the man himself or one of several causes, usually carelessness, indifference, or recklessness."

Accidents To Greenhorns and Chance-Takers

Of course the usual discussion followed as to the relative proneness of the greenhorn and the hardened chance-taker of years of experience to get injured and killed. The problem is so far quite far from solution. But the experiences of some companies have been tabulated, and in a few years they will cover a sufficient length of time and a sufficient number of instances to make their publication advisable. B. F. Tillson, E. E. Bach and C. W. Goodale were among those entering into this discussion.

Few companies ask their men on employment how long their experience has been and, if they did, the answers they might get would be far from truthful. Every man would try to show that his experience would qualify him as a competent miner. But figures are needed badly so that the operator can order his safety work accordingly.

(To be concluded)

Importance of Proper Robbing Methods

By J. T. MORRIS
Superintendent, E. E. White Coal Co., Stotesbury, W. Va.

SYNOPSIS — *The advantages of systematic mining in the first stage are appreciated by all operating companies, and systematic mining in the second stage should be observed by all. Mining methods today are nearing the goal to a 100 per cent. recovery, and the robbing of pillars, or second mining, should receive the earnest attention of all mine foremen, assistant foremen, pillar bosses and contractors.*

THIS article is not a criticism on any method of robbing, nor on the inefficiency of persons connected with the direct production of coal from the working places, but is more or less in the nature of advice to the latter—and to some men "higher up" who are held responsible for the operating company's "goods in stock," which is coal.

To the average foreman, the term "pillars" usually implies a few cars of coal coming from a certain section or sections of a mine that require little attention on his part. The sooner these are loaded out the better, he considers; and when the fall comes his inefficiency is hid forever. How many tons of coal has gone to waste in a stump here and a stump there!

But this is not the view that should be taken of pillars. These should receive more of the foreman's attention than any other part of his work, for statistics show that practically three-fifths of all accidents in normal mining comes from falls of roof, slate and coal. We have more falls on the pillars than elsewhere. In addition large feeders are liberated by these falls in pillar work in a gaseous seam, and more material is lost in robbing than in first mining.

Question of Pillars One of Importance

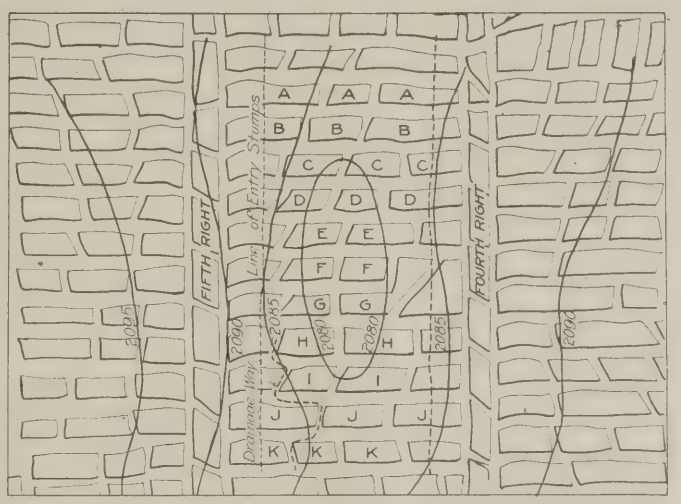
Granting that the foregoing statements are true, it is readily seen that the pillars should receive the chief attention of officials, as I have shown that there is greater loss of life, property and coal than in first mining.

In the Beckley seam being mined by the E. E. White Coal Co., at Glen White and Stotesbury, W. Va., there is a large overburden over the Raleigh sandstone that lies immediately over the coal and ranges from 30 to 85 ft. It therefore is necessary to extract the pillars with rapidity in order to prevent squeezing, on account of the sandstone being thick and not subject to breaking readily in the area away from the crop where no surface seams are existent.

There have been several squeezes in some of the near-by operations, where the coal was either extracted too slowly or some pillars became "wrapt up" and prevented a fall or the proper characteristic upheaval of the bottom, which would have allowed a greater portion of the pressure exerted on the coal to cease, owing to the fact that at a reasonably safe distance from the working faces of the pillars the top and bottom converge.

With excellent top conditions, therefore, and with full knowledge of its nature from previous mining and experience, we have thrown or cast aside the long-practiced "pocket-and-stump" method. This is a system that lends itself admirably to friable and ordinary slate top where breaks are short and a fall can be started at will, and is the only practice pursued in the Pocahontas field, as far as the writer can recall. Instead of this discarded method we have adopted a "slabbing" system, which enables us to concentrate our haulage. This means less timbering and less track and motor expense, and leads to a higher efficiency per loader.

We have one section now "coming back" that is averaging 20 to 25 tons per loader, and we are only



ROBBING METHODS OF E. E. WHITE COAL COMPANY
Robbing starts on pillars marked A, on heavy bottom lines. When these are out, robbing starts on pillars marked B, and so on to pillars C, D, E, F, etc., leaving the entry stumps on both sides until later

using ten men; whereas under the "pocket-and-stump" method we would be using 15 to 20 loaders with an average loading of 10 to 12 tons by working in single places.

In addition to slabbing these pillars, taking out an average of one cut daily on the ordinary pillar 80 ft. in length, with three men, we start in the lowest point (see accompanying sketch) to extract the coal. This enables us to leave our water behind (which is contrary to the regular established system of pillar extraction) by starting at a given point and formulating a robbing line approximately 30 deg. off the course of the heading.

This is a radical change from some of the present methods of mining and robbing, both advancing and retreating, and substantiates only too well that every mine and every seam has its own peculiar and particular characteristics. It also shows that its chief supporting factor lies in the ability of the men in charge to adopt a system suitable to their conditions, one that will win the maximum amount of coal by the most economical method.

The Beckley seam is irregular, and it has an underlying seam that is regular as to thickness and general

dip, which is just the opposite in the upper split. The strata between the upper and lower split range from nothing (where both seams merge into one) to 65 and 70 feet.

When the coal in the upper seam (which runs from 4 to 13 ft. and is of an absolutely clean variety) is not extracted quickly enough in second mining, a downward pressure is exerted by the roof. This causes the bottom to heave or buckle up, and it becomes necessary to take out the pillar at once so as to avoid the height that is too low for equipment and the taking of bottom.

In many cases we have no falls whatever, and we are mining now on two slabs, one 360 ft. long, the other 250 ft. long, the machine that cuts the coal going up. When the end of the slab is reached the bits are reversed, and after the coal is cleaned out the machine cuts its way back again. In these instances the track is slewed to the face as it advances, and at a safe distance back from the face the roof and bottom are together, and no fall has occurred.

No shooting is necessary in this coal, owing to the pressure of the roof, which is just enough to break a cut up, as is often the case in our straight workings, or first mining. These long slabs, or longwall in a mild form, are experiments on our part and so far have worked out as planned; but the success of any method of mining depends on the attention it receives from the men in charge.

Pricing F.o.b. Mine with Freight Allowed

By J. Crow Taylor
Louisville, Ky.

The embargoes of last spring and the priority orders of the present winter have served to turn attention to the idea of selling coal f.o.b. mine and furnishing the freight figures to destination showing just what it will cost delivered.

Some time ago I heard a mine representative and salesman who covered quite a large territory complain bitterly about the difficulties he had encountered in his efforts to serve the needs of customers. The customers were short of coal and some of the coal he had sold them had been held up by embargoes. This had necessitated his rebilling and disposing of it elsewhere after it had been put in transit. And all he got for his trouble was accusation from some of his customers of manipulation and crooked dealing.

The customers were inclined to view the matter in the light of profiteering. They believed that he had diverted cars intended for them, or else withheld shipment of their order simply because he had been offered better prices by someone else. They accused him of simply making embargoes an excuse. In fact there was so much of this that he said he had almost determined to make all his sales f.o.b. cars at the mine so that when cars were loaded at the mines and offered to the railroads for any given customer, that would settle the producer's responsibility and the customer himself could fight out the complications arising from the railroads confiscating cars or failing to make deliveries because of the embargoes, priority orders and other interference.

This one individual case might be taken to represent more an expression of personal feeling because of temporary disagreeable circumstances, but there have been many such cases in the past. Numerous instances have been found where mine operators have sought to free themselves from the burden of wrangling about shipments in transit by selling their product f.o.b. the mines and simply figuring out for the customer what the total cost will be delivered at a given destination, guaranteeing the rate of freight, but not the time of delivery further than their own delivery or tender of delivery to the railroads at the mouth of the mine. This tendency has been particularly noticeable in connection with making contracts. Just to what extent this new policy will prevail will probably depend upon the conditions of car supply and the ability of the railroads generally to handle the needs of the country in the way of coal transportation.

It is practically a reversing of the usual selling plan, for heretofore most sales managers and jobbers have builded their business largely upon selling coal delivered to the customers at a specified price. Usually the customer is more interested in knowing exactly what his cost will be on coal delivered than he is in figuring out freight rates from various points to determine just where and how he might better himself a fraction. It has been the lot of the sales manager and the wholesaler to unravel the complexities of freight-rate combinations and profit thereby, because he who is well posted in traffic matters can often figure out a profitable saving in freight while at the same time satisfying both the mine operator with his positive price at the mine and the consumer with his positive price delivered.

This figuring of freights is a form of service that the jobber has argued is worth something, and as a consequence he has made a specialty of this kind of work. To reverse the plan of selling and make prices f.o.b. mine with the freight rate guaranteed would seemingly result in eliminating all chances of the jobber profiting from such service.

With a return to normal conditions so that freight will move smoothly and the majority of people will be plentifully supplied with coal, there will be found a natural appeal in the idea of resuming the present practice of making delivered prices to the consumer and handling the freight rate problem as a part of the selling proposition. On the other hand, with a continued shortage, and when as now wrangling and charges of unfairness are piling up, there is a natural disposition on the part of sales managers to favor the idea of selling at an f.o.b. mine price and shifting the burden of freight misunderstandings to the railroads and the consumers.

Perhaps nothing is more illustrative of the goading they have been subjected to and the trying times that sales managers have been going through in the coal industry than the present tendency toward favoring f.o.b. mine prices.

Approximately Fifty Million car stops are made in the United States each day. The "skip-stop" schedule would eliminate one-third of these. The elimination of six billion stops a year, together with the regulation of car heating, will bring a fuel saving of not less than 1,500,000 tons of coal a year, which will meet the fuel needs of 300,000 average families.



Modern Coal Stripping in Ohio

By W. E. HOLLOWAY
Cleveland, Ohio

ONE of the latest Ohio coal properties to be worked by means of the stripping process lies in the Smithfield district of Jefferson County. This is the property of the Superior Coal Co., of Wheeling, W. Va. E. T. Hitchman, a man of long and varied experience in the operation of coal mines, is president and general manager.

The first carload of coal was shipped from this operation on Dec. 1, 1917, just seven months after the placing of the contract for the loading facilities. The property consists of 2500 acres and it was necessary to construct one-half mile of railroad siding in order to develop it.

The coal is known as Ohio No. 8. It is a high quality of steam coal and on this particular property runs about 5 ft. 3 in. in thickness. Careful consideration was given to the arrangement of the railroad sidings and the method of working the coal and preparing it for mar-



TWO VIEWS OF THE TIPPLE AND THE LOADING AND STRIPPING SHOVELS IN ACTION

ket. Three sidings were accordingly built, arranged around the property at the outcrop. This insured quick production and a minimum of expense for loading facilities.

The average cover overlying the coal bed is 21 ft. This is removed by means of two Bucyrus No. 225-B, steam shovels equipped with 6-cu.yd. dippers and 80-ft. booms. The boilers of these machines are 250-hp. capacity and the shovels are among the largest used in stripping work, each weighing 420 tons.

Bucyrus shovels are also used for digging and loading the coal. These are of the caterpillar type, No. 35-B, equipped with 1½-cu.yd. dippers. One stripping and one digging shovel work in from either side of the property toward the center. This greatly reduces the time of handling the coal from the shovels to the tipple, for no shifting of shovel trains is necessary.

Four Vulcan saddle tank locomotives handle side dump cars of 5-cu.yd. capacity each. These cars are placed in trips of 10, and while one train is being loaded the other is at the tipple being unloaded. From here the trip passes through the tipple and around to the second shovel. By this method of train manipulation the company is prepared to load 1800 to 2000 tons per day.

At the tipple the coal is deposited in a 50-ton receiving bin from which it is delivered to a crusher or bypassed direct to a conveyor where picking is done. This conveyor delivers to a bin over the railroad siding. This bin is employed to facilitate the moving or changing of railroad cars without stopping the operation of loading.

The crusher and conveyor are driven from a 150-hp. horizontal steam engine, boilers for which are located in the rear of the tipple.

The water-supply for this operation is obtained from a dam located on the property, impounding 3,000,000 gal. of water. This is pumped into two receiving tanks of 47,000 gal. capacity each, from which it is distributed to the shovels, tipple and locomotives.

The entire operation was planned with a view to reducing to a minimum the operating expense and the amount of machinery necessary for producing and loading coal. It was designed by and erected under the supervision of the Willis E. Holloway Co., of Cleveland, Ohio, working in conjunction with Mr. Hitchman.

Use of Electricity in Saving Coal

The accompanying illustration shows a 270-ton Baldwin-Westinghouse electric locomotive hauling a 3250-ton train of loaded steel coal cars up the Elkhorn Grade electrification of the Norfolk & Western Railway.

Previous to the electrification it required three of the biggest modern Mallet locomotives equipped with mechanical stokers to haul a train of this tonnage up the Elkhorn Grade at a speed of 7 miles an hour. Now two electric locomotives haul it up the same grade at 14 miles per hour, or double the speed formerly obtained by steam locomotives. As a matter of fact, in cold weather it was frequently necessary to reduce the tonnage of the train considerably in order to permit the steam machines to get it up the grade.

With electric propulsion, the same coal traffic can therefore be handled with about one-third the former number of locomotives and half the number of engine and train crews. Such economies in rolling stock and labor are particularly effective at this time in lessening the traffic congestion and hastening the movement of coal to eastern points. Of equal interest is the statement recently made by the Commissioner of Agriculture of the State of Montana in regard to the use of electric power by the Chicago, Milwaukee & St. Paul R.R., which is now obtaining 160,000 kw. of electric energy from the hydraulic plant of the Montana Power Co. The saving in fuel effected by this use of water power instead of coal has been highly gratifying to the state officials.

The commissioner states: "To give an idea of the value of the power which is being generated by these



BALDWIN-WESTINGHOUSE ELECTRIC LOCOMOTIVE HAULING TRAIN OF LOADED COAL CARS

plants it may be stated that to produce 160,000 kw. from coal would require the yearly consumption of 2,500,000 tons. This, at the average price of $4 which would apply at the points where the power is used, would amount to $10,000,000. When it is considered that the value of this coal is, by means of water power, being saved each year for future generations, and that during the next 10 years this saving will in all probability be increased seven or eight times, it is not difficult to understand that true conservation consists in encouraging the rapid development of water power, which unless developed and utilized becomes lost for all time."

It has been estimated that the national shortage of coal last year amounted to 50 million tons. The saving therefore by this one company alone of 2,500,000 tons of Montana coal amounts to 5 per cent. of the total shortage in the country last year.

Oh, No! He Was No Coal Man

Recently an operator of the Clearfield region of Pennsylvania went to Washington to complain that official requisitions had been made upon his mines for about 1,000,000 tons more than they were capable of producing. After being passed along by nine different officials, the operator finally reached the sanctum of a dynamic young man who admitted responsibility for the requisitions.

"Are you a coal man?" the operator inquired.

"Oh, no," replied the fuel administration official. "I was an automobile salesman before I got this appointment."—*N. Y. Tribune.*



The Food Administration Asks You To Save Tuesdays' Meat for the Men in the Trenches.

THE FOOD ADMINISTRATOR, HOWEVER, DOES NOT ASK YOU TO GIVE UP MUTTON AND LAMB

Acknowledgments to Gaar Williams

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The miners in the anthracite region are many of them disgruntled at the recent increase in the dues payable to the union. A meeting to discuss the matter was declared "disloyal and traitorous" by President James Matthews, of the 9th district, at Pottsville. The manifest need for the change in dues does not seem to appeal to the dissentients, but it could easily be proved were they minded to accept proof.

The Reliance colliery of the Philadelphia & Reading Coal and Iron Co. struck on Mar. 8 because the officials of the company refused to add two men on each shift of firemen. Even foremen and clerks were compelled to man the boilers though it is usual for the union to provide men to do this work when mines are on strike, even when the union regards the strike as justifiable, for the mines must be kept free of water and gas or they will be shut down almost indefinitely. Seven hundred men were laid idle by this strike at the Reliance colliery.

CENTRAL PENNSYLVANIANS WANT WAGE INCREASE

Central Pennsylvania mine workers are seeking an increase in wage to absorb the new increase in price conceded by the Fuel Administration. The miners want a 20c. a ton advance, and the day workers want another $1 per day, the boys to receive, however, only 55c. The concession was given to the mine operators to make the prices gibe with the costs of operation, but ignoring that fact the mine workers want an equivalent rise in the price of their labor. The mine workers have demanded a joint convention with the operators of the district.

It was reported at the recent biennial convention in western Pennsylvania that 76 new locals have been established in the district, and that 52 more coal companies are now making contracts with union labor.

In Ohio the miners in the 8-A seam are talking strike quite menacingly. As noted last week in this department the men believe that a revision of the scale should be made in recognition of the thinness of the measure in which they have to work. The Cambridge district miners are interesting themselves in seeing that they get a fair apportionment of railroad cars. When certain of the mines could not run by reason of high water the mines were rated as having received their full apportionment of cars. When the floods receded the mine workers were idle because cars were not supplied. On Mar. 7 a delegation of Cambridge district mine workers called on Governor Coxe to protest against this treatment and he ordered James B. Dugan, chief inspector of the public utilities commission, to take up the complaint with the railroad officials whom Dugan claims are violating agreements.

HITCHMAN MEN JOIN UNION OF THEIR OWN WILL

The Hitchman Coal and Coke Co., in West Virginia, it will be remembered, enjoined the United Mine Workers not to interfere with its operations by unionizing its employees. On Mar. 4 the International President, Frank J. Hayes, and nine other officials filed briefs declaring that if the tonnage of the Hitchman Coal and Coke Co.'s mines was reduced it was not due to labor troubles and that if any of the men employed by the company joined the union they did it of their own volition and not because of any encouragement on the part of the union. They presented 22 affidavits to this effect.

In Preston County, West Virginia, the miners are demanding a reduction in the price of blasting powder. At the mine of the Kingwood Coal Co., although the company does not handle powder, the mine committee has served notice on it that if it did not provide powder for $2.10 a keg the mine workers would strike. Other companies have received similar demands but they have been couched in milder form.

In the Georges Creek field of Maryland the miners are also asking increased wages.

The biennial conference of western Kentucky, held at Louisville, was addressed on Apr. 6 by the Rev. Dr. Richard Wilkinson, who spoke on the necessity for coöperation with the nation in its war policies. On the following day the delegates pledged their loyalty and promised not to strike during the war. Should the union, however, continue in its determination to use the war as a means to extend its affiliations in the western Kentucky field, as has been ordered by the international conference and already foreshadowed by union action, it is hard to say what may happen in western Kentucky.

MINERS REFUSE TO WORK WITH ENEMY ALIENS

Some mine workers at Greenwood, Ark., composing local No. 1842, have addressed a resolution to Newton D. Baker, the Secretary of War, protesting against the employment of enemy aliens in the mines, seeing they are being discharged from the army, and urging that mining work with its hazards to the employees is made more hazardous by the presence of men who are unfriendly to the native mine workers and may "by the slightest negligence or by malicious conduct" jeopardize the lives of their coworkers. They also protest against the employment of enemy aliens because they "take the place in the mines of our boys who go to the front." On the whole, however, no one can note that enemy aliens have been doing, in the coal mines, the acts anticipated of them. Moreover, a man might be quite a loyal worker behind the lines and yet could not be depended upon to strike down those of his own race in the battle line.

A somewhat similar condition exists near Lansford in the Pennsylvania anthracite region at mines of the Lehigh Coal and Navigation Co. Twenty-one Austrians were drafted into the national army prior to the declaration of war with Austria-Hungary. When war was declared with that country they were discharged and they returned to the mines. The other miners refused to work with them. One of the men is said to have made slighting reference to the United States uniform. Two others tried to persuade men of Austrian parentage from joining the United States army or the Slovak-Bohemian army. These men have been arrested. The 21 Austrians have been discharged and the strike is now at an end.

MICHIGAN MINES SETTLE DOWN TO STEADY WORK

In Michigan, it is said, that President Crutchfield's desire to turn the Albion strike into a state-wide suspension was due to union politics. Robert Gaffney, of Bay City, with the other international officials has been in favor of ending the strike. Crutchfield is to be retired from the presidency, and he desires to get Gaffney's berth as international board member, whereas Gaffney is a candidate for reëlection. On Mar. 6 W. K. Prudden, State Fuel Administrator, tried to solve the difficulties in a joint conference of mine operators and union men held at Lansing, Mich. He seems to have been entirely successful and the Albion men went back to work Mar. 8 with an increase in wage of 30c. a ton, the rate being now $1.30.

The only question remaining to be settled is whether the increase shall be dated back to Nov. 1, the date of the Washington agreement. This matter will be left to Dr. Garfield for settlement. There is still a discussion at Saginaw where a 10c.-per-ton increase is demanded. The Albion operators have, since Jan. 1, been willing to increase the rate 15c., but on Mar. 6 they gave the increase demanded.

It appears that the referendum regarding a strike in Michigan mines was quite favorable to that action, Crutchfield declaring on the date of the conference that 4 or 5 men favored it in their votes to every one who opposed it. Only the settlement at Albion relieved the situation. It now appears that Crutchfield will be safely elected as international board member.

The Colorado split is becoming wider. The United Mine Workers refused to accept a delegate to the biennial conference because he was a delegate also to the Independent Union of Miners of America. The delegates declared also that they would not attend a meeting to be addressed by British labor officials because John R. Lawson, the president of the Independent Union of Miners of America, was scheduled as chairman. The new union claims 3000 of the 5000 union members in the fifteenth district, whereas the United Mine Workers claims that the United Mine Workers of America has nearly 8000 members.

In Nova Scotia the agreement of the Dominion Coal Co. with its miners was duly ratified about Mar. 1. The terms of the agreement appeared in our issue of Feb. 23. The men get an increase of about 17 per cent. or a trifle less than a million dollars a year. About 5000 men work at the mines of the Dominion Steel Corporation, and all participate in the new scale.

The strike in Drumheller, Alberta, narrowed down ultimately to a strike at the Rosedale mine. On Feb. 27 W. H. Armstrong, director of coal operations, demanded that the day wages and working conditions set forth in the agreement in force at other mines in the Drumheller district be observed. According to J. F. Moodie, the general manager, this meant a reduction in wages of from a few cents to 75c. a day. The men went back to work, however, but on Mar. 4 they struck again. Yet on Mar. 7 it is recorded that they were working.

Central Pennsylvania Asks More Pay

The biennial convention in central Pennsylvania came shortly after the decision of the United States Fuel Administration to increase the price of coal from that district 60c. so as to make the production of coal profitable to all the operations in that district that are conducted with reasonable efficiency. The mine workers who got an increase when the 45c. increase in prices was made—and in fact that increase in price was granted so the wage increase could be safely conceded—believe they should have a like increase to accord with the new price.

If the advance should be granted the aims of the Fuel Administration would be circumvented. The concerns which from low coal, higher freight rates, difficulties in operation and inadequacies of equipment cannot produce the cheaper coal would be forced out of business as they threatened to be when the price for run-of-mine was $2.45 instead of $3.05. Only the concerns with favorable conditions would be able to pay an increased wage and go on working.

It was not so when there were large contracts at more than Government prices to sweeten the dose which the Administration had ordered the industry to swallow. More and more it becomes true that only Government prices are obtained, and if these are kept to the lowest operable basis the mortality among coal concerns will be high. Apparently Dr. Garfield has decided that it will be higher than is desirable. The increase he made was to avoid that mortality, but if the miners get the increase, the end of many coal operations will be a matter of a few weeks.

It begins to appear that there is but one decision possible with the Fuel Administration. It is already setting prices; it must also inevitably prepare itself to set wages. The right to regulate one is just as clear as the right to regulate the other.

The central Pennsylvania convention met in Dubois, Penn., on Feb. 27 with delegates clamoring that the coal miner who got an increase of two-ninths of the 45c. advance should receive two-ninths of the 60c. advance, or roughly 13⅓c. Presumably the rest would go to the other mine workers as in the 45c. advance.

The whole uneasiness in the district arose from the higher rate paid per ton to the miners in the Broad Top and Osceola districts, so for this reason the unrest mainly concerned itself with miners' wages and not with the day wages of the other mine workers.

On Feb. 28, when local 64, of Holsopple, presented a resolution for the nationalization of coal mines, it was unanimously approved by the assembled delegates. They also declared in favor of "clean coal" with equal unanimity, but the resolution on the subject was returned to the committee for alterations which would take cognizance of the fact that the obligation to produce clean coal rested equally on miners and operators. Some of the miners declared that the operators were mainly to blame for the loading of bony coal. According to the delegates the operators were loading out bony material that had been left lying in piles for years and ordering the miners at the coal face to load bony coal with the clean.

Do Not Like Unions or Increased Wages

The Indiana County doctors came in for much criticism. They had done two extremely wicked things. They had, to begin with, formed a new union or association, and they had increased their fees. Now men who form a union and increase their pay are demonstrably "profiteers." The mine workers sought to get some authority in the selection of mine doctors. This is almost sure to come sooner or later. The men so selected may in some cases not be the best of men, for good professional men are little disposed to have their services hang on the issue of a vote, but today there are cases in which the selection of the doctor by the mine management is not wise and not altogether uninfluenced by pelf.

The mine workers ask also for better "company houses" with water service and more defense against the cold. The rent, however, is already inadequate. House ownership around the mines is now too often a debit, not a credit. So long as rents remain at their present low level improvement cannot be granted without adding a loss on the houses to the cost of the coal.

Broad Top Differential Made All the Trouble

The Broad Top differential was a big source of dispute. The Central Pennsylvania district as a whole when the contract was modified by the Washington agreement asked for a 33⅓ per cent. increase and obtained a 25 per cent. increase, the allowance of all the other districts. The Broad Top field held out and got 10c. more a ton for the mining of coal, as is stated in our issue of Dec. 15, 1917. This 10c. was to continue till Apr. 1 and then was to be removed. But, as might have been expected, the Broad Top men do not want to suffer the reduction in price to which they agreed in their contract. Despite much urging, the delegates refused to do anything for the Broad Top miners. The Clearfield County district—using the word in its narrowest interpretation to include the district around Osceola, Houtzdale and Madera, where the Independent Operators' Agreement of Clearfield and Center Counties is in force—has the same rate as the Broad Top district. Apparently this arrangement is unlimited as to time, and it is generally understood that it is to be operative till the war ends.

The policy committee ultimately brought in a resolution asking for an increase of 20c. per ton and $1 per day for all day hands except trappers and boys under 18 years of age. These employees are to get an increase of 55c. per day. Of course the Broad Top and Osceola-Houtzdale-Madera miners who have the larger wage are to get smaller increases so that their advantage will be removed.

Though there was some opposition to increased international dues it did not have any strength. It was decided eventually to raise the dues 26c. per month which will make the miner's dues $2.28 and the day man's dues $2.26 per month.

When the vote for the next convention city was counted it was found that Johnstown had 87 votes, DuBois, 70; Indiana, 10; Philipsburg, 14; Kittanning, 1; and Barnesboro, 0. All but Johnstown and DuBois were cast out and a second vote gave Johnstown 99 votes and DuBois 89, there being 8 more votes cast in this final ballot.

EDITORIALS

Nonessential Industries Should Not Expand

THE action of Congress in refusing to give the authorities power to curb the issuing of new securities for the expansion and initiation of nonessential industries is much to be deplored. We may well have consideration for the workmen and capitalists who have invested their abilities—mental and financial—in industry and feel that it would disturb the nation unduly and with little advantage to ruthlessly put them out of business and on to the street.

But clearly we have a duty to keep persons from entering into new businesses during the war wherever we feel that the business is not of any advantage in the prosecution of the war—our supreme duty. Stores, theaters and hotels are being erected where there is really no need for them. To add to these industries is to add to the number of those institutions which may ultimately have to be curbed.

When the automobile industries catering to the pleasure seekers are voluntarily restricting production 30 per cent., no new automobile factories should be erected and no new companies be formed. Action should have been taken long ago. The public will be happy if it can retain a few of its luxuries during the war. It will certainly be ill advised if it tries to add to them.

The Governor Closes His Eyes and Dreams

IN early days we used to delight in dreaming that we had money in scads, and that we had no difficulties except to bestow it where poetic justice and our generous instincts would dictate. Sometimes we got that wealth from the sea water, where there is an unbelievably large stock of gold more hopelessly watered than any stock on the New York Curb.

But why not dream? M. G. Brumbaugh, of Harrisburg, and W. S. Tompkins, of Wilkes-Barre, admit that they do it. They have been dreaming of how they would take the methane out of the air of the mines and sell it for burning under boilers and, with that money, Mr. Brumbaugh, who is governor of Pennsylvania, would pension the mine workers.

The pension prescription reminds one of the old recipe for the making of hare soup which began with the words: "First catch your hare." Before the big-hearted governor schemes pensions let him find out how diluted methane can be concentrated. At present it seems that the fixation of nitrogen is far nearer profitable accomplishment. Yet there is more nitrogen in air than methane in the mine atmosphere, and the air of the woods and the fields is without ownership; whereas there might be more question as to the air sucked or forced, out of the mines and enriched by the gaseous emanations of the minerals below.

However, if it pleases Messrs. Brumbaugh and Tompkins to dream such miracles of science and scheme how they may be utilized, why should we object? Like the man who was hectored by his puny wife we may say, "It pleases she and doesn't hurt I." Why take offense so long as Mr. Brumbaugh does not ask the industry to store enriched mine air till such a time as he finds a way to turn it to a commercial use.

Concrete Industrial Homes

A DOLLARS AND CENTS proposition generally secures the attention of business men everywhere. Often this feature is not antagonistic to the treatment of industrial problems along humanitarian lines, as evidenced by recent improvements in the housing of employees at large plants in various industries. This is notably true in coal mining.

Suitable house accommodations attract and hold the better class of labor. Then there are great numbers of employees at the mines who are not Americanized, their living conditions often are not conducive either to efficiency or morality. Good citizenship does not seem to have appeared at all as a factor in the lives of many of our foreign-born laborers. They may live far from their work in crowded quarters—bachelor colonies existing according to their traditional standards of living.

It has been aptly expressed by one who has made a close study of such problems: "To remedy these conditions—to bring the workers closer to their work, to house them comfortably and economically, and under such an arrangement as to minimize the tendency toward over-crowding; to induce to more nearly normal, a more American recreational expansion of the individual; to inculcate a sense of appreciation of the better things in home and community life—with no less ambitious an idea the problem was undertaken by a steel company in Youngstown, Ohio."

Considering the housing problem from a technical standpoint, concrete offers a building material of exceptional advantages. A number of methods have been worked out which have been successfully used. Those will probably survive as fittest which follow ordinary contract methods—those which do not use excessively heavy, unwieldy or complicated forms in construction.

Meeting the objection of excessive standardization in similarity of design—whole rows of houses exactly alike—specialists have developed methods which give a pleasing effect by varying the style of houses. Different colors of cement stain also relieve monotony. Eliminating severe lines of straight streets and substituting curved ones makes a pleasing change. But isolated groups of houses around open courts, is a scheme tabooed by one of the larger anthracite companies. Preliminary to erecting extensive accommodations for its men, it gave the matter considerable thought. The sentiment among the employees favored the old close formation of mining villages with easy access to shopping and amusement centers.

The consensus of opinion of those who have lived in

both frame and concrete houses favors the latter type of construction. One thing stands out forcefully, and that is the solidity and tightness of the concrete house in low temperatures during high winds. If this point required a practical demonstration, the conditions of the winter of 1917-18 should have provided it conclusively. Evenness of room temperature in both summer and winter adds much to the comfort of those living in dwellings of cement construction.

At one time concrete houses were damp under certain conditions. But this objectionable feature has been removed on a better understanding of the contributing causes. Dampness on the interior surfaces of concrete walls may be due: First, to poor concrete, which is so porous as to permit the moisture to strike through from the outside. Second, cracks, from various causes, through which moisture penetrates to the inside. Third, lack of continuous air space for insulation in the wall, or lack of proper ventilation so that moisture in the air inside the house condenses on the walls. Continuous air space is readily provided by furring, lath and plaster at nominal cost.

Considerable literature on cement and concrete construction has been distributed through the medium of technical and trade journals, pamphlets and circulars of manufacturers and associations and practical works by various authorities. This building material lends itself to a great variety of applications. There is little excuse today for anyone to plead ignorance of its value and many uses.

Paying for Services Rendered

THE many schemes for regenerating the world after the war all seem to take it for granted that natural law will be suspended and economic law repealed. But just as most of us regarded the world with some misgivings before this war, so after it is over we expect to find it hampered by the laws of nature and the imperfections of mankind.

Last week reference was made editorially to the inadvisability of making a uniform price for coal winter and summer, thus causing idleness in the summer when work is unhampered and causing excessive activity in winter when every kind of difficulty interposes. A proposal of the British labor party, just as much to be criticized, is that coal should be sold at one price regardless of the distance over which it has to be transported and regardless of the difficulty of transportation.

In a country larger than Great Britain perhaps it would not have occurred to the labor leaders to ask for a perfect uniformity of price regardless of all geographical and transportation considerations. But the principle is the same whether a country be large or small.

The manifesto of the Labor Party in regard to this matter is as follows:

"There is no reason why . . . the consumer [of coal] should be made to pay more in one town than in another. What the labor party would aim at is for household coal of standard quality, a fixed and uniform price for the whole kingdom, payable by rich and poor alike, as unalterable as the penny postage stamp."

Under this arrangement the mine worker would be deprived of the privilege of buying coal below cost as he insists on doing today in America. He would have to pay as much for it as if he lived say 500 miles from the mines instead of within hailing distance.

If this unalterable charge for extremely variable services is to be extended to coal for industrial purposes no plant will try to establish itself, and no person will build, with any regard for accessibility. The problem of delivery is left to the Government which also must deliver coal of a standard quality—a thing obviously not possible of accomplishment.

The fact that the burden of transportation for long distances has hitherto been thrown, in the main, not on the transporter but on the consumer has tended to make the consumer move toward the source of supply. It has prevented big iron mills being erected in Kansas and beet-sugar mills from being built in New Mexico.

But granted a rate independent of distance and all the plants of the country will be erected to satisfy passing whims. Let us suppose that at a certain location there is a good foundation for a blast furnace making erection easy. The iron ore is found 1000 miles away; the coke must come some 800 miles; the nearest limestone is 400 miles distant; there is no water readily available; the market is across some half-dozen state lines. What do all these things matter when the world is run rigidly on a uniform-delivered cost basis and the Government does the hauling? The foundation for the mill or the idiosyncracy of the mill operator is the only consideration.

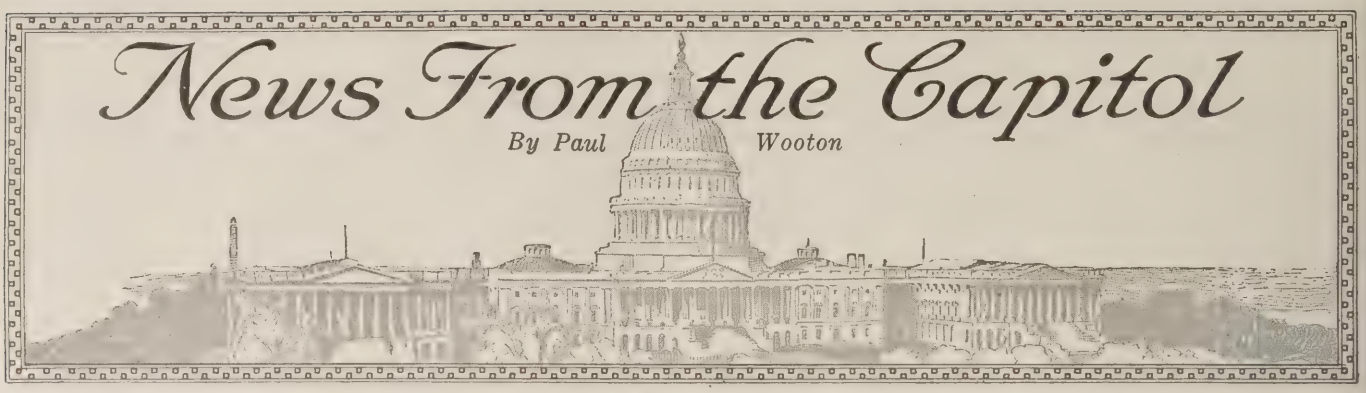
Everything will be done without regard to zones as soon as our zones are removed. Some economic feature must replace the zonal law. But the labor leaders of Great Britain would have us forget after the war the lessons taught by the necessities of the conflict, and among these lessons is the necessity for reducing needless transportation.

There is too much transportation now. Some states seem devoted to the manufacture of raw, or at least crude materials; others devote themselves to finished articles. The raw material even now often travels to the East to be refined, then to the West to be made into merchantable products and then back to the East for actual merchandizing.

The only safe and reasonable cure for this shifting back and forth is a fair and proportionate charge for transportation. If a man will persist in living or in operating where transportation is uneconomical the high prices for everything will be the best way of convincing him that his action is contrary to public interest and his private profit.

If, however, domestic fuel alone is made uniform in price the damage will not be as great. But the principle seems best which leaves the heavy burden of transportation on the man who elects to make that transportation burdensome.

Probably the labor leaders who penned the manifesto will see this point as clearly as anyone. They declare in their statement that "no labor party can hope to maintain its position unless its proposals are, in fact, the outcome of the best political science of its time." From this declaration more hope can be drawn than would be possible had they declared, with many labor men, that all economic and political law is to the labor movement but a source of stumbling and offense.



Regulations Governing Retail Distribution

In an effort to secure the broadest and the most equitable distribution during the coming coal year, the Fuel Administrator has prepared an extended list of regulations governing retail distribution. With their promulgation, he has announced that anthracite prices will be subject to an average reduction of 30c. a ton, effective from Apr. 1 to Sept. 1, rather than continuing the plan of the sliding scale of reductions. The retail regulations, in full, are as follows:

Every consumer should be urged on or before Apr. 1, 1918, to place with his regular dealer his order for his reasonable normal requirements for the year ending Mar. 31, 1919. Such orders must be made in writing and must state substantially the information called for in Regulation 3 hereinafter set forth. When such orders have been entered, the dealers shall proceed to make deliveries thereon, until each consumer, willing to accept the same, has received two-thirds of his normal annual requirements, provided that orders of six tons or under may be filled in full. When all consumers, who are willing to accept it, have received two-thirds of their normal annual requirements, the dealers may proceed to fill the balance of such orders up to normal annual requirements of each consumer. (The provision for two-thirds delivery should apply only to anthracite. With respect to bituminous for domestic use, the dealer may proceed to deliver the consumer's normal annual requirements.) If a consumer already has a quantity on hand, he shall receive only such additional amount as shall make up his normal annual requirements.

New consumers who are unable to have their orders accepted by a dealer should apply to the local fuel administrator, who should see that their requirements receive attention from the proper dealer. Carload or barge-load lots shall not be delivered to a single domestic consumer or to a group of consumers except with the permission of the local fuel administrator. Dealers shall file with the local fuel administrator on the first of each month a statement containing the names and addresses of consumers to whom deliveries have been made during the previous month and the quantity delivered to each.

The following regulations have been established by the United States Fuel Administrator:

1. Until further notice no domestic consumer of coal or coke shall purchase, receive or otherwise take possession of more coal or coke than is required for his actual and necessary requirements prior to Mar. 31, 1919. If such consumer already has a quantity on hand he shall receive only such additional amount as shall make up his actual and necessary requirements prior to that date.

2. No person, firm, association or corporation, whether acting alone or in conjunction with others, shall, directly or indirectly, provide any domestic consumer of coal or coke with more coal or coke before Mar. 31, 1919, than is necessary, with the amount already on hand, to meet the actual and necessary requirements of such consumer prior to that date.

3. On and after Apr. 1, 1918, no person, firm, association or corporation shall sell or deliver coal to a domestic consumer who does not first furnish to the person selling or delivering such coal a statement which the consumer declares in writing to be true, and which specifies (1) the amount of coal the consumer has on hand, (2) the amount of coal he has on order and the name of the person from whom ordered, (3) the amount of coal used by him in the 12 months ending Mar. 31, 1918, and (4) the amount of coal needed to meet his actual and necessary requirements prior to Mar. 31, 1919; provided, however, that this regulation may be modified by any state fuel administrator within his own state under such circumstances and conditions as he may deem proper.

4. On and after Apr. 1, 1918, and until further notice, no retail dealer shall, unless authorized by the state fuel administrator, deliver or cause to be delivered to any domestic consumer more than two-thirds of his normal annual requirements of anthracite coal until each domestic consumer who has placed his order with said dealer and is willing to receive delivery of the same has received two-thirds of his normal annual requirements for the year ending Mar. 31, 1919; provided, however, that orders of six tons or less may be filled in full.

Any dealer or consumer who violates the foregoing regulations will be subject to the penalties prescribed by the Lever Act. Such further regulations will be issued as may be necessary to enforce the essential features of the foregoing plan.

To Insist on Clean Coal

An order expected to insure the cleaning of coal to prewar standards was issued by the Fuel Administrator last week. If a shipment of coal is found to contain an unfair amount of noncombustible matter, the operator may re-prepare the shipment or it may be delivered to the consignee with the understanding that 50c. a ton may be deducted from the authorized price. The intent of the order is stated to be to reinstate the cleaning of coal at the working face and to reinstate the employment of slate pickers. The order in its entirety is as follows:

Section I. Authority is hereby given to the district representatives of the United States Fuel Administration to appoint a sufficient number of inspectors in their respective districts to carry out the terms and provisions of this order, and to assign to each of said inspectors a particular territory.

Section II. It shall be the duty of each of said inspectors:

1. To cover his territory at as frequent intervals as may be consistent with thorough inspection; the inspectors shall be qualified by knowledge and experience of the particular district or districts in which the inspection is to be per-

formed, and shall familiarize themselves with the conditions under which the coal is produced and prepared, so as to enable them to effectually carry out the terms and provisions of this regulation, the intent being to reinstate the cleaning of coal at the working faces of the mines; to reinstate employment of slate pickers with a view of bringing the ash contents of coal back to approximately the standard of normal times. Furthermore, where the coal in any part of the mine is found to be naturally of such character as to be unfit for market, judging from the usual standard of the district, the district representative may order the mining suspended in said part or parts of a mine until or unless proper cleaning methods be adopted; provided, however, that the workings shall not be so suspended where the nature of the mining to be done is necessary to preserve the mine from damage, or where a cessation of work endangers life or may result in serious risk of flooding, of explosions or of squeezing.

2. To report daily to the district representatives of the Fuel Administration mines inspected, the condition of the coal as loaded; methods being employed to prepare and clean the product, whether or not the product being shipped to market is, in his judgment, a well-prepared and merchantable product. All reports of inspections shall be made in quadruplicate, one to be forwarded by mail to the Fuel Administration, Department of Inspection, at Washington, D. C.; one to the district representative; one to the operator; and one to be retained by the inspector for his personal files.

Section III. Inspectors are authorized to condemn at the mines any coal loaded in railroad cars which, in their judgment, is not properly prepared; and any inspector finding unmerchantable coal shall immediately notify the district representative and the operator by wire or in person or in person and in writing, giving the car numbers and initials of any and all cars so rejected and stating the facts on which such action was based. A copy of such notice shall be immediately mailed to the United States Fuel Administration, Department of Inspection, and to the district representative. If the district representative approves the inspection report, he shall so notify the operator at once; in which case, unless the operator unloads and reprepares the rejected coal, the consignee shall be permitted to deduct 50c. per ton from the authorized price for the grade of coal with which the car is loaded; provided, however, the consignee after examining the coal may at his option pay and the operator may receive the full authorized price. Each invoice covering the sale of condemned coal shall bear the following notation, "This reduced price is fixed by the United States Fuel Administration as a penalty for improper preparation." The operator shall thereupon immediately report to the United States Fuel Administration, Department of Inspection, at Washington; and to the district representative the disposition made by him of said car or cars of coal, and shall accompany his reports with a copy of the invoice.

The district representative, where repeated violation of this regulation has taken place or in flagrant cases, shall require a special written report from the operator, which report shall be transmitted by said district representative to Washington with his conclusions thereon, all of which is subject to review by the Fuel Administrator.

This order or regulation shall not operate to change the terms, conditions or validity of existing contracts, but new contracts shall be made subject to this order.

While the order with regard to clean coal has been contemplated for some time, it was hurried by reports from fuel administration inspectors who found that considerable quantities of anthracite were being marketed which did not come up to the standard. It resulted in the condemnation of 1600 tons of coal in Pennsylvania markets. William Potter, the fuel administrator for Pennsylvania, has had the matter of cleaning coal before the anthracite operators for several weeks. In a report to the fuel administration, Mr. Potter says:

"Large shippers of anthracite, after indorsing the standard of preparation adopted by the fuel administration, are keeping their word and now are sending properly sized and prepared coal to all markets. Some of the small operators have been giving trouble, but the unloading of the cars, which contain the coal condemned because it did not measure up to the requirements, is believed to have effectually ended the practice."

Weekly Production Statistics

Continued fair weather and a better car supply permitted the production of 11,055,000 tons of bituminous coal during the week ended Mar. 2. Beehive coke production during the same week was 621,000 tons, a marked increase over the week preceding. This is the largest production since early in December. Anthracite shipments also increased and for the week ended Mar. 2 totaled 39,875 cars. Byproduct coke production for the week under review was 407,982 tons.

Production of bituminous coal during the week ended Feb. 23 was at the rate of 68.2 per cent. of full-time capacity. Nearly 23 per cent. of the loss was charged to unfilled car orders. The foregoing figures are those of C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey. The percentage of operators in each field who make weekly returns to the Survey is so great as to make the weekly estimates approximate closely the actual figures, which are not available until later.

Some New Price Regulations

Rapid progress is being made at the Fuel Administration in the general review of coal prices. This work is to be completed before Apr. 1. New prices for Iowa coal are as follows: Marion, Boone and Appanoose fields: Run-of-mine, $2.75; prepared sizes, $3.10; slack and screenings, $2. This price is a decided reduction from the former prices, which were: Run-of-mine, $3.15; prepared sizes, $3.40; slack or screenings, $2.90. Ninety per cent. of the coal produced in the fields mentioned is prepared sizes. Prices in the Des Moines and Albia fields remain unchanged. A 40c. increase has been allowed to all mines in Wayne County, West Virginia. The new price, which does not include the allowance made to those operators who are parties to the Washington wage agreement, are as follows: Run-of-mine, $2.40; prepared sizes, $2.65; slack or screenings, $2.15.

After prolonged negotiation, which was not unaccompanied by friction, new prices have been fixed for Colorado coals as follows: Domestic coal, domestic field, run-of-mine, $2.25; prepared sizes, $3.50; slack or screenings, $1.25. Steam coal, Trinidad district, run-of-mine, $2.35; prepared sizes, $3.25; slack or screenings, $1.65. Lignite, run-of-mine, $2.25; prepared sizes, $3.25; slack or screenings, $1. Summer reductions in the price of prepared sizes on domestic and steam coal provide for the following deductions: Domestic coal, Apr. 1, 70c.; May 1, 50c.; June 1, 35c.; Aug. 1, 15c. Steam coal (Trinidad district), Apr. 1, 40c.; May 1, 30c.; June 1, 20c.; July 1, 20c. Former prices in Colorado were: Run-of-mine, bituminous domestic, $3; prepared sizes, $4; slack or screenings, $1.50.

Uniform prices have been prescribed for Montana, Wyoming and Utah, as follows: Run-of-mine, $2.65; prepared sizes, $3.30; slack or screenings, $1.50. This schedule meets the complaint of the Utah operators that they were not receiving enough for their prepared sizes in addition to straightening out minor inequalities.

No Leniency to Future Violators of Fuel Administration's Orders

Great leniency has characterized the action of the Fuel Administration, until recently, toward violators of its orders, it is pointed out by H. D. Nims, Dr. Garfield's assistant, whose duties include the direction of the administration's legal department. For obvious reasons, it has been deemed best not to be too severe during the early stages of fuel control. It is believed now, however, that ample time has passed to enable all concerned to be conversant with the general procedure and in future the teeth in the Lever act will be much more in evidence. This change of policy is undertaken more with the desire to back up those who are heartily carrying out the orders of the Fuel Administrator than it is to punish the small percentage of offenders.

Criminal prosecutions have been instituted in 83 cases to date. Most of these are against the "little fellows," a number of them in the Kentucky mountains. Some complaints have been lodged against the more prominent offenders. These cases are under active investigation and if found to be justified, every effort will be made to see that the severe punishments provided for in the Lever act are brought upon those guilty.

To date the Fuel Administration has received 424 complaints alleging violation of its orders. This number excludes violation of the "closing down" order. It is expected that the number of complaints will increase to some extent when it becomes known that active prosecutions are under way.

Coal Priority List Suspended in Many States East of Mississippi River

All states east of the Mississippi River, with the exception of Pennsylvania, Maryland, West Virginia, Ohio and the eastern part of Kentucky, have been released from the Fuel Administrator's order providing for priority in distribution. The reason for this action is explained by the Fuel Administrator as follows:

"Improved transportation conditions and other helpful factors have contributed to a material improvement in the coal situation in the territory where the coal priority list has been suspended. It was deemed to be no longer necessary because the flow of coal into those states is sufficient to meet normal needs.

"Continuance of the order for a longer period would have resulted in the accumulation of reserve stocks of coal for the consumers benefited by priority. In the states where the regulation will continue to operate, the car shortage has not been entirely overcome."

BITUMINOUS COAL PRODUCTION in January of the present year was at the lowest rate since September, 1916. The United States Geological Survey blames the slump entirely on railroad congestion. The January output was 42,727,000 tons.

Coal and Coke Exports in January

Exports of bituminous coal in January were 647,681 tons. Exports during the corresponding month of 1917 were 1,071,124 tons. Anthracite exports during January of 1918 and 1917 were 239,549 tons and 295,396 tons, respectively. Exports were distributed in part as follows:

	1917 Tons	1918 Tons
Italy	71,773	4,505
Canada	584,241	455,377
Cuba	110,476	76,938
Argentina	50,207	11,579
Brazil	53,127	None

Coke exports in January were 84,741 tons, a slight increase over those of January, 1917.

In Charge of Zone Licenses

A. M. MacLeod, of Boston, Mass., was selected by the Fuel Administration on Mar. 13 to take charge of zone licenses. Under the new zoning plan, all coal which passes from a producing district into a consuming district other than its own must move under a license granted by the Fuel Administration through Mr. MacLeod.

Legal Department

DEFICIENCY OF COAL IN PLACE UNDER LEASE—LOSS OF RENEWAL OPTION—The English and many of the American decisions hold that when in a mining lease the parties contract with reference to a mineral known to exist, but the quantity is unknown, and incapable of certain ascertainment, and the lessee agrees to mine and bring forth a minimum quantity annually, or at other intervals, and to pay a minimum royalty therefor whether mined or not, the contract amounts to a sale of the mineral in the land, and that the lessee is bound to pay the minimum price, whether mined or not, and whether it exists or not. But when the contract relates to mineral supposed but not known to exist, and the covenant of the lessee is to mine a minimum amount and pay a minimum royalty at stated intervals, his obligation is to diligently prosecute the work of development, and to produce the minimum quantity of minerals if it exists, and not whether it exists or not. A lease—granting to the lessee for ten years a particular tract of land and a specific vein of coal known to exist, with mining rights, together with plant and improvements, fixtures, etc., with covenants of good title and quiet and peaceable possession, but without warranty of acreage or quantity of coal, and with agreement by the lessee to pay a specified price per ton for coal mined, he guaranteeing a minimum royalty of at least $31,000, $5000 payable at the execution of the lease and the remainder in annual installments—constituted a sale of the coal in place upon condition that it be removed within the term of the lease. And after expiration of the lease and making of such payments, the lessee is not entitled to recover on account of a shortage of coal in place, preventing production of enough coal to cover the minimum royalties paid, in the absence of proof of mutual mistake or of fraud or misrepresentations on the part of the lessor. And ordinarily recovery on the ground of fraud or mistake will be barred five years after the date of the lease, under the laws of Pennsylvania. Under a clause in a coal mining lease giving the lessee an option to extend or renew the lease for the purpose only of mining and removing coal from adjacent lands, right to the extension or renewal is lost by failure to give notice of exercise of the option before expiration of the original lease term. (West Virginia Supreme Court of Appeals, National Coal Co. vs. Overholt, 94 Southeastern Reporter, 735.)

DISCUSSION BY READERS

The Fuel Situation

Letter No. 2—I was much interested in two editorials that appeared in *Coal Age*, Feb. 23, pp. 382 and 383, regarding the securing of good, clean coal. Most of what has been written on this subject, however, is in the nature of complaint in respect to the inferior quality of the coal that is now being shipped from many of our mines. In but few instances has an effective remedy been suggested by means of which the trouble may be overcome.

One suggestion made was to the effect that the proper way to secure good coal would be to have the railroad cars inspected at their destination before being unloaded; and the statement was added that, occasionally, such an inspection might be made at the mine by competent men appointed for such purpose. It was suggested further that where a shipment of coal was found to fall below the standard set, the operator should be warned, for the first offense. For the second offense, the car was to be shipped back to be cleaned at the mine; while, for a third offense, it was stated that a fine of $5000 might be imposed on the operator found guilty. It was even urged that the mine should then be taken over by the Government if it is inefficiently managed.

Two Principal Sources of Impure Coal

To the uninformed, this proposition would seem to appeal favorably, but not so to the man who knows the real source of the trouble. There are two responsible sources for the shipment of impure coal to market. These are: (1) Dishonest miners who wilfully load slate and rock with their coal, in order to increase their daily tonnage and enable them to draw a larger amount on payday; and (2) small mines that have no means of properly cleaning the coal or that are compelled to work thin seams of inferior quality.

Before the present scarcity of labor in mines, an effective docking system was in use at all the larger operations, which prevented dishonest miners from sending out slate, rock and bony coal. At the present time most operators are afraid to enforce the docking system, because of the danger of losing their men, who will quit and go where the operator is not so particular.

Allow me to suggest that competent inspectors should be sent to the mines to inspect the coal sent to the surface by the miners, and that these inspectors should be authorized to impose a heavy fine on all miners found guilty of loading impure coal and rock, after being suitably warned against the practice. It seems to me that this would place the blame where it belongs and would be an effectual method of overcoming the trouble.

I have already referred to the small mines, most of which are run by farmers who are taking advantage of the present high price of coal. In most cases, the coal shipped from these mines is not fit for market, being high in ash and sulphur and mined too close to the outcrop. Being unfamiliar with proper methods of mining, the men employed in these mines use dynamite to take the place of bone and muscle, blowing the coal to pieces and shattering the roof so that it is practically impossible to load clean coal from such mines.

The situation calls for some drastic remedy. I have seen cars pass through on the railroad, loaded with what was shipped for coal, and do not hesitate to say that I would not use the stuff they contained, for making a wagon road. There was mixed with the coal much mud and soft shale that already showed the disintegrating effects of the weather. In my opinion, these smaller mines, guilty of making such shipments, should be closed down and any good miners found in them should be sent to other mines where the quality of the coal is satisfactory and it is possible to mine the coal without mixing with it bone and slate.

W. R. Jones,
Ohiopyle, Penn. General Foreman

Storage-Battery Locomotives

Letter No. 1—Since the publication of a number of articles in *Coal Age*, some time since, regarding the peculiar adaptation of the type of locomotive known as the "storage-battery type," little has been heard in regard to the performance of these machines in the mines. In the hope of learning the results that have attended their use, let me ask that those who have operated such machines submit their opinions through *Coal Age*.

During the past two years, I understand that great progress has been made in developing this particular type of mine locomotive, which has now passed the experimental stage and fully earned its right to stay in the mine. We all remember the struggle experienced in the attempt, a few years ago, to introduce electrical machinery in mine haulage. There were many obstacles to be overcome, to say nothing of prejudices that had to be set aside; but, today, the most uptodate mines in the country are electrically equipped.

The Storage-Battery Locomotive Speedily Coming into Its Own

The attempted introduction of a storage-battery locomotive, in mine haulage, likewise, has had its difficulties and prejudices to overcome; and, to the close observer, it is remarkable how rapidly this type of locomotive has come into popular favor, since it was first brought to the attention of coal operators.

While some of the manufacturers of old-line mining machines and equipment have not given this branch of the service the attention it deserves, it has not been because they have failed to recognize its growing importance. Such has been the demand for mining equipment that manufacturers have been overrun with business in their standard lines, and have not had the time to devote to making the changes required in the building of new types of machinery.

On the other hand, some of the newer companies have devoted their entire attention and energies to the building of storage-battery locomotives. One in particular, has specialized on this class of equipment, with the result that it is shipping one locomotive a day and is unable to catch up with its orders for these machines.

To the observer who has watched its progress, the conviction is firm that this type of locomotive will soon replace all other methods of gathering coal in mines. This opinion is based on the fact that the storage-battery machine works independently, which enables it to go to the face of any room or heading, or enter any place where track is laid.

Much credit is due to the zeal and effective work of the battery companies who have set themselves to the development of a long-life battery that would be suitable for mine service. One company now furnishes a battery for which they claim a life of five or ten years, which is an important factor in the reduction of cost of maintenance. From the start, the question of a suitable battery has been the main consideration.

Operators Want Facts Showing Performance

My experience, in recently passing through the mining districts of West Virginia and Kentucky, proves to me that operators are greatly interested in getting the facts relating to the performance of storage-battery machines. They freely admit the advantage of such a machine for haulage purposes, especially for the work of gathering coal at the face. On every hand, I hear the statement that in a short time this locomotive will be found in every mine.

Since no trolley wire or rail bonding is required for its operation, the storage-battery machine has proved very popular in the development of a new mine, as a small generating unit only is required, in such cases, for charging the batteries. In the later development of the mine, the storage-battery machine can be used in the gathering service, and a larger machine installed for the main-line work.

Another instance where storage-battery locomotives have proved of advantage is where alternating current is being used in the mine, for operating coal-cutting machines. A small unit can then be installed for charging the battery, since 6 or 7½ kw. is an ample charge for a 5- or 6-ton locomotive, as this eliminates the necessity of installing a high-priced substation. The flexibility of the storage-battery machine makes it adapted to conditions where other equipment could not be used. From the standpoints of safety and economy, this type of locomotive is superior to the old trolley type.

Pittsburgh, Penn. ENGINEER.

Mine Cars

Letter No. 2—Referring to the interesting letter of L. B. Paul, *Coal Age*, Feb. 16, p. 346, I want to endorse what he has said about its being practicable to use roller-bearing cars in the same mine and at the same time with plain-bearing equipment. Of course, it is willingly admitted that the most satisfactory results can only be obtained when the entire mine is equipped with roller-bearing cars; but there are many things to be considered before an entire change of equipment can be advocated.

If the mine is one that is about to start operation, it is an easy matter then to install either plain-bearing or roller-bearing equipment as the desire and ability of the operator may determine. But, consider for a moment a mine in full operation and using, say 300 cars, equipped with plain bearings. In my opinion, no difficulty should be experienced in changing the type of bearing on 50 of these cars, which would require a comparatively small outlay.

Comparative Tests Show Superiority

After changing the bearings on these cars, they should be operated, as far as practicable, on the same trip or section with plain-bearing cars, so that comparative notes can be made in regard to the force or power required to move each type of cars. Such a comparison will enable the operator to determine whether or not it will pay to make the same change in the balance of his equipment. But, in every case, the decision cannot fail to be in favor of the roller-bearing equipment; and orders will be quickly given to change the balance of the car bearings, a few at a time. By the end of the year, probably, the entire rolling stock will be equipped with roller bearings.

This method of proceeding has been in use in a large number of operations in the bituminous field of Pennsylvania, where plain bearings are rapidly giving place to roller bearings for car wheels. To my personal knowledge, none of these operations have been inconvenienced at all while making the change.

Effect of Mixed Equipment

Mixing the two types of equipment on the same haul does not, in any way, hold up the production of the mine. On the contrary, it has been found that the daily output has been much increased. As Mr. Paul says, the miners soon discover the easy-running cars.

At the present time, when every operation is confronted, not only with a shortage of labor, but with the necessity of paying a higher price for mining and other work, it behooves the management to study carefully every feature that promises to reduce operating costs and increase the efficiency of the men in the mine. This practice is occupying the mind and thought of every successful operator in the anthracite and bituminous regions and its importance is growing every day.

Pittsburgh, Penn. J. M. KELLY.

Letter No. 3—I was interested, in the reading of L. B. Paul's letter on Mine Cars, *Coal Age*, Feb. 16, p. 346, to note that he takes issue with H. M. Crankshaw, who claimed in a previous article, Jan. 26, p. 191, that "It does not pay to mix roller-bearing cars with other rolling stock." If I am not mistaken, Mr. Paul's experience has been obtained in the anthracite fields, but the practice is the same in the bituminous fields throughout the country.

The question of underground haulage is an important factor in the production of coal. Inefficient equipment has a paralyzing effect on the mine's production, and operators generally are giving this question favorable attention. Knowing the great advantage derived from the use of roller bearings on mine cars, manufacturers of this class of equipment, by advertising and other

means, have not failed to impress coal operators with its importance.

Tests of flexible-roller bearings, which is the type most widely used in mines, have shown that by the use of such bearings the power consumption is very materially reduced. It is also claimed that the expense for lubrication is greatly lessened. Similar claims have been made by the manufacturers of other types of bearings, however; and the only way the operator can determine for himself the superiority of either type is by actual comparison under the same conditions.

In order that this may be done, the roller-bearing and plain-bearing cars must both be in operation, under the same conditions. In other words, the equipment must be mixed for a time at least, until it can be determined which type of bearing will give the best service in that mine. No operator will care to change his entire equipment without having first made such a comparative test.

Storage-Battery Locomotives and Roller-Bearing Cars

In connection with the growing tendency of operators to install storage-battery locomotives, on the gathering haul in mines, it is worthy of note that the use of plain-bearing cars will often cause a heavy discharge from the battery, owing to the large increase of track resistance. Where such heavy discharges are liable to occur, it may become necessary to recharge the locomotive before the close of the shift, which would mean much annoyance and delay.

Speaking of the saving of power, it must be remembered that the greatest saving is effected on a level track. The saving accomplished at a time when hauling a loaded trip of cars up a considerable grade is small in comparison with the gain on a level track, for the reason that the grade resistance has increased so much as to overshadow the smaller gain resulting from the use of roller bearings, which therefore represents a much smaller percentage of saving on a grade, than when the cars are hauled on a level track. However, it is easy to show a considerable power saving when hauling on grades up to 5 and 6 per cent., with roller-bearing cars.

Comparative Cost of Lubrication

Speaking of the saving in expense for lubrication, it is necessary to make the same comparative tests, in order to determine the superiority of roller bearings, in this respect also. For example, mine-car oil or, as it is better known, "black strap," runs 50 gal. per bbl., and costs, at this time, about 15c. per gal. Grease for roller bearing mine cars weighs 400 lb. per bbl. and costs approximately 10c. per pound.

The average plain-bearing wheel will consume about one pint of black strap in the performance of the same work, where the average roller-bearing wheel will consume about one pound of grease. Since there are 400 pts. in 50 gal., a barrel of black strap will lubricate as many cars as a barrel of grease weighing 400 pounds.

The advantage in respect to lubrication, however, is due to the fact that plain-bearing cars that have been in service for a year or so require lubrication every day, or at least four times a week, or 208 times in a year. At a cost of 8c. per car, for each oiling, this would mean a total yearly cost of $16.64 per car.

Comparing this with the lubrication of roller-bearing cars, regardless of whether they have been in service six months or six years, such a car will not require to be lubricated oftener than once in three months, or four times a year, and some cars have run for a longer interval without causing trouble. The cost for lubricating a car of this type is 40c., making a total of $1.60 per car per year. Allow me to state, in this connection, that a roller bearing never needs the full amount of grease to fill the reservoir, after the first greasing.

Again, the oiling of plain-bearing cars requires the services of an oil boy, each day the mine is running; and, under present conditions, his pay is $3 per day. If the mine works 300 days in a year, the labor charge for this work is $900, in that time. In the lubrication of roller-bearing cars, this labor is only required when the cars are being oiled or once in three months. Results show that, at the average mine, 12 days of labor, per year, is required to grease the cars, making a total labor cost, for this work, $36 per year.

A study of these figures is sufficient to convince anyone that the use of roller-bearing mine cars effects a great saving in the cost of operation. Foremen know that miners are prone to insist upon receiving some consideration when they are given cars that push as hard when empty as others do when loaded.

The claim that the mixing of these two types of bearings in the equipment of a mine causes any inconvenience is not founded on fact; but the difference, whatever it may be, serves to argue in favor of roller bearings.

Operators who have made the change from plain bearings to roller bearings, after being convinced by a test of the latter, for a few months, have found that the entire change can be made, in some mines, in a few months, while in others it may take a couple of years, depending on the size of the operation and the financial condition of the company.

Experience.

Johnstown, Penn.

Wagon Mines vs. Patriotism

Letter No. 5—I was much interested in reading the last letter of Thomas Hogarth on this snbject, *Coal Age*, Jan. 19, p. 158. Judging from his remarks, I would consider Mr. Hogarth to be a broad-minded man of long experience in coal mining and possessed of democratic views. At the same time I must admit that he regards the subject from a different angle and reaches a different conclusion from my own.

In many localities the small wagon mine is a blessing to the country and should be encouraged. The product of these mines is generally consumed in the neighboring locality with the result that freight charges and profits of the middleman are eliminated, and the farmer and local consumer pay less for their fuel supply.

In the operation of these small mines it occasionally happens that the output exceeds the demand, and the operator finds that he can ship one or two flats if permitted to load them on the railroad switch. In justice to him let me say it is my opinion that the railroads should supply the flats for that purpose. It is true that the loading of a car, here, may take a little longer time than would be required at a larger mine, but the teams and men employed to haul the coal from the mine to the track would mostly be idle if not thus

engaged. Supplying the flats needed at such mines will keep them running and enable them to supply the local trade, which will lift that burden from the railroad. It must be admitted that the time lost in unloading a car is probably as great as or greater than that which would be lost in loading the same for shipment.

Someone has suggested that all miners should be located where they could do their best work in digging coal. In reply to this remark, however, let me say that the small mines offer a greater advantage in this respect than the larger mines where the miner is often subjected to much delay due to causes beyond his control. The wage scale paid at the small mine is generally the same as that at a larger mine, and the miner is able to produce as much or more coal in the former as in the latter.

Recently I had an opportunity to compare the tonnage, per man per day, in pick and machine mines. I found that the machine loaders averaged from 7 to 8 tons per man per day in a 5½-ft. seam, while pick miners averaged about 8 tons per man per day in a seam varying from 4 to 6 ft. in thickness. This difference is explained partly by the fact that all good and experienced miners in time work their way into pick mines, leaving men of generally less experience in the machine mines. Moreover, it frequently happens that, in machine mining, the miner finds his coal has not been cut and is obliged to go home for that day.

In addition to what I have mentioned there are numerous causes of delay in a large mine equipped with mechanical haulage. The workings are more extended, which increases the opportunity for delay, owing to falls on the roads, breakage of machinery, or the mine being thrown idle as a result of the careless act of one of the men. Delays from these causes are of far less frequency in a small mine employing but a few men.

R. J. PICKETT.

Shelburn, Ind.

Influence of Ash Content of Coal

Letter No. 1—The interesting article, by Frank G. Philo, relating to the influence of the ash content of coal on its fuel value, published in *Coal Age*, Mar. 2, p. 415, calls to mind some investigations we made of the same nature.

As the article dealt with anthracite coal and our investigations considered bituminous coals exclusively, it may prove of interest to compare the results of the two findings. We undertook to ascertain the exact relationship between the ash content and the value of the coal under our conditions of operation. The relationship discovered is believed to hold closely in the average plant.

Most contracts for coal purchased upon the basis of its heating value are predicated upon the hypothesis that the value of the coal closely approximates the value indicated by the calorimeter. Practically all of such contracts seem to recognize that the ash content influences this value and they penalize an excess of ash. No contract under the writer's attention has attempted to penalize the ash content on any other than an empirical basis, and the article referred to is the first seen that has attempted the solution of the problem.

Our starting point was the proven fact, as stated in a bulletin of the coal-testing plant of the Government, that a coal with an ash content as high as 40 per cent. was worthless as it was difficult, if not impossible, to keep it ignited in an ordinary furnace. We have had no such coals, but have had them approximating 30 per cent., and the results lead us to assume the correctness of the Government report.

Coal apparently follows a straight line characteristic, as regards its value in the calorimeter on a basis of its ash content, assuming the same character of coal, and a nearly straight line though at a different angle, as regards its usable value in the furnace. This last curve drops a little as the ash content nears 30 per cent., beginning to drop at about 20 per cent., and presumably this increases in curvature toward the point of zero value. These results seem similar to those for anthracite coal in the previously mentioned article.

The Personal Equation of the Fireman

Since the personal equation of the fireman greatly affects the results obtained from the same coal on two successive days or different parts of the same day, it is difficult to keep all of the factors the same in a combustion test and the results are approximate at best.

It is also remarkable to note the closeness of the formula we have been using to evaluate our coal to the results obtained by Mr. Philo. Because the curve begins to drop rather rapidly between 20 and 30 per cent. ash and in practice we use coals having an ash content of 15 per cent. or less, we have settled upon 1½ per cent. depreciation in the coal value for each 1 per cent. of ash content; we reject as worthless for our uses any coal above 15 per cent. Were we closer to the coal fields, with consequent lower rate on coal freight, it would probably pay us to consider coals with higher ash content, but under our conditions we cannot afford to pay freight on the ash.

In practice, then, in estimating the probable value of coal, we use the formula:

$$\textit{Value of coal} = \frac{C + F + U}{\textit{B.t.u.} - (\textit{B.t.u.} \times 1\tfrac{1}{2}\ \textit{ash per cent.})}$$

where

C = Cost of coal at mine per ton;
F = Freight rate per ton;
U = Unloading cost per ton;
B.t.u. = Heat value by calorimeter per ton.

Considering the fireman and the inability to keep our conditions exactly constant, this formula gives us results as nearly correct as we can determine. In other words, the errors caused by its use are well within the errors of observation and measuring instruments.

Selma, Ala. FUEL ENGINEER

Opening New Mines

Letter No. 1—After reading the interesting article of A. C. Watts, entitled "Coal Mining in Utah, During 1917," *Coal Age*, Jan. 26, p. 174, I am led to question the remarks made by Mr. Watts on page 177.

In speaking of the effect that the opening of new mines will have on the coal industry of the state, it appears to me that the gist of his remarks convey the idea that such undertakings should be discouraged owing to two essential reasons: (1) The present limitation of transportation facilities. (2) The shortage of

skilled labor in mines. There can be no doubt but that these two conditions prevail generally throughout the country, at the present time. The question, however, of how far these conditions should be permitted to curtail development work in coal mining is open to argument.

A company known as the Iron County Coal Co., owning property located near Cedar City, in Iron County, Utah, has just commenced the installation of a two-mile gravity tram, for the purpose of transporting the coal mined in their new opening to nearby towns, lying off the main line, in the southwest section of the state. Coal is now brought to these towns from mines several hundred miles farther away than the coal property at Cedar City.

Discussion Is Invited

Viewed from either an economic or a patriotic standpoint, I would like to hear the opinions of *Coal Age* readers, in regard to the suggestion that such new developments should be discouraged. In other words, is there any ground for condemning the undertaking of the Iron County Coal Co., in opening a new mine at Cedar City to supply a particular market that has heretofore obtained its coal from a distance of several hundred miles?

In Iron County, where the new mine is to be started, the coal measures outcrop at an elevation of 2000 ft. above the town, the coal seam itself lying practically flat. Under these conditions, no large expenditure for development work of the nature of shafts or slopes will be required, and little mining equipment will be needed in the operation of the mine. The greatest expenditure is the installation of the two-mile gravity tram connecting the drift opening with the towns further down the valley where the coal is to be delivered. To my mind, there is every reason why such an undertaking should be heartily encouraged and I see no reason to the contrary.

To supply the towns in question with the coal that they require will take a fewer number of railroad cars than when it is necessary to transport the same amount of coal a greater distance, inasmuch as the coal would then be a longer time in transit. The proposed gravity tramway will greatly relieve the transportation on the main roads and those tracks can be utilized wholly for carrying coal to other districts.

There is an abundance of labor in the local field mentioned that will be available in the new undertaking, and there will be no need of calling workmen from other mines where they are employed. Taking these things into consideration, it appears to me that it is not only good business economy, but good patriotism as well, to encourage the investment of capital in the opening up of such local properties, and I shall be glad to hear from others on this question. J. L. Donahue.

Salt Lake City, Utah.

Surveying and Mapping

Letter No. 4—After reading the several letters that have appeared in *Coal Age*, on the subject of surveying and mapping, it seems to me that an engineer's familiarity with one or another method of numbering survey stations will determine which system he will adopt. While one will prefer to number all survey stations in the mine, starting from zero at the foot of the shaft or slope, another will prefer to number each pair of cross-entries or section of the mine separately, starting from zero at the mouth of each pair of entries.

Having had considerable experience with both of these methods of numbering, it is my belief that each possesses its particular advantages. First, it must be clearly understood that the stations referred to are generally taken to mean transit points and not the hundred-foot points spoken of in connection with taking grade levels.

The consecutive numbering system certainly possesses the advantage that a newcomer can locate a given station with greater certainty and find the same in the notes more quickly, than where each pair of entries has its own set of numbers. However, I fail to see that there is any uncertainty in establishing the correct location of a given station when it is known on which entry the station occurs. It is rare, indeed, that one or more of the members of a surveying party is not familiar with the mine and can lead the way to the entries in question. In regard to grades, the level pluses shown on the map will clearly indicate the desired distances and enable the grade to be ascertained.

Need To Establish Reliable Reference Points

In this connection allow me to mention an important point that has not as yet received attention. This is the need of establishing permanent survey points at or near the mine opening, to which reference can be made later as the need may require. It has been my experience that this has generally been neglected by engineers when making the original survey of the mine. The need of such reference points close to the mouth of the mine is often not realized until it is found that the original stakes of the surface survey have been destroyed, and it is necessary to run lines from distant points on the surface to connect with what points can be found in the mine.

In one instance that I recall it became necessary to reëstablish connection on the surface 15 years after the original survey had been made. In that case three weeks was consumed in making the connection. This could have been accomplished in a short time had good reference points been maintained at the mine entrance. We were fortunate, however, in making the connction when we did, since shortly after this was done the original stakes were destroyed. I recall two similar cases, in one of which two weeks' time was consumed and in the other three weeks, in making connection between the points in the mine and the original stakes on the surface.

Let me suggest that the reference points near the mine entrance should be three in number and form a triangle, being about 300 ft. apart. I have found that old car-axles make good stations or monuments for this purpose. A collar should be shrunk on one end, while the other end of the axle is pointed to permit of its being driven in the ground. After driving such a monument in place, a center hole should be drilled in the end of the axle to indicate the exact point or station. The head of the monument should then be thickly covered with white lead to preserve it from injury.

Piney Fork, Ohio. F. C. Sanner.

INQUIRIES OF GENERAL INTEREST

Regulator Calculation

Awhile ago an examination question was answered in *Coal Age* [Vol 9, p. 771], and it seemed to me that the result obtained was incorrect. The question read as follows:

Ques.—A mine has 50,000 cu.ft. of air, under a 2-in. water gage, passing in two equal splits 6 x 10 ft. in section and 10,000 ft. long. It is proposed to divide this air so that only 15,000 cu.ft. will be allowed to the one split. State how this can be accomplished and the size of the opening required.

Kindly explain in what way the following solution is wrong: Since the quantity of air passing in one of these splits is to be reduced to 15,000 cu.ft. per min., the rubbing surface being $10{,}000 \times 2(6 + 10) = 320{,}000$ sq.ft. and the sectional area $6 \times 10 = 60$ sq.ft., the water gage due to the friction of the air in that split is found thus:

$$w.g. = \frac{ksq^2}{5.2a^3} = \frac{0.00000002 \times 320{,}000 \cdot 15{,}000^2}{5.2 \times 60^3} = 1.28\ in.$$

Then, subtracting this result from the original water gage gives for the water gage due to the regulator, $2 - 1.28 = 0.72$ in. This would give, for the area of opening in the regulator

$$A = \frac{0.0004q}{\sqrt{w.g.}} = \frac{0.0004 \cdot 15{,}000}{\sqrt{0.72}} = say\ 7\ sq.ft.$$

The answer given by *Coal Age* to this question is 4.68 sq.ft. Please explain where my trouble lies.

Fernie, B. C., Canada. JOHN BELL.

The solution given by this correspondent ignores the fact that the placing of the regulator in one of the splits, for the purpose of reducing the quantity of air passing in that split to 15,000 cu.ft., has the effect to increase the water gage in the main airway and reduce the total quantity of air in circulation.

As explained in the answer given to this question on page 771, and to which reference has been made. it is necessary to assume that the power on the air remains unchanged. This being the case, the unit pressure or the pressure per square foot of sectional area will vary inversely as the quantity of air in circulation. That is to say, as the pressure or water gage is increased by the placing of the regulator, the quantity of air circulated by a constant power will be decreased in the same proportion.

In the solution given, it was found by trial that when the quantity of air passing in the regulator split was reduced to 15,000 cu.ft. per min., the total quantity of air passing in the main airway was reduced from 50,000 to 42,200 cu.ft. per min.

The increase in water gage must be calculated from the increased quantity of air passing in the open split, which is $42{,}200 - 15{,}000 = 27{,}200$ cu.ft. per min. Then, since the water gage in the open split varies with the square of the quantity of air in circulation, the increase in water gage is in the ratio $(27{,}200/25{,}000)^2 = 1.088^2 = 1.18+$, and the increased water gage is therefore $2 \times 1.18 = 2.36$ in.

In order to calculate the water gage due to the regulator, it is necessary to ascertain how much the original water gage of 2 in. is lowered when the air traveling in that split is reduced from 25,000 to 15,000 cu.ft. per min. Since the water gage varies with the square of the quantity of air passing, the natural water gage, or the gage due to friction, in the regulator split, is $2(15/25)^2 = 2(3/5)^2 = 2 \times 9/25 = 0.72$ in. The water gage due to the regulator is, therefore, $2.36 - 0.72 = 1.64$ in., and the area of the opening in the regulator, as calculated on page 771, is 4.68 sq.ft.

It will be observed that the size and length of the airways, given in this question, do not enter the solution. The question states that a water gage of 2 in. was required to pass 50,000 cu.ft. of air per min. in the two equal splits. As a matter of fact, assuming the usual coefficient of friction, $k = 0.00000002$, the water gage required to pass 50,000 cu.ft. of air per min. in the two splits given in this question would be

$$w.g. = \frac{0.00000002 \times 640{,}000 \times 50{,}000^2}{5.2(2 \times 60)^3} = 3.56\ in.$$

This shows that if the given quantity of air was circulated in the two splits mentioned, under a water gage of 2 in., the coefficient of friction used was probably the old Fairley coefficient, $k = 0.00000001$. This, however, does not affect the solution of the question, which is as given on page 771.

Accumulation of Mine Gases

Kindly explain the reason for the accumulation of gases in mines, and state why these gases do not diffuse rapidly into the air, as we are taught they do, in all mining textbooks. T. W. MOLANEY.

Avella, Penn.

The reason for the accumulation of gas at the working face and in cavities and other void places in mines is that they are generated, or issue from the strata, more rapidly than they diffuse into the air. The diffusion of gases varies inversely as the square roots of their densities; and, as the density of the layer of gas in contact with the air closely approximates the density of the air itself, it follows that diffusion at the point of contact is very slow.

In order that diffusion shall continue to be rapid, it is necessary that fresh surfaces of contact between the gas and the air shall be constantly maintained, which requires that the air and gas shall be kept in motion. For this reason, diffusion takes place more rapidly in a place where a good air current is moving. On the other hand, diffusion is very slow in a poorly ventilated place.

EXAMINATION QUESTIONS

Indiana Firebosses' Examination, Vincennes, Jan. 17, 1918

(Answered by Request)

Ques.—(a) What is a safety lamp? (b) Describe the essential features on which a safety lamp is based.

Ans.—(a) A safety lamp is one in which the lamp flame is inclosed in a chimney of wire gauze or a glass cylinder surmounted by a wire-gauze chimney. It is so arranged that no air can enter the combustion chamber of the lamp or pass out through the chimney, except by passing through the mesh of the wire gauze, which must be arranged to protect all openings admitting air to the lamp.

The gas-charged air surrounding the lamp enters the combustion chamber and the gas is permitted to burn within the lamp chimney, but the flame is prevented from passing out of the chimney, by the cooling effect exerted by the wire gauze with which the burning gas must come in contact in its outward passage.

(b) The essential features of a properly constructed safety lamp are its simplicity of construction and good workmanship, by which all parts are made to fit tightly together, and these should so depend on each other that the lamp cannot be put together with any part omitted. All openings to the lamp must be protected by wire gauze, of standard mesh, containing 784 openings to the square inch.

For testing purposes, the lamp should be sensitive to gas; the air should enter at a point below the flame and pass out through the upper part of the chimney. A good working lamp must give a good light; the gauze chimney must be protected by a bonnet; the lamp should be simple in construction and capable of withstanding rough usage, besides being light and portable. A working lamp should be protected by a lock fastening that will show any attempt to tamper with the same.

Ques.—Supposing there are 20 men working in rooms off the 3- and 4-E off the main north and, in making an examination as fireboss, in the morning, you found a large accumulation of gas in rooms Nos. 2, 3 and 4, off the 4-E, the same being the intake; how would you proceed to remove the gas and what precautions would you take to prevent an accident?

Ans.—The gas being found, in this case, near the mouth of the intake of this section of the mine, all the men should be notified and withdrawn from this pair of entries, before any attempt is made to dislodge the gas. Having withdrawn the men from this section, proceed to increase the circulation of air in these two headings, as far as practicable.

If it is possible to short-circuit the air at any point between the mouth and the head of these entries by setting open a door, let this be done. At the same time, hang a piece of canvas on the intake airway, just inby from the point where the air current is short-circuited and passes into the return. This will prevent the gas from being carried to the face of the heading, by conducting it directly into the return airway.

Now, beginning at No. 2 room on the 4-N, hang a canvas just inby of the mouth of this room, to deflect the air current into the room. Use safety lamps only, and watch these carefully to observe the progress being made in the removal of the gas, which should pass out through rooms Nos. 3 and 4. When the gas is cleared from No. 2 room, move the canvas on the entry to a point just inby of the mouth of No. 3 room, thereby forcing the air up Nos. 2 and 3 rooms.

If no gas was found in room No. 5, and those following, a canvas should be hung in the inby breakthrough connecting rooms 4 and 5 near the face. In this manner, continue to drive the gas from the three rooms where it was found accumulated and allow it to pass out on the headings without permitting it to enter the rooms, as far as this is practicable and possible. In the performance of this work, only competent men should be employed, and all entrances to the return air current should be properly guarded to prevent anyone from entering the return current.

Ques.—How would you render first aid to a person suffering from an electric shock?

Ans.—It is important, first, to see that the person is not in contact with the live wire that has produced the shock. If it is found that he is still in contact with the wire he must be removed from it as speedily as possible and in a manner that will not affect the rescuer.

Send for a doctor at once. Then proceed to apply the Schaefer method of resuscitation, by turning the victim over so that he will lie on his stomach. Rest his forehead on a coat that has been folded up to form a pillow, or on one of his arms and turn the face slightly to one side so that the ground will not obstruct his breathing. See that the mouth is clear of any obstruction and that the tongue is pulled forward so that it does not impede the passage of air through the throat.

No time should be lost, but, as far as practicable, the patient should be given the advantage of the best air available. Now, kneel astraddle of the man's thigh in a position facing his head and resting both hands on his loins with the fingers spread over the lower ribs, swing forward, thereby throwing the weight of the body gradually and without violence upon the patient. Again, swing back and repeat this to-and-fro movement at the rate of about twelve or fifteen times a minute, imitating the action of breathing. Continue this for the space of two hours or more, or until a doctor has pronounced the man dead.

Ques.—How would you render first-aid to a person overcome by mine gases?

Ans.—Remove the person at once to fresh air. Loosen the clothing about the chest and abdomen and sprinkle cold water on the face and chest. Then give artificial respiration in the manner just described.

Coal and Coke News

What Happened in February

Feb. 1—Explosion at Mine No. 21 of Peabody Coal Co., Stonington, Ill., kills three men. General committee of anthracite operators formed to regulate anthracite industry.

Feb. 2—Dr. Garfield announces that he may do away with workless Mondays.

Feb. 4—Anthracite committee formed Feb. 1 makes report.—In Drumheller field, Alberta, Canada, 2000 men go on strike to enforce closed shop.—Dominion Coal Co. makes an agreement with its men.

Feb. 5—Meeting of state fuel administrators of the East and Michigan at which question of closing down on Mondays is considered with Federal Fuel Administrator.—Order in Council passed by Canadian cabinet suspending operation of all manufacturing plants in Canada Feb. 9-11, closing country clubs during February and March and theaters on Mondays from Feb. 18 to Mar. 25.—J. E. Roderick, chief of Pennsylvania Department of Mines, dies.

Feb. 6—A. C. Campbell and Tudor Williams, fuel administrators in Luzerne and Lackawanna Counties, order the operators in the anthracite region to prepare their coal, as in former days, with breakers and washeries.

Feb. 7—Senator Overman introduces a bill providing that the President may coördinate and consolidate executive bureaus, agencies and offices, this power to continue for one year after the war.—Prices are increased 40c. per ton for run-of-mine, prepared sizes and slack at the mines in Maryland and in Mineral, Grant and Tucker Counties and a part of Preston County, West Virginia. The same increase is conceded in the Kenova and Thacker fields in Mingo County, the extreme southern part of Wayne County, the extreme northeastern part of McDowell County, West Virginia, and the extreme northern part of Buchanan County, Virginia. All these rates may be increased 45c. per ton more if the terms of the Washington agreement have been complied with. The rates before the Washington agreement was accepted were: Run-of-mine, $2, prepared sizes, $2.25; slack, $1.75.—Fuel Administrator declares that the "heatless" Mondays must continue a little longer.—Secretary McAdoo offers a half billion dollars worth of Treasury certificates for purchase and says that the offer will be repeated every two weeks.—Members of the mine cave committee of the Civic Bureau of the Scranton Board of Trade meet with railroad presidents and heads of coal companies in New York City.—Strike at Broadwell colliery of the Lehigh Valley Coal Co., at Moosic.

Feb. 8—War Department refuses request of Fuel Administration to exempt mine workers.—Price of Pennsylvania crude oil set at $4 a barrel, an advance of 25c. Change has apparently the approval of the Fuel Administration. Corning set at $2.85. Cabell at $2.77, Somerset at $2.60 Ragland at $1.25, advances of 5c. per barrel.—Fuel Administrator lifts Monday closing order from North Carolina, Tennessee, South Carolina, Georgia, Florida, Alabama, Mississippi and Louisiana and gives power to state fuel administrators to withhold coal as well as to divert it.—Dr. H. A. Garfield, United States Fuel Administrator, refuses to Alabama the increase of 45c. per ton in the price of coal granted in other regions.

Feb. 11—L. A. Snead, in charge of appointment and distribution, is appointed assistant to the United States Fuel Administrator with duties similar to those in the office he vacates.

Feb. 12—Chairman William J. Harris, of the Federal Trade Commission, resigns.—Tipple No. 5 of the Jackson Hill Coal and Coke Co. is burned in a fire believed to be incendiary.

Feb. 13—Explosion of gas at a Lehigh Coal and Navigation colliery injures four men.—Fuel Administration announces that as the coal situation has improved the fuel restrictions on Mondays will hereafter be removed.

Feb. 14—Fuel Administrators of New England declare that under powers delegated to them by the National Fuel Administrator next Monday will continue as a holiday in New England except perhaps in New Hampshire. (New Hampshire was later included.)—Big strike commences in the Alabama field at mines of Tennessee Coal, Iron and Railroad Co., and on Feb. 15 extends to Republic Iron and Steel Company.

Feb. 15—The President orders that licenses be obtained for all imports and exports to foreign countries.—Judge Strauss, of Luzerne County, Pennsylvania, reverses decision of Workmen's Compensation Board of that state declaring that the negligent act of an employee does not defeat his right of compensation.—Fuel Administration order, under which smithing coal is put at the same price as prepared sizes of bituminous coal, goes into effect.

Feb. 17—Ten members of the National Board of Labor named. Two more will be chosen by National Industrial Conference Board and the American Federation of Labor.

Feb. 18—Coke prices revised by Fuel Administration in certain coke districts of Georgia, Alabama, West Virginia and Oklahoma.—Fuel Administration orders that prices shall be the same for the same kind of coal whether sold by operator or jobber.

Feb. 18-21—New York meeting of American Institute of Mining Engineers.

Feb. 19—President Wilson writes to W. G. McAdoo, Director of Railroads and Secretary of the Treasury, in reply to his letter of Feb. 18, authorizing him to urge on state officials that it is their duty to obtain increased rates for public service wherever public-utility corporations are suffering from the increased labor, fuel and equipment charges.

Feb. 20—Texas and Montana notify the Fuel Administration that they will take care of their own fuel needs during the war. Anthracite is barred entirely in Montana.—The Fuel Administration classifies coal consumers into four groups with priority in coal delivery in accordance with their importance. Group 1 includes households, ships, railroads, public utilities and public institutions; Group 2, necessary war industries; Group 3, necessary peace industries, and Group 4, the so-called makers of luxuries.—Frank J. Hayes, president United Mine Workers of America, orders mine workers in Alabama to go back to work.

Feb. 21—Fuel Administration fixes price of diverted coal. It is to be either the Government price or the contract price at the option of the owner of the coal thus diverted at the time of diversion.

Feb. 22—By an explosion of 28 cases of powder at the Royal colliery at Virden 4 men were killed.

Feb. 23—Fuel Administrators of Maine, Rhode Island, New Hampshire, Vermont, Connecticut and Massachusetts have decided to suspend "heatless Monday" under the United States Fuel Administration order of Jan. 17.—A. W. Calloway, of the Davis Coal and Coke Co. and the Terminal Railroad Coal Co., is appointed Director of Bituminous Coal Distribution.—E. R. Stettinius made one of the Assistant Secretaries of War.—Four shotfirers are killed in an explosion at the mines of the Citizens Coal Co., at Springfield.

Feb. 26—The Fuel Administration demands greater coal conservation.—Bernard Baruch made chairman of the War Industries Board.—Senator Reed attacks the Fuel Administration in the Senate.

Feb. 27—Frank P. Walsh chosen by American Federation of Labor to serve on the National Board of Labor.—Prices of coal produced on Tug River, West Virginia, west of Welch to Panther, including branches except Newhall, Berwind, Canebreak and Hartwell: Run-of-mine, $2.40, prepared sizes, $2.65, slack, $2.15, an increase of 40c. per ton. The "Upper Clinch" prices in Virginia are raised 50c. per ton and are 10c. higher than those above quoted. All are subject to a further 45c. increase where Washington agreement is accepted.—Independent Union of Miners of America organized.

Feb. 28—Fuel Administration orders that where cannel and bituminous coal is mixed the Government price for bituminous shall govern.

Correction—Instead of 87 lives being lost in the Stellarton explosion as stated in "What Happened in January," published Feb. 9, the correct number ultimately proved to be 86.

Harrisburg, Penn.

Judge McCarrell, of the Dauphin County court, on Mar. 8 ruled that under existing state laws it is not a crime to sell coal by short weight, provided the scales used are tested and corrected. Lawyers declare the ruling amounts to a conclusion that giving short weight is in error and that persons seeking redress under state statutes must go through the civil and not criminal courts. Judge McCarrell's ruling is that the weights and measures act contains no penalty for short weighing in any sale, but merely for use of fraudulent scales. The Dauphin judge's decision will be carried immediately to the upper courts for a final ruling.

The State Compensation Board has declined to rule that Jerry Willis, of Altoona, a claimant against the Altoona Coal and Coke Co., sustained a total loss of a hand when he had only part of a hand to lose. Willis was injured 30 years ago and lost four fingers at the knuckle joint and his thumb at his first joint, but developed much dexterity with what remained and worked as a carpenter and in other occupations. Last year as a result of an accident the remainder of his thumb and the palm of his injured hand were amputated. The Board has modified the award made so that it will terminate when Willis "shall have acquired an earning capacity."

Four coal companies operating in Clearfield County on Mar. 7 charged in a complaint filed with the Public Service Commission that the Pittsburgh & Susquehanna R.R. had allowed its line to get into such a state of disrepair that operation was attended by accidents and that money secured under promises of repair had not been expended for maintenance. It was also charged that when a bonus was refused operations were interrupted. The commission will inaugurate an inquiry at once as the coal companies declare they are dependent on the road for transportation.

The first indictments for alleged profiteering in the eastern district of Pennsylvania were returned by the Federal Grand Jury on Mar. 9. They charge the Orr Coal Mining Co., of Clarksburg, W. Va., and James M. Orr, president of the company, with asking prices in excess of those fixed by President Wilson. The Government alleges that the company billed bituminous coal to consumers in this state at the prices fixed by the Federal regulations, but under secret arrangement with certain customers an additional sum of 73c. to $1 a ton was collected by Charles T. Schectman, the Philadelphia representative. The technical charge against the company is asking higher prices than those fixed by the regulation, and against Orr of conspiracy to ask higher prices.

The method used, it is said, was to have an understanding with manufacturing plants that the receipted bills would disclose only the regulation price and that the excess could be paid in cash. Four companies in Philadelphia and vicinity paid heavy excesses, according to the indictment.

These companies, a Government official said, consented to pay the excess because of the necessity of having fuel to keep their plants in operation. The trial of Orr and the mining company has been tentatively fixed for Mar. 25.

The miners' examining boards for Luzerne County held monthly examinations of applicants for miners' certificates at the courthouse on Mar. 8-9 and questioned over 100 applicants of various nationalities who sought the right to mine coal. Seventy certificates were granted and the others were rejected on failure to answer questions satisfactorily. The examination

boards are making no distinction as to nationality, natives of Austria being accepted if their appearance and answers are satisfactory. At first when natives of Austria were classed as alien enemies the boards requested a decision from the court whether to grant these men certificates and were told to use their own judgment. Men are needed in the mines, and a man who is eager to work and aid this country in the production of coal is not considered an enemy.

Both the increase in anthracite output and fewer fatalities are shown in report, issued recently, by mine inspectors for the third, fifth, sixth and seventh anthracite districts in Lackawanna County, Pennsylvania, which produced 13,532,786 tons of coal, a big increase over 1916 despite the fewer number of mine-workers.

There were 85 fatal accidents in these four districts, or one fatality for every 159,186 tons produced. Of this number 72 occurred inside the mines and 13 outside. In the same districts there were 211 non-fatal accidents, the fatalities being saved by the safety devices installed in and about the mines by the operators at a constantly growing expense.

Inspector S. J. Phillips, of the fifth district, highly praised the work being done to safeguard mine workers at the Greenwood colliery of the Hudson Coal Co. An organization, known as the Safety Institute has been perfected, and numbers all of this colliery's employees. The operators are at work organizing all their working forces and will shortly issue a new set of safety rules for the benefit of all mine workers in the anthracite region.

Inspector T. J. Williams, of the eleventh anthracite district, in his 1917 report shows that there were mined 3,559,980 tons of coal by the eight collieries under his jurisdiction with 33 fatal accidents distributed among the 19 mines, and of these only one was nongaseous. There were 10,000 tons of coal produced by electrical machines. The fatalities were 28 inside the mines and 5 outside. In his district there were 127,141 tons of anthracite produced per fatal accident.

PENNSYLVANIA

Anthracite

Lavelle—To provide for a large reservoir to be used for washing coal at its new colliery, the Laurel Hill Coal Co. purchased the George W. Turner farm. This farm of 149 acres contains large springs, streams from which will be turned into a big dam. Lack of adequate water-supply necessitated the purchase of the farm.

Hazleton—Members of the educational committee of Hazleton Mining Institute have decided to award diplomas to students completing the course of study in the night schools of the institute. State Mine Inspector John J. Stickler was elected head of the educational committee to fill a vacancy caused by the departure of Arthur H. Lewis to Wilkes-Barre.

The Pennsylvania R R. closed a deal for the purchase of the coal yards of Claude L. Wilde, within a square of its freight station, for extensive enlargement of its facilities here as soon as the war is over. The consideration was $35,000.

The Lehigh & Wilkes-Barre Coal Co. is making efforts to get control of the long abandoned mines at Silver Brook which were formerly operated by J. S. Wentz & Co. The workings are flooded but are said to still contain great quantities of anthracite, estimated by some experts at 3,000,000 tons.

Shamokin—Justices of the peace throughout Northumberland County report a 75 per cent. falling off in criminal cases in connection with their work. Full time at the collieries, strict observance of the coal corporations' rules against drunkenness and war conditions in general have had a wonderful effect on the morale of the coal region.

Mahanoy City—Special officers for the Susquehanna Collieries Co. have arrested 14 boys and young men charged with setting fire to a mountain of young trees owned by the coal company and upon which thousands of dollars in timbers had been destroyed. They were heavily fined.

Johnstown—The Hannan Coal Co., capitalized at $10,000, is opening a new coal mine on the Horner and Wilson properties, in Ferndale, and expects to begin shipments within a few days. Dr. C. E. Hannan, of this city, is president; Henry Dasbaugh, of Pittsburgh, secretary-treasurer; R. G. Hannan, mining engineer, and F. F. Osborn, sales manager.

Bituminous

Dubois—The John E. Laing Coal Co. of this city, operating several mines at Weedville on the Buffalo & Susquehanna R.R., has sold its operations to James Archibold, of Weedville, Penn.

The Chief of the Department of Mines, Seward E. Button, has placed the Fourth Bituminous district under the jurisdiction of Inspector Joseph Knapper, of Philipsburg, of the Eighth District, until a successor to the late Elias Phillips is appointed.

The Stewart Coal Co., of Knoxdale, Penn., has taken over upward of 1000 acres of Redstone coal lands in Lewis County, West Virginia, about one mile from Weston, the county seat, a town of about 5000 population. The siding and tipple are built and coal is being shipped. Contemplated extensions to the existing plant will cost about $50,000. Power will be furnished by the Monongah Traction and Power Co., and the boilers now in use will be done away with. A. L. Bouton, former city engineer of Dubois, will superintend the plant.

Punxsutawney—John McKleavy & Co. have sold their mines at Florence, Penn., to a new company composed of Punxsutawney men. A new mine was recently opened in the upper seam of coal and is developed to a capacity of about 100 tons per day.

Savan—A pocket of 6-ft. coal has been opened up here by W. H. Bicknell, and the operator is loading the production over the tipple of his Big Two mine. It has caused considerable excitement as this vein was heretofore unknown.

Pittsburgh—More than 100 of the leading mining men of western Pennsylvania, members of the various district examining boards, met at the Seventh Avenue Hotel on Mar. 8. The dates set for the mine foremen and firebosses' examinations this year are Apr. 9, 10, 11 and 12. The following men were selected to act as a committee to draft questions, answers and other minor details: P. J. Walsh, Nicholas Evans, mine inspectors; R. H. Kay, James Porter, superintendents, the operators' board representatives; John McKillip, J. O. Van Riper, miners' representatives. The alternates chosen are John I. Pratt, mine inspector; Thomas Easton, superintendent, and John Walters, miner.

Macdonaldton — Extensive improvements will be made in the present equipment of the Brothers Valley Coal Co. The capacity of the present mines will be materially increased and a new shaft opening will be made on another part of the property. The new mine will be electrically operated, and is to be modern in every respect. H. B. Reed, of New York City, is president of the company and Charles M. Means, of Pittsburgh, is consulting engineer.

Uniontown—Referee J. G. Carroll has set Friday, Apr. 12, at 10 o'clock as the time for a hearing at which lien creditors of the J. V. Thompson estate may participate prior to the proposed sale of Greene County coal lands to the H. C Frick Coke Co. The meeting will be held in Mr. Carroll's office in the Cooper-Lackey building.

A deed recorded here last week shows the transfer of 130 acres of coal land in Franklin and Perry townships, Fayette County, from Ferdinand Guth to the Coke City Coal Co., of Connellsville. The consideration is given as $11,000.

Brownsville—J. H. Price, of South Brownsville, has purchased the mine of the Ross Coal Co. near Merrittstown, and will operate it in the future under the name of the Price Coal Co. The new owner purchased the coal, the mining rights and the new coal tipple recently erected. Mr. Price will fill the contracts made by the old company.

Greensburg—The Westmoreland Coal Co. has sold to the Irwin Gas Coal Co. seven seams of coal in Franklin Township for $237,601.80.

Pottsville—The Laurel Coal Co., composed of capitalists from Wilkes-Barre, are building a large breaker at Mowry.

Connellsville—The Jim Run Coal Co. has closed a deal for 163 acres of coal land in Stewart township, Fayette County, from Charles P. Newell and others for a consideration of $30,000. A. C. Stickel is president of the Jim Run Company.

West Virginia

CHARLESTON

Increases in several of the districts of the state having been granted by the fuel administration, operators at the central counties and northern counties, most of whom are affiliated with the Central West Virginia Coal Operators Association, have been requested to take their cost sheets to Washington in order that the application for an increase in price for the coal from the mines in the Fairmont-Clarksburg field may be considered. The Central Association has named a committee to go to Washington. Figures forwarded to Washington show that production in the central West Virginia coal fields fell off more than 1,285,000 tons in the five weeks from Jan 13 to Feb. 16, most of the decrease resulting from car shortage.

Coal operators on the Monongahela R.R. and on the Morgantown & Wheeling R.R. are facing a serious crisis, according to their opinion, unless an agreement can be reached at a meeting of committees representing the coal operators and Government railroad officials to be held in Washington at an early date. Officials of both the New York Central lines and the Pennsylvania System who jointly operate the Monongahela, it is alleged by the operators, have openly declared themselves opposed to supplying cars to the mines on the two railroads already referred to. If the sources of car supply—the Pennsylvania and the New York Central—are cut off every mine in the vicinity of Morgantown will be closed. The coal operators are to be represented by E. H. Gilbert, of Preston County, and Samuel D. Brady, for Monongalia, at the coming conference with Government railroad officials.

No cars are owned either by the Monongahela R.R. or the Morgantown & Wheeling R.R., and consequently those two roads are dependent upon the two systems which control them for a supply of cars.

While the movement of coal freight has materially improved in this state in the last three weeks, operators still voice the opinion that the tonnage moved is far below both the producing capacity of West Virginia mines and market demands. Consequently West Virginia mines, even with a return to conditions somewhat approaching normal, are not producing their maximum output.

In coal-mining circles it is felt that the fact that the fuel administration is seeking the coöperation of recognized experts in the mining industry will enable the administration to remedy existing conditions and will have beneficial results.

Cleveland capitalists and Virginian Ry. officials were in conference in Wyoming County last week with a view to determining the feasibility of building a branch line of the Virginian to tap the property of the Wyoming Pocahontas Coal Co. To reach the large tract owned by the Wyoming company it would be necessary to build about 10 miles of railroad, involving heavy construction work and the boring of a tunnel nearly a half mile in length. The branch, if built, would connect with the main line of the Virginian at Maben.

The Lick Fork Coal Co., located about 2 miles from Bishop on the Virginian Ry., will begin to load coal by Mar. 15. This colliery was recently purchased by P. C. Thomas, Alexander McNabb and F. S. Monahan, the latter having been placed in charge of operation. The company is said to have a 7½ ft. seam of clean coal. Up-to-date mining machinery has been installed.

The Hillcrest Coal Co. is opening a wagon mine just outside of Charleston at the eastern edge of the city. The development will be made in the Lewisburg seam. T. M. Boogs, of Charleston, is at the head of the enterprise.

The Davis Creek Coal and Land Co., which is headed by J. H. Snyder, of Charleston, has secured its right of way and is now shipping coal from its new mine back of Spring Hill.

Williamson—The Coalburg Coal Co., of Wilsondale, of which Judge F. H. Evans is president, has recently opened a fine plant on its property and is now ready to ship coal.

Clarksburg—According to a deed filed for record in the office of the county clerk, the Pitcairn Coal Co. has sold to the Harry B. Coal and Coke Co. the Pittsburgh vein of coal underlying 443 acres of land and three tracts of land in fee simple aggregating 164.57 acres in Clark district. The consideration was $200,000.

Pike—Work of sinking the new slope for a coal mine on the property of the Cleveland Coal and Dock Co., at Roney's Point, is rapidly nearing an end.

ALABAMA

Birmingham—According to a statement of W. E. Matthews, president of the state board of convict inspectors, convicts employed in the mines of the Sloss-Sheffield Steel and Iron Co., Bessemer Coal, Iron and Land Co. and Montevallo Mining Co. earned more than $50,000 during 1918 for coal mined in excess of their tasks. At Aldrich, an operation of the Montevallo

Mining Co., the convicts produced 20,691 tons extra and thus contributed their "bit" toward relieving the acute shortage of domestic coal.

Construction work has been begun on the new steel and concrete coal washery and screening plant of the Republic Iron and Steel Co., at Sayreton, near North Birmingham, Ala., and will be pushed to completion as rapidly as possible.

INDIANA

Vincennes—The Royal Coal Mines, backed largely by Vincennes capital, has obtained the option on 15,000 acres of coal land in Gibson and Pike Counties. The company is headed by Henry F. Allen, a coal operator formerly of Evansville. Marlein R. Moser is vice president; Charles A. Bainum, president of the Knox Bank and Trust Co., treasurer; W. M. Wilmore, general manager of the Hartman Manufacturing Co., and John L. Klemeyer, president of the Knox County Lumber Co., are trustees. One shaft is being sunk at Oakland City.

Sullivan—Henry A. Butler, of Cass, near this city, after 30 years in the coal business, has sold his interests in the Syndicate Coal Co. operating in Sullivan County, to Roy Price and John McLin, of Dugger.

ILLINOIS

Springfield—Examinations which were to have been conducted in Saline and Williamson Counties by the State Mining Board have been postponed as a result of epidemics of smallpox. The two counties were omitted from the itinerary of the board on recommendation of Dr. St. Clair Drake, of the state department of health. The board at this time is holding sessions in the southern part of the state.

Deciding that a train of the Alton & Chicago R.R. operated between Springfield and the Devereux mine is a "special" and not engaged in regular service, Commissioner Dempcy, of the State Public Utilities Commission, has overruled a petition of miners employed at the Peabody mine asking for an order to have this train stopped daily for their accommodation. The train is run under contract with the Devereux Co. The Peabody miners explained the train passed within a short distance of their shaft where 200 men were waiting to ride, but that the crew refused to stop. Company officials declared the seating capacity of the train now is taxed to the limit and that to overload the cars would tend to make travel dangerous. Lack of equipment precludes making up another train or of adding any cars to the one now in operation.

Subdistricts will be reorganized by the Illinois miners' union. A few years ago there were subdistricts in the state, but the plan has since been abandoned. Each subdistrict will contain about 15,000 miners and will have a president, secretary and other officers. The committee in charge of the reorganization is composed of George L. Mercer, Peoria; Hugh Watles, Herrin; Edward Dobbins, Belleville; Benjamin First, Gillespie; and William Hutton, of DuQuoin.

Bush—The new mine here recently opened by the Western Coal and Mining Co. is being rapidly developed for the production of fuel coal for the Missouri Pacific R.R.

Belleville—A coal miner from Shiloh recently bought $1000 worth of Thrift Stamps during a Four Minute Man Campaign here. Another coal miner bought $166.50 worth.

O'Fallon—On Mar. 7 three loaded coal cars pulled by a switch engine on a branch of the Baltimore & Ohio feeding the International Coal Co.'s Taylor mine went through a 75 ft. bridge, injuring two brakemen. The accident will tie up the Taylor mine two or three weeks, meaning a layoff of about 325 men.

Danville—The mine at Batestown has been sold by John Mauck to Terre Haute parties.

Carlinville—The Chicago & Alton Railroad Co. has given the name "Cowan" to the new station established 2 miles north of this city where the Standard Oil Co. is developing new mines. The station was named in honor of an official of the Standard Oil Co. who is in charge of construction work. Cowan will become an important coal-shipping station when the mines are opened.

New Baden—The New Baden mine of the Southern Coal, Coke and Colliery Co. has been opened, having been closed since Nov. 21, 1917, when a cave-in stopped all operation. The opening of the mine was a peculiarly difficult task as the mine caved in repeatedly and the work had to be done over patiently. Finally, 12 x 12-in. oak beams were used and a permanent shaft was opened. The mine will employ 650 men.

Ziegler—The Bell-Zoller colliery at Ziegler has been reopened. It has been closed since last December, when three miners died from a gas explosion. Inspectors sealed the mine after the explosion in hopes of getting control of a fire which raged for several weeks in the mine. Director Evan John, of the Illinois Department of Mines and Minerals, and State Mine Inspector Thompson approved the opening of the mine. They have not, however, authorized the opening of the New North mine at Christopher, Ill., where 18 miners were killed several months ago. There was also considerable property damage which must be repaired before the mine is opened. The shaft has been sealed for some time.

OHIO

Coalton—A large amount of development work in this section is projected and much of it is being carried forward at this time. When the new mines that have been planned are completed the output will be increased fully 25 per cent. if not more. Thompson & Son, of Radcliff, are opening a drift mine in No. 4 seam on the Hocking Valley Ry. near Radcliff. The company controls a large acreage at that place. It will be electrically equipped.

The Kinwood Coal Co. of Columbus, has started work on a drift mine located near Oreton in No. 4 vein. This is also located on the Hocking Valley Railway.

The Shafer Coal Co., of Logan, is another of the concerns to start work on a slope mine in No. 4 seam in Vinton County, J. J. Reittemeyer is superintendent.

The Wellston Rich Run Coal Co., of Wellston, is opening a shaft mine in No. 2 seam which is designated for gas coal. A hoist is to be built.

The Standard Colliery Co., Jackson, of which E. L. Stephenson is superintendent, is opening a mine in No. 2 seam in the Jackson district. It will be exclusively pick mining.

St. Clairsville—The coal company recently formed by Oliver Monaco, Louis Costanzo and other residents of this vicinity will mine the coal owned by ex-Congressman W. B. Francis at Robyville, near Adena, on the local branch of the W. & L. E. The company's tipple is half completed. The plant will cost $60,000. The company is one of the few that will mine on a royalty basis.

Steubenville—It is reported that the City of Cleveland is seeking coal lands in Jefferson and Belmont Counties. It is expected that about $3,000,000 will be expended on coal properties. The Cleveland administration plans to purchase large coal tracts and to erect a large power plant. S. A. Williams, representing the Cleveland administration, is in this vicinity, looking over available property.

KENTUCKY

Lexington—The Frick interests recently announced a program for the expenditure of $9,000,000 in the development of 30,000 acres of coal land for the Louisville & Nashville R.R. A modern Kentucky town is to be built in South Harlan County, giving employment to thousands.

Whitesburg—Ohio people, including M. C. Justice, W. K. Elliott and others, have organized the Eastern Kentucky Coal and Land Co. in Pike County, with $100,000 capital, after acquiring 800 acres of coal lands for development. Work is to be started at once.

Madisonville—The power house of the Shamrock Coal Co., near Providence, owned by the St. Bernard Coal Co., of Earlington, was dynamited recently and the concrete building practically ruined.

COLORADO

Denver—Twelve mines in the bituminous coal fields in Colorado, having a total production of 2500 tons daily, ceased operations to-day as a result of the fuel administration's order reducing the price of coal, according to reports made to the Colorado division of the fuel administration. As many more mines, reports received by the State Administrator said, will shut down Apr. 1. More than 500 miners are idle and the number may reach 1000 within a week, it was reported. A 50c. reduction in the price of Colorado coal at the mines went into effect on Mar. 11 and a further cut of 70c. has been ordered, effective Apr. 1.

Foreign News

Edmonton, Alta., Can.—A railway line to tap the immense anthracite coal fields held by Patrick Burns, a packing magnate of Calgary, in the foothills of the Rocky Mountains southwest of Calgary, has been made possible by a bill passed in the house to incorporate the Calgary & Southwestern Ry. It is reported that this line will be started at once in order to bring the coal into the Calgary market next winter, if possible.

Montreal, Can.—Profits of the Intercolonial Coal Co. for the year ending Dec. 31 last totaled $183,419 compared with $122,734, an increase of $60,685, or 49.4 per cent. Deductions amounted to $83,427, leaving a surplus for the year of $9992, which, added to the previous surplus, made the profit and loss total $179,089. Charles Ferngie, the president, stated that the total quantity of coal raised was 170,700 tons, compared with 143,748 in 1916, an increase of 35,952 tons. Outputs were at times, however, adversely affected owing to shortage of labor. Current assets totalled $301,868, compared with current liabilities of $42,098, leaving the net working capital $259,770, compared with $164,307 a year ago.

Personals

Harry Irvine has been appointed manager of the Carter Coal Co., Charleston, W. Va.

Frank B. Stewart, of Cincinnati, Ohio, for some time treasurer and general manager of the Winifrede Coal Co., operating in Kanawha County, has been made president of that company.

Irene Stahl, formerly private secretary to A. W. Calloway, president of the Davis Coal and Coke Co., has been promoted to assistant secretary of the Davis Coal and Coke Co. and allied interests.

J. E. North resigned as mine foreman of Fulton Run shaft of the Jefferson and Clearfield Coal and Iron Co. to accept a similar position with the Allegheny River Mining Co. at Pine Furnace, Penn.

George Love, formerly mine foreman for the Jefferson and Clearfield Coal and Iron Co. at Ernest, Penn., has accepted a similar position with the Cowanshannock Coal and Coke Co. at Yatesboro, Penn.

J. E. Sullivan, of Jermyn, Penn., and for the past 10 years a special agent for the Pennsylvania Coal Co., has been made chief clerk to E. J. Mulvihill, assistant to the president. Mr. Sullivan will have headquarters at the main offices in Dunmore, and will be in direct charge of about 50 clerks.

Obituary

Capt. James Miller Hustead, aged 91, one of western Pennsylvania's biggest coal and coke operators, died at Clearwater, Fla., recently.

David Murphy, of Dawson, N. M., a member of the New Mexico mine inspection crew, was killed on Mar. 6 in the Government coal mine at Carthage, N. M., when he removed his oxygen helmet while making an inspection of the mine with four other members of the crew, according to State Inspector Risbon. He was carried to the mouth of the mine where effort to revive him proved unsuccessful.

Publications Received

Twenty-sixth Annual Report of the Ontario Bureau of Mines, 1917. Vol. XXVI. Printed by order of the Legislative Assembly of Ontario. Illustrated, 6½ x 9¾ in.

"The Determination of Moisture in Coke." By A. C. Fieldner and W. A. Selvig. Department of the Interior, Bureau of Mines. Technical paper 148. Unillustrated, 12 pp., 6 x 9 in.

Combustion of Coal and Design of Furnaces. By Henry Kreisinger, C. E. Augustine and F. K. Ovitz. Department of the Interior, Bureau of Mines. Bulletin 135. Illustrated, 137 pp., 6 x 9 in.

Combustion of Coal and Design of Furnaces. By Henry Kreisinger, C. E. Augustine and F. K. Ovitz. Department of the Interior, Bureau of Mines. Bulletin 135. Illustrated, 137 pp., 6 x 9 in.

Occupational Hazards at Blast-Furnace Plants and Accident Prevention. Based on Records of Accidents at Blast Furnaces in Pennsylvania in 1915. By Frederick H. Willcox. Department of the Interior,

Bureau of Mines. Bulletin 140. Illustrated. 147 pp., 6 x 9 in.

Coal: The Resource and Its Full Utilization. By Chester G. Gilbert and Joseph E. Pogue, of the Division of Mineral Technology, United States National Museum. Smithsonian Institution, United States National Museum. Bulletin 102, Part 4. Unillustrated, 26 pp., 6¼ x 9¾ in.

Catalogs Received

Graphite Mine Car Lubricants. United States Graphite Co., Saginaw, Mich. Booklet. Pp. 16; 3½ x 6 in.; illustrated.

"What the Erie Is Doing" is the title of a new bulletin issued by the Ball Engine Co., Erie, Penn., which shows how the Erie steam shovel is employed on various kinds of work.

Anniversary Advertising Portfolio of 85% Magnesia. Magnesia Association of America, 702 Bulletin Building, Philadelphia, Penn. Illustrated, 32 pp., 10¾ x 13¾ in. The book is a large and impressive assemblage of all the educational publicity regarding the association's insulation which has been appearing in the technical press. It is a series of careful presentations of the nature and applications of 85% Magnesia for covering steam pipes and boilers.

Safety Auto-lock Switches, Krantz Mfg. Co., Inc., of Brooklyn, N. Y. Special publication No. 1585-A. These switches are designed for use on circuits wherever the ordinary knife switch may be applied. They are especially designed for safety, it being absolutely impossible to touch the live parts regardless of the position of the switch or of the door. Switches are particularly adapted for use in steel mills, factories, mines and other similar locations where men are employed who have no practical knowledge of electricity.

Recent Coal and Coke Patents

Gas Producer. H. J. Green, Bolton, Eng., 1,252,000. Jan. 1, 1918. Filed July 26, 1915. Serial No. 41,929.

Coal Hole Cover. J. Frank, New York, N. Y., 1,252,795. Jan. 8, 1918. Filed July 21, 1916. Serial No. 110,583.

Coke Oven. J. E. Hubbell, Philadelphia, Penn., 1,254,007. Jan. 15, 1918. Filed June 14, 1917. Serial No. 174,720.

Coal Handling Jig Gate. M. H. Reap, Scranton, Penn., 1,252,947. Jan. 8 1918. Filed May 10, 1917. Serial No. 167,696.

Coal Drill Socket Retaining Apparatus. J. C. Moler, Mulberry, Kan., 1,253,511. Jan. 15, 1918. Filed Dec. 7, 1916. Serial No. 135,605.

Steam Boiler. D. S. Jacobus, assignor to Babcock & Wilcox Co., Bayonne, N. J., 1,252,444. Jan. 8, 1918. Filed Apr. 7, 1917. Serial No. 160,369.

Unloading Apparatus for Bottom Dump Cars. O. G. Petersen, Somerset, Ky., 1,252,717. Jan. 8, 1918. Filed July 12, 1916. Serial No. 108,934.

Ash Conveyor. T. K. Webster, assignor to American Steam Conveyor Corporation, Chicago, Ill., 1,252,522. Jan. 8, 1918. Filed Aug. 28, 1916. Serial No. 117,200.

Mine Car Wheel and Axle. F. H. Gibbs, assignor to American Car and Foundry Co., New York, 1,256,484. Feb. 12, 1918. Filed Nov. 22, 1916. Serial No. 132,827.

Coal Feeder for Gas Producers. W. J. Lindsay, assignor to Camden Iron Works, Camden, N. J., 1,256,340. Feb. 12, 1918. Filed May 26, 1916. Serial No. 100,058.

Mine Car Wheel with Hub Cap. W. V. Johnson, assignor to American Car and Foundry Co., New York, 1,256,137. Feb. 12, 1918. Filed Sept. 22, 1917. Serial No. 192,693.

Hopper Car Door Operating Mechanism. J. M. Rohlfing, assignor to American Car and Foundry Co., New York, 1,256,165. Feb. 12, 1918. Filed Apr. 10, 1917. Serial No. 160,952.

Industrial News

Philadelphia, Penn.—The Jonathan Coal Mining Co. has been incorporated with a capital of $100,000. The incorporators are F. R. Hansell, of Philadelphia, J. Vernon Pimm and S. C. Seymour, of Camden, N. J.

Findlay, Ohio — The Virginia Fuel Co. has been incorporated with a capital of $10,000 to deal in fuel. The incorporators are A. E. Kerns, Chester Pendleton, George W. Corbin, T. C. Schwartzbeck, Gladys E. Yoxthimer.

Buffalo, N. Y.—The Border Coal Co. has been incorporated with a capital of $10,000 to engage in the coal and wood business. The incorporators are B. M. Lempenau, M. L. Heinis of Buffalo, and M. C. Bartholomew, of West Falls.

Philadelphia, Penn.—Nearly 99½ per cent. of the coal coming into this city is clean coal, says the Pennsylvania Fuel Administration, according to a statement issued recently by the General Committee of Anthracite Operators.

San Diego, Calif.—Material for the construction of a concrete coaling platform at the naval coaling depot at La Playa is being assembled. The platform will replace the present wooden decking on which coal is stored. It will be built by day labor.

St. Clairsville, Ohio—The Century Coal Co. has been incorporated with a capital of $60,000. The incorporators are John C. Nichols, David H. Thomas, John H. Anderson, Thomas J. McNamee, Bert W. Hopkins, J. H. Boroff, S. E. Boroff and J. A. Williamson.

Muskogee, Okla.—Headquarters for District 21, United Mine Workers of America, which includes the states of Texas, Arkansas and Oklahoma, was moved on Feb. 28 from McAlester, Okla., to Muskogee. The office had been maintained at McAlester since the organization of the district in 1908.

Bayonne, N. J.—A large portion of the trestle of the Lehigh & Wilkes-Barre Coal Co., at the Port Johnson docks here, was destroyed Sunday of this week. Shipments will be taken care of at the Elizabeth docks. It is believed that a couple of months will be required to rebuild the trestle.

Washington, D. C.—All shipments of coal from the Pocahontas district of West Virginia except that for byproduct use were ordered shipped to tidewater points for bunker and other purposes by the fuel administration on Mar. 10. The orders included all coal standing on mine sidings and continued in effect until the night of Mar. 12.

St. Louis, Mo.—Wood-chopping "bees" marking the inauguration of a movement to conserve coal have been started in St. Louis County. Parties are formed under the guidance of experienced wood choppers and the cords are stored away for next winter's supply. Many districts have pledged themselves to use no more coal until the end of the war.

Denver, Colo.—The Colorado Fuel and Iron Co. reports for the six months ended Dec. 31, 1917, a surplus of $1,647,117 after all expenses and charges have been deducted. Dividends paid on the preferred stock totaled $8000 and on the common stock $513,438, leaving a balance of $1,053,679 carried to the profit and loss account. Profit and loss surplus, as of Dec. 31, 1917, was $7,689,875.

Cincinnati, Ohio—Plans have been completed for a conference in Cincinnati on Mar. 20 of representatives of Ohio Valley cities interested in the improvement of the river for transportation purposes, the Ohio Valley Improvement Association having the matter in charge. Specific plans for improvements in the way of terminal facilities and connections with railroads will be discussed.

St. Louis, Mo.—The Walter A. Zelnicker Supply Co. has recently secured the services of G. W. Bichlmeir, who prior to his association with the Zelnicker company was connected with the supply departments of the Missouri Pacific and Kansas City Southern Railway companies, as well as having been secretary-treasurer of the W. L. Sullivan Machinery Co. Mr. Bichlmeir is connected with the Zelnicker machinery department.

Tacoma, Wash.—Suit for the foreclosure of the property of the American Coal Co.'s mines and improvements near here has been filed in the Superior Court by W. V. Rinehart, Jr., trustee for the Seattle Trust Co. Bonds of the company amounting to $1,500,000 were indorsed by the Seattle Trust Co. Interest since Mar. 1, 1912, when the mortgage was executed has not been paid and amounts to approximately $500,000 more.

Columbus, Ohio—On behalf of a delegation of coal miners from Guernsey County, Governor James M. Cox took steps to see that the district is furnished railway cars on the basis desired by the delegation. The miners say that there are two months in the year, in the spring, when the mines are flooded and they cannot work, and that they wish their cars so distributed as to time that they may get 100 per cent. car supply in times when they can work.

St. Louis, Mo.—Information has been received here that Attorney-General McAllister is preparing to file suits under the anti-trust law against members of the Fifth and Ninth Illinois Districts Association and the Fifth and Ninth Districts Coal Bureau, based on information obtained by him in an inquiry last November and December. McAllister, when questioned, said that he would not act hastily and that he was not prepared to say what his ultimate plan of procedure would be.

Columbus, Ohio.—The announcement is made by Secretary B. F. Nigh, of the Michigan-Ohio-Indiana Coal Association, that the annual convention of the organization will be held in Cincinnati, the exact time to be fixed later. It is believed that the date will be the last week in April. Last year because of unusual war conditions the annual meeting was called off. This year the meeting will be of a strictly business nature and practically all entertainment features will be eliminated.

Springfield, Ill.—A suit has been filed against the Chicago-Williamsburg Coal Co. restraining it and its officials from disposing of its "company stock," requiring the company to display its records and asking that a receiver be appointed for the company. E. H. Buckley filed the suit, alleging that he paid certain debts of the company with agreements that he was to receive 768 shares of stock. He also asks that the stock due him be ordered delivered by the company on order of the court.

Washington, D. C.—Government reports give details of an important addition to the world's coal supply. The new source of supply is guaranteed by the building of a new Peruvian railroad which will run to the eastern slope of the Andes. The coal fields, which are 25,000 ft. above sea level, are estimated to contain about 50,000,000 tons. The coal is said to be of excellent quality. The new railroad will cost about $1,500,000 and will be financed by the Italian bank at Lima. The contract is not let, but the grading probably will start within the next three or four months.

St. Louis, Mo.—Edward F. Goltra, president of the Mississippi Valley Iron Co., who is planning a barge line to the northern fields for shipments of coal and iron ore, has entered a denial to charges of Congressman James A. Frear, of Wisconsin, that he received anything "free" from the Government in the experimental barge trips made under his supervision. Two Government boats, used in making the experiments, Goltra said, were paid for in full. The barge line, which now is nearing reality, is designed to transport iron ore from the northwest ranges to St. Louis and to ship coal from the southern Illinois fields for return cargoes.

Wheeling, W. Va.—The annual meeting of the Ohio Coal Strippers' Association was held in Wheeling on Mar. 7, the principal pieces of business transacted being the admission of West Virginia and Pennsylvania stripping operators, and the change of the name of the organization to the Tristate Strippers' Association. The following officers were elected: President, W. J. Sampson, Youngstown, Ohio; vice president, George A. Blackford, Wheeling, W. Va.; secretary, B. A. Elkins, Cleveland; treasurer, Douglas Vaas, Wheeling; directors, the officers and Everett Ferguson, Steubenville, Ohio; J. A. Swanberg, Danville, Ill., and E. A. P. Roy, Cleveland. The organization now has a membership of 35 operators, representing an investment of $60,000,000. Resolutions were adopted pledging full support to the Government in the conduct of the war. A meeting will be held in Pittsburgh on Apr. 7.

St. Louis, Mo.—A protest has begun to take form against the plan to supply St. Louis and the eastern district of Missouri from the Fifth and Ninth Illinois districts, to the exclusion of the normal supply of high grade coal from Franklin and Williamson Counties, which it is intended to divert to Chicago. While the plan would assure St. Louis of a supply of fuel, it would be practically all of the inferior grade which comes from the Fifth and Ninth districts. There is a disposition on the part of consumers to insist that part of the high grade coal from southern Illinois be sent to St. Louis, particularly as St. Louis is nearer to the southern Illinois field than Chicago and shipments from that field to Chicago will have to go around St. Louis. P. H. Greenlaw, Secretary of the Fifth and Ninth Districts Bureau, has been recommended by operators of those districts as Government Distributor for St. Louis and the Eastern district of Missouri.

MARKET DEPARTMENT

Weekly Review

Coal Year Drawing to a Close—Improvement in Output of Bituminous Due to Better Car Supply—Anthracite Still Short—No Contracting as Yet

THE most eventful year in the history of the coal industry is drawing to a close. Operators, jobbers, dealers and the consuming public are relaxing from the tension of a nerve-wracking winter and turning hopefully toward Washington, whence is soon to come the word that will dispel the clouds of uncertainty that now envelop the Government's plans for prices, zoning, car supply, diversion of shipments and so forth.

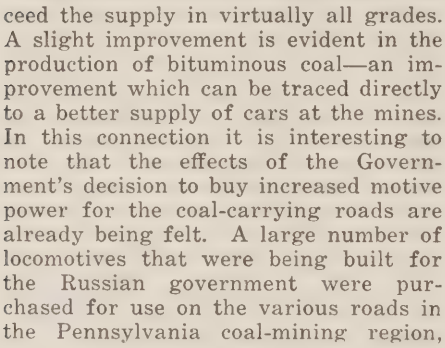
The demand for coal continues to exceed the supply in virtually all grades. A slight improvement is evident in the production of bituminous coal—an improvement which can be traced directly to a better supply of cars at the mines. In this connection it is interesting to note that the effects of the Government's decision to buy increased motive power for the coal-carrying roads are already being felt. A large number of locomotives that were being built for the Russian government were purchased for use on the various roads in the Pennsylvania coal-mining region, and many of them are now in service. It can safely be asserted that with this increase in motive power and a better supply of cars the bituminous mines will soon be producing enough soft coal to meet the country's needs.

As regards anthracite coal, however, the situation is not so favorable. The production of hard coal has about reached its zenith, and it is doubtful if the 77,000,000 tons mined in 1917 will be approximated this year, much less bettered. It has been figured out that the total population of the anthracite-burning area, which includes New England, the Middle Atlantic states and the District of Columbia, is 32,877,609. Therefore, if only 25,000,000 of this total be taken as a basis, it would mean that there would be three tons to every consumer. When it is also considered that this does not include the Government's coal supply, nor the constantly increasing number of war industries that use hard coal, it can be understood readily why anthracite will continue to be scarce for some time.

Indications point to a heavy contract demand after Apr. 1, which is the beginning of a new year in the coal trade. Consumers have still uppermost in their minds the memory of the past winter's sufferings, and they are determined not to fall short again if they can help it. The trade is fixing no prices in contracts, however, the general attitude being that as the Government's prices must necessarily prevail, subject to such future action as the Fuel Administration may see fit to take in the matter of distribution, there is nothing to be gained by a fixing of contract prices. Agreements are being made which simply state that a certain number of tons of a certain kind of coal will be furnished, subject to existing and future Government regulations, and to whatever other contingencies may arise to affect either the price or the supply. The fact that consumers are readily accepting contracts under such extremely indefinite conditions is an indication of the anxiety to secure a fuel supply.

COAL PRODUCTION

Except for time lost in occasional observances of Washington's Birthday as a holiday, the continued fair weather has permitted three consecutive weeks of normal operation with bituminous production well above 1,800,000 tons per day. Preliminary estimates place the output (including lignite and coal made into coke) at 11,055,000 tons during the week ended Mar. 2. The average production per working day was 1,843,000 tons, as compared with an average of 1,777,000 tons for the past year and 1,753,000 tons in February, 1917. The total production of beehive coke is estimated on the basis of railroad shipments at 621,000 net tons, an average per working day of 104,000 tons. The output was the largest recorded since early in December and reflects the improved car supply at the ovens. Anthracite shipments amounted to 39,875 cars.



Steady improvement in operating conditions at byproduct coke plants was reported during the week of Mar. 2. For all plants reporting the ratio of tonnage produced to maximum capacity rose from 77 to 79.9 per cent. The improvement was effected by a reduction in loss due to lack of coal, the tonnage lost for that cause amounted to 14.4 per cent. of maximum capacity. Only one plant reported labor trouble, and its loss on that account was small. Alabama and New Jersey were the only states in which production declined appreciably. An increase in losses due to no coal caused the ratio of tonnage produced to full-time capacity in the former state to drop from 84.3 to 74.4 per cent. Conditions in Massachusetts and Minnesota underwent no change. In all other states, particularly in the Middle West, operating conditions improved. Illinois, which had suffered severely from shortage of byproduct coke reported a production of 84.2 per cent. of capacity. The output in Indiana though still restricted by inadequate transportation, continued to increase. Production in Maryland was 97.8 per cent. of capacity.

TABLE II. CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended:			
	Feb. 9	Feb. 16	Feb. 23	Mar. 2
Bituminous shipments, 121 roads	181,586	189,984	189,691*	196,563†
Anthracite shipments, 9 roads	32,011	40,661	36,612*	39,875†
Beehive coke shipments, 4 roads	10,470	11,357	11,634*	12,753†

* Revised from last report. † Subject to revision.

Atlantic Seaboard

BOSTON

Somewhat less anxiety over current needs. Most of local restrictions removed Mar. 6, and normal hours resumed. Much eagerness to know season program, although no adequate plan has yet been put forth. Washington interested in New England coal statistics. Meanwhile a large tonnage of "Storrow coal" diverted to keep railroads in operation. Army colliers slow in arriving. Textile manufacturers hold conference to support jobbers as performing a necessary function. Emergency supplies doled out to industrials, a few days' supply at a time. All-rail movement fair. Heavy weather again interferes with boats. Dispatch not so good at Hampton Roads. "Storrow" coal beginning to move also by barges from New York piers. Anthracite loading beginning to be less irregular.

Bituminous—The storm of Mar. 10 was a vigorous reminder that winter conditions have not entirely passed. Receipts again show a falling off and demands upon fuel authorities to keep plants running are as insistent as ever. The railroads are still worrying along on an extremely close-hauled basis, and hardly a collier reaches Mystic Wharf, Boston, without a portion of the cargo being requisitioned by the Boston & Maine. All the industrials, too, are working on small coal reserves, but all will admit less apprehension over the near future. Under present conditions distribution is bound to be uneven. The question whether a consumer gets deliveries in contracts depends upon whether his source of supply has a car supply over and above the various "priorities." The buyer who either has no contracts or is unable to get coal in the open market has to make himself heard by the Fuel Administration and there, if possible, he is given a supply, limited usually to a few days. The departments at Washington are still actively supporting the demands made by plants manufacturing Government material, and there is now a detail of officers with Mr. Storrow's office to recommend to the distributors an order of preference in which manufacturers should be served, the classification being roughly according to prior need of output.

Beginning Mar. 6 the regulations governing retail stores, office buildings, etc., the past six weeks were lifted, except for the Federal order requiring two lightless nights per week. The result is a heavier draft upon retail stocks of coal and to such extent that the dealers have been seriously

embarrassed more than once the past week. Efforts to make up the Boston deficiency all-rail are not productive, and it is evident that all distributors must to a greater extent exert themselves at Hampton Roads and elsewhere to get coal loaded. It is observed that large industrials, like paper mills, power plants, etc., are getting coal in somewhat increased volume, chiefly because they are using every means at their command to get barges and steamers to the piers to connect with coal arranged for at the mines. In other words, those who try energetically to help themselves, as in the old days of competition, are likely this year to get better service.

No material change has so far been made in the all-rail order of Jan. 3, covering emergency shipments to the New England Fuel Administration. About 90 cars are now the daily yield instead of the 500 that are so often referred to, and of these about 80 per cent. are going to the railroads for engine supply. Only on one day, and that in January, did actual shipments amount to 60 per cent. on this order.

Only two of the "army colliers" sent here through the Quartermaster-General's office have so far reached Boston. The cargoes were distributed to textile and other plants engaged on war orders. The other ships have not loaded as yet, so the measure of relief to New England industrials through this channel is so far not very great.

Deliveries from emergency supplies at the disposal of the fuel authorities continue to be made on a hand-to-mouth basis, a week's supply usually being the most that a plant of any size can secure from any one cargo. Occasionally this is modified in cases where large consumers are in sections by themselves, as, for instance, the Great Northern Paper Co. at Millinocket, Maine, using more than 150,000 tons. A steamer is assigned for that particular plant and continues until some other arrangement has to be made.

All-rail movement keeps up in fair shape, although every few days there is more or less congestion. It is plain, however, that one or two of the gateways could handle more coal if it were sent to them. Increased shipments over the New York piers for Bridgeport, New Haven and New London are helping out the situation at Harlem River and therefore in the southeastern corner of Connecticut. There have been several cases where plants have actually shut down and there are many more where there would have been shutdowns if the New Haven R.R. had not come to the rescue from its engine supply.

Loading dispatch at Hampton Roads has slackened enough so that two or three days is the best that cargo ships can rely upon. Movement from the mines shows improvement the last few days and when dumping is more regular it is likely that coal will flow to the piers in better volume. Unfavorable weather has interfered with the arrival of boats and there have been days the past week when the public would have been alarmed had it been generally known how little coal was available for the absolutely necessary needs. Of one cargo of "Storrow" coal this week, 17,500 tons in all, nearly half had to be turned over to the Boston & Maine R.R. to keep the Boston terminal in operation.

There is now a fairly steady volume of coal coming forward along the Sound for Mr. Storrow's account, thereby relieving a great many emergency needs inland from Providence and other points. There seems a good supply of box barges for this trade, and in these days of locomotive shortage it should help a lot.

Anthracite—Movement all-rail shows a very material improvement over corresponding days in February, although the number of cars passing the gateways increases only gradually from day to day. Aside from interruptions because of weather the loading of barges at Philadelphia and New York is less intermittent and a better volume of tidewater coal is now looked for. There are many rumors of new methods of distribution the coming season but they are hard to verify. Another week will doubtless see announcements of much importance.

NEW YORK

The announcement from Washington regarding reduction in prices is pleasing to the trade. Retailers arranging for proper distribution of coal. While demand is not so heavy coal remains scarce. Steam coal situation unchanged. Bituminous situation slightly improved due to better car supply. Miners want more work. No inclination on part of producers to make contracts.

Anthracite—The announcement from Washington that mine prices for the domestic sizes will be reduced 30c. per ton during the four months beginning Apr. 1 has gone a great way toward placing the anthracite situation on a firmer basis. Although the flat reduction came as a surprise to most coal men, the change from the old form of discount seems most welcome as everybody realizes the consumer will look upon it with more favor. It will also mean considerable in the way of business to the retail dealer.

Dealers are not waiting for the new prices to go into effect before placing orders for their summer coal. Demand, so far as the wholesale offices are concerned, continues strong, but mild weather conditions have caused a lessening in consumption which has resulted in a let-up on retail dealers and enabled them to put some coal into their yard bins. Dealers in The Bronx, according to the announcement of the Fuel Administration officials, on one day during the past week had more coal on hand than on any day since the early part of the winter.

Supplies at the docks are not heavy, although production is at top-notch. Middlemen dependent entirely upon free coals are not able to find many stray lots.

Cleaner coal is one of the matters of vital interest to the trade. Many complaints continue to be heard but tradesmen say the coal is coming forward in better shape. The operators have assured the public that they are outspoken for clean coal. Inspectors of the Fuel Administration are in the coal regions watching shipments and dirty coal is immediately returned to the shipper.

Harry T. Peters, chairman of the State Conservation Committee, has submitted to A. H. Wiggin, State Fuel Administrator, a report on the fuel needs of New York State and its coal supply for next winter. The report recommends that public service corporations, public utilities and hospitals should put in a sufficient supply of coal to take care of their normal winter needs, that county fuel administrators should investigate conditions in their respective localities and report to the state fuel administrator as to their storage facilities, and that plans should be made so as to facilitate and secure the proper distribution of the necessary quantities of coal.

There has been no change in the steam-coal situation. Buckwheat and rice are practically out of the spot coal market, while barley and culm are difficult to get. Nothing has been heard from Washington regarding the prospects of Government price fixing for these sizes. As the time approaches for the renewal or the making of new contracts for the small anthracite coals there is much conjecture as to what course operators and wholesale dealers will take.

Current quotations, per gross tons, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buckwheat	4.30@5.00	5.50@5.80
Rice	3.75@3.95	4.50@4.80
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—There has been an improvement in the bituminous situation at this harbor, but the demand is so heavy that supplies on hand at the docks do not show an increase. Everybody appears to want coal and as a result the buyer who wants in excess of his contract has a slim chance of picking up free coal.

Reports from the mines are more encouraging than for some time past. Car supply is better, the mines along the Pennsylvania receiving about 25 per cent. of their requirements, while the other roads are doing as well if not better.

Production continues to improve and the Fuel Administration officials are hopeful that the tonnage figures will show the amount necessary to meet the nation's needs.

Consumers without contracts are having a hand-to-mouth existence so far as coal is concerned. Contract coal is none too plentiful, and as practically all of the coal shipped is going on contract or priority orders there is very little left for the spot buyer.

Demand is heavy from all sections of the East, shippers here receiving many inquiries from New England, Canada and the northern part of the state.

It is not likely that many contracts will be closed between now and April 1, the beginning of the coal year, although buyers are showing unusual activity in their efforts to protect themselves. Operators on the other hand are not displaying any great desire to tie up their output, but it is the belief that any consumer having a contract now will be taken care of in the matter of distribution after the expiration of his contract.

PHILADELPHIA

Anthracite spring prices create stir. Order silent on individual differential and broker's commission. Retail trade quiet. Larger dealers anxious to store at present prices. Gross retail margin unchanged. Interest as to contract prices. Bituminous conditions improve, but demand still extraordinary. Rail conditions improve. Increased motive power promised. No contract business.

Anthracite—The feature of the week has been the announcement of the new spring prices by the National Fuel Administration. The plan of making a flat reduction of 30c. a ton on domestic sizes to remain effective from Apr. 1 to Sept. 1 seems to meet with the approval of most interests. According to this the prices beginning Apr. 1 will be as follows:

	Line	Tide		Line	Tide
Egg	$4.50	$5.70	Chestnut	$4.85	$6.10
Stove	4.75	6.05	Pea	3.45	4.35

Unless a change shall be made by the Fuel Administration it will be seen from the new order that the winter prices for next year, beginning with Sept. 1, will be the same as have been in effect during the winter just passing.

For a week past there has been much confusion in the local market, as the state fuel administration had given out the information that the regular 50c. discount, with the 10c. decrease each month, was to be put into effect on Apr. 1. Evidently there was a mix-up somewhere, for the switch to a flat discount of 30c. came with a suddenness that startled.

Due to the publication in the local papers that a price reduction was imminent, together with the mild weather, the retail trade has been extremely quiescent. Probably no better illustration of this was the advertisement of a large local retailer announcing to his regular customers that he was in position to fill orders on all sizes for current consumption, giving the retail prices. This is the first publicity used by any retailer for many months. Business continues quite brisk on chestnut and pea, but many requests to hold the larger sizes are being received by the shippers, especially from dealers who supply the smaller homes.

While the retail business is somewhat inactive, or at least having lost much of its vigor of previous weeks, the stocks on hand continue to be quite small; but some of the large buyers, with more courage than their smaller competitors, are anxious to increase theirs. They claim that despite the announced reduction of 30c. beginning with Apr. 1 they will be willing to pocket this loss on any coal they store now, in order that they may be in position to do business as soon as the rush comes. The wiser ones realize they have nothing on which to base a belief that they will receive substantial shipments immediately after the first of the month. There are a few who admit that if the $2.50 gross margin which they now enjoy is not disturbed they can easily afford to assume this 30c. if only to keep their equipment going. Another thing which inclines them to the belief that there will be no great rush of coal to this market, at least not in excess of last year, is the statement of several operating authorities that they believe the maximum production of anthracite coal has now been reached and that it will be many years, if ever, before the production of the past year will be approximated.

In regard to the margin of gross profit to be allowed the dealers after Apr. 1, nothing definite has been announced and the trade remains on the anxious bench, for it was intimated when the margin was increased it was only because of more difficult delivery conditions during the winter. Chairman Lewis has promised a decision in the matter before Apr. 1.

With the definite announcement of a reduction in prices throughout the summer the dealers began to receive quite a large number of orders, but the rush does not seem to be nearly so large as usual, on account of the reduction being equalized for the entire summer. For this reason some dealers fear that they will be swamped with orders during August, the last month of the cheap coal. However, the coal authorities intend to keep urging consumers

to order at once and in addition the dealers will more than likely solicit orders themselves with the understanding that delivery is to be made before Sept. 1.

Early in the week the records showed but 39,000 tons of coal in stock in the various retail yards. This is estimated as being only 3 per cent. of what the Fuel Administration hopes to see stored in the cellars before fall, by which time it wants to see 1,140,000 tons tucked away.

We learn that much time and thought is being given by the various shippers as to the distribution during the coming coal year. All figures are naturally based on purchases of the past two years. In the latest order issued by the National authorities this matter of anthracite distribution has been placed in the hands of two local men, W. J. Richards, president of the Philadelphia & Reading Coal and Iron Co., and S. D. Warriner, president of the Lehigh Coal and Navigation Co., in addition to J. B. Dickson, of New York. If the public at large is to carry out the desires of the authorities, the coming spring and summer will see more coal delivered to homes than during any similar season in the history of the trade.

While many of the local retailers, with the exception of the larger ones referred to, are inclined to hold orders at this time, this causes no concern with the operating companies, for they are making heavy shipments to the West, while New England also continues to receive attention. The movement to outside markets has been of such volume as to reduce receipts here to about 8000 tons daily.

The local authorities continue to wage the campaign against dirty coal and this week condemned several shipments that had been dumped in the yards of retailers. The local committee also has sent details of its system of inspection to the administrations in the other states receiving anthracite, which method has been approved by the National Fuel Administration.

With the new spring prices in effect much interest is taken in what the new contract prices on steam coals will be. While fewer contracts than usual were closed last year by all the companies, yet there are certain sizes, particularly rice and barley, that the companies are anxious to have assigned in this way. Of course, the steam prices are not controlled by the Government, but it has always been the practice to advance or decrease these prices in sympathy with the domestic coals and inasmuch as the basic prices of domestic coals have not been increased it may be that the steam contracts will remain unchanged.

The prices for the month of March per gross ton of 2240 lb. for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—There continues to be improvement in the situation, due principally to the almost ideal weather conditions, which have assisted the rail movement to a notable degree. This is not to be taken that conditions are normal, for such is not the case, as the shortage is still serious. Numerous plants continue to operate on restricted time and many of the essential industries are still compelled to depend upon the fuel administration to confiscate a considerable tonnage. There continues to be considerable rail congestion and this is particularly true west of Altoona, although eastward from there to this city the improvement has been quite pronounced. The movement of fuel from the southern fields via the Baltimore & Ohio R.R. is also on the mend.

The trade is quite gratified at the decision made by the Government to expend vast sums in the purchase of increased motive power for all the coal roads. If anything the greatest need of the industry has at all times been for more locomotives and the prompt repair of the large number that have been disabled.

Due to the very much unsettled conditions in the trade relating to the Government's control, practically no contract business is being done. As it now stands most interests take the stand that there is no particular advantage to be gained by entering into an agreement. On the part of the consumer, though, he feels that if he can negotiate a contract he will feel some assurance of getting a fairly regular supply. As it now stands he is compelled to plead with his old shippers to keep him supplied, but in the case where the operator is having his production deflected by priority orders the old customers are left out in the cold. This is a condition that the operators themselves are chafing under, as we know of several companies who for the past several months on account of priority orders have not had more than a dozen cars of coal for customers of long standing.

BALTIMORE

Bituminous supply easier, but still apportioned to hard-pressed industries. Little anthracite arriving. Trade looks toward changes coming in April.

Bituminous—Ideal weather conditions for the railroads in this section have speeded up movement. While many mines are still complaining that they have not all the cars they could use by any means, there is no doubt that a great quantity of fuel is now awheel and that even easier conditions are assured for a time. Reports of coal between this point and the mines show that hundreds of cars are on sidings, in addition to those now moving. The coal coming here was readily absorbed, however, and there is still no spot market. As a matter of fact the urgent demand from certain factories is such that the Fuel Administrator is practically directing the distribution of all coal coming here to jobbers.

Anthracite—The trade, of course, generally discussed the 30c. reduction plan for domestic anthracite, and it is for the most part looked on as equitable. The idea of requiring consumers to file requests showing tonnage used, on hand, etc., was also generally approved. These were two of the recommendations of the national coal merchants group while in session here recently. Receipts of anthracite continue light as compared with demand. The approach of spring has lightened the call, as most of those without coal in their cellars have made up their minds to do without until the 30c. reduction plan is inaugurated in April. Even under careful handling of summer distribution the trade is skeptical of ability to furnish consumers with anything like full supply before the advent of next fall and winter.

Lake Markets

PITTSBURGH

Coal contracting awaits new prices. Some reservations made. New inspection system discussed. Car supplies increasing. Large consumers supplied with coal.

Making of coal contracts for the period beginning Apr. 1 naturally awaits the announcement of the Fuel Administration's plans. Never before has the contracting been so long delayed, but it is doubtful if there will be the usual volume of contracting when prices are set, as both producers and consumers are disposed to go slow. Informal understandings have been reached between producers and consumers in many cases that shipments are to continue as formerly, subject to the ruling Government price.

The expectation is still entertained in some quarters that if any considerable advance is made over the present set prices, based on $2.45 for mine-run, there will be times when the open market for free coal will be below the Government limit. That, after all, would only repeat the condition that has often obtained in spring and summer of prompt prices being below the contract level.

Local operators are much interested to see how the inspection system of the Fuel Administration will work out. Undoubtedly the district representatives of the Fuel Administration can find many men willing, or even anxious, to act as inspectors, but it is pointed out that the test of the inspector's ability is not clearly defined. All the operators express themselves as favorable to the elimination of slate and other refuse matter as a material to be carried by the railroads under the guise of "coal," as its elimination would increase the real capacity of the railroads; but none of the operators is willing individually to plead guilty to the charge of shipping 9 per cent. waste matter with his coal. The fact that inspection is at least a possibility may have a good moral influence at the mines.

Car supplies increased slightly last week, while this week opened with very good promise. There is little scarcity of coal in the immediate Pittsburgh district, and practically none at all in the Youngstown district, the large consumers in both districts being in fairly comfortable position as to coal. The steel mills are not running full, however, on account of difficulty in shipping their product, and are therefore not consuming altogether normal tonnages of coal. Jobbers are still doing business, when opportunity offers, on the commission basis, but are doubtful what position the trade will accord them when the commission comes off Apr. 1, as an extra to be charged the ultimate buyer. The market remains quotable at the former set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. extra permitted to be charged by brokers.

BUFFALO

Some car improvement. Bituminous in usual heavy demand. Anthracite not yet meeting wants of consumers. Interest in reports of price reduction.

Bituminous—The situation improves slowly, chiefly on account of the better movement of cars. If this improvement keeps up complaints will soon be over. Some jobbers are able to report good blocks of cars now and then, but not regularly.

There are predictions on the part of some shippers that the cars which have been frozen in all over the country will soon begin to move with a rush, in which case the coal supply will increase fast. It will be hard to get too much of this sort of thing, though, and if it does not go on very far the coal shortage will continue. The winter has apparently gone, so that the need of coal is less.

The uncertainty in the trade continues. Nobody knows what to look for next, and orders from Washington to report this or that phase of the trade are as numerous as ever. Oddly enough, the new zoning order does not make its appearance here, and the taking over of the railroads has not produced any visible change in the running of the roads. Shippers are puzzled.

It is anything but an easy matter to fix prices on bituminous coal, as the various rail rates and orders are complicating. Generally Buffalo pays $4.60½ for mine-run (thin-veined at the Pittsburgh rail rate) with 5 and 15c. less at the Bessemer and Allegheny Valley rates. The thick-vein prices are $4.35 for three-quarter, $4.15 for mine-run and $3.90 for slack at the Pittsburgh rate, all per net ton, f.o.b. Buffalo.

Anthracite—The supply is not good. It seems that the shippers overdid the reduction of weather shipment which was instituted to meet the arrival of mild weather. No distress is possible now, but the supply in consumers' cellars is not increasing to any extent. At the same time many consumers are returning to the exclusive use of natural gas, which relieves the shippers to a great extent.

Shipping agents say that they have no coal to load for lake shipment and do not see how they are going to have any till the local demand is satisfied. Canadian retail dealers are still demanding coal as usual, on the plea that it is entirely lacking in many homes; but the shipments are such that this condition of things will slowly disappear.

DETROIT

Return of wintry temperature stimulates domestic demand. Receipts of bituminous maintain fair volume.

Bituminous—While in a general way the Detroit market presents an easier aspect because shipments are being maintained in fair volume, there is still no excess of supply arriving. The fact that weather conditions through the first week of March were characterized by springlike temperature permitted a considerable reduction in household consumption, thus increasing the supply of coal available for the use of steam plants.

Atmospheric conditions, however, have undergone a conspicuous change, and snow, blustering wind and low temperature have brought a revival of demand from household consumers, many of whom had allowed their supplies to dwindle away during the warmer weather. Records of the Detroit-Toledo railroads' operating committee indicate that shipments of bituminous coal coming into Detroit in the week ending Mar. 9 averaged slightly above 700 cars daily.

Apparently little attempt has yet been made by retail dealers or industrial concerns to begin stocking up reserves for later needs. It is said, in fact, that the quantity of coal coming into the city just about meets present requirements. Some of the jobbers are advising customers to get a reserve as large as possible during the present month, explaining that with the resumption of navigation on the lakes early in April the opportunity for stocking up will likely be much less favorable,

as cars now used in moving coal here may then be required in carrying it from mines to lake loading docks.

Uncertainty as to what prices may be put in effect after Apr. 1 is a deterrent factor as far as the retail dealers are concerned, as also is a statement credited to the Michigan fuel administrator that after Apr. 1, the maximum permissible margin ought to be not more than $2 a ton.

Anthracite—Receipts of anthracite rather fall short of requirements. Practically all the stock now arriving is needed for immediate distribution to household consumers, and retailers are seemingly finding no opportunity to create reserve piles in their yards. With little or no coke available and not much smokeless bituminous in the market, the greater proportion of household users are endeavoring to get anthracite.

COLUMBUS

A much more easier feeling is shown in the coal trade in Ohio. Stocking by domestic users is not as active as might be expected although a considerable tonnage is being laid up for next winter.

The coal trade in Ohio shows a much more normal aspect in every way. With the passing of the low temperatures and the wonderful improvement in transportation facilities the coal situation is much easier and coal men generally now have time to cast around and predict the future of the trade. Steam business is still active, although stocking for that purpose is not frenzied. The opinion appears to prevail that there will be sufficient fuel in this section to take care of current needs for some time to come.

The domestic trade is still active as a large sprinkling of users are taking heed of advice and are stocking for the coming winter. Others are holding off in the belief that they will be able to get Pocahontas and other fancy grades later. There is a marked scarcity of the fancy grades on the local market, due largely to talk of instituting the zoning plan of distribution. But so many complaints have been received against the zoning plan that it is now the belief that Federal authorities will allow the domestic trade at least to develop along normal lines. Dealers are stocking up to a certain extent in anticipation of a better demand prior to the opening of the lake trade. Some of the most farsighted dealers are trying to get as much coal in their yards as possible, as it is believed an advance in price may be made. Wagons which have been used for coal delivery during the emergency of the winter are not now required. On the whole the domestic trade is practically normal as far as supply and demand goes.

The steam business is probably the most active department of the trade at this time. Steam consumers, especially those using the largest tonnage are stocking up as fast as possible and many have accumulated quite a surplus. Manufacturing plants are now completely supplied with fuel. The same is true of public utilities and all interurban lines. Curtailment of service upon the advice of the state fuel administration is still in vogue by public utilities. Some of the larger users are casting around for contracts as the time for contracting is now approaching. But contracts will not be nearly as numerous as in previous years. Railroads are still taking a large tonnage as their freight movement is still large.

The production in all Ohio districts has been gradually increased under the influence of a better car supply. The Hocking Valley is now almost up to capacity and the same is true of the Pomeroy Bend field. Massillon and Crooksville are producing about 75 to 80 per cent. of normal and quite a good increase is reported from eastern Ohio.

Prices of short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.70	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

Demand continues to exceed supply in virtually all lines. Little spot coal available. Contract inquiry is heavy.

The continuation of moderate weather has to some extent caused a diminution of demand, especially from domestic consumers; but the total volume of demand is still much in excess of the available supply, as traffic conditions remain bad, and the car supply is far from up to normal. Virtually all of the coal shipped is being delivered under old contracts, leaving the spot market bare of offerings, or very nearly so. What coal is available is moving at the prices fixed by the Government and is eagerly snapped up. Prospects are for the heaviest contract demand ever witnessed, as all consumers have fresh in their minds the scarcity of the past few months and are determined not to be caught short of coal again if they can help it. The trade will fix no prices in contracts, however, the general position being that as Government prices must necessarily prevail, subject to such subsequent action as the Federal authorities may see fit to take in the matter of prices, car supply, diversion of shipments and so forth there is no use in attempting to fix contract figures. The agreement will simply be to furnish a certain amount of a certain kind of coal, subject to existing and future Government regulations and to whatever other contingencies may arise to affect either price or the supply itself. The fact that consumers will readily accept contracts under such extremely indefinite conditions is a sufficient indication of the general anxiety to secure some guarantee of a fuel supply.

BIRMINGHAM

Domestic demand experiences a slowing up; steam market strong. Production better than last period though curtailed by irregular work and local strikes.

There has been a noticeable slacking up in the domestic demand during the past week, though inquiries continue fairly good. The easing up is due, presumably, to the anticipated new schedule of prices to be announced by the Fuel Administration, effective Apr. 1. It is learned that such schedules will carry some changes in the classification of mines, but further than this it is not known that there will be any revision in prices. It is stated that the mines in the Blue Creek district will be placed on the big seam basis, and other classification adjustments made.

Inquiries for steam coal show no diminution, and some mines producing the soft Cahaba domestic coal, which does not stock so well, have temporarily thrown their output on the steam market to help relieve the stress.

The output of coal in the Alabama field, while showing considerable improvement over a week ago, especially at the mines where differences existed with union labor, and where outputs are nearly normal again, is far below what it should be. Production at the mines of the commercial operators is reported as badly crippled by irregular work and labor shortage. A strike at the Piper mines of the Ivy Leaf and Piper Coal Co. closed that colliery down three days the past week and cut the production 50 per cent. or more.

An ample car supply is being furnished all mines in the district, no complaint being heard on this score.

Coke

CONNELLSVILLE

Much better car supply this week but poor distribution as to consuming points, and competitive market possible in coke loaded in some cars. Labor supply regarded adequate for heavier shipments.

The opening of this week saw the largest car supply in the Connellsville region since last October, also the largest increase from one week to the next that has occurred for a long time. The improvement, assuming it to be lasting, is attributable partly to better movement of empties back from furnaces to ovens, the movement of loaded cars having greatly improved several weeks ago, and partly to the addition to the service of a number of cars released in the east by the clearing of the congestion there.

The Monongahela R.R., which is the governing factor, had an 80 per cent. car supply Monday of this week, with a promise of a 70 per cent. supply for Tuesday. Last week the average was only 43 per cent. while with such a start this week promises about 60 per cent. for an average. The increased car supply this week will help the coke operators more than the blast furnaces, for the reason that the supply of Peoria & Lake Erie cars is much better than that of Pennsylvania cars, and the former reach only a limited number of furnaces. Coke operators will have an opportunity to move a little of the coke they have been accumulating the past few weeks. This may make a wide open market for coke in Peoria & Lake Erie cars, while coke loaded in Pennsylvania and Baltimore & Ohio cars may continue scarce. Market transactions of late have been confined almost entirely to Peoria & Lake Erie deliveries.

While there may be some difficulty in getting out full working forces this week to take care of the large increase in car supply, operators have no fear but that in the long run they will be able to produce and load all the coke the furnaces require, if only they are given the cars regularly.

Nothing specific has been heard as to progress in the movement to reform car distribution and make it in relation to the capacity of the individual coke works instead of, as for a long time past, in relation to the number of ovens in blast.

The market on the whole continues quiet, with only occasional sales of small lots. So far as known all transactions are at the set prices: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1-in., $7.30, per net ton at ovens. So far as known no contracts expire this month, but the major portion of contracts now in operation will run out June 30.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 2 at 285,828 tons, an increase of 29,979 tons, and shipments at 297,234 tons, a decrease of 344 tons.

Buffalo—With the slight stir in bituminous coal the coke trade seems to take up all their time, so that nobody is able to report new business in coke. It remains undecided whether the consumers are going to be able to make their own deals with the ovens direct, as they did last year, and whether the price can be made without reference to the Government rules, as has been the case in general for the present contracting year. The supply to the furnaces remains adequate.

Birmingham—There is little change to be reported in the coke market. Inquiry is stiff and Government figures rule in the business booked. Both foundry and furnace coke supply is far short of requirements. Production is not up to capacity by any means, trouble in coal-mining circles causing a corresponding slump in the output. The problem of securing an adequate supply of furnace coke is becoming a serious problem with the iron-makers, and temporary banking of furnaces has been reported.

Middle Western

GENERAL REVIEW

Trade is delaying buying, waiting for the Government to announce some definite program.

All branches of the coal trade are fully cognizant of the fact that there are to be some changes in the program and have been patiently waiting for an announcement from Washington to outline a policy for the coming year. The trade is awaiting the Government's zoning policy before closing for next year's requirements with any jobber or producer. The fact that some trade papers have suggested there might be a reduction of prices for the early buyers is having its influence regardless of the disastrous results of such a policy last year.

The immediate coal situation is much relieved. The demand for domestic coal naturally slumps with the advance of warm weather. The dealer welcomes a let up in order that he may sum up his accomplishments for the past season and collect outstanding accounts, which have in some instances been neglected, because of the constant attention that was necessary to supply the trade with enough fuel to keep it warm. Many dealers say that a summary of their last year's business indicated a smaller percentage of outstanding accounts at this time than for any similar period for years. Transportation conditions are much improved as to movement. However, cars are still scarce and mines have not worked on an average to exceed 68 per cent. during the past week. The Chicago & Eastern Illinois, Burlington, Illinois Central and Missouri Pacific have all failed to provide sufficient cars to keep local mines in operation.

The receipts of steam coal have reached almost normal, and little or no trouble is expected in the need of western bituminous coal for the immediate future. Few contracts will be made until the Garfield policy is announced. Eastern bituminous and

hard coal is still scarce in the Middle West, dealers reporting that they are unable to buy hard coal for early delivery. This seems to be more than true with the dealers that have had no long-time connection with some firm that handles hard coal.

CHICAGO

Demand for steam good and market brisk. Domestic trade buying only the best grades.

There is still a market here for any grade that comes in. However, the lower grades are finding a market only with the steam user, and the better prepared high grade Illinois and Indiana coal is demanded by the domestic trade. Some few contracts have been closed, but with connections that have been intimate for years; in fact everyone seems to prefer to delay contract negotiations until some definite assurance is had that arrangements made will meet with the approval of the Federal Fuel Administration.

The receipts of eastern coal in this market are by no means normal, though much improved; in fact, more coal from the East is arriving than at any time since November, 1917.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	.....
Washed egg	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.15@2.30	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	.....	.....	2.15@2.30	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Smokeless: Hocking	Smokeless: West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Chestnut anthracite sold out in city and state. Plenty of egg and buckwheat, and also of coke. Plans made to check coal hoarding.

The announcement by the Federal Fuel Administration that anthracite coal would be cut 30c. per ton between Apr. 1 and Sept. 1 has served to check immediate buying to some extent, but it is expected that the advent of April will witness a rush on the part of householders to stock up their bins. At present there is an ample supply of egg and buckwheat anthracite, but chestnut is not to be had. The same is true at points in the interior of the state. Coke is easily obtainable. There is some uneasiness over a report that there will be no chestnut the coming season. State Fuel Administrator W. N. Fitzgerald has given notice that any attempts to hoard coal beyond estimated needs will meet with severe treatment.

W. H. Groverman, of Minneapolis, will supervise coal docks on Lake Superior and the west shore of Lake Michigan the coming season, but his authority does not affect that of the state fuel administration's.

ST. LOUIS

Spring weather has taken all the life out of the local market. Railroad conditions have helped it some, but in a general way the market is loaded with coal and the demand exceedingly light, with no outside coals coming in. Steam demand easy. Car service bad and movement slow.

The local condition is now worrying the shipper more than it is the consumer. During the past two weeks everybody has filled up to storage capacity with both steam and domestic coal, with the result that the demand is practically nothing.

There seems to be an effort on the part of some of the large buyers to hold off buying right now in an effort to break the market. The latter part of the week there were rumors that the prices had been cut under the $2.65 price in some instances, but this could not be confirmed. The situation, however, is a bad one, for several of the mines have had coal left over unbilled. The L. & N. R.R. still has an embargo on Chicago and that has filled the local market with the output of the mines on that road. The ferry of the Illinois Southern R.R. at St. Genevieve went out of commission last week, shutting off the gateway to southeast Missouri and the Lead Belt, with the result that an additional tonnage was thrown in here.

The Illinois Central, however, has been running about two to three days a week with a scant supply of cars, and the same condition is to some extent true of the M. & O. and L. & N. The Iron Mountain R.R. is perhaps as bad, if not worse. The movement on most of these roads is exceedingly poor. For the first time in many months the Terminal situation is practically normal, and cars locally are beginning to move in somewhat reasonable time.

In the Carterville field working conditions are improved, but not as they should be, on account of the poor car supply afforded by the Iron Mountain and Illinois Central. The Chicago & East Illinois has somewhat better service and the Burlington is doing remarkably well. The greater portion of this coal is still going for railroad purposes, and the Government orders have let up some, but no coal to speak of from this field is coming into St. Louis. In the DuQuoin field conditions are somewhat similar.

The Mt. Olive district has a tendency to be a little bit long on domestic sizes, and especially is this so when loaded in equipment restricted to St. Louis. All equipment that can move to the north and west is billed out that way, and a fairly good market is found north and west; but this is diminishing fast under the heavy tonnage supplied.

The Standard field is about ready to break on the price. The Chicago market shut off shipments of Standard coal and that has practically shut everything in here locally.

The country buying has not been as good as it was a year ago, and in a general way the condition is not satisfactory to the shipper. There is no indication that any cold weather will be severe enough to bring about any great change, and the only thing that can be expected to bring any relief will be the fact that the public will generally begin the storage of coal in April. This will have a greater effect in the way of moving tonnage than two weeks of real severe weather at this particular time.

There have been no shipments of anthracite, with the exception of from 12 to 15 cars, and no smokeless and but a small tonnage of Arkansas. The local coke situation is somewhat easier and some yards have a small supply.

During the past couple of weeks there have been some contracts made by operators for a maximum and minimum tonnage of either lump, egg or nut, as the operator may choose, and in the event that he cannot get it, mine-run at the Government price prevailing at time of shipment, with a stipulation to the effect that if there is any increase it shall be added. The contract is just a mere form of protection for the buyer, he having the assurance that he will have some regular source of supply.

The local market is per net ton f.o.b. mine:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.50	.....

Williamson & Franklin Co. rate is 87½c. Other fields 72½c.

SEATTLE

Washington coal to be reclassified with maximum price fixed for every grade and preparation. Some prices to be lowered, others raised.

The coals of Washington will be completely reclassified and maximum prices fixed for every grade and preparation of coal produced by the mines if recommendations forwarded to Washington by David Whitcomb, state fuel administrator, are accepted by the national fuel administrator. The recommendations are based upon the report of the mine price board, which spent six weeks in formulating the new classification and new prices. The exact prices will not be given out until a decision in the matter is made by the national head of the Fuel Administration, but it is known that some radical changes in prices, some increased and some decreased, have been asked. The figures are based on an accurate tabulation and knowledge of mining costs in the various fields of the state. Sizes and the composition of mixtures have been taken into consideration so that all classes of coal will have a definite price hereafter.

General Statistics

BALTIMORE & OHIO

The following is statement of the coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of December, 1917, as compared with the corresponding month of the previous year:

	Tons, 1917	Tons, 1916
Coal	2,911,244	2,749,964
Coke	231,032	309,791
Total	3,142,276	3,059,755

ANTHRACITE SHIPMENTS FOR FEBRUARY, 1918

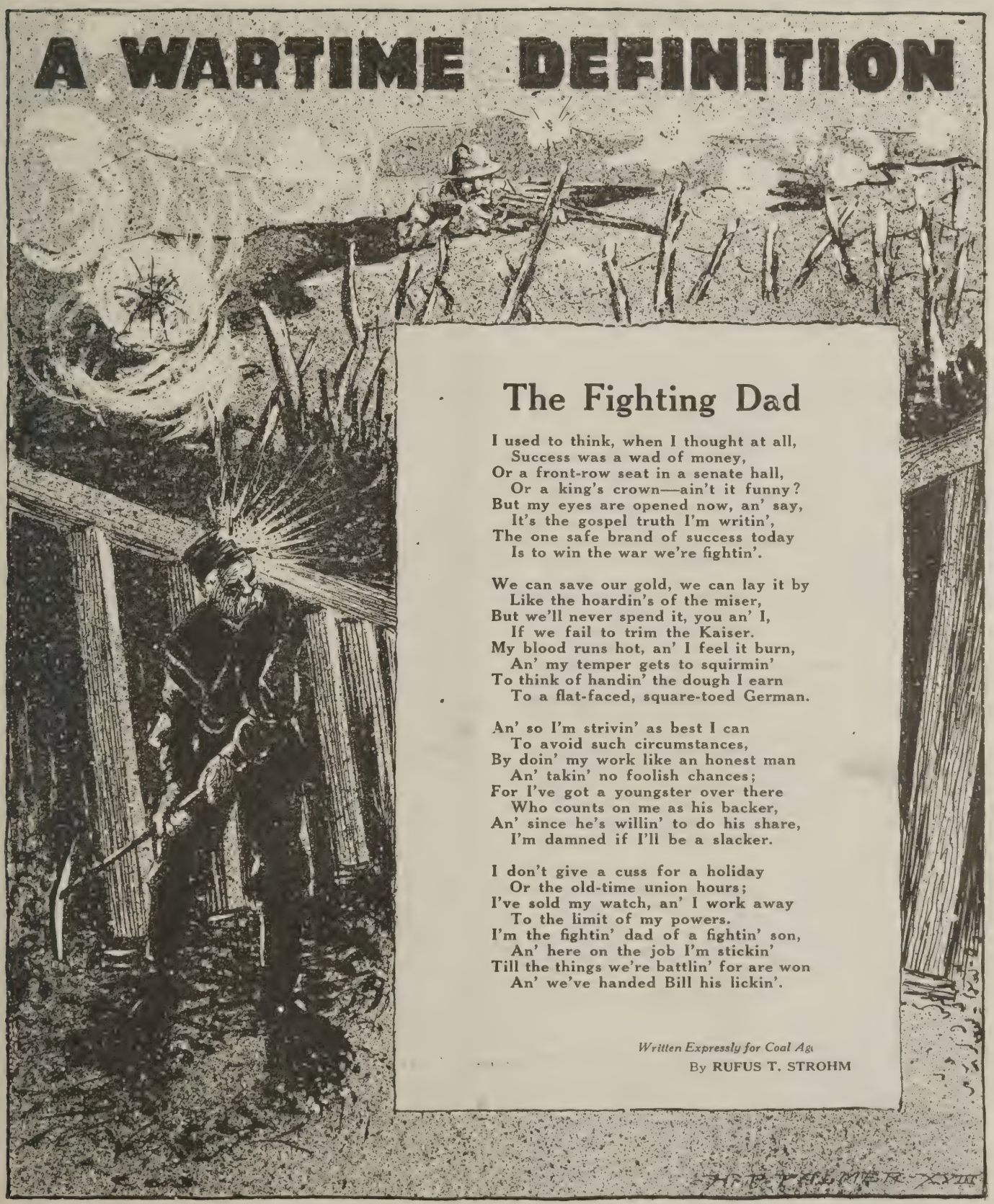
The shipments by carrier companies in February, 1917, and 1918, and for the coal year to date, were as follows:

	February, 1918	February, 1917	Coal Year, 1917–1918	Coal Year, 1916–1917
P. & R. R. W	1,107,982	966,725	13,459,445	11,541,178
L. V. R.R.	1,042,784	909,704	12,865,850	10,934,270
C. R. R. of N. J	638,557	536,023	7,598,756	6,485,736
D. L. & W. R.R	997,550	901,098	11,372,936	9,776,614
D. & H. Co	600,799	482,638	7,892,860	6,518,233
Penna. R.R	459,271	428,230	5,123,695	5,001,516
Erie R.R.	614,210	637,325	7,975,611	6,930,053
N. Y. O. & W. R. W	177,047	143,711	1,865,556	1,739,542
L. & N. E. R.R	286,147	225,944	3,670,561	2,535,179
	5,924,347	5,231,398	71,825,270	61,462,321
* Deduction	* 112,265	* 52,966	* 1,349,732	* 674,807
	5,812,082	5,178,432	70,475,538	60,787,514

* Deduction: Tonnage reported by both C. R.R. of N. J. and L. & N. E. R.R.

COAL AGE

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The Fighting Dad

I used to think, when I thought at all,
Success was a wad of money,
Or a front-row seat in a senate hall,
Or a king's crown—ain't it funny?
But my eyes are opened now, an' say,
It's the gospel truth I'm writin',
The one safe brand of success today
Is to win the war we're fightin'.

We can save our gold, we can lay it by
Like the hoardin's of the miser,
But we'll never spend it, you an' I,
If we fail to trim the Kaiser.
My blood runs hot, an' I feel it burn,
An' my temper gets to squirmin'
To think of handin' the dough I earn
To a flat-faced, square-toed German.

An' so I'm strivin' as best I can
To avoid such circumstances,
By doin' my work like an honest man
An' takin' no foolish chances;
For I've got a youngster over there
Who counts on me as his backer,
An' since he's willin' to do his share,
I'm damned if I'll be a slacker.

I don't give a cuss for a holiday
Or the old-time union hours;
I've sold my watch, an' I work away
To the limit of my powers.
I'm the fightin' dad of a fightin' son,
An' here on the job I'm stickin'
Till the things we're battlin' for are won
An' we've handed Bill his lickin'.

Written Expressly for Coal Age

By RUFUS T. STROHM

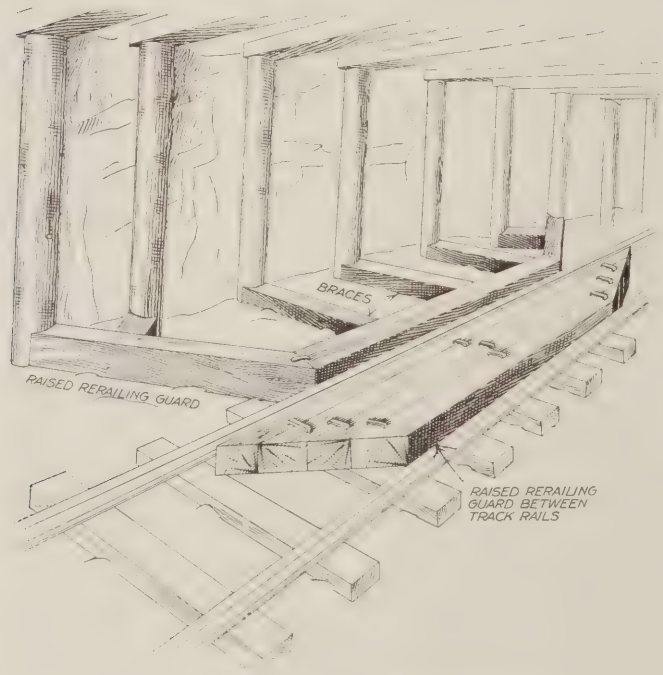
IDEAS AND SUGGESTIONS

A Simple Rerail

BY RALPH W. MAYER
Roslyn, Wash.

The Roslyn Fuel Co. uses a simple device for replacing derailed cars upon the track automatically. It is placed at the top of the slope just below the knuckle. Cars which are on the rails pass without touching it, but those which have become derailed are promptly replaced upon the rails. Heavy planking is spiked close against the outside of the rail, the top surface of the planking being as high as or a trifle higher than the top of the rail. A piece of 6 x 8-in. timber is spiked on top of this planking, parallel to the rail. This timber is placed just far enough from the rail so that the tread of the car wheel will clear it when the car is on the track. This timber should be 10 or 15 ft. long.

From both ends of this timber other timbers of the same size are placed at a long sloping angle to the rib of the incline, or entry. The side of these timbers next to the rail should be shod with iron to prevent the derailed cars from chewing into the wood, and to slide the cars over onto the rails easily. Braces are placed from these timbers extending back to the rib, or to



DEVICE TO REPLACE DERAILED CARS

the legs of the timber sets. The car wheels striking the long slanting timbers which are placed at an angle with the rail are crowded over to the rail and up onto it, the long timber parallel to the rail holding the wheel upon the rail.

Between the two track rails planking is spiked. The top surface of this planking is even with the top of the rails. Room for the flange of the car wheel is left next to the rail. Other timbers are spiked on top of this planking, just high enough to clear the axles of the cars. The under planking extends beyond the ends of the top timbers about 6 ft. The top timbers are laid tight up one against the other or skin to skin. Their ends are cut on a long slant, so that those next to one rail are about 10 or 12 ft. longer than those next to the opposite rail.

The long side of this rerailing guard between the tracks, should be placed next to the rail which has the outside rerailing guard. The ends of the timbers between the rails should be iron shod the same as the outside guards. These timbers catch the inside wheels of the derailed car and crowd them over onto the rail, while the guard outside the rails crowd the outside car wheels in a similar manner. The length of the inside and outside guards should be such that the car wheels strike the outside guard first and slightly before the wheels touch the guard between the rail.

Retiring Mine Locomotive Trucks

BY JACK L. BALL
Amsterdam, Ohio

The life of the tires on mine locomotive trucks varies. Sometimes it is necessary to replace such tires after four months' service; then again, they may last for a year or two, depending greatly on the actual working conditions, length of haul and to a considerable extent on the motorman. Occasionally we find men who use sand when it is not at all necessary, and sand is injurious to both tire and rail; others sometimes grind away just to see the sparks fly. Poor contact causes arcing, which shortens the life of a tire. The purpose of this article, however, is not to discuss why tires wear out, but to give a few suggestions to those who may have to retire a set of trucks.

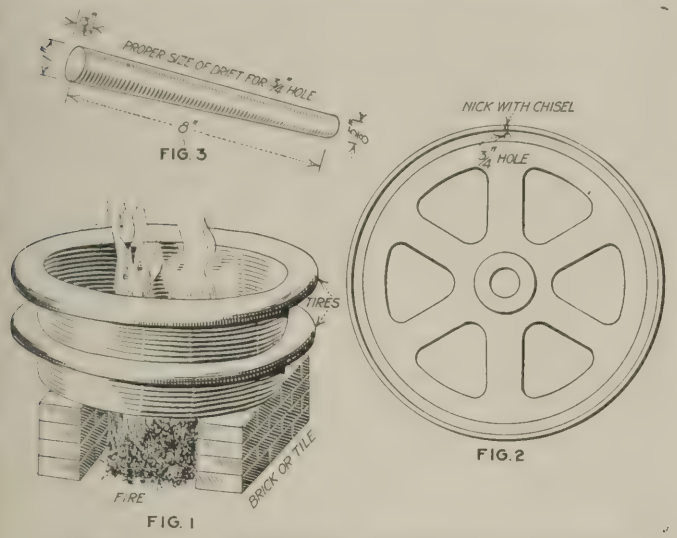
Assume that the locomotive to be retired is outside of the mine; then, by using a few bricks, you can build a support like that shown in Fig. 1. Place the tires one on top of another and build a good fire. If you have four tires it is better to build two fires, as a more even heat can be secured by placing two rather than four tires over each fire.

With a ratchet or some other kind of portable drill bore a ¾-in. hole entirely through the center of the tire to be removed. This hole should be drilled over a spoke if possible (see Fig. 2). Then take a cold chisel and nick the tire deeply, directly over the drilled hole. Insert the drift (see Fig. 3); then with the aid of a sledge little trouble will be experienced in loosening the tire. The sledgeman should stand to one side of the drift when sledging, as the drift may fly out with sufficient force to break an arm or a leg.

It is a good plan to drill all the holes and then remove the tires, or if a helper is employed the work may be arranged to any agreeable advantage. By the

time all the old tires are removed the new ones should be hot enough to shrink in place.

New tires should not be heated to any degree of color. An easy test is to throw a little water on them, and if they are hot enough the water is instantly converted into steam; in other words, the water will "sizzle." It should be borne in mind that a tire which is too hot is liable to warp out of round. It is sometimes im-



FIGS. 1 TO 3. RETIRING LOCOMOTIVE TRUCKS

possible to get a tight fit on account of the tires having expanded too much; again, unless care is exercised during the shrinking process, tires are liable to burst through undue contractional strains.

When the tires are at about the right temperature put one in place. A bucket of water and some waste or old rags should be close by. Wet the waste or rags, and apply them to the tire until it is comfortably warm to the hand. This cooling should be done gradually. Do not use a stream of water from a hose, as this sometimes causes a great deal of trouble.

Where an oxyacetylene torch is available the tire can be cut away more quickly than by the drill and drift method. In using a torch, however, one thing should be borne in mind—the channel should be cut evenly all the way across. When the cut is deep enough the tire will break away, owing to the strain caused by the shrinkage.

The Mining Camp Pest

By Observer

Rosemont, W. Va.

For creating dissension, disturbance and general misunderstanding, the mining-camp gossip belongs in the same class with the I. W. W. and the German propagandist. One woman of this sort can cause more trouble and do more to impede the smooth running of a mining plant than would seem humanly possible. And every community seems to have at least one of these pests. If she is a miner's wife, that is bad enough; but if she happens to be an official's wife, no matter how subordinate his position, the situation is doubly serious. Husbands, most generally, have a habit of listening, at least with one ear, to what their wives say. And if a man is narrow enough to give credit to everything he hears, he makes a perfect medium for his gossiping wife's activities.

Often one woman spreads dissatisfaction among her neighbors by repeating conversations, purely fictitious or with a slight degree of truth, which conversations were supposed to have taken place between a superintendent, mine foreman or some other company official and her husband and, usually, containing some criticism of some employee, whose ears it finally reaches; or that improvements are to be made to the house which she occupies and to no other house; or her "man" is to have the best working place; or some other apparently idle, but nevertheless dissension-provoking gossip.

The worst feature of this evil is that there is nothing one can put one's finger on. A man cannot be discharged simply because his wife gossips. Yet if he possesses a wife or family with a fertile imagination, coupled with a malicious and agile tongue, he may as well say farewell to his hopes of a better job.

Though there is a fixed price for wheat, coal and other things, there seems to be no restrictions of any kind on a woman's tongue; and the damage that it often does is incalculable.

Safe Loads for Beams of T-Rails

By Sheldon Smillie

Indiana, Penn.

Owing to their availability at all times, old and new T-rails are being constantly used around mines as beams or reinforcing for concrete.

The accompanying table giving the safe load for various spans was calculated for the convenience of mine superintendents and foremen. It is based on new rail of the American Society of Civil Engineers standard sections for the weights given. It gives the net safe load uniformly distributed over the entire span, the weight of the beam itself being deducted from the figures. Allowance must of course be made for old rail based on its condition and length of service. Rail deteriorates rapidly when used for electric haulage and halving the safe load for rails having had much service would not be too great an allowance. If the load is concentrated at or near the center of the span the figures in the table should be reduced one-half.

In reinforcing concrete slabs or roofs it is safest to consider the steel as carrying all the load and the weight of the concrete as well, since the concrete itself is valueless in tension. A crack on the under side might throw the upper side counted on for compression into tension, thus causing failure.

SAFE-LOADS FOR T-RAIL BEAMS

Span, in Feet	Rail Weights 12 Lb.	16 Lb.	25 Lb.	30 Lb.	35 Lb.	40 Lb.	45 Lb.	50 Lb.	60 Lb.	80 Lb.
4	1,668	2,570	4,765	6,725	7,910	9,547	11,420	13,563	17,810	26,843
5	1,325	2,120	3,790	5,280	6,310	7,613	9,095	10,816	14,200	21,416
6	1,092	1,755	3,145	4,380	5,235	6,320	7,535	8,950	11,700	18,800
7	923	1,490	2,678	3,745	4,480	5,327	6,445	7,643	10,080	15,213
8	803	1,295	2,335	3,250	3,885	4,683	5,605	6,656	8,765	13,256
9	695	1,140	2,060	2,870	3,440	4,130	4,955	5,890	7,760	11,740
10	630	1,013	1,829	2,565	2,961	3,705	4,430	5,273	6,940	10,507
11	565	914	1,650	2,315	2,767	3,360	4,005	4,766	6,280	9,496
12	510	827	1,492	2,100	2,512	3,027	3,640	4,340	5,710	8,650
13	462	752	1,363	1,907	2,300	2,770	3,330	3,963	5,240	7,928
14	420	686	1,249	1,761	2,065	2,552	3,065	3,651	4,820	7,316
15	375	642	1,150	1,625	1,945	2,350	2,835	3,380	4,470	6,780
16	353	582	1,068	1,503	1,799	2,163	2,625	3,133	4,150	6,303
17	326	538	966	1,397	1,667	2,023	2,445	2,916	3,860	5,880
18	296	497	905	1,298	1,552	1,878	2,275	2,725	3,610	5,500
19	271	460	842	1,209	1,445	1,755	2,130	2,548	3,380	5,163
20	250	426	783	1,125	1,348	1,640	1,995	2,386	3,175	4,846
21	230	396	727	1,054	1,260	1,532	1,870	2,240	2,985	4,570
22	....	368	678	985	1,179	1,434	1,755	2,108	2,810	4,313
23	....	342	630	923	1,104	1,345	1,655	1,960	2,690	4,066
24	....	317	587	861	1,033	1,262	1,552	1,870	2,500	3,850

Economy of Electricity Over Steam for Colliery Power Purposes*

By R. E. HOBART
Mechanical Superintendent, Lehigh Coal and Navigation Co., Lansford, Penn.

THE development of the Hauto power plant and the claims made by various engineers that electricity was more economical than steam for power purposes in and about the mines, led the Lehigh Coal and Navigation Co., in 1911, to conduct a test to ascertain the consumption of power used by a large steam hoisting engine. The question being one on which no reliable information could be found, and the opinion of various engineers differing to such an extent, it was decided that a test under actual operating conditions was necessary. This was arranged for at one of the collieries. The engine selected was a 30 x 60-in. piston-valve engine of modern type, and comparatively new.

The boiler plant from which the hoist received its power was about 600 ft. from the engine, the latter being fed by a 10-in. steam line insulated with magnesia pipe covering. Two batteries of the boiler plant, aggregating 1200 hp., were cut off and fed into a separate steam line leading direct to the hoist engine. Steam auxiliaries, consisting of feed-water pump and blowers, were fed by the boilers in test, and their consumption charged against the hoist. A barrel weighing device was installed, as it was felt that this would be the most accurate way of determining the consumption of water. The fuel, No. 3 buckwheat, was carefully weighed, and every precaution was taken to make the test accurate in every particular.

Test Was Run for One Week

The test was run for one week, or a total of 168 hours. A record was kept of the number of trips hoisted or lowered, and continuous indicator cards were taken. One particular set of cards was taken with the hoist operating balanced, and also with the hoist operating with no counterweight other than the empty cage, the coal in the car being weighed. This speed of the hoist was taken by means of a graphic recording instrument which registered the number of revolutions every 5 sec. From this record, speed-time curves were plotted.

The test was divided into two periods: working time and idle time. The hoist did not operate between the hours of 5:30 p.m. and 6:30 a.m., nor from 3:30 p.m. Saturday until 6:30 a.m. Monday morning. The actual working time, therefore, was 64 hours, and the idle time 104 hours for the week. The total weight of coal used in idle time was 108,075 lb., while the coal used in working time was 119,950 lb. From these figures, the amount of coal consumed per hour to cover standby losses would be $108{,}075 \div 104 = 1038$ lb. of coal per hour.

During the week, 1705 cars of coal were hoisted from a depth of 581 ft. A tabulation of test results is shown in Table I.

*Presented at the February, 1918, meeting of the American Institute of Mining Engineers, New York City.

From these results, it will be noticed that to the 104 idle hours, representing the period when the hoist was not operating, must be added the idle time occurring between hoists during the operating period, which makes a total of 156.2 hours, the actual hoisting time being only 11.82 hours in the week. From these surprising results, the Lehigh Coal and Navigation Co. felt that it would be advisable to use electric power at the new operation to be developed at No. 11 shaft.

It is a well-known fact, in the anthracite region, that the working time of a coal hoist is only from 8 to 9 hours in a day, the night hoist being intermittent. At the time the test was made very few electric hoists of this capacity were in operation, and most of the larger ones had either the Ward Leonard or Ilgner system of control, the only large induction hoists being in South Africa. Various hoist engineers were consulted on the different types of hoists using alternating current. Propositions were submitted on the Ward Leonard and Ilgner systems, as well as on the induction-motor type. All these hoists have their good and bad features. The Ward Leonard system consists of a motor-generator set in which an alternating-current motor is directly connected to a direct-current generator, which generator furnishes power to a direct-current hoist motor. The Ilgner system also consists of a motor-generator set, which drives a direct-current hoist motor, the generator being separately excited. By means of a flywheel and slip regulator, the load peak on the power system is practically eliminated. The other type of hoist is driven with an induction motor, with a polar-wound rotor to permit of the addition of external resistance to the rotor direct.

The lift at No. 11 shaft was 266 ft., and the desired number of cars to be hoisted per hour was 120. This short lift and the number of cars per hour would mean numerous peaks, which from the brief description given of the different systems might make it appear that the Ilgner system would have been the better one to use. However, when it was considered that the working day at that time consisted of 9 hours, with occasional hoisting during the remaining 15 hours of the day, and with

TABLE I. TABULATION OF RESULTS, HOISTING BY STEAM

Depth of shaft, ft.	581
Weight of coal per car, lb.	8,960
Coal used during 104 idle hours, lb.	108,075
Coal per hour idle, lb.	1,038
Trips during week.	1,705
Actual time used in hoisting, sec., $1{,}705 \times 25$	42,625
Actual hours hoisting $42{,}625 \div (60 \times 60)$	11.82
Seconds during week.	604,800
Seconds idle during week.	562,175
Idle hours.	156.2
Coal used during idle time, lb., $156.2 \times 1{,}038$	162,135
Coal used during hoisting, lb., $228{,}025 - 162{,}135$	65,890
Coal used per trip, lb., $65{,}890 \div 1{,}705$	38.6
Horsepower-hours per trip, $\frac{581 \times 8{,}960}{33{,}000 \times 60}$	2.63
Coal per horsepower-hour, lb., $\frac{38.6}{2.63}$	14.70

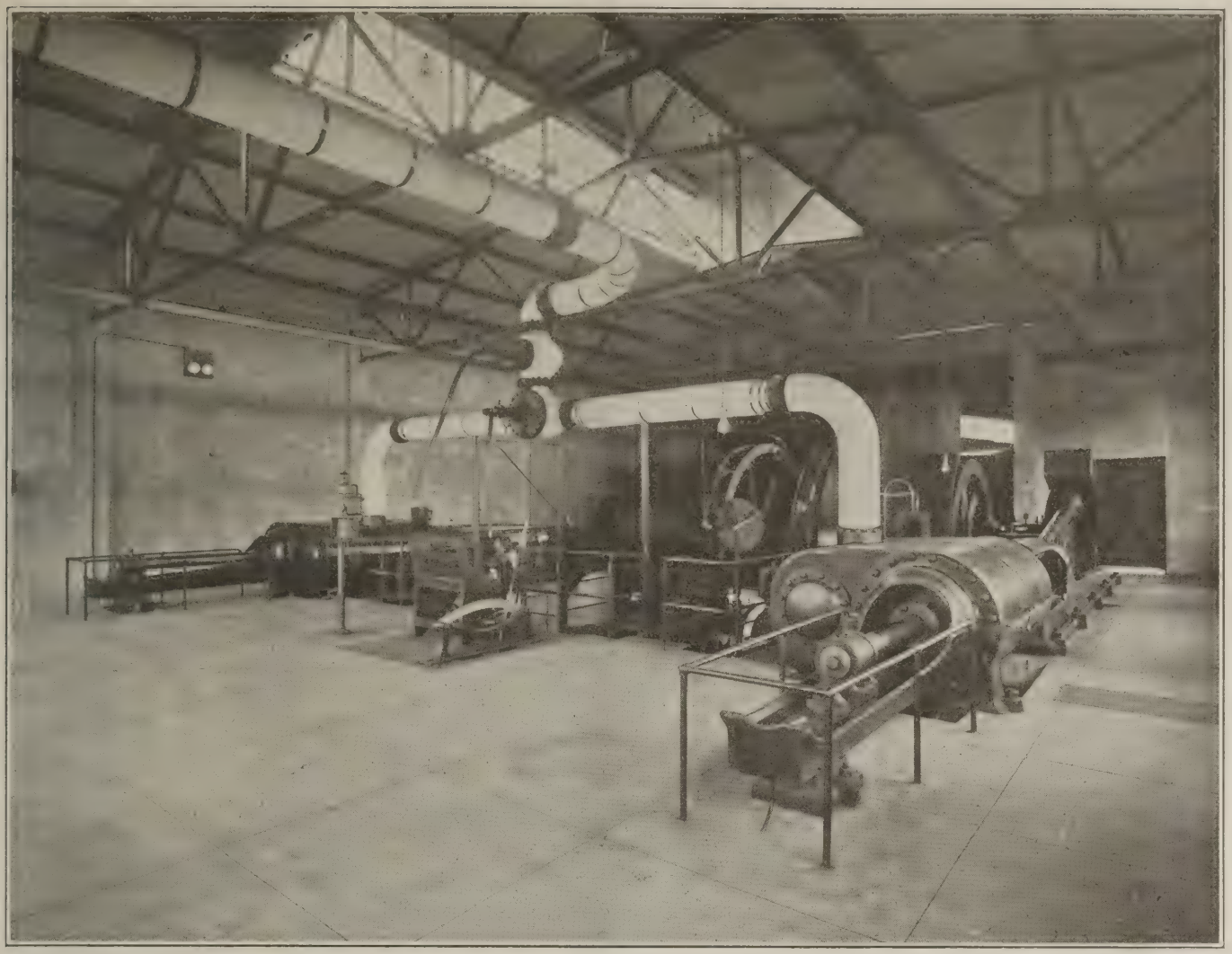


FIG. 1. STEAM HOIST, 30 x 60 IN., LEHIGH COAL AND NAVIGATION CO.

frequent stoppages for various reasons during the working time, it will readily be seen that the generator set would be operating continuously, whereas the actual work done by the hoist would be very little. The other disadvantage of the Ilgner system is its high first cost, the hoist costing about 60 per cent. more than an induction hoist. It was therefore decided to use a slip-ring induction-motor system. Its disadvantages of poor efficiency, low power factor and high load peaks in starting were offset by the fact that when the hoist is not working, no current is used for the hoisting system excepting the small amount necessary to run the pump for the liquid rheostat, which may be shut off at the will of the operator.

At all the company's operations, synchronous converters are used in connection with the mine haulage. It was found that there was sufficient converter capacity connected to the supply line to permit of a great deal of power-factor correction.

The next important feature connected with this hoist was to design and make a proper control system. The usual control for electric hoists up to that time consisted of a slow-down device at a predetermined point in the travel, or a device that would automatically operate the controller and apply the brake at a predetermined point. The overwind features were also included.

From experience with steam hoists, it was felt that this type of control would not do for electric hoists, on account of fluctuating loads. Many times loaded cars are hoisted without balance, and loaded cars are lowered at various times, and, what is more important, from 75 to 100 trips a day are made for raising or lowering men. To meet these varied conditions, the company insisted that the following features should be embodied in the control of this hoist:

1. Hoist must not over-travel in either direction.
2. It must be impossible for the operator to start hoist in wrong direction at either limit of travel.
3. Hoist must not back away, due to failure of power or overload.
4. Protection must be provided against overspeed, due to any cause whatever in any position of travel.
5. Emergency brake must set and power be interrupted if operator fails to retard hoist approaching landings. This value to be graduated and to be adjustable to meet conditions.
6. Hoist must not start return of power if operator has carelessly left lever in "on" position.
7. If control circuits become grounded, hoist must stop.
8. If operator fails to keep power brake in proper adjustment, emergency brakes must set and power must be interrupted, to remain so until operator has readjusted brake.

9. Hoist must be brought to rest and brake applied on loose drum before clutch can be disengaged.

10. It must be impossible to release brake on loose drum while clutch is disengaged.

11. Pawl must be provided, interlocking with clutch engine lock, this pawl to engage in loose drum before clutch can be released.

12. It must be impossible to operate hoist unless clutch is full "in" and locked.

13. Air reservoir must not be drained by emergency stopping of hoist.

14. There must be no delay in operation of hoist due to emergency stopping.

15. It must not be necessary for operator to call assistance in case of emergency stop, over-travel or otherwise.

16. For operating hoist, multiplicity of levers must be avoided; two will be allowed—namely, brake and control.

17. Hoist operator must not be endangered by flying levers in emergency stopping of hoist.

18. No safety features must be dependent on the will of the operator.

19. Switch must be provided on operator's platform for an emergency stop, if necessary.

20. Travel limits and speed range must be adjustable.

21. Current input and acceleration of hoist motor must be governed automatically.

22. Hoist must start from rest gradually without excessive jerks and come to rest smoothly, and must be under control of the operator at all times.

23. The speed of the hoist must be varied by cutting the resistance into or out of the rotor circuit. The rheostat must be of the liquid type and of ample capacity to meet all operative conditions.

All the foregoing features were met in every particular, and it will be found that this type of control for slip-ring induction motor hoists has been made standard by the larger hoist manufacturers.

This hoist was placed in operation on Apr. 16, 1915, and to date has operated with no delays and very little upkeep. During 2½ years, the only repairs necessary to keep the hoist in operation have been a few contact tips for the reversing switches, and packing for the brakes and rheostat pump. The average power used for hoisting a car of coal 266 ft., including line and transformer losses, is 2.59 kw.-hr., which at 8 mills per kilowatt-hour amounts to $0.0207 per car, the average weight of coal in the car being 8960 pounds.

In connection with the electrification of the hoist, it was decided to electrify both inside and outside the mines. The electric haulage system was already installed inside, but the fans, pumps and air compressor were steam driven. The fan, which was situated on Sharpe Mountain, was about 100,000 cu.ft. per min. capacity, being driven by an 18 x 36-in. slide-valve engine.



FIG. 2. ELECTRIC SLIP-RING INDUCTION HOIST, NO. 11 SHAFT, RAHN COLLIERY

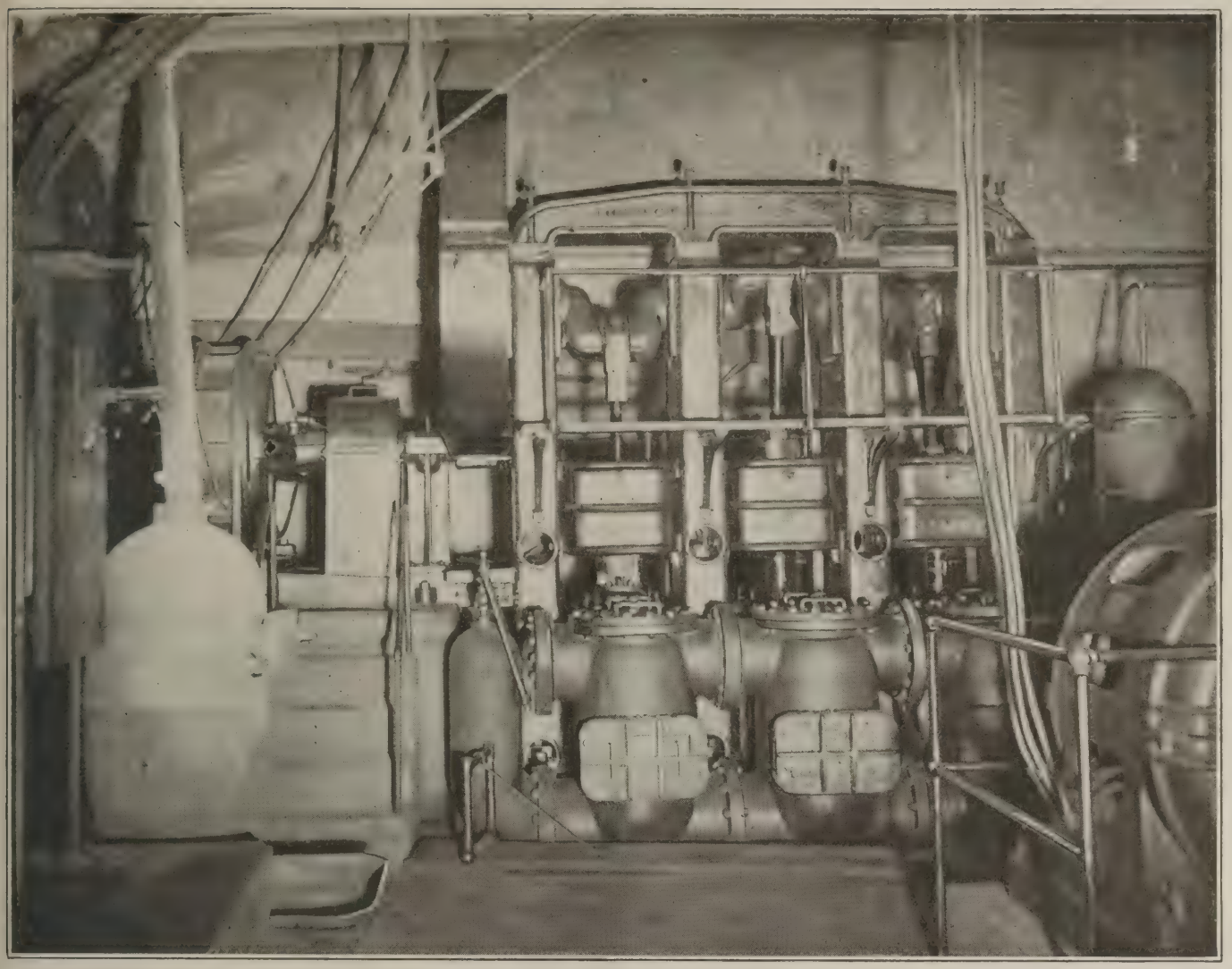


FIG. 3. TRIPLEX PUMP, NO. 11 SHAFT, RAHN COLLIERY

The hoisting engine and air compressor were situated near the fan and close to the boiler plant. The development of the new No. 11 shaft allowed the abandonment of the 30 x 60-in. hoisting engine, as the new electric hoist would operate from the same level as the steam hoist. In place of the 900 cu.ft. per min. steam-driven air compressor, we erected one of 1500 cu.ft. per min., electrically driven by a 250-hp. synchronous motor. A 200,000 cu.ft. per min. fan, driven by a 150-hp. slip-ring induction motor, was installed to take the place of the steam fan, and a small steam plant was built for heating.

The steam pumps were located in a pumphouse south of the bottom of the old No. 11 shaft. As this shaft was to be abandoned, it might be interesting to explain the various features of the electric pump installation in the mines. No detailed figures are available on the steam costs of operating the mine pumps, as at that time separate costs for the different units taking steam from the central boiler plant were not kept. The old pumping plant consisted of one 42 x 20 x 72-in. duplex pump, and two 16 x 48-in. single pumps. At various times, in flood seasons, it was necessary to install water tanks in the coal shaft either to prevent drown-outs or hoist the water from the mine in case of a drown-out.

The sump for the old pumphouse was situated about 50 ft. south of the old shaft, so it was decided to drive a small sump tunnel from the old sump into the shaft sump. The old sump was also extended westward about 300 ft., making the opening into the sump on a pitch, so that a car could be run into the main sump for cleaning purposes. One 1500-gal. per min. triplex, one 1500-gal. and two 3000-gal. all-bronze centrifugal pumps were ordered for this pumphouse. The triplex and the 1500-gal. centrifugal pumps were placed south of the shaft, and the two 3000-gal. centrifugal pumps were placed north of the shaft. The tail pipes of the 1500-gal. and the two 3000-gal. centrifugal pumps were run into the shaft sump, while the tail pipe of the triplex pump was run into the main sump. A ditch of large capacity was made on the west side of the pumphouse, entering into the main sump. Gates were installed to allow the water to be diverted into the shaft sump, if necessary, and a gate was installed in the sump tunnel, which dammed off the main sump from the shaft sump. By this method, it is always possible to clean either sump, and it is not necessary to wait for a dry season, with the added expense of installing dams for this necessary cleaning.

All of the centrifugal pumps are horizontally split, being all bronze, with a full-load speed of 725 r.p.m. The reason for specifying this low speed was that the mine water is acidulous and gritty. All pumps are hydraulically balanced, none of them depending upon thrust bearings.

A very important thing to consider in the specification for a centrifugal pump is to have a proper metal for acidulous water. The specification for the bronze in these pumps was 75 per cent. copper, 15 per cent. lead and 10 per cent. tin. All screws, washers and dowel pins should be eliminated from the seal rings and diffusion vanes. In fact it is believed better to buy pumps without diffusion vanes, as this part of the pump is very apt to give trouble. I do not approve of labyrinth rings for mine pumps. The seal rings should be wide, straight rings, the one on the impeller being shrunk on, the stationary ring being held from turning by means of a tongue resting on the bottom split of the casing.

pumps, and steam heat, the cost of the boiler plant for the year April, 1914, to April, 1915, was $46,992. This figure included the cost of fuel and handling, wages of firemen and ashmen, maintenance of boilers and pumping of water for the boilers. During the same time, the shaft produced 343,665 tons of coal, or a steam cost of $0.137 per ton.

For the year November, 1916, to November, 1917, the electric power cost was as follows:

Hoist	$3,300.16
Fan	3,270.63
Air compressor	8,845.39
Pumps	6,174.08
Total	$21,590.26

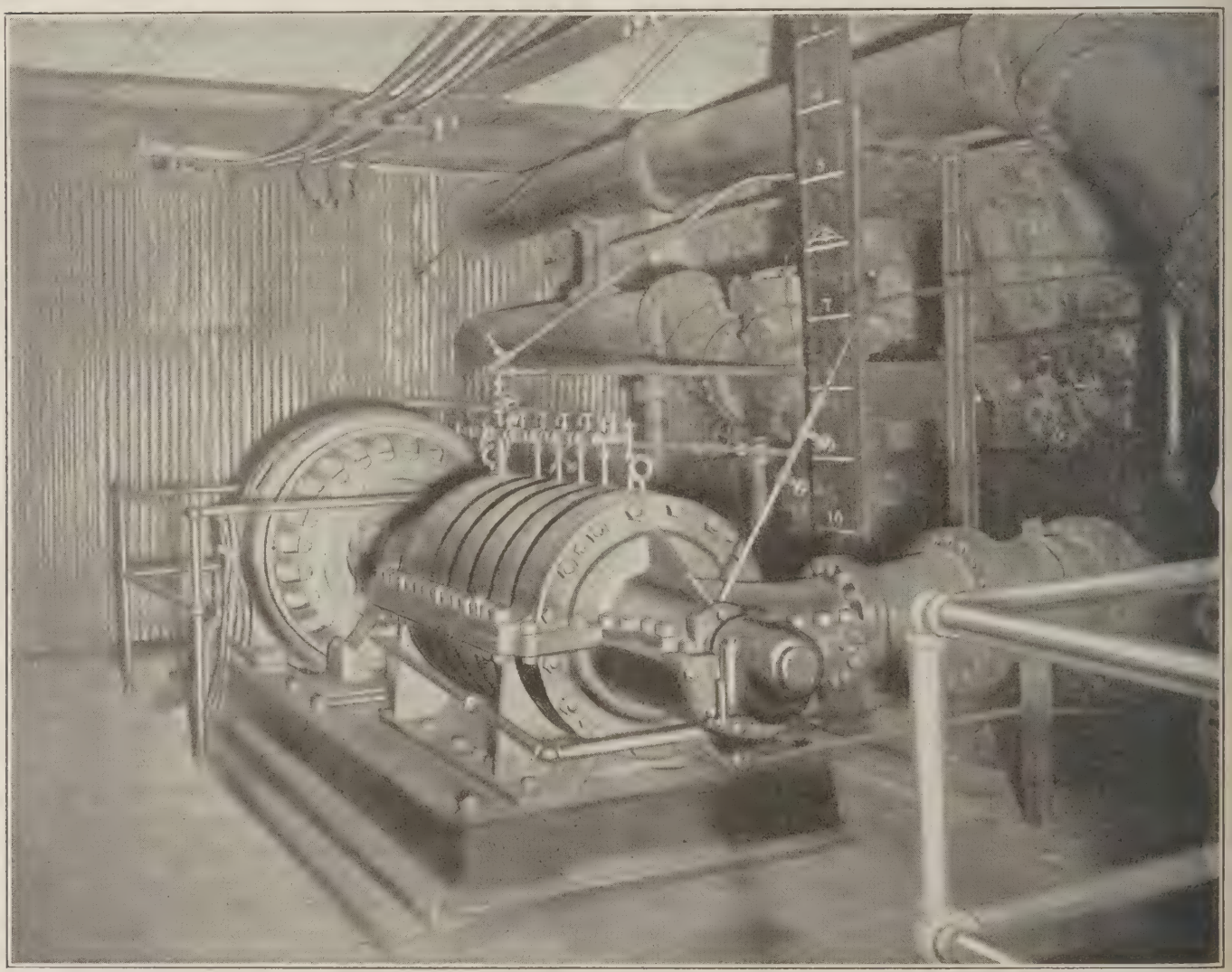


FIG. 4. CENTRIFUGAL PUMP, 3000 GAL. PER MIN., NO. 11 SHAFT, RAHN COLLIERY

It is a question whether the hydraulically balanced pump will operate under all acid conditions. However, the 8-in. six-stage pumps operating in No. 11 shaft have not given any trouble in this respect since they were placed in operation. The cost for operating these pumps, including transmission line and transformer losses, on a 266-ft. lift, is 1.545 kw.-hr. per 1000 gal., which, at a rate of 8 mills per kw.-hr., amounts to $0.012 per 1000 gallons.

When operating the old boiler plant at No. 11, which furnished steam for the No. 11 shaft hoisting engine, one steam fan, one 900 cu.ft. air compressor, the inside

To this figure should be added the cost of the heating plant, making a total power cost of $30,290.26. During this period the shaft produced 435,073 tons, with a power cost of $0.0696 per ton.

It can therefore be seen that this shows an actual saving per annum of $16,702, but as the use of electricity permitted more efficient work and less loss of time from repairs, drown-outs, etc., the tonnage hoisted increased from 343,665 to 435,073, and the cost of power per ton produced decreased from $0.137 to $0.0696, a saving of $0.0674 per ton, which for the output of 435,073 tons amounts to $29,149 per annum.

Some Data on Sperm Oils Used for Burning in Miners' Safety Lamps*

By A. G. BLAKELEY and E. A. REILLY
Philadelphia & Reading Coal and Iron Co., Pottsville, Penn.

THE representative of a big oil company was once asked if he could supply 10c. oil. "Certainly," was the reply. "I can give you oil for any price you may name—oil is simply a question of mixture." If oil can be mixed as to price, why cannot it be sold on specification? And why should it not be quoted to meet certain requirements? To the "lay reader," the tables accompanying this article may not mean much at first glance. However, the comments on them by those explaining the tests are interesting and to the point. They show by the results of these tests just which oils are satisfactory and where others fall short. The data given should prove valuable for reference—for comparison with reports which are made on oils from time to time.

This matter calls attention anew to the advisability of having specifications to cover the principal supplies purchased by coal-mining companies. For a number of years steel and cement have been purchased on specification and, to some extent, coal. The Federal Government has set the pace in this respect for coal for several years. If a small company does not care to incur the expense of the refinement of exhaustive tests on materials, it can in many cases apply a few simple tests which will answer all practical requirements. This is actually being done with some materials. Different kinds of reports are made by experts to suit the demands and purse of their clients.—EDITOR.

A CONSIDERABLE quantity of sperm oil is used as a burning oil in miner's safety lamps of the Davy type. Some trouble experienced with a shipment of supposedly pure sperm oil led the writers to conduct an investigation, the results of which are given in Table I.

The flake test indicates the temperature at which occurs a separation of solid matter. This test corresponds to the "cold test" of the sperm oil manufacturer. The cloud test indicates the temperature at which the lower half of the sample becomes opaque. The pour test indicates the temperature at which a sample of oil in cylindrical form of specified diameter and length will just flow under specified conditions.[1]

TABLE I. RESULTS

Abbreviations: N W, Natural Winter; B W, Bleached Winter; E W B, Extra Winter Bleached

Description of Sample														
Sample No.	R-1	R-2	R-3	F-1	F-2	F-3	N-1	N-2	N-3	N-4	S-1	F-4	T-1	T-2
Kind of Oil	N W	B W	B W	N W	B W	B W	N W	B W	B W	B W[1]	E W B	(a)	(b)	(b)
"Cold Test"	45	45	38	45	45	38	Below 38		42	42	....	....	....	....
Specific Gravity at 15.6° C.	0.882	0.876	0.877	0.881	0.879	0.879	0.883	0.881	0.882	0.879	0.883	0.879	0.884	0.881
Refractive Index at 15.6° C.	1.4649	1.4649	1.4649	1.4665	1.4661	1.4665	1.4649	1.4650	1.4650	1.4664	1.4669	1.4665	1.4593	1.4600
Flash Point, ° C.	245	260	260	245	255	250	260	255	265	255	265	250	250	270
Fire Point, ° C.	285	295	300	285	295	290	290	295	295	295	300	295	285	300
Saponification Value	142.1	128.9	130.2	136.1	130.1	130.6	142.2	135.0	139.6	127.7	133.8	130.8	145.7	142.7
Iodine Value (*Hanus*)	86.6	86.4	89.6	83.1	86.3	85.7	89.3	87.9	87.1	88.1	85.3	85.6	64.7	62.4
Per cent. Free Acid (calculated as oleic)	3.60	0.21	0.20	2.28	0.46	0.14	1.34	0.03	0.58	0.04	0.19	0.23	1.42	1.37
Flake Test, ° F.	52	51	42	50	43	39	39	38	38	37	43	....	....	....
Cloud Test, ° F.	46	46	35	45	39	34	36	34	35	34	38	....	....	....
Pour Test, ° F.	35	30	25	36	31	25	31	29	30	24	38	29	37	37
Viscosity (*Tagliabue*): at 70° F.	110	107	105	112	108	105	109	106	112	116	114	....	111	....
at 212° F.	91	93	94	93	90	88	93	97	93	92	96	....	86	....
Viscosity (*Saybolt*): at 100° F.	117	110	111	117	110	111	127	118	120	119	118	....	....	....
at 130° F.	82	82	83	79	76	76	80	74	80	74	88	....	....	....
at 210° F.	52	48	48	49	50	48	47	47	49	47	46	....	....	....
Percentages: Fatty anhydrides	63.1	59.8	59.6	55.5	61.3	56.3	63.0	52.4	64.1	58.0	....	63.7	60.1	59.9
Alcohols	35.2	39.1	39.9	43.3	37.1	43.2	35.4	46.2	33.6	41.4	33.6	35.2	36.3	37.8
Fatty Acids:														
Specific Gravity at 15.6° C.	0.899	0.896	0.897	0.897	0.895	0.894	0.896	0.899	0.896	0.894	0.895	0.893	0.895	0.895
Refractive Index at 15.6° C.	1.4623	1.4609	1.4600	1.4595	1.4595	1.4595	1.4587	1.4600	1.4585	1.4580	1.4609	....	....	....
Neutralization Value	216.2	208.9	206.2	201.6	201.2	194.3	204.3	198.8	201.3	188.6	197.7	186.8	224.8	222.8
Iodine Value (*Hanus*)	88.8	82.2	86.5	86.6	87.7	88.1	86.0	85.6	84.8	85.9	91.8	86.7	64.9	66.2
Titer Test, ° C.	13.6	11.5	10.5	12.9	10.6	10.1	7.9	7.7	9.6	6.2	13.2	11.0	12.0	12.0
Alcohols:														
Refractive Index at 60° C.	1.4475	1.4450	1.4455	1.4495	1.4490	1.4490	1.4461	1.4484	1.4465	1.4464	1.4388	....	....	....
Iodine Value (*Hanus*)	67.4	65.9	70.2	68.9	72.3	73.2	71.4	74.1	74.1	72.5	71.6	63.9	41.4	39.3
Melting Point, ° C.	27.0	25.5	25.0	23.5	24.0	22.5	24.0	20.0	23.5	25.0	23.2	24.0	34.0	35.0
Saponification Value of Acetate	193.2	216.0	203.3	202.9	193.4	200.1	204.6	197.9	197.3	215.4	189.6	189.5	198.3	

[1] Low acidity. (a) Sample representing shipment. (b) Oil which gave trouble.

The iodine values were determined by the Hanus method. The melting points were determined by the ordinary capillary tube method. No glycerol was found in any sperm oil tested.

Samples R1, R2 and R3 (received Dec. 1, 1916) were supplied by the same manufacturer. The manufacturer stated that the oil was probably taken from one or two different lots of Atlantic Ocean sperm oil. The oil was all from the sperm or cachalot whale. The head and body oils were thoroughly mixed. The "boats catch this oil in moderately warm waters, say from about as far north as the Azores to as far south as the coast of Brazil." Samples R2 and R3 were entirely satisfactory as burning oils. Sample R1, the natural winter oil, was not satisfactory for burning.

Samples F1, F2 and F3 (received Dec. 11, 1916) were all supplied by a second manufacturer. The oils were from the sperm or cachalot whale, and were mixtures of head and body oils. No further information was available. Samples F2 and F3 were entirely satisfactory as burning oils. Even sample F1, the natural winter oil (containing 2.28 per cent. free oleic acid) gave fairly good results, although showing a slight tendency to incrust the wick.

Samples N1, N2, N3 and N4 (received Jan. 4, 1917) were supplied by a third manufacturer. The manufacturer stated that the oils were all from the same cargo. The oil is bought from the whalers in original casks which, in refining, is put into a press, and in one pressing there may be three or four different casks of oil. These casks may contain head and body

*Reprinted from the Journal of Industrial and Engineering Chemistry, Vol. 9, No. 12, page 1099, December, 1917.

[1] Proceedings of the A. S. T. M., 15 (1915), Part 1, pp. 281-282.

oil from two or three different whales. The cargo from which the four samples were prepared consisted of some 16,000 gal. of oil of "very fine quality." The oil is all strictly pure sperm oil from the sperm or cachalot whale. Sample N1 represents the natural winter oil. Sample N2 represents the same oil after "caustic" bleaching to reduce free acid. Sample N3 represents sample N1 bleached by filtering through fuller's earth to make it of light color. Sample N4 represents sample N3 "caustic" bleached; that is, this sample had been treated both to reduce color and to reduce acidity. Samples N3 and N4 gave entirely satisfactory results in burning. Sample N2 was satisfactory but inferior to samples N3 and N4. Sample N1, the natural winter oil, was fairly good as a burning oil.

Sample S1 represents an oil submitted by a fourth company. No information was furnished with this oil. It gave satisfactory results as a burning oil.

Sample F4 represents an oil shipment which was entirely satisfactory. Samples T1 and T2 are from two different barrels of the shipment which caused considerable trouble. These oils encrusted the wicks very badly and were altogether unsatisfactory.

The nature of the adulteration in the unsatisfactory oils has not been determined. The table shows abnormal figures for refractive index (saponification value) and iodine value of the oil as well as for iodine values of fatty acids and alcohols, and for melting point of alcohols.

Results for the constants of the genuine sperm oils agree, in the main, with results given in the literature. For some constants, the writers have found a somewhat wider variation than is generally noted in the technical literature (see Table II).

In connection with the writing of specifications for sperm oil it has been the general custom to include requirements as to the maximum percentage of free acid allowed. In order to determine the effects of free acid upon the burning properties of sperm oil, experiments

TABLE II. CONSTANTS OF GENUINE SPERM OIL

	Data Given in Literature	Data From Authors' Tests
Sperm Oils:		
Refractive index (15.6° C.)	1.4664 to 1.4673	1.4649 to 1.4669
Fatty Acids:		
Specific gravity (15.6° C.)	0.899	0.893 to 0.899
Neutralization value	183 to 199	186.8 to 216.2
Titer test, ° C.	11.1 to 11.9	6.2 to 13.6
Alcohols:		
Iodine value	64.6 to 65.8	63.9 to 74.1
Melting Point, ° C	25.5 to 27.5	20.0 to 27.0
Saponification value of acetate	161 to 190	189.5 to 216.0

were made with sperm oil to which had been added varying amounts of pure oleic acid. The oil was in each test burned in a Davy miners' safety lamp. It was found that sperm oil containing 1, 2, 3 and up to 4 per cent. added oleic acid caused a slight crust to form on the wick, but that oil with even 4 per cent. oleic acid gave fairly satisfactory results. The addition of 5 per cent. oleic acid caused heavier crust, while the addition of 6 per cent. made the sperm oil entirely unsatisfactory for burning in a Davy safety lamp.

In judging the suitability of a sperm oil for burning purposes, one would do well to consider the iodine value and refractive index as well as the other constants and the free acid.

Some of the work above tabulated was done by Mr. Donald Thorn, to whom the authors would acknowledge indebtedness.

Coal Mining in Alberta During 1917

By J. T. Stirling
Chief Inspector of Mines, Edmonton, Alta., Canada

During the year 1917 there were in operation in Alberta 283 coal mines, one copper ore mine and two shale mines. Of these 48 were opened, 11 reopened and 38 abandoned. The output of coal for the year was 4,863,414 tons, exceeding that of the year 1916 by 214,810 tons, notwithstanding that the production was considerably interfered with owing to labor troubles and lack of railway facilities in certain districts.

If the mines had worked steadily throughout the year with the present labor employed and the present amount of development, the amount of coal produced would have been nearly 8,000,000 tons or over 3,000,000 tons in excess of what was actually produced.

The importance of this will be understood when it is remembered that over 3,000,000 tons of imported coal were consumed in the Provinces of Manitoba, Saskatchewan and Alberta, a territory which could be more than supplied entirely by Alberta mines.

Notwithstanding these facts it may well be asked why it should be necessary to import into Western Canada, at the present time over 3,000,000 tons per year from the United States, particularly at a time when the operation of munition plants and other essential industries in the United States and Eastern Canada are being seriously interfered with owing to lack of fuel. And the thing that strikes one who has tried to familiarize himself with the situation is the absurdity that such a condition should be allowed to exist. More than sufficient fuel can be produced from the Alberta mines to supply all the demands existing or likely to exist in the Provinces of Manitoba, Saskatchewan and Alberta, and in addition that part of the United States immediately to the south of us. It is being fully demonstrated every day that railway locomotives, steam plants and buildings of all kinds and sizes can use Alberta coal in Saskatchewan and Alberta with very satisfactory results, so that there appears to be no reason why the same fuel cannot be used in Manitoba.

The statement has been made on various occasions that Alberta coal will not store, and while this may be true to a certain extent regarding 25 or 30 per cent. of the output produced, it is not true of the remainder.

Satisfactory progress is still being made in connection with training in mine-rescue and first-aid work, three mine-rescue cars and six stations being now in operation. Whenever possible these cars and stations are placed under the charge of returned soldiers who have previously been engaged in mining, the result obtained by these appointments being very satisfactory.

The average number of persons employed in or about coal mines during the year was 2263 above ground and 6047 below ground. The total number of persons employed above and below ground on Dec. 31, 1917, was 9812. This shows an increase of 1213 over the number employed in December, 1916.

Safety lamps of the Wolf type, which have been in use in practically all the mines where safety lamps are required, are gradually being replaced by electric cap lamps of the Edison type.

A number of mine operators, particularly in the Crow's Nest Pass, have erected inert dust barriers. These barriers extend from 175 to 200 ft. in length and consist of shelves 18 to 24 in. wide and 24 in. apart. There is no doubt that these barriers would have the effect of minimizing the effects of an explosion should one occur.

The coal-mining industry in the Province is assuming large proportions, and if all fuel consumed in the Provinces of Alberta, Saskatchewan and Manitoba was supplied from Alberta mines as it should be, the output would be nearly doubled. It is confidently expected that this condition of affairs will obtain in the near future.

The following table gives particulars respecting the amount of coal actually produced in each district in Alberta during the year 1917, and also the amount which could have been produced in each of these districts if the mines had been in operation fairly steadily without increasing the present amount of development or the number of men employed.

OUTPUT OBTAINED AND POSSIBLE OUTPUT OF MINING DISTRICTS IN ALBERTA, CAN., DURING 1917

District	Output Obtained, Tons	Possible Output, Tons
Crow's Nest Pass	1,193,313	1,779,888
Pincher Creek	6,804	12,891
Lethbridge	619,850	903,391
Magrath	1,011	2,244
Milk River	9,140	19,200
Taber	175,666	277,920
Bow Island	6,846	14,124
Medicine Hat	14,846	36,780
Aldersyde	7,339	14,712
High River	1,096	3,192
Drumheller	660,974	1,187,052
Big Valley	29,897	57,971
Brooks	8,283	23,256
Hanna	26,064	60,492
Lacombe	18,223	42,624
Trochu	14,134	37,284
Three Hills	24,874	47,172
Carbon	4,615	7,776
Battle River	10,544	34,748
Camrose	61,293	118,992
Tofield	71,510	150,972
Clover Bar	263,857	475,308
Edmonton	120,519	222,732
Mamao	19,406	43,116
Cardiff	257,459	532,812
Wabamun	19,007	31,308
Pembina	84,549	168,480
Canmore	196,233	286,008
Brazeau	266,897	397,596
Jasper Park	250,079	355,416
Yellowhead Pass	146,949	196,032
Mountain Park	153,397	202,068
Banff	118,717	162,468
Total	4,863,414	7,904,825

Nature and Distribution of Peat Deposits

Peat is a dark-brown or black residuum produced by the partial decomposition of mosses, sedges and other vegetable matter in marshes and like wet places. Most of the peat deposits of this country occur in depressions and poorly drained areas in regions where the temperature of the air and the soil is low in summer and the humidity of the air is high. The most extensive peat beds are found in New England and around the Great Lakes, where the climate and the topography are favorable to the accumulation of partly decomposed vegetable matter. Many deposits are found also in the Atlantic Coastal Plain, from New Jersey southward to Florida. In regions of heavy downfall along the Pacific Coast peat bogs occur wherever the drainage is so greatly interrupted that the soil becomes permanently saturated with water.

The Second Annual Report of the Public Utilities Commission of Maine contains descriptions of many peat bogs in that state. Detailed information relating to the occurrence of this material in Maine and a map showing the location of workable deposits in that state can also be found in United States Geological Survey Bulletin 376, which, though no longer available for free distribution, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 20c. a copy.

It is estimated that more than 11,000 square miles of swamp land in the United States contains peat beds of good quality, and that the total available fuel in these deposits would amount to more than 12,000,000,000 tons, a quantity that, if it could be distributed, would furnish heat and power for the entire country for many years. Much of this material is in states that have no known deposits of coal and that on account of their cold climate and their manufacturing industries consume large quantities of fuel, a constantly increasing percentage of which has to be brought by rail and water from distant mines. According to a recent estimate made by Prof. E. K. Soper in a paper on the peat deposits of Minnesota, published by the Minnesota Geological Survey, more than 6,000,000,000 tons of air-dried peat fuel can be obtained from deposits in that state alone. The utilization of these deposits would augment the local fuel supply and incidentally would relieve the strain on our transportation facilities by furnishing fuel to an area where coal is now brought by the longest haul.

Coal and Coke Production in Canada During 1917

The preliminary report of the coal production of Canada during 1917 by the Canadian Department of Mines shows a total production of 14,015,588 short tons of coal valued at $47,643,646, as compared with 14,483,395 tons of the value of $38,817,481 in 1916. The provinces of New Brunswick, Saskatchewan, Alberta and the Yukon showed a total increase of 281,781 tons. The total decrease in Nova Scotia and British Columbia was 752,588 tons. The Nova Scotia production fell off 587,456 tons or 8.5 per cent. as compared with 1916. Alberta increased 164,085 tons, notwithstanding the serious loss in output due to strikes while British Columbia production fell off 165,132 tons.

The total imports in 1917 included 15,537,262 tons of bituminous coal, valued at $42,452,771, as against 13,009,788 tons valued at $17,073,303 in 1916, and 5,320,198 tons of anthracite valued at $28,109,586, as against 4,570,815 tons, valued at $22,216,363 in 1916.

The total output of oven coke in 1917 was 1,231,865 tons, made from 1,978,893 tons of coal, of which 1,379,038 was of domestic origin. In 1916 the total output was 1,448,782 tons. Nova Scotia showed a decrease of 8767 tons; Ontario, 77,488 tons; Alberta, 11,352 tons and British Columbia, 119,310 tons. At the close of the year 1657 ovens were in operation and 875 were idle. Imports of coke were 970,106 tons, valued at $6,517,260, as against 757,116 tons, valued at $3,229,078 in 1916. Of the total output of coke 914,466 tons was made in by-product recovery ovens and the recovery of byproducts included ammonium sulphate, 9941 tons, and tar, 8,277,078 gal., as against 11,040 tons of sulphate of ammonia and 9,012,202 gal. of tar in 1916. There was also an important recovery of benzol, toluol, naphtha and naphthalene.

Cement Gun in Mining Work—II*

By GEORGE S. RICE
Chief mining engineer, Bureau of Mines, Pittsburgh, Penn.

SYNOPSIS—*A review of the use of the cement gun in the Leonard mine at Butte, Mont., in the mines of the Philadelphia & Reading Coal and Iron Co., the Consolidation Coal Co. and the H. C. Frick Coke Co. Some figures on the cost of cement-gun work.*

FOLLOWING the first tests made in 1914 of cement coating with the gun at the experimental mine, I and my able assistant, the late L. M. Jones, began a campaign among mine operators to urge the trial of the method in mining operations. We advocated the application of a coating to the roof and sides to prevent weathering and also to render ventilating and fire stoppings air-tight. In regard to the latter, it frequently happens that while the stopping itself is tight the ground surrounding it is permeable. Often the air passes freely through the coal strata around the end of the stopping. This is largely prevented by the use of a closely adhering cement coating such as can be put on by the cement gun, not only adjacent to the stopping but for a number of feet back along the sides of the opening.

The matter progressed rather slowly for a time, but within the past year much testing has been done, and I have brief statements from a number of concerns which show the present widespread application. Among other things the cement gun has been used for fireproofing shafts which had wood linings, wire mesh being placed over the wood, such fireproofing or other alternative being required in Illinois.

In the fall of 1916, the writer, in visiting the Leonard mine of the Anaconda group at Butte, Mont., was struck with the difficulty in keeping the extensive fire areas sealed off. These fires were fed by timber and rich sulphide ores. I suggested to the superintendent who accompanied me the important advantages that might accrue from the use of the cement gun for the repeated coating of the stoppings. These had to be renewed from time to time because the heat would crack them. I suggested also that the cement gun could be used to advantage to seal the cracks in the adjacent broken ground. The patching work had been done by hand and was very laborious and difficult on account of the heat. The cement-gun method was tried and found to be of such an advantage that now nine guns have been purchased by the Anaconda company and, according to an article in the *Mining and Scientific Press* of July, 1917, the work is accomplished in one-fifth of the time required by hand work. The article states:

> The finished work shows that the mixture of sand and cement has been shot into every crack and fold of the rock until it can hardly be distinguished from the rock itself. In some instances, on account of fumes, it was necessary for the nozzle-man to wear a compressed-air hood . . .
>
> In preparing the ground for these bulkheads, no other work than picking out the loose rock on the bottom, sides, and back was done. The loose rock in the bottom extended from 16 to 24 in. below the track level.
>
> In some cases there were large loose boulders in the back which it was not feasible to remove. They were held in place by stulls, and cement was shot in the crevices between them. When this had set, the stulls were removed and the bulkheads built from the floor up to meet them.
>
> In some cases, after the completion of these emergency-bulkheads, cement was shot on the entire back and sides of the drift on either side of the bulkhead for a distance of 16 to 18 ft. in length. This sealed all seams that were likely to bypass fumes around the bulkhead. Heavy blows will not cause this coating to sliver off nor to show any line of cleavage. The only result is a powdering of the cement directly under the hammer-head. Immediately above the passageway in these bulkheads, pipes were cemented in to allow of passing air, water, and electric-wire through the bulkhead.

It is learned, through the courtesy of W. J. Richards, president, and Charles Enzian, mining engineer, that the Philadelphia & Reading Coal and Iron Co. now has eight guns distributed through the mines of that company. It is stated that

> The use of the machines so far has been confined to lining tunnels, pointing and facing retaining walls and gob stoppings, lining reservoirs, etc. We hope to try fireproofing shafts, etc., as labor becomes available for such work.

Douglas Bunting, chief engineer of the Lehigh & Wilkes-Barre Coal Co., states that his company has used the gun for lining a gangway driven in top fireclay, also for coating a short tunnel in fireclay rock and for covering the underside of Hy-Rib used in connection with steel timbering. As yet, the experience has been too recent to determine how serviceable the gunite will be.

John G. Smyth, chief engineer of the Consolidation Coal Co., says that his company has used the cement gun in coating headings at its mine No. 155, Van Lear, Ky., and at mine No. 125 at Somerset, Penn. In the latter mine there was a rock slope driven across the measures. It was first expected to use massive concrete arching to line these slopes, but later it was thought that if the action of the atmosphere could be kept away from the strata it might stand. In the main slope 675 lin.ft. were gunited, and in the manway slope, 300 lin.ft. Similar treatment was given to 1786 lin.ft. of air course driven through the coal bed, where 12 to 30 in. of slate of uncertain character were taken down. This work was begun in May, 1917, and continued at intervals to September, 1917.

Mr. Smyth states:

> From our experience with gunite underground the serious question is the action of the gunite under atmospheric changes during winter and summer, and of course the job in question has not been in place long enough to pass any judgment on this feature. It may be found necessary to use a reinforcing wire mesh in the gunite to take care of the expansion and contraction. On account of the irregular nature of the side walls and roof the application of reinforcing will be tedious and the increase in labor cost will be quite an item.
>
> The work in question was done in a very thorough, workmanlike manner. The conditions were such that we feel that this job will settle the question in our minds as to the permanency and value of gunite in underground work, particularly to protect the roof and side walls from disintegration.

The Consolidation Coal Co.'s first work of this character was done in November, 1916, in the coating of

*Paper read before the Coal Mining Institute of America at its Pittsburgh, Penn., meeting, Dec. 6, 1917, and entitled "Weather-proofing Mine Roof and Walls and Making Tight Stoppings With Cement Gun."

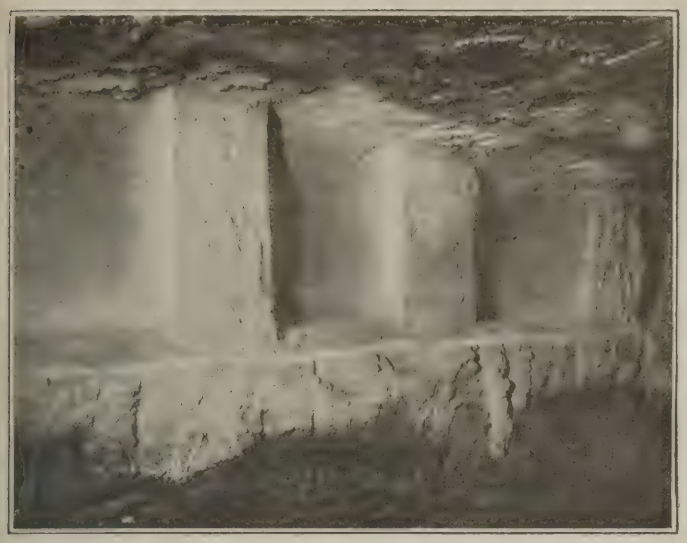


FIG. 5. DRAWSLATE AND TILE BLOCK GUNITED

The drawslate in the United States Experimental Mine had weathered back over the coal. To support the roof tile blocks were erected on the top of the coal and the blocks and drawslate gunited as shown so as to prevent further deterioration of the drawslate.



FIG. 6. RAIL BEAMS COVERED BY GUNITE

In this section of the United States Experimental Mine a heavy fall took place before the roof was gunited. Rail beams were put in to carry the burden, roof and beams being covered with gunite for protection against further weathering. In the rear is a massive concrete stopping.

the roof and ribs of mine No. 155 at Van Lear, Ky. It is stated by Mr. Collier of the Cement Gun Co. "that the thin coating put on stood through the first year, then dropped off in patches, but the roof had not come down, while in the parallel entry without treatment the roof had slacked off to the amount of many carloads." He added that though some repairing of the patches in the cemented entry would need to be done, this would cost less by far than what was needed to repair the other entry.

The Clearfield Bituminous Coal Corporation, according to J. William Welter, chief engineer, purchased a cement gun, but have only just begun to use it. It is interesting to state the condition; namely, that the purpose was to place a coating on the exposed surface of a fire-clay roof. Mr. Welter writes:

> As is characteristic of fire clay, this material slacks when the air comes in contact with it. . . . It was necessary for us to make considerable preparation, such as removing all loose particles from the roof . . .

The Rock Island Coal Mining Co. employed a cement gun in their No. 10 mine, Hartshorne, Okla. It is understood that 350 lin.ft. of entry was covered as an experiment, and that it has withstood the heavy slacking of the past summer.

As an offset to some of the promising results, one of the earlier tests, which followed the testing at the experimental mine, has recently been reported as unfavorable, although at first it looked as if it would be a success. This test was made by the H. C. Frick Coke Co. in 1914. The then chief engineer, J. P. K. Miller, wrote the author on Jan. 15, 1915, as follows:

> The cement gun has been used at two points near the shaft bottom and the superintendent is well pleased with the character of the work it is doing, which consists of coating the roof, after it has been properly treated. The work is being done with a view of preventing any further falling of roof. We intended at one time to arch the roof, but hope that now it will not be necessary.

Thomas W. Dawson, writing Dec. 1, 1917, says:

> The results [of the cement gun] were not satisfactory, but, in our opinion, this was due to the fact that in a number of places the covering of the cement applied was very thin; the whole covering being of variable thickness.

Mr. Dawson quotes from a report from Mr. S. Mack, the mine superintendent, that:

> For about two years it [the gunite] looked as if it was going to be very satisfactory. Shortly after that it began to crack off in small pieces, and I find that there are a number of places where it has spalled off where before it looked solid. It seems that the spalling starts where the cement is thin and then extends to the thicker parts.
>
> Of course this work is all experimental but I believe that if all the roof that is loose is taken down and the space thoroughly washed and a coat not less than ¾-in. thick applied it will last for quite a long time but it must be done right.

Mr. Dawson reported that the mine foreman advised that:

> After an interval of about one year it began to show signs of failure by some cracks appearing. He did not know whether these cracks were due to movement in the roof or sides or due to the slacking of the rock and coal, but when this covering was tested it sounded hollow, showing that the bond between the cement and the rock and coal had been broken so that it would seem that the failure was due to the slacking of the rock and coal behind the cement covering.

In spite of this unfavorable evidence, I do not feel that this testimony should be regarded as condemning such a coating. I do not know fully the conditions of this particular test, for instance whether the ribs were also covered. If they were not then with the usual tendency of the coal of the Pittsburgh district to spall off and crack so that air is admitted, weathering might continue upward and over the cement coating. The test was a difficult one, as it is understood the entries were wide. One must also weigh the first cost plus the cost of annual repairs against the annual cost of timbering and cleaning up falls over a number of years.

Undoubtedly if a roof is of a nature that it can be "brushed" so that its cross-section will be in the form of an arch it will assist in making the coating self-supporting, and as a final resort a light wire mesh resting in a shallow groove in either rib at the springing line of the arch and a heavier coating about 2 in. thick could be employed. This would make the coating self-supporting and it would not then have to be held up by the roof to which it is caused to adhere. The rib coating does not need reinforcement, so the final

cost should not be great. In the long run it is believed that this additional cost would be justified, and certainly such work would be much cheaper than massive concrete lining or brick arching.

The Consolidation Coal Co. of Iowa, the Valley Camp Coal Co. of Pittsburgh, Penn., the Cambria Steel Co. of Johnstown, Penn., the Cameron Coal Co. of Marion, Ill., the New River Co. of MacDonald, W. Va., and many other companies, are all experimenting with the use of the gun in underground work. Therefore in the near future there will be available a large amount of information on the success or failure of weatherproofing roof by cement coating.

Cost of Cement-Sand Coating

The cost of applying the cement-sand coating varies widely with conditions. It has been rather difficult to get figures. Some of the companies do not care to disclose them and others have not kept them in precise shape. In the first work done at the experimental mine the figures were as follows:

For coating 378 ft. of entry averaging 5.9 ft. in height and 9.15 ft. wide, the cement averaging about 2 in. in thickness on the ribs and ½ in. thick on the roof, the costs were as follows:

Labor and Repairs:		
Labor	$138.86	
Supervision	23.04	
Cleaning and repairing gun	10.74	$172.64
Material:		
Cement 280 sacks, or 70 bbl., at $1.10 per bbl.	77.00	
Sand 42 tons at 89c. per ton	37.38	114.38
Total		$287.02

The cost per lineal foot of entry averaged 76c., and the cost per square yard of surface averaged 32c. This job took ten days and the speed was 4.7 lin.ft. per hour, or 11¼ sq.yd. per working hour. In a subsequent job the total cost per lineal foot of entry was 93c. and the average cost per square yard was 40c.

Tested by the explosions in the experimental mine the coating on the ribs remained intact, but the roof coating shelled off from time to time. It did not always separate from the shaly material of the roof, for the two occasionally came down together. In these places and in other parts of the mine we attempted to get a stronger job by drilling holes in the roof as keys for the cement. At the same time we put in reinforcing wires. Also where the roof was naturally very weak some rails were put in for support. The total cost of repairing 6600 sq.ft. of roof and sides, including the railing reinforcement, was $617.95, or 85c. per sq.yd. The cost of applying the gunite averaged alone 42c. per square yard.

In a certain Western mine the cost of the coating put on by the cement gun is given as follows: Labor, $21.50; and material, $17.80 for a total of 190 sq.yd., or 20.6c. per sq.yd. This cost is very low and the figures cover apparently only the application, the coating being ½ in. thick.

One of the companies in Pennsylvania reports that the actual cost was $3 per lineal foot of heading. The section of heading averaged 22 sq.ft., making the cost about 13.6c. per sq.ft., or $1.22 per sq.yd., of gunite deposited. This cost is based on cement at about $2.20 per bbl. and sand at $2 per ton at the site. The thickness was about 1 in., no reinforcement being used, but it was most carefully done and the estimate includes all costs.

At a mine in the Connellsville district, the cost of cementing 5929 sq.ft., which was accomplished in 12 days, the daily cost was as follows:

One demonstrator	$2.86
One nozzle man	2.85
One machine tender	2.15
Two laborers at $2.15	4.30
One-half time teamster at $2.00	1.00
Total	$13.16

The total labor cost was $154.02.

Material:	
325 sacks cement	$125.12
600 bu. sand	36.00
50 ft. mining machine hose	17.50
Total	$178.62
Grand total	$333.44

The cost per square foot was therefore 6.38c., or per square yard 57c. It will be observed that these figures vary widely, but it is thought that under average conditions, with men fully trained in the use of the cement gun, that work can be done for at least 50c. per sq.yd. on the basis of wages prevailing prior to 1917.

It may be pointed out that the gunite not only protects



FIG. 7. SHOWING THE EFFECT OF GUNITING

The coal face as shown on the left, like all natural faces, is provided with ledges on which coal dust can accumulate. On the extreme right is the gunited coal, without ledges, with the insulated wire covered and so protected from injury. Note also how the gunite aids to lighten the heading.



FIG. 8. GUNITE SURROUNDS THIS STOPPING

In this instance the roof and the floor near a massive concrete stopping has been carefully gunited. This prevents the air from leaking through the rib or the roof to the area beyond. In case of a mine fire this is a most valuable feature and assures a more rapid extinction of the conflagration.

the roof and sides from weathering, but also assists in the illumination of the passageways by reason of its light color. It also lessens the hazard of coal-dust explosions.

The ordinary timbered entry has innumerable projections and there are many recesses on the coal ribs which serve as places on which coal dust may collect in dangerous quantities. Comparatively little dust can collect on the surface of a cement-coated heading and what does collect can be readily washed down without damage to the roof or ribs.

The conclusions are:

1. By compressed air a cement-sand coating can be successfully applied to the weak roofs of entries and tunnels in coal mines.

2. By the use of the above means the ribs and a weak roof in coal mines promise to be satisfactorily weatherproofed.

3. Steel timbers in entries and shafts can be protected from rusting and wood timbers fireproofed.

4. The method is of the greatest advantage in fireproofing wood overcasts and stoppings and in making them air-tight. By facing gob stoppings with this material they can be made tight.

5. Fire stoppings can be made gas-tight and are quickly built and repaired.

The last four purposes alone justify the employment of the cement gun method, regardless of what machine is used with the accomplishment.

Eastern Kentucky Pioneer Towns

A few years ago the pioneer towns were no credit to the mining industry. The argument was that when you went into a country with "sagers" who had not had any domestic comforts except those of a log cabin inherited from three or four generations back—a cabin that was in the last stage of disrepair, the chimney of which smoked unconscionably—you could safely put up any kind of a crib and call it a tenant house and invite the people to occupy it.

But we do not do it that way today. No towns today are better than these pioneer communities. The operator is trying to get skilled mining labor from older camps; he is trying to get the better indigenous labor, and then also he has a pride in making the camp a village and not a mere shanty town. He looks for a longer life for the village than was customary years ago. Such towns as Jenkins, McRoberts, Burdine, Dunham, Seco, Fleming, Haymond and Hemphill in Kentucky show how far the new pioneers have advanced from the old idea that a pioneer town should closely resemble the town a squatter would build when he, in his forty-niner wagon, found a stream with pay gravel.



CHURCH AND SCHOOL BUILDINGS AT JENKINS, KY.

Most of the big operating companies in eastern Kentucky maintain playgrounds, rest and reading rooms, newsstands, where many of the best newspapers and magazines are on sale, Y. M. C. A.'s, motion-picture shows, churches and, of course, good schools. It is said that during the first year of development work in Jenkins and the surrounding territory the company spent over $100,000 in Y. M. C. A. work alone, including the construction of a $40,000 building in Jenkins and branch buildings in McRoberts, Burdine and Dunham. The Elk Horn Coal Corporation has also spent large sums in maintaining this work in Fleming, Hemphill and Haymond.



AT JENKINS, KY., THE CONSOLIDATION COAL CO. HAS A SPLENDID HOSPITAL

Eastern Kentucky gardens are comparable with those anywhere. The mine workers are finding that gardening brings them in large returns. From the first the Consolidation has had 8 to 10 acres in gardens and a 500-acre dairy with adequate high-grade stock.

Miners May Join Army Engineers

Miners who are classified for active service in the coming draft are eligible for enlistment in the First Replacement Regiment of Engineers, which was organized at Washington Barracks, D. C., on Dec. 14, 1917, for the specific purpose of keeping all engineering units of the army at full enlistment strength during the period of this war. Engineers are called upon to perform such a wide range of work that practically every man with any technical training or mechanical ability can find a place in this organization. Every male citizen in the United States who is physically fit, and between the ages of 18 and 21, and 31 and 40, is eligible to join the regiment by voluntary enlistment.

To be assured of assignment to this regiment, the applicant for enlistment should write to the Commanding Officer, 1st Replacement Regiment Engineers, Room 107, Headquarters Building, Post of Washington Barracks, D. C., for application blank. If the blank shows the man to be eligible, an enlistment card is filled out and sent to the recruiting officer nearest to the applicant's place of residence, with instructions to enlist the man for service in this regiment. Transportation and meals will be furnished by the recruiting officer and the man will be instructed to report at the post for duty.

Mining Engineers Consider Industrial Relations—IV

By R. DAWSON HALL
Associate Editor, "Coal Age"

SYNOPSIS—*The members of the American Institute of Mining Engineers discuss the losses of industry due to frequent changes in personnel. Thomas T. Read urges that every large company should have an employment manager who should be regarded as a leading official in the corporation. Short account of banquet and trip to Princeton University.*

THE address on "The Employment Manager and the Reduction of Labor Turnover" by Thomas T. Read followed the paper by H. M. Wilson and the discussion on the relative hazards of untrained men and chance-takers. A few aphorisms and statements from this paper may be profitably quoted.

"Intensive study has shown that faulty methods of hiring and discharging men are the most important factor in labor turnover.

"Centralized hiring does not impair the authority of the foreman; he hires his men from the employment office and discharges them back to it, instead of from and to the street.

"The introduction of the employment manager, who is a direct representative of the employer, tends to restore the former relation of direct intercourse between employer and employee that was helpful in avoiding friction between them. Employment managers have invariably reduced labor turnover so that it is now, in some cases, as little as one-tenth of what it was formerly.

Physiognomy Not a Safe Guide for Selection

"Many people think they are good judges of character, whatever that may mean, but it has been scientifically demonstrated that the determined chin, thoughtful brow, sensitive mouth and so on of fiction writers has no basis whatever in fact, and in general that there is no connection between physical features and the characteristics and aptitudes of men. About the only thing that can be told about a man by looking at him is that if he weighs 110 lb. he would not be a good man to put at lifting heavy weights, and if he is 5 ft. 2 in. tall he would not be adapted to a job where he had to reach high.

"The employment manager should have either at his own command or among his associates all the languages spoken in the company's working force.

"The employment department of the Saxon Motor Co. is credited in the first year of its operation with reducing the labor turnover of that organization to 40 per cent. of what it had been. The Hayes Manufacturing Co., of Detroit, diminished its labor turnover one-half the first year and another one-half the second year, while the output per man increased 30 per cent. The Solvay Companies, of Detroit, reduced the labor turnover rate from 10 per cent. per month in May, 1916, to 2.4 per cent. per month in December. Fayette R. Plumb, Inc., of Philadelphia, reports that employment management reduced its labor turnover 48 per cent., enabling it to decrease its working force 10 per cent., to reduce the working time 9 per cent. and at the same time increase its total shop production 10 per cent. In such an organization as the Bethlehem Steel Co. labor turnover probably costs at least $3,000,000 a year.

"A man's rank in the organization inevitably depends largely on his salary. No one who works low in the organization can do effective work as an employment manager because he is not in position to make his views prevail. The failure of the first British campaign in Mesopotamia proved to be due, not to the inadequacy of the medical department but to the fact that the medical officers did not rank high enough to insist that the necessary preparations be made and precautions taken.

Experts Buy Supplies; Anyone Can Buy Labor

"An employment manager is that member of a modern industrial organization who is charged with the specific duty of hiring men for the whole organization. The recent growth of corporate industry has led to the hiring of men in such numbers that the work becomes a task of first-class magnitude; in some cases twenty to fifty thousand men are hired in a year. No organization would think of buying supplies on such a scale without creating a special department to see that it was done in the most efficient and economical manner, and it is remarkable that industry has waited so long before putting the purchasing of so complex a thing as labor on a scientific basis.

"I have said the purchasing of labor; it would be more accurate to say the selling of employment, for the demands of industry at the present time are such that the workman no longer has to go with his hat in his hand asking for a job: the representative of the employer has to go to the workman and endeavor to get him to accept employment. This is an additional and powerful reason why the employing of workmen for a given industrial organization should be put in the hands of one who can bring special skill and knowledge to bear on the work.

"Labor represents more than half the cost of the finished product and it is more essential that labor shall be bought (or employment sold) by a man having special knowledge, skill, and aptitude than it is to have a purchasing department for raw materials. There are many other specific reasons why centralized hiring is desirable and profitable. In the first place, if hiring is done by foremen and the workmen are chiefly foreigners, it frequently transpires that the foreman is grafting on the men he employs, especially if labor is plentiful. Decentralizing hiring also builds up racial or religious cliques in a department that will make themselves felt in trouble later. This is inevitable, since the only source of supply that a foreman has is through his friends and the friends of the men on his gang."

It may be added that the paper gives forms for the conduct of the office of employment manager—the requisition of the foreman asking for help, the application of the applicant for work, the medical examination card, the medical report, the hiring slip, the employee's attendance card, his transfer card from job to job and his leaving slip.

The afternoon session on employment problems was enlivened by a short talk from I. C. Henderschott, of the New York Edison Co., executive secretary of the National Association of Corporation Schools, who said that Frank A. Vanderlip, the president of the National City Bank of New York, stated that a billion dollars a year was lost in strikes, two billion dollars in the incapacity of working men and two to five billion dollars in labor turnover.

Lawrence Veiller, of the National Housing Association, declared that one company spent ⅛ of 1 per cent. of its payroll in improving its houses and found that it was amply repaid by the lessened loss from labor turnover.

In the absence of Maj. Frank M. Gilbreath, the authority on motion study and fatigue, his wife spoke for him—the first time a woman had spoken at a technical session of the institute, the results being wholly encouraging to an extension of the experiment. The subject was "The Crippled Soldier in Industry."

Mrs. Gilbreath urged employers to note and record all jobs around plants which could be filled by crippled men. Some one remarked that he felt as much urged now to search out jobs for crippled men as he had felt urged before to keep cripples out of his organization. Much of the selection of workmen in the past has resulted in the pauperization of those rejected. The war will make a lot of cripples, and it will be a crime if no place in industry can be found for these men.

Most Vital Need in Industry Is Brains

The paper of F. C. Stanford, of Ishpeming, Mich., was largely a review of the school work of the Cleveland Cliffs Iron Co. of which he is chief electrician, but some of his remarks are well worthy of reproduction for coal-mining engineers.

"The average of knowledge is not equal to the average needs of the present time, but continually fails to keep pace with it. It has been aptly said that the really essential need of the period is for more brains; if we only had sufficient knowledge and sagacity we could not only solve all difficulties, but prevent them from arising.

"This generalization holds good for an industrial organization. The most vital need of the management is for more brains. The logical course for an engineer in charge of an industrial organization is, therefore, to direct whatever forces may be at his command toward the development, training and guiding of all the brains in his organization.

"This is easier said than done, for it involves the carrying on toward two objectives, the maximum of productive work, and the development of the individuals who perform it. This is essentially like the rebuilding and enlarging of a plant, keeping it in full operation the while. On the other hand, if the aim is merely for maximum production from an organization, without offering opportunity for development, the final outcome will necessarily be like that of a plant that is driven at full capacity without stopping for repairs and improvements; it eventually becomes so run down that either a complete rebuilding or abandonment is necessary. If the best results are to be obtained in an industrial organization it is imperative to make provision for the development of the individuals composing it.

E. E. Bach's paper on "Social and Religious Organizations as Factors in the Labor Problem" defies any attempt to abstract it. It gives a somewhat complete account of the work at the Ellsworth Collieries, and Mr. Bach's comment added much to the interest.

The evening was given over to the annual banquet which took place at the Hotel Biltmore. The menu was said to be a "Hoover" menu, but if that be true it proved how little Mr. Hoover has done to take the joy out of life even on a wheatless day. In a letter to the secretary of the institute, Bradley Stoughton, Herbert Hoover said:

"I am glad to hear that the Conservation Division of the Food Administration is to dine in spirit with the American Institute of Mining Engineers. Be cheerful about this dinner; every year the War goes on the butter pot will shrink in size—but it has disappeared in Germany. Some year or other, when we are living on the German ration—they will crack."

Banquet in New York and Visit to Princeton

The speakers of the evening were W. O. Hotchkiss of the War Minerals Committee, Bainbridge Colby, of the United States Shipping Board and President-elect Sidney J. Jennings. The retiring president, Philip N. Moore, who acted as toastmaster was somewhat deftly rebuked by Bainbridge Colby for saying in his introduction that our War Department was in the hands of a temporarily reformed pacifist and the Public Information Bureau in charge of a temporarily reformed muckraker. Quite a large number of persons who believe in keeping their wisdom under their hats, especially in the presence of foreign guests, protested in private against Mr. Moore's outspoken remarks.

The trip to Princeton, N. J., which closed the evening though made on one of the chilliest days was a most enjoyable termination to a notable meeting. Lunch was served in Proctor Memorial Hall of the Graduate College, and President John Grier Hibben, of Princeton University, addressed the visitors. The guests then walked or rode by automobile to the aviation field and later visited the Museum, Nassau Hall, the Library and Holder Hall. In the Museum was a piece of New Jersey coal. The small chunk of mineral came from a quarry near Princeton and looked like the real article though doubtless the state will never be a coal producer.

Coals having different composition require different sizes of combustion space. The chemical characteristics that are most likely to affect the size of the combustion space required for a given set of conditions are the quantity and quality of the volatile matter. The quantity of the volatile matter is shown by its percentage as determined by the proximate analysis. The quality of the volatile matter is indicated approximately by the ratio of volatile carbon to available hydrogen, and probably also by the oxygen content of the coal on a moisture and ash free basis.—*Bureau of Mines Bulletin No. 135.*



Licensing Plan for Jobbers

Fundamental changes in the regulations governing coal jobbers will be put into effect by the Fuel Administration on Apr. 1. A licensing plan has been devised which, it is believed, will protect the legitimate jobber and will make impossible abuses which had sprung up under the previous regulation.

It is the belief of the Fuel Administration that the jobber should receive remuneration for service only. Just as a professional man has nothing to sell other than service, it is the intention of the new regulations to limit the income of the jobber to actual service performed.

The new regulations have been worked out with much deliberation. The advice of representative jobbers has been sought at every turn. In the light of last year's experiences, it is believed that a plan has been worked out which will be fair to the operator, fair to the bona fide jobber and fair to the consumer. It is believed that this is the first instance in which a system has been worked out which will permit a retailer to buy, at his option, of the producer or the jobber. In eliminating unnecessary middlemen, the Fuel Administration believes it will point the way to the elimination of middlemen in other industries.

The complete text of the new regulations follows:

Rule 1. A licensee who, as owner or selling agent for another, sells coal or coke without physically handling the same on, over or through his, or its, own vehicle, dock, trestle or yard, shall not ask, demand or receive for such coal or coke more than the price fixed by the President or the United States Fuel Administrator for such coal or coke f.o.b. cars at the mines or ovens, and in effect at the date of the sale thereof, plus 5c. per ton of 2240 lb. of anthracite coal, when such licensee incurs the expense of rescreening such coal at Atlantic or Lake ports for transshipment by water.

Rule 2. A licensee who acts as purchasing agent of coal for and by authority of a retail dealer or consumer without becoming the owner thereof, may charge a purchasing commission not exceeding (a) the sum of 15c. per ton of 2000 lb. of bituminous coal, (b) 5 per cent. of the delivered price of smithing coal when certified in writing by the retail dealer or consumer that such coal is to be used for smithing purposes only, (c) the sum of 20c. per ton of 2240 lb. of anthracite coal when delivery of such coal is to be effected at or east of Buffalo, or (d) the sum of 30c. per ton of 2240 lb. of anthracite coal when delivery of such coal is to be effected west of Buffalo, provided that such licensee may add to such purchasing commission 5c. per ton of 2240 lb. of anthracite coal when such licensee incurs the expense of rescreening such coal at Atlantic or Lake ports for transshipment by water. The combined purchasing commissions of any number of licensees who act for a retail dealer or consumer in the purchase of a given shipment or shipments of coal shall not exceed the commissions herein allowed for one licensee. No licensee shall charge any purchasing commission as purchasing agent of coke for a retail dealer or consumer. Any coal or coke purchased by a licensee for any consumer or retail dealer may be charged and invoiced to such licensee as agent.

Rule 3. No licensee shall ask, demand or receive any commission, charge or profit as broker or purchasing agent from any consumer or retail dealer for the purchase of any coal which is owned by such licensee, or in which he or it has any direct or indirect interest, or for selling which such licensee is entitled to receive any commission or compensation as selling agent or otherwise, or which was produced from a mine controlled, directly or indirectly, by such licensee, or by the controlling owners of such licensee, or from a mine whose owner or the stockholders, members, or partners who control such owner also control directly or indirectly such licensee.

Rule 4. No licensee shall rebate or pay to any owner of a mine producing coal or to any person directly or indirectly interested therein, either as stockholder, partner, member of association or otherwise, any part of any commission, charge or profit received by such licensee.

Rule 5. No person exclusively employed as salesman by a single producer or exclusively employed as purchasing agent by a single consumer, shall be required to procure a license for the performance of his duties as such salesman or purchasing agent.

Rule 6. Contracts relating to bituminous coal made before the President's executive order of Aug. 21, 1917, and contracts relating to anthracite coal made before the President's executive order of Aug. 23, 1917, which are bona fide in character, and enforceable at law, shall not be affected by Rule 1 hereof, but coal purchased or sold under such contracts shall be governed by Paragraphs 8, 9, 10 and 11 (as modified by the order of the United States Fuel Administrator, dated Nov. 8, 1917), of Publication No. 9 of the United States Fuel Administration.

Rule 7. Every license shall be in such form and shall contain such terms, provisions, limitations and restrictions as the United States Fuel Administrator may from time to time prescribe, and the same shall be subject to modification and revocation by him, and shall be issued and held subject to these and such further rules and regulations as he may from time to time establish.

The foregoing rules and regulations approved and promulgated this 15th day of March, 1918, to become effective 7 a.m., Apr. 1, 1918.

In his proclamation authorizing the licensing of jobbers, the President says in part:

All persons, firms, corporations and associations (except those specifically exempted by said act of Congress, producers and miners of coal and manufacturers of coke, distributing exclusively their own product, and retail dealers, as defined in the United States Fuel Administrator's order of Oct. 1, 1917, Publication No. 7, engaged in the business of distributing coal or coke as jobber, broker, selling agent, purchasing agent, wholesaler, or in any capacity whatsoever, are hereby required to secure a license on or before

Apr. 1, 1918, which license will be issued under such rules and regulations governing the conduct of the business, as may from time to time be prescribed by the President of the United States or by the United States Fuel Administrator acting by virtue of the authority heretofore as aforesaid, or hereby, delegated to him by the President.

Fuel Administration's Zoning Plan

After months of work the Fuel Administration announced Mar. 22 a zoning plan which will revolutionize coal distribution in this country. While every state will be affected to a more or less degree, the principal effect of the order is to restrict Eastern coal to Eastern markets and make it compulsory for the Middle West, as well as other sections, to use coal produced near-by. Expectations of the Fuel Administration in this regard are indicated by the following extract from the Fuel Administration statement:

In addition to the saving in transportation the system will provide for the possible retention of something like 5,000,000 tons of coal for the eastern states which heretofore has gone west all rail. This tonnage can be readily utilized in the East. As an indication of the saving to be effected by the system, it will eliminate the movement of more than 2,000,000 tons of Pocahontas coal to Chicago and other western points over a haul of about 660 miles. Chicago can obtain this tonnage of coal, and under this system must obtain it from southern Illinois mines with an average haul of 312 miles. Allowing for the differences in quality in the two coals there will be thus saved 11,400,000 car miles or very conservatively figured 285,000 car days. This will permit 14 additional round trips of 20 days each from West Virginia mines to zone destinations, permitting an additional production of at least 700,000 tons of Pocahontas coal.

Coal of particular quality needed for the making of byproduct coke, the manufacture of gas, for metallurgical purposes or like uses, will not be restricted to the zone in which it is produced, but will move under license. Permits will be issued to the individual consumers having need for this special-purpose coal where a supply is not available in the producing districts which are permitted to ship into the consuming zone where the consumer is located. Applications for permits must be made to the Zone Permit Bureau of the United States Fuel Administration in Washington.

With regard to lake cargo coal, the Fuel Administration makes the following statement:

The present indications are that it will not be possible to furnish as much lake cargo coal during the coming seasons as was moved during the season of 1917. Therefore, to make up for the decreased amount of lake cargo coal, consumers in the Northwest must obtain a greater supply of Illinois coal.

The plan does not prohibit the movement of lake cargo coal from any of the mines located in the Pittsburgh, Connellsville or Westmoreland Pennsylvania districts; in the Altoona, Meyersdale or northern Pennsylvania districts; in the Fairmont, Kanawha or Kenova-Thacker high-volatile West Virginia districts; in the New River or Pocahontas low-volatile West Virginia districts; in the eastern Kentucky districts located along the Chesapeake & Ohio Ry., the Sandy Valley Elkhorn Ry. and the Louisville & Nashville R.R. (Hazard and McRoberts fields); in the southern Kentucky districts located along the Louisville & Nashville Ry. and the Cincinnati, New Orleans & Texas Pacific Ry.; in the Ohio districts as a whole.

The plan does not take into consideration the movement of coal to the lower Lake Erie ports for vessel fueling purposes. This tonnage during the past lake season amounted to approximately 1,650,000 tons.

In discussing the effect of the order in Pennsylvania, West Virginia, Virginia, Maryland, Delaware, New Jersey, New York and the New England States, the following statement is made:

With the exception of the Pittsburgh district, the consuming territory in all of these states requires movement of coal eastbound in the same direction as the preponderance of railroad traffic for export or inland delivery; and because of the congested conditions on all of the eastbound railroads in these states, it has been found unwise as yet to circumscribe the markets to be reached by coal produced in one portion or another of the producing field described, for, in order to move the maximum tonnage, it is necessary to preserve the greatest possible flexibility in the number of sources of supply for and the available routes of transportation to the consuming markets.

Weekly Coal Production

By producing 11,228,000 tons of coal during the week ended Mar. 9, the mines of the country made a better showing than in any other seven-day period since the week ending Nov. 24. Anthracite shipments were 42,207 cars. Beehive-coke production was 733,000 tons. Byproduct coke production aggregated 446,371 tons. These marked increases are accounted for almost entirely as being a result of an increased car supply. The figures are those of C. E. Lesher, the statistician of the U. S. Geological Survey.

To Consider Hall-Zimmerman Case

Appointment of a committee to consider the situation in connection with the Hall-Zimmerman case, which involves the placing of cars assigned for railroad fuel, has been authorized by the directors of the National Coal Association. The committee is authorized to employ counsel and to determine what participation, if any, the National Coal Association should take in the case.

Brief Washington Notes

The recent increase in price granted to a part of Preston County, West Virginia, has been made to apply to the entire county. Operators not included in the original order were able to show that similar mining conditions exist throughout the county and that transportation costs are the same.

Dr. H. A. Garfield, the fuel administrator, is being urged from many quarters to make a tour of the states most affected by fuel regulation. It is believed that a clearer understanding of the objects sought to be gained by the Fuel Administration will be had if Dr. Garfield finds it possible to make a series of speeches in those states where coal matters are of great moment.

Brewers in the United States expect to reduce their output 30 per cent. during the period between Apr. 1 and July 1. Action to this end has been undertaken

in compliance with a suggestion from the Fuel Administration. This is another step in the interest in promoting the conduct of war industries to the fullest possible extent by curtailing fuel consumption among the industries which are not so essential.

J. Howard Magee, of Cumberland, Md., has been appointed assistant district representative of the Fuel Administration for Maryland; D. M. Carl, also of Cumberland, has been made assistant district representative in the coal field consisting of Mineral, Grant and Tucker Counties, West Virginia, and in the Maryland fields; J. M. Cover, of Cumberland, another of those appointed, is assigned to certain operations in Somerset County and in the Indian Valley district.

A three-day diversion of practically all coal from the Pocahontas and New River fields to tidewater has had the effect of meeting the bunker situation and supplying a certain reserve. The order was cancelled at midnight Mar. 14. To meet the requirements of the United States Shipping Board, however, all operators in the two fields, whose mines are adjacent to the Chesapeake & Ohio and Virginia railroads, will continue to ship to tidewater. The only exception to the order is coal for the making of byproduct coke.

Certain increases in the freight rate on anthracite coal proposed by the Norfolk & Western R.R. have been allowed by the Interstate Commerce Commission. The increases approved are those of 15c. or less per long ton. It is provided that the rates between points in official classification territory shall not be increased by more than 15c. It also is provided that where a through rate between two such points is made by combination, appropriate provision will be made so that the aggregate increase shall not exceed 15c. per ton.

New Prices in Somerset Field

New prices for the Somerset field of Pennsylvania have been announced as follows: Run-of-mine, $2.60; prepared sizes, $2.60; slack or screenings, $2.60. The prices which they supersede are run-of-mine, $2; prepared sizes, $2.25; slack or screenings, $1.75. The Somerset field has been enlarged by adding to it the territory tributary to the Baltimore & Ohio between the Somerset County line and Indian Creek.

Contracts Limited to 65 Per Cent. of Mine's Capacity

That not more than 65 per cent. of a mine's production be contracted for is asked by the Fuel Administrator. By leaving the remainder to move on current orders and instructions from the Fuel Administration, there will be little interference with the normal movements of coal and the usual relationships between consumers and producers, Dr. Garfield believes. "Large consumers, including railroads who contract for their fuel requirements," he says, "should not contract for more than 65 per cent. of the output of any one mine or coal-mining company."

Legal Department

PASSING ACROSS SHAFT BOTTOM AS CONTRIBUTORY NEGLIGENCE—A section of the Iowa mining statutes reads: "At the bottom of each hoisting shaft there shall be constructed a safe and convenient traveling way around the shaft for employees and animals, and it shall be unlawful for any person to pass across the shaft bottom in any other manner than by the traveling way herein contemplated; except such employees as may be necessary to perform the work at the bottom of the shaft or those engaged in making repairs." Applying this section in the case of Dennis vs. Gibson, 165 Northwestern Reporter, 1030, the Iowa Supreme Court denied the right of plaintiff to recover damages for injury sustained by him in being struck by a descending cage while he was crossing the shaft. The court holds that neither custom nor an emergency to prevent cars from piling up, nor considerations of convenience will excuse violation of the statutory injunction. The exception in the statute of employees working at the "bottom of the shaft" is limited to those who work in the actual bottom of the shaft and excludes employees engaged in loading and unloading cages.

RELIANCE UPON MINE FOREMAN'S ASSURANCE—The Kentucky Court of Appeals has affirmed judgment in favor of plaintiff in the case of Deskins vs. Consolidation Coal Co., 199 Southwestern Reporter, 779, growing out of injury to plaintiff through a fall of slate while pulling coal stumps under direction of his foreman, who ordered him to remove them notwithstanding plaintiff's suggestion that that might be dangerous. The court said: "Though the safe-place doctrine might not have been applicable if plaintiff of his own volition had proceeded with the work, such is not the case presented. According to plaintiff's evidence, he would have stopped work on the pillar had it not been for the foreman's command. Hence, if no command had been given, he would have been subjected to no further danger. In obeying the command he had the right to rely upon the superior judgment of the foreman and assume that the foreman would not subject him to any unnecessary peril, and to proceed with the work, unless the danger was so obvious that an ordinarily prudent person in his situation would have refused to encounter it. Under these circumstances, the mere giving of the command, if negligently done, was of itself sufficient to impose liability on the company, although no other evidence was shown. . . . On this question the evidence was sufficient to take the case to the jury."

Coming Meetings

AMERICAN ASSOCIATION OF ENGINEERS will hold its fourth annual convention May 14 in Chicago, Ill. Secretary, A. H. Krom, 29 South La Salle St., Chicago, Ill.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS' annual convention June 26-28 at Atlantic City, N. J. Secretary, F. L. Hutchinson, 25 W. 39th St., New York City.

AMERICAN INSTITUTE OF MECHANICAL ENGINEERS will hold its spring meeting June 4-7, at Worcester, Mass. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

INDIANA RETAIL COAL MERCHANTS ASSOCIATION will hold its spring meeting Apr. 10 and 11, at the Hotel Severin, Indianapolis, Ind. The meeting will be a strictly business affair, most of the time being given to discussion of retailers' problems. Secretary, R. R. Yeagley, 703 Fidelity Trust Building, Indianapolis, Ind.

Plant a Garden

and Save Food for the Soldiers



THE dates given for planting in the seven zones into which the eastern part of the United States has been divided are considered to be the best for planting. Earlier and later plantings often can be made, however, with fair chances of success.

Zone	Group One	Group Two	Group Three	Group Four
A	Jan. 1-Feb. 1	Feb. 1-Feb. 15	Feb. 15-Mar. 1	Mar. 1-Mar. 15
B	Feb. 1-Feb. 15	Feb. 15-Mar. 1	Mar. 1-Mar. 15	Mar. 15-Apr. 1
C	Feb. 15-Mar. 1	Mar. 1-Mar. 15	Mar. 15-Apr. 1	Apr. 1-Apr. 15
D	Mar. 1-Mar. 15	Mar. 15-Apr. 15	Apr. 1-May 1	May 1-May 15
E	Mar. 15-Apr. 15	Apr. 15-May 1	May 1-May 15	May 15-June 1
F*	Apr. 15-May 1	May 1-May 15	May 15-June 1	May 15-June 15
G*	May 1-May 15	May 15-June 1	May 15-June 15	(†)

*For the crops grown. †Season too short for this group.

GROUP ONE (may be planted two weeks before last killing frost).—Early cabbage plants from hotbed or seedbox, radishes, collards, onion sets, early smooth peas, kale, early potatoes, turnips and mustard.

GROUP TWO (planted about the date of last killing frost).—Beets, parsnips, carrots, lettuce, salsify, spinach, wrinkled peas, cauliflower plants, celery seed, onion seed, parsley, sweet corn, and Chinese cabbage.

GROUP THREE (should be planted two weeks after last killing frost).—Snap beans, okra, and tomato plants.

GROUP FOUR (cannot be planted until ground is well warmed up, about a month after last hard frosts).—Lima beans, pepper plants, eggplant, cucumbers, melons, squash and sweet potatoes.

Courtesy "New York Globe"

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

There are two outstanding features in the news of the week. The first is the threatened split in the union and the second the determination apparent on the part of the miners to absorb by increased wages all the increases in the price of coal granted by the Fuel Administrator.

The anthracite region has always questioned the advantage of its labor connection with the bituminous field. The operators have declared against what they regarded as the dictation of the soft-coal mine workers. The anthracite mine workers have believed that the anthracite labor interests were only the tail of the dog to be wagged at his pleasure.

THREATENED SPLIT IN ANTHRACITE REGION

It is useless to deny these declarations, for the anthracite industry is convinced that they are true, and, being a closely-knit district, argument is impossible. Besides, are not all the leading men in the organization from the soft-coal regions and is not the greater part of the money spent in those same bituminous fields? Of course most of it is raised there, but in far greater proportion is it spent there. Area after area has been unionized or its unionization attempted at great expense to the organization. It is only necessary to name a few fields thus assisted to prove this contention: Colorado, western Kentucky, eastern Kentucky, eastern Tennessee and Alabama. The anthracite region in recent years has not seen any such long strikes, and it has never been involved in lawsuits such as those in Arkansas with the Coronado Coal Co. and the Pennsylvania Mining Co., and those in West Virginia with the Hitchman Coal and Coke Co.

Probably the trouble will blow over as it has in the past and no new organization will be formed. However, the rumor from Shamokin was to the effect that mine workers from Northumberland, Schuylkill and Columbia Counties met Sunday week and at least discussed this subject if they did no more.

COLORADO UNION MEN ARE BADLY DIVIDED

The trouble in Colorado is another thorn in the flesh of the international board. What little unionization has been effected in that state is in danger of being swept away. The signatories to the contract in that state are the Victor-American Fuel Co., the Routt Pinnacle Coal Co., the Black Canon Coal Co., the Curtis Coal Co., the Elk Creek Mining Co., the Colorado and Utah Coal Co., the Wolf Park Leasing Co., the Gibson Lumber and Fuel Co., the Monument Valley Coal Mining Co., the Bear River Coal Co., the Louisville Coal and Land Co., the Alliance Coal Co., the Black Canon New Maitland Coal Co., the George McNally Coal Co., the Rapson Coal Co., the International Fuel Co. and the Evans Fuel Co. The Victor-American is the only concern of prominence. The reader will note that the Colorado Fuel and Iron Co. and the Rocky-Mountain Fuel Co. are not on the list. Nor is the Puritan Mine, which John R. Lawson declares signed up with him before the split.

The unionization is therefore quite incomplete and already a new union has sprung up. All this and no more is the outcome of the expenditure of six million dollars since the year 1910. One cannot regard the defection as negligible even though it be true, as Robert H. Harlin says, that there were only 34 delegates at the rump convention representing 11 local unions, four of which repudiated the action of their delegates at the next local meeting. There were, however, according to the same authority only 70 delegates at the regular convention. The defection seems to be quite important in view of the small size of the field and its moderate degree of unionization.

The other development to which reference has been made is the determination of the mine workers to overlook the fact that the Fuel Administration is raising coal prices in order to make production possible at all the operable mines of a given district. On Mar. 15 B. M. Clark, the president of the Executive Board of the Association of Bituminous Coal Operators of Central Pennsylvania, refused to meet the mine workers to discuss the increase in wage for which they are asking.

OHIO SERVES NOTICE OF INTENTION TO STRIKE

News comes from Martins Ferry, Ohio, to the effect that in the closing meeting of the twentieth annual session of sub-district No. 5, John Moore, the state president, declared that the operators of Ohio were trying to get an increased price for coal and he added that if they got the increase he "would be after a piece of it for the miners" even if it was necessary to have a strike equal to that of two years ago, which lasted 14 months.

Lee Hall spoke to the delegates about the importance of clean coal, but he declared that the reopening of old mines was partly to blame. He said that "unless there is an improvement in the mining so that clean coal is produced no one will want Ohio coal in the future."

The strike threatened in Preston County, West Virginia, at the mines of the Kingwood Coal Co. did not materialize. The district officials insisted that the men remain at work. The Fuel Administration is to solve the problem whether the Kingwood Coal Co. should be compelled to buy powder and sell it to its miners at less than cost. Selling anything at less than cost is an anomaly and should be done away with. However, those concerns which have hitherto never sold powder are given an advantage now that the powder has to be sold at a loss. The price presumably is fixed high enough for the operators to sell powder at a loss or otherwise those who do not would be put out of business.

The returns from district No. 24, Michigan, indicate that former President John Crutchfield, one of the radical socialist element, has defeated Robert Gaffney by an overwhelming majority in the election for international board member. William Muir becomes president. He had 16 more votes than Frank O'Donnell and the race was so close that for a long time it was thought that O'Donnell had the job cinched. William Stevenson becomes vice-president and Fred Dando is reëlected secretary-treasurer. O'Donnell and Gaffney were both men who desired to keep the mines working steadily throughout the duration of the war.

KENTUCKY MINERS WANT A UNION POORHOUSE

Despite the fact that the United Mine Workers are opposed to the idea of building homes for aged and disabled mine workers the mine workers of western Kentucky at the recent session voted, at the suggestion of President W. G. Duncan, in favor of building a $20,000 home at Central City, Ky. The general sentiment has been that the mine worker would prefer a pension and to pass his declining years with those who are near and dear to him. Only recently John Mitchell, the former president of the United Mine Workers, issued a statement opposing the erection of a home for the aged and infirm.

The mine workers also recommended that the Government intervene to secure that powder be sold them by the operators at a lower cost. At the present prices no one but operators will sell the miners powder, but that is not enough, they want the operators to accept an even larger loss in handling powder than that which they now sustain.

A stand was taken at this session against the practice of mine operators in making contracts with railroads to supply them with the full output of the mine. These mines get all the cars and the other mines have to divide up what are left and so run irregularly. The men perforce have to leave the mines that have no output contracts.

Conditions in the Drumheller field, Alberta, Canada, are somewhat hard to determine. Between the days when the Rosedale men won't work—or rather when some of them won't work—and days when there are no cars, but little work is done. On Mar. 12 the mine operators of British Columbia made a protest against Bill 27 (Coal Mines Regulation Act.), which provides for an 8-hour day from bank to bank for all employees at mines. The operators complain that wages have increased 35 per cent. since 1907 and the cost of production $1.10 a ton. They declare it is impossible to replace Chinese with white laborers for at the mines on Vancouver Island 52½ per cent. of the employees are Chinese and the proportion throughout the entire province is 28½ per cent.

Possible Anthracite Labor Split

It seems that the risk of a split in the ranks of the United Mine Workers which will cleave the anthracite and bituminous contingents from one another is more possible than was at first thought. The anthracite men keenly resent the fact that the bills for which they are to be assessed are, by chance, incurred by bituminous mine workers and not by their own men.

One can only wonder at this point of view. If the men at the anthracite mines believed that the action of the union was wrong in the Coronado Coal Co. case and if they thought that the union should refuse to permit the formation of a local at an operation like the Hitchman Coal and Coke Co., which made contracts with each individual mine worker precluding him from joining a union, then their action could be understood. But breaking up for a mere geographical reason is absurd. Or is the argument more mineralogical? Anthracite is more mineralized than bituminous coal; therefore the miner of bituminous coal is a person of no interest to the anthracite miner. Was ever argument more flimsy?

But, like many arguments, the worse they are the more convincing they seem, and Frank J. Hayes, the president of the United Mine Workers, has felt compelled to send telegrams to several national organizers to take charge of a situation which James Matthews, the district president of the Schuylkill region seems unable to control. The mine workers are determined not to pay the 50 per cent. increase in dues levied by the international convention at Indianapolis in January, which increase is effective Apr. 1.

The union officials are certainly badly scared by the developments. They have even issued an order that the increase in dues shall be kept in the anthracite region instead of being sent to the national treasury of the organization. It is announced that 20 per cent. of the money that each local union would send into the national treasury, with the increased dues, will be returned to the district and local treasuries. Instead of getting 55c. from each union, the national organization will only receive a net amount of 40c., while the district treasury and local treasury will receive 5c. each.

Bernice Mine Workers' Decision

There are only two large corporations in the Bernice field, of Sullivan County, Pennsylvania. That field lies off by itself at some distance from the area commonly known as the northern anthracite field. These two concerns are the Northern Anthracite Coal Co. and the Connell Anthracite Coal Co. The mine workers in both of these recently presented grievances before the Anthracite Conciliation Board which, unable to agree, turned the matter over for decision to Charles P. Neill, the umpire of the board. The men in both cases ask for payment of a 10 per cent. increase under the terms of the agreement of May 20, 1912. The companies had granted only 5½ per cent. The mine workers were not organized until recently and had been unable to make their demands articulate.

The arbitrator found that the Northern Anthracite Co. was a party to and was therefore bound by the decision delivered by the Strike Commission in 1902 and also by the terms of the agreement of May 20, 1912. This later agreement provided for an increase of 10 per cent. over and above the rates established by the award of the commission. The umpire decided that the employees of this company were entitled to this increase and directed that it be paid.

The umpire also said that the Connell Anthracite Co. was not organized until after the award of the commission and so was not in any way bound by its terms. He decided that the increase of 5½ per cent. that it paid to its employees was a voluntary act on its part. For this reason he did not sustain the grievance and denied that the employees were entitled to any additional increase under the old agreement.

Kansas Patriots Sweep Howat Aside

A correspondent recently wrote as follows:

Alexander Howat, president of the mine workers in the Kansas district, failing to induce the men to recognize his authority and listen to his arguments in favor of contract breaking, has recently issued what purports to be a supplement to the biennial contract. This incorrect reprint misleads the miners as to contract conditions and is causing unwarranted discontent in some fields.

The practice with reference to contracts and supplemental agreements is for the operators to print and issue copies to their members, and for the union to print and issue other copies for the use of the union membership. Heretofore there has never been any variation in these versions, exact reproductions being published, so that the men knew just what the agreements were.

Late in February, however, a book was issued at Pittsburg that appeared in all respects to be the text of the agreement signed in Kansas City last spring as supplemental to the biennial agreement. On the title page is the statement that the book contains the agreement made by the Southwestern Interstate Coal Operators Association. The last page bears the names, as signatures, of the association's officers. But the agreement as printed varies radically from the true contract and its supplement.

In the section pertaining to the Osage field, for instance, the scale is given 50c. higher than that actually agreed upon. This higher scale as printed was operative under orders from Dr. Garfield between Jan. 19 and Mar. 1, but it is no longer in force. The Osage miners being in possession of these apocryphal agreements, are up in arms to compel the fulfilment of the terms of this pseudo-record. As might be expected much trouble is brewing.

There are many instances, similar to the one quoted, where the contract of the book varies from the contract actually signed. The operators are studying it, comparing the terms in it with the original agreements as actually accepted, and they are publishing the facts broadcast for the information of the mine workers and the general public.

Suspicions against the patriotism of the Kansas miners have long been harbored in some quarters. But it has recently been proved that if they can shake off the demoralizing influence of unscrupulous leaders they will prove just as good citizens as mine workers anywhere.

All but one of the mines in Kansas that had been shut down in violation of the contract have reopened. In every case Alexander Howat, the president of the Kansas district, has appealed to the mine workers and ordered the strike to go on, but without avail. In fact the open revolt against the authority of Howat is the most gratifying development in the Kansas labor situation that has appeared for many months.

The Smith, Scott & White Contracting Co.'s mines were shut down on Dec. 28 because of the refusal of the mine workers—as individuals—to report for work. Howat had advised this action, and he insisted throughout the suspension that there was no strike and nothing whatever that

called for arbitration. In fine, he said, that Tom and John and Pete were not coming to work for reasons of their own, but whenever they felt so disposed they would return.

It was, however, quite well understood that if the operators would refrain from assigning men to jobs which the miners did not want to do, the miners would return to work. As the matter of striking was quite fully covered in the contract, the miners could not strike as a body without violating its terms and without being subject to a heavy penalty. Hence Howat's "individualistic" method of quitting work.

When thus on strike, or "sulk," or whatever you may term it, the miners held several meetings at each of which Howat pleaded with them to stay away from work. The last meeting was held Feb. 26. For hours the men listened to the pleading of their president, but they had listened even longer to their loyal instincts, and they decided to go back to work.

Returned as They Had Quit—As If Unorganized

There was no announcement that the strike was at an end, but the men all went back to the strippings on Mar. 1, not as a union but as individuals. However, the subject in controversy will now be taken up in the manner provided by the contract. The men have lost $35,000 in wages, and the country has lost about 50,000 tons of coal, and that at a time when the shortage of coal was most acute. No one gained anything but the pro-Germans.

The strike at the Jackson-Walker Coal and Mining Co.'s mines was a real farce. The outcome was the same, but it came sooner. The men found out that they were being used for somebody's ulterior purposes, and they decided that they would abide by their contract and the principles of the saner of their leaders.

The resumption of work Mar. 1 at the Jackson-Walker mines marks the early demise of the abortive National Bookkeepers and Company Weighmasters Union of which Alexander Howat was the organizer, and first and only national president.

It was formed, it is said, with the express purpose of circumventing the Washington penalty provision. If the mine workers could not strike without violating their pledge and paying a fine, this new union, unpledged and too small for official cognizance, could strike at its pleasure and give the mine workers the opportunity for remaining idle that they might happen to covet or have coveted for them by Alexander Howat.

But the bookkeepers were not so anxious to serve the ends of the mine workers as to raise their own wages. They struck though they have received two advances during the past year. Their places were quickly filled, so the great scheme did not work. In consequence it was necessary for the mine workers to strike, and this they did in sympathy with the union bookkeepers.

Howat, President of Bosses and Bossed

The operating companies naturally regarded this new development of unionism with disapproval, for not only did it attempt to circumvent the contract but it aligned the weighmasters with the mine workers, whereas the mine workers are supposed to be kept in check by the weighmasters. With the weighmasters hand in glove with the miner, the operator felt much as the miner would feel if the check-weighman he paid and appointed were to join some operators' association and put himself subject to its rulings. As the new order of things threatened to put it within the power of two or three men to close the works down, the operators felt justified in looking for new men when the strike occurred.

The miners in two of the mines stayed out ten days, and then voted to return to work, resuming operations Feb. 27. The other three mines did not resume until Mar. 1. When the bookkeepers and weighmasters saw that the miners were not going to stand back of them, and that the clever plan was failing, they met and adopted resolutions of extravagant loyalty to the Government and declared that to avoid any appearance of seeming to interfere with the production of coal at a time when the country needed it, they would temporarily suspend their demands. But the jobs of the members of the new union, even after they had divorced themselves from it, were no longer open.

The two labor difficulties above outlined were ended largely through the efforts of representatives of the United Mine Workers, who were able to make plain to the miners how dangerous a course it was to follow the unethical suggestions of the Kansas president. In consequence of the strike the Jackson-Walker miners lost $41,000 in wages, and the country 18,000 tons of coal.

Low Tonnage Is No Fault of Miners

The mine workers of Illinois at their meeting in Peoria, Ill., tried hard to absolve themselves of all blame for the coal shortage. It is true that the output has been so restricted by lack of equipment that the many strikes in the state during the past year did not greatly reduce the output of the whole state or country, though that cannot be conclusively proved.

The mine workers' attempts to defend their action shows how strongly they feel now the necessity for steady work. Where labor is concerned, the public has a ready power of forgetting. If the Illinois mine workers continue in their present diligent attention to the country's needs, in a few months they will have absolved themselves more completely than can be done by any vigorous protestations.

Miners Apologize for Taking Time to Talk

There is even a note of apology from them regarding the number of men made idle by the conference. They feel, in their patriotic enthusiasm, that now is the time to work and not to talk, and they are in a defensive mood like patriots discovered in what is, on its face, not a creditable business. They explain that ordinarily between 800 and 900 mine workers would be withdrawn from productive labor by such a conference for about two weeks, and the railroads would have to provide that number with transportation.

But this time the number is reduced one-half. The basis of representation is changed so that now each delegate acts for 100 miners instead of 50, as heretofore. The reader will please note the spirit of these Illinois men. It was perhaps of slow growth, but it seems to have attained an intensity with which few regions can compare.

President Frank Farrington, in his annual report, declared that if cars were provided the Illinois miners could produce 59,000,000 more tons annually than they are producing. He backed up his statement with figures, showing the production since 1915. "For the fiscal year ending June 30, 1916," he said, "Illinois mines worked an average of 163 days and produced 63,673,530 tons of coal. This was sufficient to fill the demand of the time. The railroads then had adequate facilities to move the requisite tonnage.

Mine Workers Always Waiting on Somebody

"No one had then any reason to complain, except the miners themselves. It was they who had suffered by being given just a little more than half-time employment. Then the abnormal demand began to hit the country. To move the tonnage taxed the railroads to the point of breaking down. In that period, the fiscal year ending June 30, 1917, Illinois attained her maximum production and mined 78,983,527 tons of coal. And still the mines worked an average of only 179 days, or 134 days less than full working time. Had the mines operated for full time during this period and maintained the same ratio of production as obtained during the days of actual operation, Illinois miners could and would have mined 138,110,093 tons of coal; but due to a lack of transportation facilities to move the tonnage from the mines, they were able to produce only 78,983,527 tons, or 59,126,562 tons less than their potential capacity."

Farrington bitterly denounced the Industrial Workers of the World. "The declared policy of the Industrial Workers of the World," he said, "is to destroy the United Mine Workers of America. For years we have allowed them to tear at the very vitals of our union. Emboldened by our indifference, they are becoming more and more active."

We Need These Boys at the Mines

A Big Opportunity is Open to the Boys Around the Mines to Get Back of the Government and Help in the War







PERCY S. BULLEN *writing in the* New York Times *recently showed the good work Boy Scouts can do under stress of war conditions.*

"On a recent visit to England I found that the Boy Scouts were in the zenith of their career of national usefulness. They had been the means of releasing many thousands of men for service at the front. You found them everywhere with their standards of manhood, integrity, and chivalry to girls and women, acting as civil guards on all sorts of occasions, policing the streets for processions, safeguarding property, bearing ambulances, and acting as dispatch carriers. The usefulness of the organization in America during the war and its great possibilities of expansion, judged by what has been accomplished elsewhere, have not yet been fully brought home to the public and more especially to parents who might well be proud to have one or more Boy Scouts in the family."

Boy Scouts in America are selling Liberty Bonds, and War Savings Certificates; they are aiding the Food Administration and even helping the Fuel Administration. We need their enthusiasm and their services.







EDITORIALS

Bandar-Log or Bee?

FROM the time a monkey opens his eyes in the morning until drowsiness overpowers him at night, he is pretty much a law unto himself. He does anything he wants to, when he wants to, and as long as he wants to. A whimsical individualism sums up his philosophy of life. The day's end finds him just where he was in the morning. The tribe—bandar-log, Kipling calls them—respond to any leader of the moment and as quickly quit him to follow another or to fetch up individually with a brand-new, suddenly-caught and all-absorbing idea.

Like any other philosophy, it is a charming one if you like the net results of it. The monkey does. On the contrary, the bee doesn't. The bee insists on organization by functions. His philosophy is self-sacrificing, vigorous and stern—a Spartan philosophy applied to production. "Beefficiency" is the Taylor system raised to the *n*th power; and the bee doesn't get the honey.

If the bee had sense, he'd maintain his present organization a few hours a day—which would easily supply his wants—and be a bit bandar-logish the balance of the time. But he cannot. The reason is because he doesn't think. He's a machine that is a part of a bigger machine. On the other hand, if he did think, he'd immediately tend to become individualistic, and the moment that happened the organization would begin to wobble. There would be argument about how the comb should be built, who should build it, who should boss it, how much honey should go to each; societies for the prevention of this and that would be formed. Social workers must eat; so must bosses; so must societies for the prevention of things.

Nature did not see fit to devise a species having the merits of both bandar-log and bee—a sort of bandar-bee.

A bandar-bee would help us a lot just now. It would be the real super-thing. It would be highly coöperative for a few working hours and highly individualistic the rest of the day. It would accept the notion that working together bee-fashion is the answer to the question of maximum production in minimum time; but being a super-thing, it would reject the notion that the honey gathered should all get into the hands of a few crafty speculators to be sold back at the speculators' price. It would control distribution with the same bee-like coöperative efficiency that it used in production.

It would accept the axiom that self-expression is necessary to a thinking super-thing—that monkey play in a monkey way is after all the best fun in life. It would approve the bandar-log system, in which the individual in his idle hours may sit on a limb and philosophize, or try a new way of weaving twigs, or join the bunch in a frolic, or play with the kids.

Obviously the bandar-bee would be a clear and direct thinker. He would be an intense individualist—so intense an individualist that in order to have the maximum number of hours a day for individualism, he would sink his individualism when he came to his production and distribution hours, and be an intense coöperator. He would treat as wasters those superbees who would work themselves and others without any thought of the monkey play, merely to amass a personal pile of honey. There would be piles of honey, adequate personal piles, but not huge ones.

Individualism and self-interest are about the same thing. The date when the bandar-bee will appear on the earth depends upon the amount of hammering which mankind must undergo, to pound into it a realization of the fact that in the long run self-interest can be most permanently promoted by intense and unselfish coöperation in production and distribution.

Why Raise Only Raw-Material Rates?

NO ONE will ever applaud the Interstate Commerce Commission, not even when it is interred, which interment a large section of the public hopes will come soon. It has just increased railroad rates. That seems hopeful. When one hears it one is prone to believe that the commission has become reasonable and really appreciates railroad conditions and the difficulties which their administrations—private or Governmental—have to confront.

But the commission had, nevertheless, to do wrong. It places the increases on raw materials, on which the rate is high, rather than on manufactured goods which are carried at too low a rate. Of course, this may not do the harm under Governmental supervision that it might do under private management. The Government should, and probably will, scorn profits and show a preference for the handling of such raw materials as the country most needs.

But it is surprising that the rates on raw materials are chosen for increase when everyone knows that the advance in rates should not have been so placed. It would have been bad enough to have put an equal increase on all classes. It is essentially wrong to correct first an evil which is the least crying. Raw materials had at least a good argument for an unchanged rate, but manufactured articles never possessed even the very shadow of a right to that contention.

The attempt being made to sidestep that responsibility and put the blame for rate increases on the demand of the railroads made when under personal management is deplorable. Everyone knows that the present managements desire the increases or they would not be granted. There is no new need for increased rates for railroad transportation. The regulation of the price of coal has actually made it less necessary. The only reason why it is granted now and was refused before is because the ox has a new master.

The ox is now paddocked in Washington, D. C., and it is recognized that all Washington cattle must be pro-

tected. No one ever cared what happened to the ox when it was at Wall Street, New York City. There it was gored far more cruelly. There it became a mere mangled corpse and was denied veterinarian aid. Now, by Government regulation of coal prices, its precious hide is protected, yet nevertheless its new master is most solicitous about its condition, and the veterinarians who refused medicine before are ready with their potions.

No one can regret that rates are raised, even though they are the wrong rates. Higher rates were necessary. They could not come too soon. However, we are permitted to regret that the wrong rates were raised—that the unfairly proportioned raw-material rates were changed first and may, perhaps, be the only ones that are to be changed. We may also be allowed to regret that many of the increases were in the freightage rates of primary necessities, anthracite, live stock, fresh meats, petroleum, grain, cement and lumber, the high cost of which so many people are deploring. But no matter where the railroads get their operating money it is a source of rejoicing that the revenue is to come in.

We have always contended that the producer of essentials should be allowed the bigger profits, for his is the greater service. No one can deny the logic of this. The only answer is that it is more important that the cost of essentials shall be low, that the public may live. Now the Government steps in. It has its chance to make profits on nonessentials, and immediately it jacks up the cost of essentials over which beforetime it exercised such a careful ward. Was there ever more inconsistent action?

Green Hands vs. Chance-Takers

THE problem as to which kind of employee was the greatest menace to a mine and to himself—the green hand or the chance-taker—received consideration at a recent meeting of the American Institute of Mining Engineers. Those who discussed it did not presume to say that they had the matter solved, but even when the problem is answered one way or the other it will perhaps make little difference for the work of safety will be best secured by the same methods no matter whether a green hand or an old hand is most to blame.

Take an illustration from the field of crime and penology. We know there are men who are hardened in evil and our hope has always been not so much to correct these men as to prevent the young men who are continually replacing these old offenders in the work of each generation from starting out wrongly in the battle of life. The public schools and the institutions for the recreation of the young are expected to do a work of character formation more effective than any work of character reformation.

Likewise in the matter of the dangers to green hands and old hands there is in the future a surer solution to be found in the training of green hands than propaganda among chance-takers can ever afford.

The green hand, well coached at the first by trained men, properly convinced that a careless, reckless miner is a bad miner, will be careful from the very beginning, and good habits, once learned, are apt to persist. The hope is in emphasizing safety when the man is hired and especially when he is hired for the first time. The workman must be given not merely a sort of inchoate dread of his work, but a definite system of safety practices to be followed unerringly.

As it is we put the men in the mine to work with men whom we know practice unsafe methods, with men who habitually run risks. We place them in the mine entirely untrained, and we leave it to a chance visit of the mine foreman at an opportune moment to work the reformation. But the seeds of carelessness and slackness have perhaps by this time already been sown by an old and reckless miner.

Have You Plans for Next Liberty Loan?

WE ARE not asking if you are planning to buy bonds, because, of course, you are. You will buy all you can. But that is not enough. How many are you going to *sell?* To what extent have you laid plans to sell them? Lay your plans carefully so that when Apr. 6 comes every man at your mines will know that you are a patriot and a citizen ready and willing to help in the three-week drive that is going to put over the biggest loan that we, the world's biggest people, have ever floated.

The Kaiser is not a side issue in our lives. He is the main issue. We cannot let the Prussians win, and we cannot prevent them from winning unless we make their defeat the main purpose of our lives till the war is ended. On Apr. 6 the immediate interest of everybody will be to see that the great loan is subscribed and oversubscribed. Every manager, superintendent, mine foreman, fireboss and miner will be a Liberty Loan seller and a Liberty Loan buyer, first; and a worker in the industrial army, second. Everybody will be thinking Liberty Loan from the time he hears the alarm clock in the morning till the moment he lifts the window sash before retiring—and in the watches of the night also.

If you have any stories as to how Liberty Loans have been sold in your community and as to the manner in which you purpose to sell the bonds let us hear from you. Perhaps we can help, and we know your suggestions will help others.

Fidelity, Industry and Intelligence

IF A man is faithful, industrious and possesses average common sense, he has the three chief requisites to success. The coal industry has several hundred such men, who through the exercise of these simple virtues have advanced from insignificant positions to posts of responsibility and importance. Nothing is more inspiring to those who are struggling against heavy odds than the story of some other fellow who has persisted and eventually won out. He does not necessarily have to be the president or the general manager—a man who has raised a family, sent his sons through college, and owns his own home, is to that extent successful. We want a number of such stories for our Success Number, which is to be issued Apr. 13. Pick out your subject today and let us have the sketch by the first of April. If you can furnish a photograph, we will be pleased to print it with the article. This is one way to help the coal-mining business by heartening some of the men in it.

DISCUSSION BY READERS

Prohibition and Labor

Letter No. 1—My attention was strangely arrested by the full-page cartoon that appeared in *Coal Age*, Mar. 9, p. 463, showing miners drinking in a saloon. The scene there portrayed brought a train of thoughts to my mind.

Before attempting to discuss the relation of prohibition to labor, however, let me say that I very much regret that Samuel Gompers, president of the American Federation of Labor, has seen fit to array himself against the adoption of the Federal Prohibition Amendment in New York State. It would seem that the class of workers whom Mr. Gompers represents, in his official capacity, is composed of those who are most injured by the prevalence of the liquor traffic. For this reason he, of all others, should have stood firm for prohibition.

No argument is needed to make clear the fact that the laborer who indulges in liquor to excess loses not only a portion of his earnings, but, likewise, to a large degree, his ability to earn. Drinking to excess is necessarily followed by a period of enforced idleness when the man must sober up before he can return to work. If he should return, however, and start to work when under the influence of liquor he would not only endanger himself but his fellow workers by reason of his irresponsible acts.

To Protect Men Against Themselves

To protect a man against himself is reason enough for the enactment of prohibition, but there is yet another element that requires equal consideration. It is a duty that rests upon society requiring it to act in its own defense against the social evils that become rampant in its midst wherever liquor holds sway. There is, again, the duty incumbent upon every community to safeguard its homes against the degrading acts of those given to the drink habit, who by word and example persuade the young to travel the same downward road they themselves have followed to their ruin.

Every year makes it more apparent that the drink habit is a prevailing evil and its authorization by Government sets up an institution that violates the personal rights and liberties of the individual guaranteed by the Constitution. It is the individual's right to protect himself and his own from the inroads of evil and to intervene for the betterment of humanity. Every citizen has the right to live and build his home in the community where he earns his bread and to demand that the standards of that community shall be such as not to undermine the home.

There is, again, another side to this question of prohibition. Whatever affects labor affects the entire social life of a community and its productiveness. At the present time, labor is being urged to do its utmost to produce coal, food, steel, ships, airships and motors; while, at the same time, the draft is thinning out the forces of labor in the country. We are told that this is no time to attend to other matters, but that the war and its requirements are of the most vital importance.

Wars are won by clear brains and strong bodies, which are needed not only at the firing line but must be in the possession of every one of the great army of workers to whom the boys at the front are looking for support and encouragement. Clear brains are not the product of the saloon. There is, therefore, today, no greater menace to the successful prosecution of the war than the presence of the saloon in our mining camps and industrial centers. Food is required to win the war, and it should not be wasted or used in the manufacture of drink that is a hindrance to production.

It has become a popular saying, "A quarter a day keeps the Kaiser away." Let every drinker ask himself whether it will not be better to spend his quarters for thrift stamps instead of for beer. Loyalty to the cause permits of but one answer.

Reply to Samuel Gompers

In reply to Mr. Gompers, who says, "Aren't we asking about enough of our German and Austrian citizens to give their loyal support to this Government, against that of their own, without injecting an enactment that will forbid them gratifying their normal tastes?" Let me answer, unconditionally, No! Not when those "normal habits" conflict with and destroy the effectiveness of American citizens.

When the German, Austrian, Englishman, Frenchman, Italian, or Pole, comes to this country to establish a home, we ask him to become Americanized; and loyal American citizenship may demand, as it does today, the destruction of an industry that is and always has been an enemy to good citizenship.

In that case, the so styled "normal habits" of citizens of foreign extraction must give way to the higher demands of the country. This demand has been growing greater and stronger every year, until it is now overwhelming, and national prohibition will soon be welcomed throughout the land. GEORGE N. LANTZ.

New Straitsville, Ohio.

Coal Production and Booze

Letter No. 6—I was much interested in the letter of John Buggy, *Coal Age*, Feb. 9, p. 300, regarding the damage done to the production of coal by the tolerance of the saloon in mining camps and districts. I must admit, however, that I was somewhat amused at the suggestion offered as a means of curtailing this great evil.

Br. Buggy suggests that the Government limit the shipment of liquor to each mining district, allowing only a prescribed percentage of the accustomed consumption. This, he says, would provide but a small amount that each man could receive and thereby prevent

drunkenness. He asks that the Government issue orders requiring saloonkeepers and bartenders to furnish tickets to their regular customers, which would restrict the number of drinks a man could obtain.

My own idea is that the Government, having already stopped the mannfacture of whiskey in the state, should go further and do the same in regard to all drinks that use articles of food in their preparation, and serve no good purpose but render men unfit for work.

While I am no temperance man, it does seem strange to me that the Government should permit articles of food to be used in the manufacture of liquor, which does not serve the purpose of food and has never been known to help anyone who was given to the habit of drinking. On the other hand, any man who has reached 26 years of age can not fail to have observed many occasions when someone who has imbibed too freely has caused much harm by his irresponsible acts.

It is my firm belief that, should the Government enact a law prohibiting the manufacture and sale of all intoxicating drinks, the effect would be to increase the efficiency of the miner fully 10 per cent.

Eldorado, Ill. MINE MANAGER.

Letter No. 7—I agree most heartily with everything that S. D. Hainley has said in his letter, *Coal Age*, Feb. 16, p. 346, in regard to how the booze habit affects the coal production in the country's present crisis when the demand for coal has been so great that many sections of the country have been unable to obtain an adequate fuel supply.

It is not my habit to put up a hard kick in the interest of temperance; but I can see no good growing out of the confirmed habit of many men, who repeatedly drink themselves drunk, until they are unfit for work. If I should spend $1 in two months, for drink, I would feel it was too much, especially where I have mouths to feed and a family to clothe. When a man can secure but three days a week for work it requires the strictest economy to provide these necessities.

Our town has about 300 inhabitants, and I am frank to say the consumption of beer, in this place, surpasses anything I have seen before. For example, at one house where there are but four boarders there were delivered 35 quarter-kegs of beer in one evening, which is not an uncommon amount of liquor supplied to many other houses in the place.

How Drink Affects the Operation of a Mine

The effect of drink on the operation of a mine has not been exaggerated in the letters previously written. When a mine foreman wants to start he finds that he must run empty handed as the "booze hoisters" always fail to show up when needed. Not infrequently there is no machine runner on hand and the miners must go home because there is no coal to load. He is reported to be at home sick.

A motorman fails to show up, and the foreman puts a less experienced man in his place to run the machine. Before long there is a wreck and the mine must now lay idle for several hours or the balance of the day. Like the machine runner, this man is reported sick when, in truth, both are drunk and unfit for work.

I can indorse the suggestion made by John Buggy to the effect that the Fuel Administration give its closest attention to the production of coal and eliminate these causes that are more than any others responsible for the short supply of coal. As Mr. Buggy asserts, the way to do this is to limit the shipments of liquor to mining districts and camps to a small percentage of the usual consumption. They will then not be able to get enough drink to harm them or render them unfit for work and every man will be on the job.

Injustice to Steady Workers

It would seem that the general attitude of operators toward their men who lose much time by reason of drink is not what it should be, while men who are always in their places are forced to run machines and drive motors when it is their desire to cut coal.

When first starting work in this mine I was given a job of spragging and, later, was asked to assist the motorman. I was not fitted for the work because the coal was low; but the foreman refused to give me a place to dig coal until I spoke of quitting. He then gave me a wet hole where half a dozen men had quit before me; first, however, making me promise to help him out when he needed a spragger. This was done to punish me for not being willing to continue to fill the places of men who failed to show up because of drink.

A similar case was that of a friend who wanted to dig coal, because he could make more money so doing than by driving a mule. The boss replied to him, "All right, Bill, pick yourself out a place that will suit you; but when I am in need of a driver I want you to help me out." These instances show that many good workers who never drink suffer through the drink habit of others, whose places they are called upon to fill.

Waterman, Penn. A MINER.

Mine Cars

Letter No. 4.—Referring to L. B. Paul's letter, *Coal Age*, Feb. 16, p. 346, one is reminded that the chief consideration, at the present time, is the reduction of operating expenses, and that this depends, in a high degree, on attaining the greatest mechanical efficiency possible in mining equipment. This is particularly true in respect to mine haulage, which must be put on a highly efficient basis.

Besides the many points relating to efficient mine haulage, such as grades, curves, clean roads and well ballasted roadbeds, there still remains an important factor that is not given the consideration it demands. Today, operators are beginning to realize that bearing friction is the one factor that can be put on a high efficiency basis without interfering with the daily output of the mine.

There is no need to dwell at length on the fact that roller bearings of the proper kind and properly installed on mine cars greatly increase the length of trip a mine locomotive will haul; or that peak loads are greatly reduced and occur with less frequency than where the old type of plain bearings are in use. The reduction of peak loads means a longer life for the locomotive, especially if this is of the storage-battery type, which is rapidly growing in popular favor for gathering hauls.

In the use of plain bearings on mine cars, a heavy item of expense is the lubrication of the wheels, which

is a matter that requires the daily attention of a "greaser." The quantity of oil spilled at the tipple or on the shaft bottom where the cars are greased, and the larger amount that is wasted along the track, by the oil running out of the hub, call for a large expenditure for oil, to say nothing of the wages paid the greaser. This question of lubrication is one of the first items, in connection with mine haulage, that would engage the attention of an efficiency expert.

In contrast with this expenditure when operating with plain bearings, it should be observed that properly designed roller-bearing wheels require lubrication but once in about three months; and every drop of lubricant placed in the wheel is utilized for the purpose it was intended and does not drip along the haulage road.

I heartily agree with Mr. Paul in his conclusion that the installation of properly designed antifriction roller-bearing equipment means a saving of many dollars to the company. Experience has convinced me that roller-bearing equipment is a money-saving investment. Where the old style bearing must be replaced gradually with the new type, it is a fact that every ten cars equipped with the new bearings cause a drawbar pull not exceeding one-half of what it was when those cars were equipped with plain bearings, and the upkeep for the cars is far less than formerly. N. G. HERBERT.

Huntington, W. Va.

Letter No. 5.—I quite agree with L. B. Paul, who states in his letter, *Coal Age*, Feb. 16, p. 346, that there are a number of anthracite mines using mixed roller stock, and refutes the idea advanced by H. M. Crankshaw, in his article, Jan. 26, p. 191, that it is inadvisable to mix roller-bearing cars with those having plain bearings in the same mine.

To my own knowledge, there are many collieries in the anthracite region, and I doubt not in the bituminous region also, where the cars are mixed, those having roller bearings being operated with others mounted on plain bearings. There seems to be no mechanical reason why this cannot be done; and, on the contrary, there are many reasons why it must be done where a mine equipped with the old type of plain-bearing cars desires to change to roller bearings

ADVANTAGE IN A GRADUAL CHANGE OF EQUIPMENT

By changing the cars gradually from the old plain-bearing type to the new and more efficient roller bearings, a colliery can take advantage of the fact that a certain number of the cars used in the mine are going through the shops for repairs, each month, and the change of bearings can be made with less expense and delay at that time and the old equipment will be replaced when it is worn out.

While it is true that a great advantage will be gained by changing the equipment from plain to roller bearings where a colliery is using a thousand or more cars; at the same time, it must be acknowledged that to discard the old gear for the new, at one time, would not only lay the mine idle for a considerable period but would necessitate the investment of a considerable capital to be charged in bulk to the equipment account.

The cost of installing good roller bearings on mine cars is much in excess of the cost of plain bearings, but the former have a longer life and cost less to maintain. For this reason, it is good policy to make the change, but this should be done in a way that will not interfere with the regular operation of the mine or embarrass the company financially.

It was the practice of the railroads, a few years ago, to handle items of this nature under the charge of "betterment expenditures" and finance the investment from the earnings rather than drawing on the capital. This required that such expenditures should be distributed over a period of time, as determined by the earnings of the company.

I have observed more or less of the same practice adopted by some collieries. In a few instances, collieries have started to equip with roller-bearing cars at least two years ago, and the change is not complete today but is progressing steadily. However, as a colliery nears the completion of such a change, I have observed that the tendency is to hurry the matter, because of the marked advantage shown by the adoption of the new equipment. In none of these cases has there seemed to be any difficulty in the operation of a mine owing to mixed rolling stock. H. P. GIRARD,

Kingston, Penn. Engineer.

Relative Size of Intake and Return Airways

Letter No. 7.—The question of mine ventilation is only second to that of safety, to which it is closely allied. In opening a mine, either a drift, slope, or shaft, the first thing to be considered is timber and then air, for it is certain one cannot advance far underground without both of these.

In regard to ventilation, let me say here that I have always preferred to install a blower rather than an exhaust fan for several reasons: (1) The blower appeals to me as the stronger ventilator. (2) It can be installed at an opening provided with a manway and this, in my opinion, should always be the intake opening, so as to afford air for the men going to and coming from their work. (3) When using a blower the haulage road is the return air-course, and this avoids the annoyance and trouble due to snow and ice obstructing the haulage road in winter, which is the case when that road is made the intake for the mine.

In regard to the question of which should be the larger, the intake or the return airway, I answer that, for practical reasons, it has always been my preference to make the return airway the larger of the two and use it as the main haulage road.

LOADED TRIPS SHOULD MOVE WITH THE AIR

By adopting that system the loaded trips all move with the air current, while the empty trips must be hauled against the air. However, it is clear that the empty trips moving against the air will create less resistance than would result when the haulage road is made the intake, which requires that the loaded trips be hauled against the air.

Again, it is always considered the best practice to have the grade of the haulage road favor the movement of the loaded cars. In that case the empty cars ascending the grade will move slower and cause less resistance to the air current against which they are traveling.

These considerations, together with the arguments already advanced by other writers, convince me that the best practice is to make the return airway the larger, unless some particular conditions require the contrary.

The plan suggested by W. H. Clark, *Coal Age*, Feb. 23, p. 387, providing one main intake airway of ample size and two main return airways, one for each side of the mine, in addition to the haulage road, would be an expensive undertaking in our low seams. However, the Pennsylvania Mining Law, art. 6, sec. 4, requires the adoption of such an arrangement in mines generating gas.

The law provides further that, in a nongaseous mine working a considerable area, with main entries 5000 ft. or more in length, the operator must either haul the men to and from their work, or provide three main entries, one of which shall be used exclusively as a traveling way. S. D. HAINLEY.

Osceola Mills, Penn.

Letter No. 8.—Kindly allow me to say a word in reply to the letter of John Rose, *Coal Age*, Feb. 9, p. 299, who seems to think that the return airway of a mine should always be larger in sectional area than the intake airway. Like Mr. Rose, I have always held this opinion and answered such a question, when given in a mine foreman's examination, by saying that the sectional area of the return airway should be the larger.

It is my belief, however, that the conditions existing in the mine must govern this matter. If a mine is very gaseous and the main haulage road is made the intake of the mine, it may be necessary to increase the sectional area, in order to provide a sufficient amount of air at the working face to meet the requirements of the law.

Mr. Rose asks that someone figure out and tell us whether the intake or return airway should be the larger, in that case. In my opinion, it is not a question to be answered by figures, but must be judged from a practical standpoint. For example, in a mine where the haulage road is the return airway it should, in practically every case, have a larger sectional area than the main intake air-course. On the other hand, in a mine where the main haulage road is made the intake, the question of the relative size of the intake and return airways can only be decided by a competent man of wide experience who has charge of the mine.

In general it may be said that a haulage road, under good roof, can seldom be driven too wide, for the considerations of the health and safety of the miners. There will then be little trouble experienced from the resistance offered by the moving cars to the passage of air, whether the haulway is the intake or the return airway of the mine. CLAUDE CARRUTH.

Collinsville, Ill.

Electrically Driven Mine Pump

Letter No. 2.—The inquiry of John Martin, *Coal Age*, Jan. 26, p. 214, relative to the troubles he experienced in operating an electrical mine pump located at the bottom of an 800-ft. slope having a 25 per cent. grade, recalls a similar incident in my own experience with an electric pump.

Practically the same difficulties were encountered in the operation of this pump, as those described by Mr. Martin. He states that his pump worked badly, at times bending the piston rod or breaking the castings of the belt-wheel journal, besides burning out the armature on certain occasions.

It was suggested in the reply to this inquiry that the difficulty may have been due to a lack of adjustment in the controller of the motor, whereby the pump was started too suddendy and unable to overcome the inertia of the water. Allow me to suggest that the pump may have been operated at too high a speed.

In my own case, the difficulty was overcome by reducing the speed of the pump by using a smaller pinion. It appears that Mr. Martin's pump is belt-driven, but, in that case, it should have been equipped with a properly adjusted compensator or controller to regulate the speed.

Again, perhaps the power of the motor was not sufficient to work against the discharge head; or, it may be that the power was taken from a direct-current circuit delivering current to a number of haulage motors. While it is possible to run some small pumps with direct current and give them little attention, larger pumps require constant watching, under these conditions. With so little data at hand, however, it is hardly possible to give a conclusive answer to the question asked.

Thomas, W. Va. W. H. NOONE.

Miners and the War

Letter No. 7—The present coal shortage has excited the greatest interest in the mind of every loyal citizen of this nation, whose natural resources and man-power are not equalled in any other portion of the globe. This being true, there should be no shortage of coal such as exists in the country today.

Almost a year ago President Wilson made his appeal to the coal miners of the United States to do their utmost to produce coal, explaining that the efforts of the Government and the brave men sent to the front would be of no avail if the coal miners did not do their part. Looking about us for evidence of successful coöperation in the matter of producing and transporting coal to the points where it is needed, one fails to find any united efforts of the miners, operators and railroads to promote the fuel supply.

There is an old saying that might well be adopted as the slogan in this country. It is, "United we stand, divided we fall." For the sake of humanity and to maintain our own sacred rights there should be unity of effort, without which we shall fall under the mailed fist of that autocratic government that has sought to rule the world.

A short time ago there was an editorial published in *Coal Age* [Dec. 8, p. 981] comparing the efficiency of miners under the day-labor and piecework systems. As there stated, "the union and piecework . . . have combined to reduce efficiency in the mining of coal." It would seem a practical impossibility to establish, as the union has done, a uniform wage scale that will be equitable and just to every worker. Too many mine workers are possessed of the I. W. W. ideals, and it is a crime to regard the work of such men as constituting a good day's work in mining.

Only last summer, a few other men and myself were sent into the mine, as a nightshift, to extend a certain motor road. Two or three of us did our best to perform a good day's work, to which the others took exception, claiming that we would receive the same pay whatever work was performed. They would not listen to reason and even threatened to bring charges against us, as working in the interests of the company instead of supporting the Brotherhood.

Uniform Day Wage Unjust and a Failure

In my opinion it must always prove a failure to attempt to establish a uniform day wage, by which the same amount is paid to every man whether he does a good day's work or lays down on the job. Merchants and manufacturers compete with one another in the superiority of the goods they produce at a given price. Why should not the same principle apply to the work performed in the mines, so that each man would be paid according to his efficiency.

It would seem that the attitude of the miners' union on the one side and of the coal operators on the other is very much like that of the cat and the dog. They continually refuse to work in each other's interests, although those interests are common; namely, the production of the largest possible daily tonnage, for which the miner would receive an increased pay and the operator an increased profit on the output of his mine.

Let me say, in closing, that the war makes every month, every day and every hour valuable, and each miner must do his utmost and labor with his best skill and ability to produce the needed coal. Let us, as miners, do our honest share to stand behind the boys fighting at the front. War is a cruel business, but it purifies the soul. A Humble Miner.

———, Ill.

Letter No. 8—The relation that the coal miners of this country bear to the war will no doubt admit of a wide range of discussion, but I desire to offer a few remarks that will be confined to the more simple aspects of the question.

To increase the production of coal and assist in its equal and prompt distribution to points where it is most needed, the Government has assumed control of the situation. At this early stage of the undertaking, it would be mere speculation to attempt to forecast what advantages will accrue to the coal-mining industry, throughout the country, on this account. We can only hope that the result will be successful and that the problems of coal supply and distribution, together with the more perplexing questions that arise in regard to labor and prices, will be satisfactorily solved.

As Thomas Hogarth has said in his letter, *Coal Age*, Dec. 22, p. 1067, "America is at war," and I would add that the great army of mine workers in this country must not lose sight of the fact that her enemy is powerful and resourceful. If it is true, as is claimed, that the winning of the war depends primarily on the production of coal, then it is a fact that the miners of the country constitute a tremendous factor in prosecuting the war to a successful issue. The responsibilities that rest on their shoulders are indeed great. To what extent our miners will stand up to their part in this world drama remains to be seen.

While the loyalty and patriotism of the great mass of coal miners, in this country, cannot be questioned, it is still true that there are some among them who have little or no regard for the nation's interests, but are more concerned in taking a selfish advantage of the present situation to get for themselves more wages and shorter hours. They are not interested in increasing the output of the mines, except as they can profit thereby.

While believing that coal miners, as a class, are as patriotic as any other industrial workers, it has proved a sad spectacle to witness an army, amounting in the aggregate to 10,000 mine workers, laying down pick and shovel, at different times and places, for causes that are trivial in comparison with the one great aim before us.

Disposition and Habits of Many Miners

In his letter, Jan. 12, p. 70, W. H. Luxton cites an instance where the miners refused to proceed to work one morning because the train that was to take them to the mine was three minutes late, though it is most likely the delay was unavoidable.

An experience of more than thirty years among miners makes it difficult for me to agree altogether with the statement made by "A Miner," in his letter, Feb, 2, p. 259, which reads, "The public should cast aside the idea that the miner is thriftless and extravagant." If the average miner was as much concerned in saving his money as many are in making it, the most of them would have substantial bank accounts.

It is a common occurrence for miners to work hard and make big money and yet have not a dime three days after pay day. When times are good, it is easy for the miner to believe that these conditions will continue and he gives little heed to laying by a store. The man who earns $5 a day and yet, by frugal living, saves some of it, is of greater service to the country than one who earns $8 a day and squanders it.

Miners Need To Practice Economy

There is no class of workers who need to be counseled more in regard to practicing economy than miners. It is important that they should remember, as stated in the last letter to which I have referred, that "the process of increasing prices and then increasing wages to meet them, it is certain cannot go on forever." This miner takes the correct view. Reaction in war prices will sooner or later take place, and, as he points out, retrenchment will surely come.

As one considers the tremendous possibilities in the savings of miners, the need of such a movement appears the more urgent. Suppose, for example, 100,000 of our half million coal miners saved enough to invest in a $200 Liberty bond and another 100,000 purchased a $100 bond, while still another like number invested in a $50 bond. There would result, from this source alone, a total investment of $35,000,000.

What a monument that would be to the patriotism of coal miners! The efforts put forth by these men, in saving their earnings, would be as much to their own benefit as it would assist in the prosecution of the war. The present need would thus prove a blessing in disguise in providing many a miner with a competency that would be a great help to him later.

Dayton, Tenn. John Rose.

INQUIRIES OF GENERAL INTEREST

Seasonal Freight Rates

In connection with the discussion of seasonal freight rates and the interesting letter that appeared in *Coal Age*, Feb. 23, p. 386, suggesting a more equitable adjustment of freight rates in the transportation of coal, it has occurred to me that it is important to know the actual difference in cost of transportation, or the relative operating expenses of railways per ton-mile, for the summer and winter seasons of the year.

I would like to ask if there is any information of this nature available at the present time, or if it can be secured from any reliable source.

As stated in the letter to which I have referred, the rating of freight charges, for the transportation of coal, in accordance with the conditions prevailing at different seasons of the year, would make possible and amply justify the storage of large quantities of coal by dealers and consumers, and would tend to equalize the burdens resting on the railways throughout the year.

The proposition gives rise, however, to an important question, as the suggested rating of freight charges involves a consideration of the operating expenses of railroads, as the season changes from summer to winter and *vice versa*. I believe that this information will assist in the intelligent discussion of the question.

Philadelphia, Penn. EFFICIENCY ENGINEER.

This correspondent has drawn attention to an important factor in the matter of securing a more uniform and equable production and distribution of coal to large consuming centers. As is well known, when conditions in the country are normal the demand for coal increases with the advance of the winter season.

The seasonal demand for coal not only imposes an unnecessary burden on the carriers, calling for the transportation of a larger tonnage during the inclement seasons of the year; but has the effect, besides, of throwing many mines idle during the summer and producing a shortage of coal in the winter, at a time when it is most needed.

The question is a broad one, involving many considerations, and we hope that it will be intelligently discussed by coal operators, coal consumers and dealers, and railway interests, with a view not only to keep the mines running regularly throughout the year but to insure a never failing supply of coal at a reasonable cost.

It may be well to mention here that the principle of reducing the price of coal to domestic consumers in the spring and advancing it each month till the fall is a wise provision, as it tends to equalize the distribution of domestic coal throughout the summer, when each household should lay in its winter supply, as far as practicable. This principle need not apply, however, to steam plants and other large consumers for industrial purposes.

Replying to the question of the relative cost of the operation of railroads, on a ton-mile basis, in the winter and summer seasons, it may be stated that there is no information of this nature now on record, as far as our knowledge goes. That such a comparative tabulation of costs would be interesting and valuable cannot be doubted, and we hope that the *Railway Age* and others in a position to secure or furnish the necessary statistics from which this information can be deduced will take the matter up as being of equal interest to railways and coal producers.

None but railway men appreciate fully how much the cost of transportation in winter exceeds that in the summer season. This is not wholly due to the necessity of removing snow from the tracks and the increased difficulty of making track repairs at a time when the roadbeds are frozen and rails are more frequently broken. The increased cost of operating is largely the result of the effect of sleet on the rails, which decreases the tractive force of the locomotive and compels it to haul lighter loads or operate with double-headers.

As an offset of this increased expense in winter, however, extension work and other track improvements are pushed more urgently in the summer season when such work can be performed at a less cost. Further discussion of this question is urged by *Coal Age* as being of the utmost importance to the coal industry.

Methods of Working

Kindly permit me to present the following proposition to the readers of *Coal Age*, asking for their suggestions as to the best method of working the seam to obtain the largest possible extraction of coal at the least cost.

The seam has an inclination of 15 or 20 deg. and outcrops near the surface, which is practically level. The coal may be said to have a thickness of 10 ft., and is overlaid with a soft sandy shale that makes a weak roof and will require to be well timbered. The floor of the seam is a sandy shale.

I want to ask what plan of working and system of haulage would be best adapted to develop this seam. Assuming that the rooms are driven 15 ft. wide, what thickness of pillar should be left between them? It should be stated that the surface is traversed by numerous large streams and the seam is subject to many irregularities and faults or "pinchouts."

———, Ky. SUPERINTENDENT.

This is a practical question in coal mining, and we hope that it will receive careful attention from those whose experience will enable them to offer helpful suggestions. The plan of working suggested should be illustrated by rough sketches, showing the system of haulage employed and the method of timbering and ventilating proposed.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—A hemp-center, wire rope, 1 in. in diameter, with 114 wires, has a breaking strain of 50,000 lb. If 19 wires in this rope are broken, what should be the safe load on the rope?

Ans.—This is evidently a catch question, which the alert candidate will answer that there is no safe load for a wire rope having so many broken strands. On the other hand, the unwary candidate will estimate that if the breaking strain for 114 wires is 50,000 lb., the breaking strain on each wire would be $50,000 \div 114 = 438.6$ lb. Then, since there are $114 - 19 = 95$ wires still remaining unbroken in the rope, the breaking strain of the rope would be $438.6 \times 95 = 41,667$ lb., and allowing a factor of safety of, say 5, the estimated safe working load would be $41,667 \div 5 = 8333$ lb., or somewhat greater than 4 tons. It is never safe, however, to rely on a wire hoisting rope having many wires broken, because the strain on the remaining wires cannot be correctly estimated, and the rope is liable to give way suddenly.

Ques.—What will be the weight of water in a boiler 48 in. in diameter, by 168 in. in length and having forty-eight 3-in. tubes? Calculate the number of gallons of water in the boiler.

Ans.—The depth of the water in the boiler not being given, the total capacity of the boiler will first be calculated thus: Assuming the dimensions given are the internal diameter and length of the boiler, respectively, its cubic contents, disregarding the tubes, would be $168(0.7854 \times 48^2) =$ say 304,000 cu.in. The cubic displacement of forty-eight 3-in. tubes, in this boiler, is $48 \times 168(0.7854 \times 3^2) =$ say 57,000 cu.in. This makes the total capacity of the boiler when full, $304,000 - 57,000 = 247,000$ cu.in.; or $247,000 \div 231 =$ say 1070 gal

Ques.—When the diameter of a valve, the steam pressure, the length of the short arm and the weight are known, what is the rule to find the place to hang the weight?

Ans.—The question should state that the steam pressure is the maximum allowable pressure, and ask for the place to hang the weight so that the boiler will blow off at the given pressure. However, assuming that the "short arm" means the distance from the fulcrum to the valve-stem, the rule for finding the distance from the fulcrum to the weight, so that the valve will blow off at the given pressure, is as follows: Multiply the area of the valve in square inches, by the steam pressure expressed in pounds per square inch, and that product by the distance from the fulcrum to the valve-stem, also expressed in inches. Finally, divide the last product by the weight, in pounds, and the quotient will be the distance from the fulcrum to the weight expressed in inches.

For example, taking the diameter of the valve as 3 in., its sectional area is $0.7854 \times 3^2 =$ say 7 sq. in. Then, if the distance from the fulcrum to the valve-stem is 4 in. and the weight of the ball 60 lb., the desired blowoff pressure being 90 lb. per sq. in., the total pressure on the valve when it is lifted by the pressure of the steam is $90 \times 7 = 630$ lb. The moment of this pressure acting on the valve is $630 \times 4 = 2520$ in.lb. Finally, dividing this moment by the weight of the ball gives, for the distance from the fulcrum to the point that the ball should be hung on the lever, $2520 \div 60 = 42$ in.

Ques.—How would you find the capacity of a water cylinder of a steam pump in gallons?

Ans.—First, find the piston displacement, when the pump is running, which is equal to the continued product of the sectional area of the piston expressed in square inches, the length of stroke, in inches, and the number of strokes the pump makes per minute. It is customary to assume an efficiency of 85 per cent. for the water-end of the pump. On this basis the capacity of the pump in gallons is found by multiplying the piston displacement, expressed in cubic inches, by 0.85 to obtain the actual volume of water handled per minute, and dividing by 231, which will give the capacity of the pump in gallons per minute.

Ques.—What are the necessary supplies that should always be on hand at a mine, for the safe working of the same; and what is your duty in the case when your supplies are not on hand when needed?

Ans.—In addition to the necessary supplies of timber, ties, rails, cap-pieces, brattice boards and canvas, tools, powder, fuse or squibs, oil, hay and other feed, together with the necessary nails, spikes, rail-splices and bolts, there should also be a first-aid outfit, including two or more sets of breathing apparatus, oxygen tanks, pulmotor, safety lamps of an approved type, stretchers, blankets, and water-proof coverings. A suitable ambulance should also be available for use in time of need.

Should any of these supplies be lacking at the mine, it is the duty of the mine foreman to notify the superintendent or order what is required himself.

Ques.—How should a person be treated who is suffering from mine burns?

Ans.—Exclude the air by applying a thin paste of baking soda (bicarbonate). Vaselin, olive, oil, fresh lard or cream are all good. Severe burns should be treated by a physician.

Ques.—If you were inspecting a place after an explosion and found that near the floor or bottom the lamp would go out, while half-way between the top and bottom the lamp burned normally, and near the roof the flame became lengthened, what would be the three mixtures?

Ans.—The indications of the lamp flame would lead to the conclusion that there was an accumulation of blackdamp at the floor, and a body or layer of methane at the roof, while pure air occupied the center of the entry.

COAL AND COKE NEWS

Harrisburg, Penn.

Joseph B. Dickson, of New York, who with S. D. Warriner, president of the Lehigh Coal and Navigation Co. and W. J. Richards, president of the Philadelphia and Reading Coal and Iron Co., comprise the distribution committee on anthracite just appointed by Dr. Garfield, outlined, on March 15 the committee's plans. "The duties of our committee, subject to the direction of the United States Fuel Administration, will be to stimulate production; that is, to produce the greatest amount of anthracite coal by keeping all the mines operating to the fullest possible extent continuously throughout the year; to supply the requirements of the Government and apportion the balance among the various states and communities in a manner that will be fair and equitable to all and subject to the direction of the director general of railroads; to advise as to the routing and distribution of coal from the time it leaves the mines until delivered in the various states and communities, and we hope that by carefully watching this movement of coal over the railroads, using water and rail routes when practical, preventing more or less cross-hauling which has taken place in the past, to not only increase car mileage, but in doing so to enlarge production and increase deliveries to various states and communities.

"We also feel certain that with a close working arrangement and a complete understanding with the various state administrators that all sections of the country will be fairly and equitably treated in receiving their just proportion of the anthracite produced. It is not the province of this committee to either direct or distribute coal to the householder, this being absolutely cared for and attended to by the various state administrators."

To urge the making of the Susquehanna River navigable from Pittston, Luzerne County, to Baltimore, Md., instead of resurrecting the abandoned Pennsylvania canal, was the decision made at a meeting of the Pennsylvania Canal Boatmen's Association, business men, coal operators and manufacturers from all over eastern Pennsylvania held on Mar. 16. Hundreds of thousands of tons of coal and merchandise could be hauled annually, the boatmen explained, and they declared that it would not only relieve the railroads but would help much of the existing congestion during these war times and in the future.

It was pointed out that the opening of a waterway or channel in the Susquehanna would not be in competition with the railroads, as they cannot begin to handle the fuel and manufactured products now necessary to be carried from points of production.

That the rehabilitation of the old Pennsylvania canal, much of which has been filled in, with bridges and locks gone and miles of right-of-way used for railroad tracks, is out of the question was agreed to.

By the building of a series of dams 10 ft. higher than the low water mark at Sunbury, Berwick and Nanticoke, old boatmen asserted, and by dredging at low points, such a waterway could be constructed at a minimum of expense as to give a navigable stream for light draft boats of the type used on canals for the whole distance from the hard coal fields to tidewater.

Petitions will be presented to each Congressman along the right-of-way of the abandoned canal, and every effort will be made to secure the required legislation that will result in boats plying on the Susquehanna.

The state fuel administrator has suggested to the director general of railroads that resumption of operation of the Pittsburgh & Susquehanna R.R. could easily be accomplished by the New York Central operating this short line. The Pittsburgh & Susquehanna has not been operated since Feb. 18, when a payroll of about $5000 became overdue. More than 500 miners are employed at the 31 mines of the line, with a weekly production of 15,000 tons.

The Public Service Commission has announced a decision directing that the New York Central R.R. install a switch at the property of the West Branch Coal Co. in Clearfield County, saying that the railroad company must install the connections at its own expense and the remainder to be paid by the coal company. In case the parties cannot agree the commission says it will make an order.

The annual examination for applicants for certificates as mine foremen and assistant mine foremen in the anthracite region will be held at Harrisburg on April 23 and 24.

Fairmont, W. Va.

The coal operators of the Fairmont district, which includes 12½ counties of northern and central West Virginia as designated by the Fuel Administration, are on record as being opposed to the "assigned car" policy. The number of cars which should come into this region (Monongah district of the Baltimore & Ohio) is 1500 a day. The capacity of the mines at present, however, is not over 1000. The Baltimore & Ohio promised the office of the director-general of railroads to provide these, but the Baltimore & Ohio could not fill its promise either in getting the empties in or moving the loaded cars. There is a lack of motive power on the railroad which seriously interferes with the shipment of coal from this region.

Coal operators of the Fairmont district are expecting an increase in selling price any time. The cost-of-production sheets were filed in Washington last week by C. H. Jenkins, A. Brooks Fleming, Jr., T. W. Arnett, all of Fairmont, and A. C. Beeson, of Worthington, on behalf of the Fairmont Coal Club, and action has been assured before Apr. 1. The "thin vein" operators in several counties in the district have been granted an advance, and similar ventures in Marion and other counties are to make application shortly.

Charleston, W. Va.

Coal shipments from central and southern West Virginia, particularly from the Kanawha field, were tied up nearly all last week, not through the failure to secure cars but through flood conditions. From Wednesday until late Friday the Chesapeake & Ohio was unable to operate even passenger trains over most of its lines in West Virginia, trains being detoured over the Norfolk & Western Railroad. The Coal & Coke R.R. was also out of commission for almost the entire week. High water does not seem to have resulted in any damage physically to the mines outside of causing shutdowns.

Where flood conditions did not interfere, the car supply was the best it had been in several months, several hundred cars having been given the Fairmont-Clarksburg field last Sunday. As a result nearly all the mines in that section were able to work at full tilt at least during the first part of the week.

Operators in the Monongahela field are asking the Federal Fuel Administrator for a 40c. increase in the price of coal. Thirty-six companies were represented at the meeting held at Morgantown, where resolutions were adopted setting forth conditions under which the companies represented operated and requesting the increase referred to.

According to information obtained from the office of the Chief of the Department of Conscription and Enrollment, there are 1100 West Virginia miners in the military and naval service at the present time.

Much indignation has been caused by the tendency of some of the railroads to divert the fuel they obtain for use as railroad fuel to other purposes. Last week F. J. Patton, District Deputy of the National Fuel Administration, commandeered 431 cars of coal ordered by the railroads as fuel, which was over and above their needs. The coal commandeered was sent to steel mills, powder plants and concerns engaged in 100 per cent. war work. According to complaint made by coal operators, the railroads at times secure fuel at a price lower than the actual cost of production and dispose of their surplus where such coal would find a ready market at contract price.

Plans for operation on a large scale of their mines near Morgantown are being developed by the Pursglove-Mayer Coal Co., of Cleveland Ohio. They have a large acreage of Sewickley coal to develop.

As soon as they secure switching connections the Donohue-Shinn Coal Co. will begin to ship coal from their plant at Alexander, W. Va.

Arrangements have been made by the Barbour-Upshur Coal Co. to install a loop line tramway outfit for conveying coal. Such equipment is said to be the second of its kind used in the Fairmont-Clarksburg field.

After having their mines closed down for some time, Smith & Braun have reopened their mines again for the shipment of coal.

Arrangements are being made by Britt & Hornor, of Clarksburg, to open a new mine near Clarksburg.

Extensive repairs are being made to the tipple of Wyatt Bros., near Shinnston.

The Orville Coal Co. at Ojay, in the Guyan Valley Field, of which S. E. Scholl, of Huntington, is general superintendent, is installing a six-phase rotary converter.

The work of installing equipment at its mines on Coal River has been begun by the Maderson Coal Co., of which A. J. Dalton at Omar is general manager.

A 150-kw. rotary converter and other equipment is to be installed by the Fall River Pocahontas Coal Co. at Roderfield. The general manager of the company is C. B. Smith, of Mayberry.

The offices of the Logan & Hazard Coal Co. are to be moved from Cincinnati to Huntington.

The Cheney Coal Co. expects to open a plant at Chesapeake on the Chesapeake & Ohio Ry. in the very near future. J. S. Cheney, until recently general manager of the Stonegap Colliery Co. at Glamorgan, Va., will manage the new operation.

Having been chartered in November, The Laurel Branch Coal Co. will install a power plant and begin mining coal in a short time from No. 2 Gas Seam. Meredith Moore, at St. Albans, has been made general manager.

The Don Coal Co. at Eskdale is building a new tipple for its No. 1 Mine.

W. E. Deegans and associates have purchased the Beckley Vein Co. recently chartered. The company's plant will be located at Pemberton, connecting with both the Chesapeake & Ohio and Virginian railways. The company expects to begin making shipments by Apr. 1.

A substation and other equipment is being installed by the Sewall Valley Coal Co. at Meadow Creek.

Louisville, Ky.

"Big developments are coming fast in the eastern and southeastern coal districts of the state. Attention has lately been turned to the Clay, Ky., district, where a considerable acreage has changed hands recently. It is understood that the Peabody interests have purchased large holdings for future development, which will not come for several years, as the lands are off of the railroads and much developing will have to be done. The Frick interests of Pittsburgh are understood to have purchased additional holdings in the Harlan field, where improvements are expected to start at an early date.

In the Harlan field a number of new mines are getting ready for operation, including the Middleton Coal Co., which will start with about two cars a day; the Cambria Coal Co., two cars; the Harlan-Knox Coal Co., two cars; the Kitts Creek Coal Co., one to two cars. This concern is completing a tipple and will soon be ready to ship. The Clover Fork branch of the K. & V. R.R. will open about 12 mines, most of which will be three-to-four-car mines, and among which are the High Splint and High Point mines.

Development over in the Elkhorn district is going ahead at a rapid pace, and several big mines will be in operation shortly after the completion of the new spurs of the L. & N. Several of these mines will have a daily capacity of from 8 to 10 cars and running up to 20 cars a day, there being about 8 or 10 new companies getting ready.

PENNSYLVANIA

Anthracite

Wilkes-Barre—The 1917 annual report of Thomas J. Williams, mine inspector of the eleventh anthracite district, which includes the collieries in this city, shows that the year's production was 3,559,983 tons, of which 2,931,461 tons were shipped to market. David T. Davis, of the twelfth district, covering collieries in Plymouth, Larksville and Plymouth township, reports a total tonnage of 4,153,402 tons for the year, with 3,683,895 tons shipped to market. Both inspectors report a falling off in accidents in their districts, despite the great speed at which coal mining is being done in the Wyoming Valley.

Freeland—Within a short time extensive developments of mining will be under way. The recent acquisition of the Spring Brook operations by the Lehigh Valley Coal Co. in that section makes available two tracts of virgin coal held by the Coxe estate. These are fairly large beds, and combined with the robbing work that will be conducted in the Spring Brook operations will provide a large field for operation. Plans are also being considered at this time for draining the Old Silver Brook operations that have been filled with water for many years. The project is a most extensive one, however, and may have to wait the coming of more normal times before it is attempted.

Jeanesville—Work has been started on the sinking of a 600-ft. slope at the Spring Mountain colliery. The slope, while of comparatively short length, is of much importance to the development of the mine, as it will permit the tapping of two seams of virgin coal at that operation. The seams are the Lykens and the Buck Mountain. It is estimated that a large amount of coal can be obtained from this operation.

Shamokin—Several giant locomotives, built for the Atchison, Topeka & Santa Fe R. R., have been ordered by the Federal railroad administration for service in coal transportation on the Pennsylvania R. R. lines out of the anthracite region. The first of the engines was sent over the Shamokin division with a train of 75 empty coal cars, doing the work of two of the Pennsylvania engines in daily use.

Tamaqua—To encourage residents of the Panther Creek Valley to plant gardens, the Lehigh Coal and Navigation Co. has engaged Claude Deitrich, a graduate of Penn State College, as horticulturist, with headquarters at Lansford, and will lease all available plots at a nominal fee.

Trevorton—What is said to be one of the finest veins of coal in the middle western anthracite coal fields was cut recently at the Katherine colliery at Dunkelberger station, two miles west of Trevorton. The vein is the Lykens Valley No. 2, 10 ft. thick and reported to be of an unusually high quality. The new vein will increase the colliery output about 150 tons a day.

Scranton—Amicable adjustment of the equity proceedings of residents of Bromley Ave. against the Se-Rob Coal Co. was made in court on Mar. 14, following a hearing in which much testimony was taken. The agreement was approved by the court. Under it the company agrees to clear away all rubbish from the property; a concrete wall will be erected around the surface into the vein, supplanted by an iron rail; mining operations will be carried on under a plan indorsed by Engineers T. Ellsworth Davis, E. F. Blewitt, Harry Myers and W. C. Monroe. For every 28 ft. of coal taken out, 12 ft. of coal in pillars must be left. No coal will be taken through a surface opening. An opening will be made from a lower vein from the inside working and coal transferred through this second vein to the Oxford colliery of the Peoples Coal Company.

Danville—The first coal dredge to be floated on the Susquehanna River here this season was that owned by Charles Forney, who obtained 16 tons of buckwheat coal and three tons of stove coal. Nine dredges are located here. Indications are that many thousands of tons of anthracite will be taken from the Susquehanna between Harrisburg and Wilkes-Barre this year. Because of the high price of coal, dealers have offered an increase of 50 per cent. above last year's prices, and want the entire output of all dredges.

Bituminous

Du Bois—The Rhody & Maurer Coal Co., of Patton, has purchased the mines of the Tozier Coal Co. at Luthersburg, Penn., on the Buffalo, Rochester & Pittsburgh Railway.

Brookville—The Knoxdale Coal & Coke Co. is putting in a new operation known as Coder No. 5 on the L.E.F. & C. division of the New York Central R.R. in Clarion County. This company operates several mines of the Pittsburgh & Shawmut Railroad.

Punxsutawney—Jacob L. Fisher has purchased the entire stock of the Montgomery Mining Co. and will continue to operate the Montgomery mine on the Buffalo, Rochester & Pittsburgh Ry. near here.

Ford City—Three men were killed and four others escaped, one crawling on his hands and knees through dense smoke, when an explosion occurred in the Campbell mine, on March 16. The dead are Robert King, mine foreman, James Gould, and his son, Paul. The bodies of Gould and his son were recovered soon after the explosion by volunteer rescuers who braved the dangers of blackdamp and penetrated the wrecked section of the mine. The body of King was found 40 ft. from the mine entrance. He was just about to enter the mine with the pay for the miners when the force of the explosion caught him.

Knoxdale—A new operation has been begun here by the Green Valley Coal Co., with E. B. and F. B. Henderson, of Brockville, and B. E. Taylor, of Brockwayville, directors. Mr. Taylor will be general manager and general sales agent. The mine is located on the Pittsburgh & Shawmut R.R. and is putting out 250 tons a day, with prospect of 500 tons this season.

WEST VIRGINIA

Morgantown—Twenty cars a day for the use of operators in the Scott's Run coal region have been ordered by the New Haven R.R. for delivery to the Pennsylvania, and through them to the mines on Scott's Run. This important information was contained in a telegram received recently by Raymond Kerr, receiver of the Morgantown & Wheeling R.R., which serves the Scott's Run region. Contracts for the delivery of fuel to the New Haven have been held for some time by local operators, but until now they have been unable to secure the cars in which to make shipments. It would now appear that these cars will be supplied without further delay.

C. B. Bokey and son, R. L. Bokey, have leased a tract of 10 acres of Freeport coal from the Peninsula Coal Co. on Deckers Creek, opposite the Morgantown and Kingwood shops. A force of men is already at work and it is expected that three openings will be working soon. Coal will be run by a chute about 250 ft. to a large bin, from which it will be trucked to cars on the "Y" track. About 15 men will be employed.

Fairmont—The Kingmont mine, which has been operated by pick work exclusively, is to put in a mining machine, there being certain spots which it is almost impossible for miners to reach on account of the water.

Montgomery—During the heavy rainfall in this section last week the Cannelton Coal Co. suffered damages amounting to more than $25,000. The tipples of two or three operations on Smithers Creek were damaged heavily and four or five bridges of the branch line running up this creek were washed out. Mining operations on all other creeks in this vicinity also suffered heavy losses. Two coal tipples were washed out of Morris Creek, these being owned by the Kanawha Rail and River Coal Co.

KENTUCKY

Barbourville—Notice has been given of the dissolution of the Hughes Jellico Coal Co., which is winding up its corporate affairs. A. M. Decker and R. N. Cornett signed the notice as president and secretary.

The wagon-mine operators have been busy holding meetings at Barbourville and Corbin, Ky., this month, in order to file protests against the new Federal regulations which are said to be of a very drastic nature, and discriminatory. At Barbourville 50 wagon-mine operators recently organized the Knox County Wagon Mine Coal Operators' Association. W. B. Bailey was named president and an advisory committee of seven was named to take up with the Government authorities the status of the wagon mine, which it is claimed will be put out of business.

Madisonville—Basil Ramsey and James D. Overall have purchased the No. Clinker Mine from B. C. Mitchell, Harper Gatton and T. E. Hibbs. The new owners will build a tram to the L. & N. tracks. The former owners have since purchased the Ed Best mine.

Work of rebuilding the power house of the Shamrock Mine, of the St. Bernard Mining Co., twelve miles from Madisonville, has started. This power house was dynamited a few days ago, and fire broke out following the explosion. The tipple and other equipment came through undamaged. The power house was valued at about $40,000, and the mine is probably the largest in western Kentucky. It ships about 150 cars of coal a week under normal conditions.

Somerset—The Bauer Cooperage Co., of Lawrenceburg, Ind., which owns considerable cut-over land at Bauer, Ky., near Somerset, is planning to open coal mines at that point and install a mining town to take care of about 500 men. Hugh Wright, manager of the company, was recently at Somerset, Ky., where he discussed plans for starting the work.

INDIANA

Terre Haute—Mine mules have been causing trouble in the mines in this vicinity. The drivers of the West Cleveland Mining Co. asked for a relay herd one day last week because the regular herd needed rest and treatment. Their legs had become infected from the mineral water in the mine. The management insisted upon the mules being continued at work and the drivers struck, throwing several hundred miners out of work. In another mine the men quit work because the mules were not groomed enough. In still another mine 1200 men were out three weeks because a driver was discharged for beating a mule with a scantling. The contention was that the mule was a hardened reprobate who had a long list of injured men to his discredit, and what would have been cruelty to another brute was nothing of the sort in his case. The men returned to work when the driver was reinstated.

ILLINOIS

Lincoln—Efforts to enlist capital for the reopening of the mine of the Lincoln Mining Co., shut down several months ago on account of fire, have been finally abandoned and the machinery and other removable property is being disposed of

Virden—The Montour Coal Co.'s mine here has been ordered closed by the Macoupin County mine inspector until changes he deems necessary for the protection of the miners have been made. It is alleged that the owners have failed to provide adequate fire protection and refuge holes and that the ventilation is bad. Four miners were recently killed by an explosion in another Virden mine, which has resulted in more rigid inspection generally.

Carlinville—The Macoupin County Board of Supervisors met Tuesday, Mar. 12, and accepted the resignation of Samuel Dugan as county mine inspector. After a motion to refer the matter to the miners' union had been tabled, Alex Gray, of Staunton, was elected to succeed him. The other candidates were W. A. Dickerson, of Gillespie; H. C. Knoemoeller, of Staunton; Philip Davis, of Virden, and Edward Potter, of Virden.

Carlinville—Mine No. 3 in this community produced in 260 working days of last year 1,158,796 tons of coal. This is said to be the largest production of any mine in the state. The mine has a daily output of 4457 tons and employs 690 men.

Duquoin—George W. Dowell, former member of the Illinois state court of claims under Governor Edward F. Dunne, has disposed of his holdings in the Paradise and Franklin County Coal Co., of which he is the president, to the Northern States Coal and Mining Co. of Chicago. The mines are located in the Perry County field.

Pana—By an agreement of the operators of the four big mines operated here by the Pana, Penwell and Smith-Lohr companies with County Fuel Administrator Ernest Hoover, of Taylorville, the price at the mines until further notice will be $3 a ton for all grades except screenings and slack, which will continue to be $2.40 and $2.20 respectively. Heretofore the price of lump has been $3.45, nut $2.95 and pea $2.70.

Auburn—Auburn is experiencing a financial and industrial boom as the result of the opening of the new mine north of town. Many new houses are being built.

Springfield—The cases of six men, connected with Citizens' Mine A of the Citizens' Coal Co., charged with violating state mining laws, resulting in an explosion which killed four miners recently, have been continued for a week. The men under charges are Mine Manager John Scatterwood, Mine Superintendent Henry Martini, shotfirers John and William Flynn, and miners I. Ward and Frank Ward.

Belleville—The Ellis & Richmer Coal Co., of St. Louis, purchased the old Oak Dale mine near here and is equipping it and putting it in shape for double its former tonnage during the month of April.

OHIO

New Petersburg—The Buckeye Coal and Railway Co., which owns a large acreage in this section, has opened a large store to serve the miners in this vicinity.

Personals

W. S. Blythe has resigned his position as general manager of the Coal Run Mining Co. and Tide Coal Mining Co., of Indiana, Penn.

Charles Boggess, of Charleston, W. Va., is making arrangements to operate a mine in the New River seam of coal in Webster County.

M. M. Townshend, formerly president of the Pool-Townshend Coal Co., has disposed of his interest in the company to C. E. Pool, of Charleston, W. Va.

Candus Schmid, mine examiner for the Lincoln Mining Co. before the closing of the property of that company, has taken a position at Shelbyville, Ill., as a mine examiner.

Proctor K. Malin, of Ashland, Ky., district counsel for the Kentucky Solvay Co., which has plants at Ashland, Portsmouth and Ironton, has been elected to the presidency of the company.

J. C. Messenger has been appointed superintendent of the Beryl mine of the Davis Coal & Coke Co. at Beryl, W. Va., succeeding William P. Beveridge, who resigned to go into business with his father.

George Evans, for 24 years with the Lincoln Mining Co., which company has suspended business, has taken a position as superintendent of the Latham Coal Mining Co., of Latham, Illinois.

Clarence W. Watson, of the Consolidation Coal Co., of Baltimore, Md., has been given a commission as colonel in the Army and detailed to the Quartermaster corps. Mr. Watson formerly represented West Virginia in the United States Senate.

Andrew Devers, of Port Griffith, Penn., has received from the Carnegie Hero Fund Commission at Pittsburgh a check for $500, half of the cash award granted for heroic conduct. Mr. Devers and six other men, including John Brown, now superintendent at No. 6 colliery of the Pennsylvania Coal Co., were each awarded a hero medal and $1000 in cash for their brave rescue of men who had become overcome or injured in an explosion at the Hoyt shaft on Jan. 10, 1911.

U. B. Williams, until two years ago general superintendent of the Baltimore & Ohio R.R., since that time located at Wheeling and previously at Grafton as division superintendent, has been named to represent the railroads in the Fairmont district, working with the district representative of the Fuel Administration. The plan is to have a railroad man working in every district with the coal man named as district representative. The selection of Mr. Williams is gratifying to coal men in the Fairmont district, who look upon him as well qualified and admirably fitted for the position in every respect.

John Ira Thomas, of Philipsburg, Penn., was appointed on Mar. 12, by Hon. Seward E. Button, Chief of the Department of Mines of Pennsylvania, as mine inspector, to succeed the late Elias Phillips, inspector of the Fourth Bituminous District. Mr. Thomas is 36 years of age, and was highly recommended for the position, having been connected with the bituminous coal industry practically all his life. For many years Mr. Thomas was employed as a mining engineer and then as superintendent in the Central Bituminous District. For the last two years Mr. Thomas has been employed as a mine inspector by the State Workmen's Compensation Board. About 25 years ago Mr. Thomas' father was mine inspector in practically the same district as will be covered by his son. Mr. Thomas will have headquarters in DuBois.

Obituary

William H. Holland, one of the pioneer operators of the New River field of West Virginia, died Mar. 15 at his home in Nuttallburg, aged 77 years. Mr. Holland came to this country from England when a young man, and opened up the Sewell seam of coal at Nuttallburg about the time that John McGuffin opened it up at Sewell. He lived for 50 years along New River at Nuttallburg, and was engaged in the mining and production of coal until the last few years. The mining fraternity has lost a good and faithful man in the death of Mr. Holland.

Industrial News

Cumberland, Md.—At a recent meeting of the Jaffy Coal Co., held at Cumberland, Charles H. Lantz was elected as president; Robert Grant, of Elk Garden, vice president, and W. R. Nethken, of Cumberland, as general manager.

Buffalo, N. Y.—George A. Corson, president of the Corson Byproduct Coal Corporation of Buffalo, with a new mine at Elkhorn City, Ky., has retired, and George J. Brendel, of Buffalo, succeeds him. Mr. Corson announces that he will organize another company and open new mines.

St. Louis, Mo.—Wallace Crossley, Missouri Fuel Administrator, has announced that next winter fuel distribution throughout the state will be directed by the State Administration at Jefferson City and that licenses will be issued solely by the Jefferson City office, instead of by local branch offices.

Cumberland, Md.—Stockholders and directors of the Deep Run Big Vein Coal Co., of Cumberland, have met and elected Noah H. Swayne, of Philadelphia, as president; W. B. Nethken, of Cumberland, as vice president and general manager, and Charles H. Lantz, of Piedmont, as secretary and treasurer.

Frankfort, Ky. — The legislature has passed bills providing for the reorganization of the Department of Mines and Mining, creating the office of Chief Mining Inspector with three assistants, and providing for five rescue stations to be located in the mining regions of the state. The new bill creates a department similar to those in the most advanced states.

Lexington, Ky.—The new Chesapeake & Ohio fuel forwarding bureau at Russell, Ky., is now operating under Federal direction. This bureau represents most of the large operators of eastern Kentucky, and is expected to prove of great aid in expediting movement of coal to the lake region this summer. Coal will be reconsigned at that point to prevent congestion.

Birmingham, Ala. — The Black Warrior Coal Co. has been organized and incorporated with a capital stock of $100,000. The personnel of the company is composed of experienced coal men in both the operating and selling branches. W. J. Penhallegen is president; W. B. Hillhouse, vice president and general manager, and D. H. Brown, secretary and treasurer.

New Petersburg, Ohio—Fred Essex, of Columbus, has leased from the Buckeye Coal and Railway Co. a tract of 365 acres of coal lands near New Petersburg, which will be developed by building a drift mine to have a capacity of 600 tons daily. The seam is No. 7, which is about 5½ ft. thick. The mine will be electrically equipped and will be ready for operation about July 1.

Middleport, Ohio—The Stalter-Essex Coal Co. has leased from the Buckeye Coal and Railway Co. a tract of 200 acres of No. 8 coal on the Kanawha & Michigan R.R. at Middleport, which is located in the Pomeroy Bend district. The work of developing the property will start at once, and a mine with a capacity of 1000 tons daily is planned. It will be electrically equipped.

Cincinnati, Ohio — Increased interest in transportation matters has caused a revival of the discussion of a lakes-to-river canal, of sufficient depth to accommodate large vessels. The old Miami & Erie Canal, which has been abandoned for some years, is the favorite route proposed by engineers and investigators, although it would require much deepening and widening to care for the kind of traffic proposed, 12 ft. being the depth indicated.

Birmingham, Ala.—The civic bodies of this city are endeavoring to secure the 1918 meeting of the American Mining Congress, conferences having been held in Washington with Secretary Callbreath, of the organization. Mr. Callbreath plans to visit Birmingham and attend the dinner to be given Henry Edmonds, editor of the "Manufacturer's Record," at an early date, at which time it is probable that final arrangements will be consummated for the meeting of the mining men here.

Louisville, Ky.—R. C. Tway, president of the James Coal Co., a retail organization, and the Tway Coal Co., a producing and jobbing organization, was indicted on 13 counts by the Federal Grand Jury on Mar. 15, the cases being continued until the October term of the Grand Jury. Tway was held under $1000 bond. The first two counts are on charges of failure to observe Government regulations relative to making reports, etc., the others being on overcharges.

Louisville, Ky.—The Louisville, Henderson & St. Louis Railroad Co., in an effort to facilitate shipping, switching and handling of coal, has placed an embargo on coal that does not carry complete instructions as to consignee and track upon which to be placed on arrival in Louisville from connecting lines at Owensboro and Henderson, and from mines on the company's line. Incomplete instructions have been responsible for much terminal congestion and loss of car mileage. The new arrangement will be a bit hard at the outset, but is expected to eventually improve conditions.

Cincinnati, Ohio—Kentucky stockholders of the Continental Coal Co. won a decision in the United States Circuit Court of Appeals when that court affirmed the ruling of the trial court enjoining Chattanooga interests from carrying out plans to turn the property of the company over to the Federal Coal Co., and appointing receivers to take charge of the property involved. The case was decided only 10 days after arguments were presented, showing great rapidity in reaching the decision. The court held that "the arbiter who gave the 'Chattanooga interests' the majority in the meeting of Sept. 15 was disqualified by interest, and that the proceedings of that meeting were incidental to a deliberate plan for overriding an essential provision of the reorganization agreement."

St. Louis, Mo.—Joseph W. Folk, general counsel of the St. Louis Chamber of Commerce, filed with the Interstate Commerce Commission at Washington, Wednesday, Mar. 20, a petition for the removal of the bridge arbitrary of 20c. a ton which is now charged by the St. Louis Terminal Railway Association for hauling Illinois coal across the Mississippi River to St. Louis. All the railroads constituting the Terminal Association are made defendants. He makes a plea that inasmuch as practically all of the coal for St. Louis comes from the inner group mines, ranging from 8 miles to 72 miles from St. Louis, and a blanket rate is applied to East St. Louis, a blanket rate should also be applied to the St. Louis industrial district. He contends that St. Louis and East St. Louis and the other eastside towns should be considered as one industrial district and receive the same rates on coal.

New York, N. Y.—The manufacturers of electric hoists in the United States have organized "The Electric Hoist Manufacturers Association," comprising the following companies: The Brown Hoisting Machinery Co.; Detroit Hoist and Machine Co.; Euclid Crane and Hoist Co.; The Franklin-Moore Co.; Link Belt Co.; Roeper Crane and Hoist Works; Shepard Electric Crane and Hoist Co.; Sprague Electric Works; The Yale & Towne Manufacturing Co. The association, membership in which is confined to those engaged in the manufacture of monorail electric hoists, holds monthly meetings for the purpose of studying the specific needs of the hoist user and to develop standardized methods of presenting information to him so that guesswork will be eliminated. The officers of the association are as follows: F. A. Hatch, chairman, Shepard Electric Crane and Hoist Co.; F. W. Hall, vice chairman, Sprague Electric Works; C. W. Beaver, secretary and treasurer, The Yale and Towne Manufacturing Co.

MARKET DEPARTMENT

Weekly Review

Conditions in Coal Market Generally Satisfactory—Domestic Demand Not So Keen as Expected—Rail Movement Again Slowing Up—No Contracting Reported

THE tone of the coal trade is generally satisfactory. With the moderating weather dealers are noticing a tendency toward an easier market. Domestic consumers are not so urgent regarding deliveries, though demand in all lines is still ahead of the supply. In face of the repeated urgings of the Fuel Administration that householders stock their next winter's coal early, the demand from this class of buyers is disappointing. This may be attributed to the fact that the public generally seems to feel that the price of coal will come down on April 1, and therefore hesitates to place orders at the old figure. Also, dealers do not seem anxious to force sales until some sort of assurance is had that they will receive sufficient coal to take care of a strong early demand, as the quantity of coal now in storage is not great.

The improvement in rail movement noticed for the past two weeks has failed to continue. The lines are again congested, and there has been an appreciable falling off in the number of cars supplied to the mines. Few operators report more than a 50 per cent. car supply, with the majority of shippers down to 25 per cent. and lower. This means that the country will be faced with an even more serious fuel shortage next winter, unless the Government takes immediate steps to rehabilitate the motive power on the railroads, whose disabled and inadequate equipment is mainly responsible for decreased production at present.

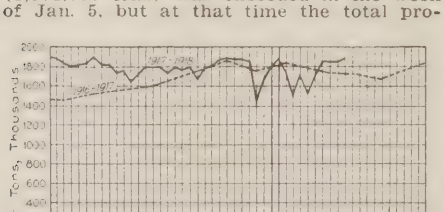
Consumers will likely have to pay more for their coal during the coming summer than they did the past winter, owing to the fact that the Interstate Commerce Commission has granted the railroads a freight-rate increase of 15 per cent. on bulk commodities, including coal. This increase, which will apply to all shipments east of the Mississippi River and north of the Ohio and Potomac Rivers, will mean an increase of from 18c. to 30c. a ton on the domestic sizes.

J. D. A. Morrow, National Fuel Distributor, has completed an arrangement with the operators producing smokeless coal in West Virginia that will stop the shipment of this high-grade fuel to Western markets and divert this coal to New England after April 1. This is an important move, as it will relieve an acute situation in a territory that is producing the maximum of war supplies. It will also greatly improve the fuel situation in New York and Pennsylvania, as the result of this action will be to lessen the demands on Pennsylvania mines from New England consumers. Curtailing shipments of smokeless coal to Western points will necessitate Cleveland, Cincinnati, Toledo, Detroit, Chicago, Indianapolis and other cities burning the lower grade Central West coals. The West will have to endure smoke in all its cities for the present. A second and no less important result of this new order will be to provide plenty of smokeless coal for transports and naval vessels. This will go a long way toward combating the German U-boat peril. In addition, it is true that with this high-grade steam coal a vessel will travel 16 knots an hour, as compared with a speed of only 12 knots an hour when using a lower grade fuel.

No information is yet available regarding contracts. While quite a heavy contract tonnage will expire within the next week or two, there is no activity on the part of the mines to renew contracts until the announcement is made by the Fuel Administration of new regulations, prices, zoning, etc., which is expected at any moment. The Administration has already made public its plan for licensing jobbers. Instead of eliminating the jobber's commission, the authorities have assured him a reasonable compensation for his services, while at the same time preventing improper practices. The commissions to be allowed are briefly: 15c. on bituminous; 20c. on anthracite in the East and 30c. in the West, and 5 per cent. of the delivered price on smithing coal.

COAL PRODUCTION

Last week's output of soft coal was the largest since Nov. 24. The total bituminous production during the week ended Mar. 9 (including lignite and coal made into coke) is estimated at 11,228,000 net tons. The daily average for the week (1,871,000 tons) was exceeded in the week of Jan. 5, but at that time the total production was reduced by the New Year holiday. The improvement has been made possible by relief of the railroad freight congestion. Anthracite and coke, both beehive and byproduct, reflected the increase in bituminous production.



Preliminary estimates based on railroad shipments place the week's production of beehive coke at 633,000 net tons, or 106,000 tons per working day. Connellsville production, as reported by the "Courier," increased from 285,828 tons during the preceding week, to 314,409 tons.

Anthracite shipments rose to 42,207 cars, the largest since the week of Dec. 1.

For the country as a whole, the ratio of tonnage produced to full-time capacity, during the week ended Mar. 2, was 70.9 per cent. Shortage of cars remained the dominant factor limiting production; losses attributed to that cause amounted to 20.8 per cent. of capacity.

A general improvement in working conditions was reported from Illinois, east to Pennsylvania, and south to Alabama. In Illinois, Ohio, and throughout Pennsylvania, the improvement was effected by the reduction in losses due to car shortage. The only districts in the Appalachian region to report more acute car shortage were the Panhandle, New River, and Pocahontas fields of West Virginia. From the Fairmont district and the high-volatile fields of southern West Virginia, a marked improvement in transportation was reported. In both districts, however, production is still far short of capacity; the Fairmont field operated to 49.3 per cent., and the high-volatile field to 58.2 per cent. of capacity.

The lack of demand from the Southwest and Mountain States was more noticeable during the week of Mar. 2. Thirty-nine operators, representing 53 mines in Iowa, Kansas, Arkansas, Oklahoma, Colorado, Utah, Montana and Washington, lost 100,752 tons because of "no market." The absence of demand was most severe in Utah, where it caused a loss of 40,699 tons. The tonnage sacrificed in Washington was small.

An improved car supply and increased activity in movement by river caused beehive-coke production in the Connellsville and adjacent regions to reach the highest point attained since November. Sixty-one of the principal operators in the Connellsville, Greensburg and Latrobe districts reported a production of 255,325 net tons during the week ended Mar. 9, or 50.8 per cent. of their full-time capacity as reported by the railroads. Losses due to shortage of coke cars fell from 32.8 per cent. of capacity, during the preceding week, to 27.4 per cent. Losses due to shortage of yard labor were reported at 6.4 per cent. An increased supply of coal cars enabled the same operators to ship 168,050 tons of coal.

TABLE II. CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: Feb. 16	Feb. 23	Mar. 2	Mar. 9
Bituminous shipments, 121 roads	189,984	189,691	197,415*	199,582†
Anthracite shipments, 9 roads	40,661	36,612	39,875*	42,207†
Beehive coke shipments, 4 roads	11,357	11,634	12,911*	12,990†

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Marshall Field & Company—The current wholesale distribution of dry goods is greatly ahead of the heavy volume of the corresponding period a year ago. The volume of road sales for both immediate and future deliveries is much larger than in the same week of 1917. Customers have been in the market in greater numbers. The market on domestic cotton continues strong. Collections are excellent.

Dry Goods Economist—Conditions in the dry goods field are improving; the railroad congestion is daily becoming less and the movement of needed merchandise is thereby being expedited. While there is still room for improvement, the situation promises to become easier week by week.

The Iron Age—Steel production with some companies has made a considerable stride forward in the past week, Steel Corporation plants apparently coming closer to normal capacity than the majority of independent producers. A 10 per cent. increase over the February rate represents the average condition. The situation as to cars and motive power is still a serious one and promises to continue so. On the score of securing the largest possible output of pig iron and steel from the available coke, current priority decisions tend more and more to throw smaller iron and steel plants into idleness, and the development of this policy is being watched closely throughout the industry.

Atlantic Seaboard

BOSTON

Uncertainty over program the leading feature of present situation. Rail movement good, but outlook for water coal not so reassuring. If bottoms now in coastwise service are taken away it will be a question of which industries are to be supplied. All kinds of plants including utilities on a hand-to-mouth basis for the present. Boston "L" among those forced to rely upon emergency coal. Shippers cooperate. More or less frantic efforts on part of buyers fail to get results in form of contracts. Much anxiety to be "in line" when word is given. Developments as to status of "jobbers." Because of scarcity of vessels loading dispatch at Norfolk is about normal. Dumpings less than normal. Anthracite outlook also uncertain, and trade awaits definite announcement.

Bituminous—The larger industrials within 50 miles of tidewater continue to rely upon high-priced emergency coal brought here from Hampton Roads on $3.25 freights, the United States Shipping Board rate, and about a week's supply continues to be handed out in each case. The present week the receipts will be less, and it is possible the needs of some mills will be acute enough to cause shutdowns. There is, of course, a considerable tonnage coming forward in customary channels, but on account of steamers being under control of the Shipping Board and therefore subject to assignment by trip, it is difficult for shippers to carry out plans for distribution.

At the same time that New England is kept on the ragged edge of coal famine, about every buyer in the territory is looking most eagerly for signs of anything that looks like "contract." Acting on the advice of the New England Fuel Administrator, all have been trying to effect season arrangements with regular sources of supply, but so far as reported the efforts have been without result, save in a few small insignificant cases. With "zoning" and "assigned cars" still matters of undefined policy, and an uncertainty even as to railroad fuel, it is easy to see why operators are coy of making contracts. With prices, rehandling conditions, and pretty much every other factor still a matter of conference at Washington, history will have to be made fast the next ten days if the trade is to be straightened out for the first few months of next season. The producers are, of course, satisfied so long as demand exceeds supply. A remunerative price being granted it is really a matter of indifference on their part where coal goes, except that the more cars are placed for points near the mines the better will be the general car supply for the district.

A few informal arrangements have been entered into, it is understood, on water coal, but the conditions of sale are so closely bound up with all manner of contingencies that the net result is a matter of good will on the part of the producer. The Government fixes prices and the producer practically decides whether requirements are important enough to justify shipment. The system of deputy distributors, one for each mining region, is likely to continue for the present. The question of additional personnel to supervise preparation, for instance, seems still undetermined.

On water coal, since the need is for bottoms rather than coal, several of the agencies have begun to load certain ships that are at the disposal of the shipping board. The understanding is that while the shippers are likely now to furnish more and more of the coal that is dumped at Hampton Roads for New England the distribution and out-turn of the cargoes will continue to rest in the hands of the fuel authorities. Gradually the disposition of the ships assigned for the coastwise service is also being vested in the New England Fuel Administration and the whole system of distribution will have to be wisely administered in order to accumulate any reserve whatever by the time cold weather returns. Current receipts either by rail or by water are not so encouraging as might seem. Every time a "new ship" is transferred to the coastwise trade the fact is made prominent in the newspapers, but little or nothing is said when another hand of the Government takes one away.

Just now there is plenty of coal at Hampton Roads for the vessels in line. For a fortnight or so the arrivals for different sales agencies have been relatively small, and the coal to their credit has accumulated while the loadings were largely for account of the Navy, the Army, the Shipping Board, or some other Government service.

Anthracite—Rail deliveries so far have averaged better than in March, 1917. By water routes, however, the falling off is marked. There is much interest in the first probable announcement by the anthracite committee. The impression seems to be gaining ground that preference in the spring is to be given the far-away places, up the rivers, and at such points as are less accessible by rail. If such a program is followed there will be less real hardship, for barges and other transportation would be confined in colder weather to service that would require shorter trips. The new ruling as to jobbers seems to have created very little stir. So far as anthracite is concerned, it was pretty well discounted, for it was felt that in distribution the reputable middle houses were performing a service that could readily be justified.

NEW YORK

Anthracite supplies low while demand remains strong. Jobbers discuss Dr. Garfield's announcement of licenses, but await official copy. National Jobbers Association meet in this city. Consumption lighter and dealers have an opportunity to obtain surplus. Bituminous producers anxious for more cars. Local situation not much improved. Supplies low. Bunkering situation much better.

Anthracite—Supplies in this market continue to remain low, and early this week were judged by many to be as small as at any time during the past few months. Conditions, however, showed improvement, as the retail demand has subsided. While dealers were as anxious as ever to get coal, they were not under pressure to make deliveries. As a result most retail dealers are enabled for the first time in many weeks to boast of having a small surplus in their yards.

The uppermost topic of interest in the trade was the announcement of Dr. Garfield regarding the licensing of jobbers. No one was willing to discuss the new regulations pending the receipt here of an official copy, but it is not believed that the tradesmen affected are entirely satisfied. However, they are willing to live up to the rulings of the Federal Fuel Administrator.

The conferences between representatives of the Federal Fuel Administration forces in Washington and the Fuel Administrators of Greater New York, at which plans for distribution and the coal requirements of the Greater City for the coming year were discussed, have ended, and the data have been submitted to Dr. Garfield. The proposition of creating a reserve supply of about 500,000 tons for this city does not meet with the approval of the entire trade, inasmuch as the storage facilities are extremely limited and there would be extra charges for reloading the coal for delivery.

With the weather moderating dealers are noticing a tendency toward an easier market. Consumers are not as urgent regarding deliveries and instead of insisting upon deliveries of at least one ton, they are willing to take half and sometimes quarter ton deliveries. Many orders have already been placed for next winter's supply, but there is no apparent hurry for deliveries to begin, consumers appearing anxious to await better preparation. Complaints of dirty coal are diminishing and dealers believe that the worst is over now that the Federal inspectors are on the job at the mines.

The fact that production is steady does not increase stocks at the Tidewater piers. Everything coming to this market is sold before it leaves the mines, and spot coal buyers are having difficulty in picking up a stray cargo.

Several of the city departments have been authorized by the Board of Aldermen to buy a three months' supply of coal in the open market.

The small anthracite sizes continue to be scarce. Buckwheat No. 1 is practically out of supply, and nothing is heard concerning the making of contracts. Rice and barley are scare, but freer than the larger size. Screenings are in strong demand but not plentiful.

Current quotations, per gross ton, f.o.b Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buckwheat	4.30@5.00	5.50@5.80
Rice	3.75@3.95	4.50@4.80
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—Many local producers and jobbers were at Altoona on Tuesday of this week attending an important conference at which the coal situation was discussed and where it was hoped plans would be formulated for the betterment of the existing conditions.

Locally conditions do not show much improvement. Supplies are short and nearly everything sent to this market is sold before shipment.

While efforts have been made to improve the car supply very little success has been attained. Complaints continue numerous. Operators are unable to increase production and the miners are disgruntled because they cannot work as steady as they would like.

The Wholesale Coal Trade Association of this city in a bulletin to its members estimates that the approximate price alongside in the harbor limits for bunker coal, based on present mine prices and expenses of handling, is $7.533 per gross ton.

The bunker coal situation here is in better shape than it usually is at this season, and the reserve for bunkering of transports is such that orders were given to hold off on shipments for two weeks.

Improvement in the inland coal situation is looked for now that the order diverting practically all eastern shipments from the Pocahontas and New River fields to Tidewater has been canceled. The Tidewater requirements having been met, the low volatile coals from these fields will go a long way toward relieving the situation in other sections of the country.

PHILADELPHIA

Anthracite trade full of uncertainties. Not sure now about April price. Individuals' price, subject of discussion. Freight-rate increase complicates matters. Current retail demand light, but dealers take all coal shipped. Early ordering campaign being waged. Commission men licensed. Bituminous trade stirred by price agitation. Somerset price increased. Rail situation not so good. Car supply fair to poor. No zoning yet. Brokers win their fight.

Anthracite—Uncertainty at this time rules the coal trade, especially among the retailers. The shippers have been unable as yet to assure the dealers that they will receive ample supplies of coal after Apr. 1; neither have they been advised by the Federal Fuel Administration as to the margin of profit to be allowed. In the meanwhile dealers with large storage capacities are glad to accept all the coal they can secure, but the small dealers with limited bin room have in numerous cases been compelled to cancel orders for certain sizes. The retailers who deal largely in independent coal are in a particular quandary. If the smaller operators are to be allowed to charge 75c above the company circular the dealers feel they should know it now. They seem to be in dread of the possibility of being stocked up at the high

rate when the Government may step in and reduce the differential. They point out that they are putting themselves in the position of going into April with coal costing them about $1 a ton more than the April shipments received by company customers. Yet they hesitate to cancel their orders for March for fear shipments will not be resumed the same as if they had not been interrupted.

As to the retail demand, it can be said that during the last weeks of the month the sales have been a disappointment. In the suburban sections where the buyers are more affluent there is some activity, but the dealers who serve the more humble homes are actually complaining. It is the dealers caring for this trade who express some doubt as to whether their customers will place their orders this spring. They will refuse to deliver on credit and are afraid many small buyers will not display sufficient thrift to buy so far in advance. It is this class who for years have been willing to take a chance and who always pay the top prices.

Shipments to this city have been far from free, but the demand has been correspondingly light. Pea coal is scarce, as there seems to be the usual March demand for it. Chestnut is quite active, if only because it is being extensively bought as a substitute for pea. Egg and stove are very draggy, except in the suburbs. On account of this somewhat sluggish demand for deliveries the fuel committee revised its order not to allow dealers to book summer orders before Apr. 1 and changed it to Mar. 20. On that date the new form to be filled out by the customer will be ready. This is an elaborate statement of the consumer's needs, and to meet the cost of administration in connection with the recording of the applications a 2c. stamp has been devised to be placed on each order at the cost of the retailer. Even with the advancing of the date for receiving orders there seems to be no general disposition on the part of the dealers to encourage ordering on account of the uncertainties stated above.

A ruling that has been handed down by the National Administration and that is particularly pleasing to the retail dealers is the one forbidding the practice of selling carloads of coal direct to the domestic consumer. Operators throughout the state have received instructions from State Administrator Potter prohibiting the shipment of coal directly to the consumer. The purpose is to prevent persons of influence from ordering direct from the mines and thus escaping the system of checks and reports predicated on the assumption that coal will go to the consumer by way of the retailer. The practice was greatly abused all last summer and the dealers welcome the opportunity they will now have of serving this trade in the regular manner. It is understood that the Fuel Administration will permit the continuance of the practice of employees of coal-producing companies to purchase their supplies in this manner, which has been the practice for many years, but all such shipments will be subject to the approval of the local fuel committees of the towns to which the coal is consigned.

No information as to contracts is as yet obtainable. There are some in the trade who express the opinion that few, if any, will be made by the shippers. This seems plausible, especially when it is recalled that no contracts will be permitted except subject to the approval of the National Fuel Administration.

The anthracite brokers seemed entirely satisfied with the order of the Fuel Administration which provides for their doing business under a license system. The rule also carries with it a commission of 20c. added to the mines price of the coal. From this it would appear that there would be at least one variation from a fixed mine price for all shippers.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—Local producers have been greatly stirred by the agitation—and they feel convinced that agitators are behind the movement—to secure a reduction of the present price of $3.05 for coal at the mines. It has been intimated that an effort is being made to have the Fuel Administration issue reduced prices beginning with Apr. 1, and that the matter is being given consideration.

As to the general situation, it must be said that the rail improvement as noted last week has failed to continue during the succeeding period, as the lines are now considerably congested, and there has been a considerable falling off in the car supply at most mines. No mine has reported more than a 50 per cent. supply, with most shippers down to 25 per cent. or lower. Despite this the general feeling is one of optimism, and with a continuance of favorable weather conditions it is thought that the next fortnight at least will show much improvement.

BALTIMORE

Better supply of soft coal reaching this territory and even more relief when rail congestion near here is broken. Jobbers and retail dealers preparing to meet new conditions after Apr. 1.

Bituminous — The fuel administrator's office here reports better receipts of soft coal both for tide loading and local business. The shortage in industrial circles, however, has been such that it will take some time to catch up, even in part, and meanwhile the coal arriving is still being apportioned to the most needy cases. Serious congestion exists on the railroads between this point and the mines, however, and there has been much confusion on reconsignment of coal refused at connecting roads because of embargoes. At Brunswick, for instance, at the start of this week there was a jam of over 2500 loaded freight cars, much of it coal, and nearly 1000 of these cars were marked for delivery at the piers here. When this coal gets running the situation will be much relieved both at this point and at the mines, which are unable to get empties or to get laden cars away from sidings in many cases. The soft coal jobbers here, while not entirely satisfied with the readjustment of the order from Washington relating to their commissions, etc., are much elated at the modification of the first drastic ruling. Many are now making contractural relations with firms here under the new management. It will take some time of practical working before it can be said just how far the ruling is to hit the jobbing business.

Anthracite — Almost springlike weather here has caused a sharp drop in the demand for hard coal for domestic consumption. The trade is not expecting much of a demand now until after the new schedule is arranged for sales after Apr. 1. Most of the dealers, if able to get any quantity of coal in the spring and early summer, will urge their customers not to delay laying in supplies.

Lake Markets

PITTSBURGH

Market supplies still light but increasing. Car movement better. Some jobbers well pleased with proposed new license system for jobbers.

Supplies of coal in the open market have been increasing slowly and are still quite small, but progress is being made and large consumers continue to be well supplied, as they have been in the main for three or four weeks past. The Monongahela River mines have aided greatly in improving the situation in the immediate Pittsburgh district. In the past few days mines in the lower pools have been practically idle on account of high water, approaching a flood. There is no disposition to complain, however, as it is really remarkable how the weather has conduced to a free running out of the enormous accumulation of water.

Car supplies at rail mines continue to increase, but the increase is slow and at some mines is hardly noticeable from one week to the next. The improvement thus far is attributed chiefly to quicker movement of cars. Not much seems to have come thus far of the recently predicted influx of cars into the district released from the eastern congestion. Reports are that the number of cars tied up in the East is still very large.

The older and larger coal jobbers express themselves as rather well satisfied with the new system of control for jobbers being developed at Washington, as far at least as the plan has been outlined thus far. All jobbers are to be licensed, and they are given two methods of conducting transactions, only one to be used in a given case. The first is to buy and sell outright, in neither case at above the set price for the operators; but they can make as large a margin as circumstances permit by buying at under the set limit. The second is to act as buying agent for a consumer or retail dealers, in which case a brokerage up to 15c. can be charged as formerly, beyond the set limit. This system, many jobbers feel, will give them a better opportunity to conduct business than they have had heretofore. While some doubts are entertained as to whether it will be possible to buy much coal at under the Government limit, there are some jobbers who expect to do so at certain times in the year. All the details of the plan have not been given out as yet. The length of time a jobber may hold coal in his own name may be limited, but thus far it is not known positively that it will be.

The market continues to be quotable as formerly: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. extra permitted to be charged in sales by jobbers to consumers. These prices run only to the end of the month and the new prices and trading conditions will be announced not later than the end of next week.

TORONTO

Conditions improving, but supply unequal to demand. Local deliveries still much in arrears. City has given up taking orders. Anthracite increased in price.

Conditions have been gradually improving, but owing to the continuance of severe weather the demand is much greater than usual at this season. Shipments are coming forward well and dealers are taking orders, though owing to arrears, which have to be overtaken, local deliveries are much delayed and many customers can only obtain small lots. The pressure has so far lessened that the city has ceased supplying coal to necessitous cases, having since Jan. 1 filled about 8000 orders. The price of anthracite has advanced 15c. per ton, otherwise prices are unchanged. Quotations per short ton for best grades are: Retail anthracite, egg, stove, nut and grate, $10; pea, $9; bituminous steam, $5; slack, $8 to $8.50; domestic lump, $10; cannel, $11, wholesale f.o.b. cars at destination; three-quarter lump, $7 to $7.50; slack, $6.85 to $7.

BUFFALO

Not much bituminous improvement. Jobbers hoping and doubting. Car supply not much improved. Anthracite in fair supply. None for the lakes right away.

Bituminous—The situation has steadily, though slowly, improved so that the consumer is at least getting what he needs from week to week, though he would not be able to put any in storage. As the end of the annual contracting season approaches the trade becomes more and more anxious over the outcome.

Cars are hardly more plentiful than formerly. The Pennsylvania R.R. has shown substantial improvement, sometimes delivering the cars to destination, even at Canadian points, before the weights were received, but the Buffalo & Pittsburgh, New York Central and Erie are not making good deliveries. The Erie is so badly blocked at Hornell that it refuses to take coal for shipment past there.

Anthracite—There is complaint of bad assortment of sizes now, more than of a general shortage. Egg and stove have not been in proportionate supply for a week or more, but distributors report that they have had a fair supply as a whole. The orders for next winter's coal are coming in fast, but shipping agents have had no instructions as yet and do not know what the price is to be. If the proposed 30c. reduction is met by 30c. freight advance, the consumer will get small relief and the producer will pay the amount to the roads.

The lake fleet is fitting out and will be ready to sail in a few days, but the chances are that no coal will be ready here for them to load. The shipping companies state that it will not be possible to get any for that trade awhile yet. As the upper lakes are said to be better supplied with anthracite than we are and have a surplus of bituminous, there need be no hurry in one sense, though it may not be easy to move a sufficient amount for next winter unless the shipments begin before the season is far advanced. The down freight offering is large, so the fleet will have to go after it and not wait for coal cargoes.

DETROIT

Interest of domestic buyers fluctuates with weather changes. Steam trade demand active. Early lake movement predicted.

Bituminous—Changes in temperature now appear to be the controlling factor in buy-

ing for household use. Frosty weather early in the week stimulated a demand among domestic consumers, who had been husbanding short supplies in the hope temperature conditions might moderate to an extent that would enable them to avoid further purchases at this time. The duration of the cold weather was so brief, however, that the renewed demand was short-lived and was not to any noticeable extent carried beyond retail dealers.

Demand for steam coal from manufacturing and industrial plants continues active, and it is observed by some of the jobbers that this class of consumers appear willing to accept fine coal and lump, without demanding three-quarter lump, egg and other sizes that were popular a year ago. The incoming shipments include a smaller proportion of the sizes requiring special preparation, than was the case formerly.

Supply is being maintained in fair volume, though the receipts are not sufficient to leave any free coal on tracks. Most of the stock comes from mines in Ohio and West Virginia fields, and smokeless coal is conspicuous by its scarcity.

Wholesalers are advising their customers to make a start if possible in putting in a reserve supply, arguing that conditions at present are likely to be more favorable than after the reopening of lake navigation early next month.

Anthracite—Little increase in volume of anthracite receipts is apparent. The quantity received seems little more than sufficient to meet current requirements of household consumers, which are widened by the scarcity of coke.

Lake Trade—Shippers handling coal over lake routes are planning to start the business early. It was decided at a conference in Cleveland, a few days ago, to continue handling shipments through the Lake Erie coal pool. Some modifications may be made in the system in use last season. Little inquiry for vessel capacity has so far appeared. Removal from the lakes to the Atlantic of a great number of the smaller type of bulk freighters is expected to increase the difficulty of shipment to small docks.

COLUMBUS

The warm weather has lessened domestic demand appreciably. Steam business is exceedingly strong and preparations are being made for a heavy lake trade.

The coal trade in Ohio continues strong in practically every department. Buying for steam consumption is one of the most important factors of the trade, but there is also heavy buying on the part of retailers. The urging of the Federal Fuel Administration is having its effect on private users, and a larger number are accumulating their coal for the coming winter. On the whole the tone of the market is generally satisfactory and prospects for the future are considered good.

Manufacturing plants are taking advantage of the lull in domestic buying to secure a surplus stock, and many have succeeded beyond their expectations. Other users of steam grades are not buying for the future, trusting to improved transportation facilities to supply the fuel when needed.

The domestic trade is running along smoothly in every respect. Dealers are buying rather heavily, as they want to be in a position to take care of customers who desire stocks for the coming winter. Storage space is being provided and dealers are buying in larger quantities than formerly at this time of the year. There is a strong demand for the fancy grades such as Pocahontas and West Virginia splints, and little of the former is coming into the local market. West Virginia grades are arriving in larger quantities. Retail prices are strong at the levels which have maintained for some time. Domestic coke is expected to advance soon. Anthracite is quite scarce and sells around $10.

Production is fairly good in most of the mining districts of the state. This is especially true of the Hocking Valley and Pomeroy Bend sections. Car supply is fairly good and as a result the output is estimated at 85 per cent. Eastern Ohio is still hampered by car shortage, and the output is about 65 per cent. High water in certain sections of the Hocking Valley is causing idleness among mines.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2 70
Mine-run	2.45	2.80	2 45
Screenings	2.20	2.45	2 20

CINCINNATI

The trade is busy making arrangement for supplying storage demand as well as taking care of immediate consumption. Conditions are improving.

With the entire public—domestic and industrial consumers alike—keenly alive to the necessity of making provision well in advance for the coal supply for next winter, the coal trade will have no difficulty in keeping things moving during the summer. Indications now are that the trouble will be the other way around—that is, to get coal enough to take care of the constant demand. There is now enough regular demand from retailers and jobbers to take care of all of the coal forwarded. If this condition continues, the city will enter next fall in the best condition in its history. Just now, however, consumers are to be strictly limited in their purchases. The unusual spectacle will be witnessed of enforced limitation of orders during the season when the trade is normally unable to secure enough business to keep its facilities employed. Domestic consumers are being required to sign statements showing what their requirements are (as measured by last season's consumption) and what coal they have on hand, and to confine their orders to the difference.

LOUISVILLE

Situation steadily improving, with much better movement from both eastern and western Kentucky fields. Car supply somewhat better. Demand fair for steam and domestic use.

The retail demand has been rather light, fluctuating with the weather, which is unsteady. The steam demand is showing little change, however. The western Kentucky movement is steady and good, the fair supply of cars being received in that section enabling the mines to operate on a five-day average basis. Local retailers have not been making any effort to sell coal and have been busy stocking their yards, with the result that there is a ten-day to two-week supply on hand with most of the local concerns. The car supply in eastern Kentucky is somewhat more encouraging than it was, and a better movement is being shown. The demand for eastern Kentucky coal is strong.

The prinicpal interest in the market at this time is in connection with the Fuel Administration's setting prices at which summer stocking will start, and for contract making. It is believed that if the price is set before Apr. 1, that the heaviest bookings on record will be made, as there appears to be a general movement toward early stocking this season and many inquiries are coming in.

BIRMINGHAM

Domestic buying in abeyance awaiting new price adjustments and regulations. Steam demand continues unabated. Production improves some, but supply is still far from adequate to requirements.

Both domestic dealers and producers are anxiously awaiting the adjustment in prices and changes in classification which are being worked out by the Fuel Administration in Washington, with the advice and assistance of coal men from this district. Therefore the movement of domestic coal is light, there being sufficient stocks in the yards of retailers to supply all current demands. Dealers, however, are desirous of placing contracts for their 1918-19 requirements, and when the regulations and prices are announced by the Fuel Administration a strong buying movement is expected.

The steam trade is strong and susceptible of little change, there being a demand for a much larger tonnage than can be produced under existing operating conditions, and any changes made in price schedules would hardly affect the market, or the output either (barring any drastic reductions). The wide margin between supply and requirements will maintain a heavy demand for some time to come.

Coal production in the district is improving slightly each week, and is expected to shortly reach the normal status which prevailed prior to the interruptions caused by strike troubles several weeks ago.

Coke

CONNELLSVILLE

Coke movement continues to improve. Furnaces better supplied and may be fully supplied shortly. Foundry coke remains extremely scarce. No brokerage allowance contemplated.

Last week's coke movement showed an improvement on the whole, but the week did not end nearly as well as was presaged by conditions in the first two or three days, when, as noted in the last report, there was the largest car supply since October as well as the largest increase from one week to the next. While the Monongahela R.R. Monday of last week had an 80 per cent. car supply, its average for the whole week was only 46 per cent., which would be equivalent to 80 per cent. one day and a daily average of 49 per cent. for the remaining five days. This week opened with 60 per cent. on Monday and 80 per cent. on Tuesday. Supplies elsewhere in the region improved last week and again this week. Shipments may be estimated at fully 350,000 tons last week and somewhat more this week, whereas in the first nine weeks of this year not a week showed 300,000 tons, and the average was only 267,000 tons.

Shipments are now nearly equal to the requirements of the blast furnaces, depending on the region, but the furnaces have not all received coke, as yet, at the increased rate as it takes a week and more for shipments to get through to the average furnace. In the past ten days furnaces have been operating at fully 80 per cent. of capacity, and if the improvement in conditions continues they will soon be operating at 100 per cent. The steel mills, however, are not in position to ship finished product in proportion to increased supply of pig iron, by reason of car shortage and embargoes, and it looks as if pig iron might accumulate to an extent, after having been extremely scarce for a twelvemonth.

Offerings of furnace coke in the open market have not increased much, except that usually some coke loaded in P. & L. E. cars can be had without much difficulty, for the limited number of consumers that can take such delivery. Foundry coke continues extremely scarce and few enquirers get what they want. The market remains quotable at $6 for furnace, $7 for foundry, 72-hour selected, and $7.30 for crushed, over 1-in., per net ton at ovens. There is no allowance for brokerage to be charged to consumers above the set price, and the new regulations, while continuing in modified form the allowance to brokers in coal, will not allow anything in the case of coke.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 9 at 314,409 tons, an increase of 28,581 tons, and shipments at 334,584 tons, an increase of 37,350 tons.

Buffalo—The supply is called short, but it seems to hold out. Jobbers are so out of this trade that no information is to be had of them. They dropped coke in the days before the high prices, when the consumer was finding so much fault that it was impossible to satisfy him. High prices seem to have stopped complaints. The sale of byproduct coke is brisk, many jobbers being in it. The price is from $2 a ton at the place of production, so the quality is not likely to be high. It practically all goes as a substitute for bituminous coal, so the old complaints do not apply to it.

Middle Western

GENERAL REVIEW

All efforts of operators to increase output held in check by failure of railroads to increase equipment supply.

Weather conditions for the past week were such that mines might have materially increased output had the railroads been able to provide sufficient cars to keep the mines in operation. The only mines that have received 100 per cent. car supply were those with railroad fuel contracts. Others have had to be content with a maximum of 65 per cent. supply, and in many instances running time fell far below this per cent. Many large mines with two and three lines of roads have only worked three and a half days the week just past.

Warmer weather has relieved market tension. The retail trade, although it has not altogether discontinued to take some tonnage, seems to be taking things easy and waiting for developments. One of the puzzling problems is the uncertainty of eastern coal. Dr. Garfield is continuing for an indefinite period the diversion of West Virginia smokeless to the use of tidewater vessels in the United States service, thus rendering doubtful the prospects of a normal supply of this grade in the Western market.

News of the Fuel Administration's clean-coal policy has caused more or less speculation. Many small operators say they

have no facilities for the installation of picking tables and will have to depend on inspection being made on shaking screens or at the bottom of pit and at the coal face.

Scattered throughout the country are many strip and slope mines. These produce a small tonnage which has heretofore been sold as mine-run. These operations possess no screens of any character and will be compelled to depend entirely on underground or face inspection.

The situation with reference to Pocahontas seems to be rather confusing. Some dealers affirm they are getting more of this grade at this time than they did for the corresponding period last year, other dealers in the same locality stating that they are getting none, and that their yards are without any eastern coal. No doubt this difference is due not so much to an actual shortage, but to long established trade relations. During the past week Hocking seems to be more plentiful than for some time, due to easier conditions in Michigan and Ohio.

CHICAGO

Contemplated price change causes light buying. Chicago easy on all grades of western coal.

The reduction of price effective Apr. 1 on hard coal, and a reduced price on Colorado and other coals, has caused dealers and steam users to look for reduced prices on all grades; therefore little buying is done beyond enough to take care of the immediate future. Contracts of all kinds are held up pending word from Dr. Garfield outlining a future sales policy.

During the past week numerous buyers from the Northwest have been in this market trying to get a line on high-grade southern Illinois coal. Particularly is there an eager Northwest market for fine coal under 2 in.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.00@3.15	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.00@3.15	2.65@2.80	2.65@2.80	.....
Washed egg	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.40@2.55	2.40@2.55	2.75@2.90	2.40@2.55	2.40@2.55	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Hocking	West Va. Splint
Dom. lump.	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Coal dealers awaiting official advices as to future price and delivery regulations. Consumers requested to place order for next season on or before Apr. 1.

Watchful waiting is the order of the day in Milwaukee coal circles. The return of W. N. Fitzgerald, state fuel administrator, who went to Washington to confer with the Federal coal authorities, is awaited with great interest. When he arrives, a meeting will be arranged and an understanding reached. All express a willingness to conform to any Government regulation which may be imposed. This has been the attitude of all the old dock companies and retailers since the fuel agitation began, but there are some mushroom companies which operate dumps alongside side-tracks which have enjoyed war-time profits on Illinois coal. Coal costing $4.50 on track here has been sold right along at $7.50 with the extra charges for delivery. Regulation does not seem to have disturbed them.

The state fuel administration office is urging every consumer to place orders for coal or coke with his regular dealer on or before Apr. 1. The consumer will be allowed an amount sufficient to last until Mar. 31, 1919. Dealers are to deliver two-thirds of the annual requirement of anthracite, and when all consumers have received this allotment, the remainder will be forthcoming. No restrictions are being advanced as to bituminous coal. The general purpose of the regulations is to secure a broader and more equitable distribution of fuel than in the past.

According to officials of the State Council of Defense more wood will be consumed in Wisconsin the coming year than ever before. This is expected to relieve the coal supply materially. All over the state arrangements are being made to heat school houses, city halls and other public buildings with wood.

ST. LOUIS

Local conditions extremely easy, with plenty of coal and a tendency to cut prices in the Standard field. Car conditions extremely bad on the M. & O. and I. C. Practically no steam demand, and domestic coal dragging heavily. Pennsylvania anthracite shipments good, with nothing from Arkansas.

The local situation is one that is causing worry to the operators in the Standard field. Prices of $2.50 and under have been freely quoted this week, although in many instances these quotations have been made at the $2.65 price with a commission paid for buying, so that the sales record would show the Government price. This has been done to some extent on the short-line roads entering St. Louis and on some of the trunk lines.

The L. & N. R.R. is still embargoed against Chicago, and this coal coming in here heavily has demoralized the local market. The Wabash and C. & A., the two principal carriers from the St. Louis market to Chicago, are embargoed on account of having too much coal at Chicago, they claim. The result is that there are several hundred cars of coal held at East St. Louis which were destined to Chicago, with no other place to move them.

The Missouri Fuel Administrator refuses to touch the coal, and the Illinois Administrator ignores the demand of the local roads for relief. It appears as if the Chicago market is too heavy and that in order to keep it firm the railroads are tying this stuff up at the St. Louis end, thereby breaking the local market.

There is little domestic demand locally for Standard coal, and the steam call is not as good as it should be. There seems to be a feeling that the price of coal will come down on Apr. 1, especially in the Standard and Mt. Olive fields, and the buyers are holding off. Conditions in the Mt. Olive field are somewhat similar, although there is no demurrage coal there. What does not move into St. Louis can be moved north, and the embargo will not affect it.

The railroads still continue to draw heavily on these fields, and that is the principal reason why both of these fields have not practically suspended operations.

Conditions are much better in the Duquoin field, and this coal continues to move north and west; but the car supply on the Illinois Central is extremely short.

In the Carterville districts of Williamson and Franklin County there is beginning to be a surplus of domestic sizes, but the steam call is extremely good. Car supply is not good on the Illinois Central, nor on the Iron Mountain, but the C. B. & Q. and C. & E. I. are doing well. Working conditions in a general way are improving.

One St. Louis company, it is understood, has 5000 tons of Pennsylvania anthracite bought, which is to be shipped before Apr 1. This is coming in in good volume, and a few other companies have small tonnages moving in. There is no smokeless booked for this market. A little Arkansas is commencing to drift in, but not in any great volume.

The local market is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. sergs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

SEATTLE

Coal operators of state hope for peace pact in early adjustment of mine-price controversy with Fuel Administrator.

Announcement that H. A. Garfield, United States Fuel Administrator, had revised anthracite coal prices to take effect Apr. 1 and had urged consumers to lay in an early supply of coal for next winter, is interpreted by coal operators in the State of Washington to be a forerunner of an early adjustment of the mine-price controversy in this state.

Some of the mines have already felt the effect of a decrease in the demand for coal, and it is expected that consumption will decline steadily from now until fall. A falling off in the coal consumption will make it difficult to hold men at the mines, and a greater use of coal is urged both for the benefit of the mines and their men, and also to ease up on the demands for fuel oil in this territory.

General Statistics

CHESAPEAKE & OHIO

Following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for the month of January, 1918:

COAL

To	January 1918	January 1917
Tidewater (bituminous)	231,455	512,952
East (bituminous)	322,550	273,470
West (bituminous)	839,414	1,185,416
Company's fuel (bituminous)	188,008	207,704
From connections (bituminous)	112,477	168,678
Total	1,793,904	2,348,220
Anthracite	3,470	718
Total coal movement	1,797,374	2,348,938

COKE

To	January 1918	January 1917
Tidewater	.....	.....
East	21,538	15,496
West	18,197	25,512
Total	39,735	41,008
From connections	5,915	6,352
Total coke movement	45,650	47,360

NORFOLK & WESTERN

Below is a statement of the coal and coke shipments over the Norfolk & Western lines during the month of January, 1918, as compared with January, 1917. The figures are in net tons:

Shipments	January 1917	January 1918
Tidewater foreign coal	200,482	76,644
Tidewater foreign coke	2,894	.....
Tidewater coastwise coal	240,286	206,079
Other domestic coal	2,404,817	1,615,312
Other domestic coke	203,983	226,157
Totals	3,052,462	2,124,192

COAL AGE

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Economic Suicide

Some facts regarding a Dangerous Government Policy that is causing labor unrest, rendering an injustice to coal-mine owners, and saving money at the expense of the public consumer. All industries are vitally concerned.

By FLOYD W. PARSONS

WE cannot win the war unless we mix justice and intelligence into the conduct of our industrial life. The production of coal so far this year has been more than a million tons less each week than the output estimated as necessary to prevent another fuel famine next winter. As a consequence, every action bearing on coal production must be carefully weighed to see that no unfavorable results arise.

In the face of this very serious situation there is discontent and the threat of a strike in that important district embracing the mines of central Pennsylvania. However, the miners can't strike. Frank J. Hayes, President of the Union, said to me in Washington last night: "We propose to insist that in all cases the men shall abide by the terms of the recent Washington agreement. If they demand an increase in one district where the price of coal has been raised, they would have to submit to a wage reduction in some other field where the mine price has been reduced. Any changes of wages now in one district would open the whole question throughout the country, and that we will not permit."

Dr. Garfield yesterday expressed the same thought, and added that he was sure the miners in Pennsylvania would rescind their demands now that they had had an opportunity to examine fully the costs of mining in the affected districts. He explained to them that the increase of 60c. awarded the operators was not an additional profit, but actually a necessary rectification of the earlier price, which had not been based on such an exhaustive investigation and which had been too low to permit many Pennsylvania operators to make any profit at all.

So much for this specific instance. Let us go a step farther. Even though there can be no serious coal strike at present in any of our fields, the men must be happy in their work and the mine owners prosperous if a maximum production is to be attained. The Government is pursuing an economic policy that is certain to defeat the constructive efforts of the Fuel Administration. Here is a summary of the evil practice:

The railroad administration is now, and has been, making contracts with certain mines in every district, agreeing to furnish these specially appointed mines with a full car supply, providing the coal is sold to the railroad at a reduced price. Many operators find it advantageous to enter into such a deal, which insures them plenty of cars and regular work, as against a higher price for coal with only enough cars to work half time, or less

These railroad mines as a consequence double production and draw men from all adjacent collieries. The direct result is dissatisfaction and discouragement on the part of the miners at the idle plants and an increased cost of production for these less favored companies.

Men can't live even on high wages when they work but two or three days each week. The companies can't mine at low cost under such conditions. Presto! Up goes coal prices and wages, and the public pay what the railroads save. No good is accomplished, for the railroads could secure a satisfactory fuel, and plenty of it, through priority, without disrupting uniform car distribution.

If the Government uses its ownership of cars to drive hard bargains with coal producers, will it not soon employ the same methods with steel manufacturers and others and say to them: "Give us a special price, and we will give you cars." Each time this is done the public pays the difference. But the big fact is the unrest resulting from a selfish and ill-advised national economic policy, practiced at a time when absolute justice should obtain and harmony prevail.

IDEAS AND SUGGESTIONS

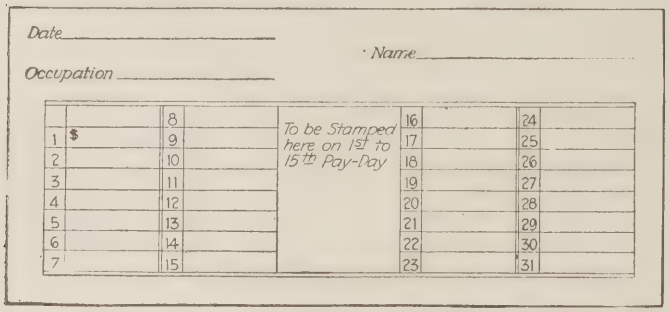
A Useful Card

BY J. A. SMITH
Albert, W. Va.

The accompanying illustration shows a card which can be made to serve several useful purposes—it acts as an identification card, also as a passbook when drawing store orders, and finally it is taken up by the company issuing it as a receipt showing that the holder has been paid.

In addition to the printing shown on the face of the card, the back bears the following inscription:

This card must be presented to the clerk to have store orders charged thereon, each time a store order is drawn.



CARD SERVES A NUMBER OF USEFUL PURPOSES

It must be presented and stamped when drawing pay for the first half of the month, and will be taken up by the paymaster on pay day for the last half of the month and be held as a receipt showing that the holder has received his pay for the month stated hereon. Take care of this card. In case of loss report it to the office.

Some time during the month cards are made out for the following month for each person on the payroll. The first time the holder draws an order he is given his card with the amount of the order charged thereon. Each time afterward that a store order is drawn it is charged on the card opposite the date on which it is drawn.

The holder of a card always knows exactly the amount he has drawn to date and for the pay period. The company officials are thereby spared much trouble and annoyance on pay day from employees who claim their store order account is incorrect.

At one plant, before these cards were adopted, it was a common occurrence each pay day to have from 12 to 20 complaints from this cause. As each complaint had to be investigated by looking up the account on the books and order stubs, there was considerable loss of time. Sometimes much ill feeling resulted, as often it was impossible to convince the claimant that a mistake had not been made. Since the cards have been in use complaints from this cause have ceased. On pay day for the first half of each month the card is stamped in the space shown as follows:

Paid 1st to 15th.
(Date of pay day.)
Blank Coal Co.

When the card is presented on pay day for the last half of the month it is kept and filed to show that the holder has been paid.

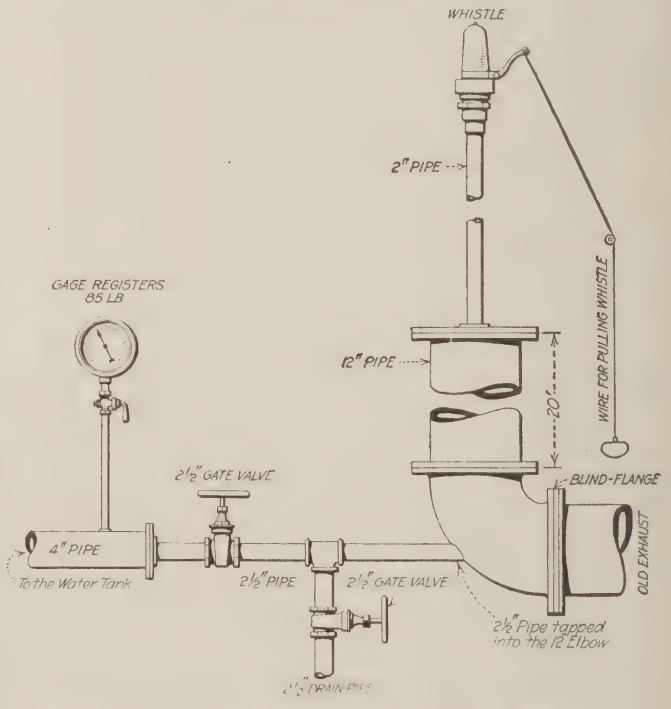
A new employee when first given a card is instructed to take care of it and in case it is lost, to immediately report this loss to the clerk, when a new card is issued and a record made of the card having been lost. This prevents any person except the owner of the card from drawing store orders or pay, unless the card presented is accompanied by an order from the owner, or unless the party presenting it is a member of his family or an old, well-known employee.

The war continues, therefore your duty also continues. It is your duty to buy a THIRD LIBERTY LOAN BOND, *even if you have bonds of the First and Second Loans.*

Water Whistle

BY FRANK HUSKINSON
Lafayette, Colo.

Central station power was installed at a certain mine. The power house was converted into a substation. As there was no necessity for keeping up steam, the use of the boilers and engines was discontinued. Then it was discovered that the steam whistle which had signaled



DETAILS OF PIPE CONNECTIONS AND WHISTLE

the time of starting and stopping work could not be sounded. I decided to try a scheme of blowing the whistle by means of water and air. The water tank was located upon a hill. The pressure at the boiler house was 85 lb., and we had plenty of water.

Part of the old exhaust line from the engines consisted of a 20-ft. length of 12-in. pipe, which extended vertically from the floor up through the roof of the boiler house. I removed the exhaust head from this piece of pipe and put on a special flange that reduced the 12-in. pipe to a 2-in. opening. Then I took a piece of 2-in. pipe 18 ft. long and secured the old steam whistle to one end of it. The other end I screwed into the opening on top of the 12-in. pipe.

On the bottom part of the 12-in. pipe I put in a blind flange. I also made a connection in the 12-in. pipe for a 2½-in. pipe. Into this opening I screwed a short piece of pipe. Onto this I screwed a tee, then another short piece of pipe and a gate valve. This was connected to the 4-in. water line from the tank. The outlet of the tee was then fitted with a short piece of pipe and a gate valve from which a section of pipe was run outside the building as a drain.

The accompanying diagram shows the details of the pipe connections and whistle. All joints were made airtight. The whistle was of a type that is operated by means of a quick-acting valve. This was opened by pulling a wire. The operation of the "water whistle," as it was called, was simple and quite satisfactory.

The valve for draining the 12-in. pipe was opened, also the whistle valve on top was held open, and all the water was allowed to drain out. Then the whistle valve and the drain valve were closed, and the valve on the water line was opened wide, allowing the water to flow into the 12-in. pipe. This was done about 30 sec. before the whistle was to be blown. Next the wire that opened the whistle valve was pulled, allowing the whistle to blow.

The action of the apparatus was as follows: The draining of the 12-in. pipe with the whistle valve open allowed the pipes to fill with air at the ordinary atmospheric pressure. As soon as water from the main was turned into the pipes, all other outlets being closed and airtight, the air inside the pipes was compressed to the pressure of the water, which is 85 lb. As soon as the whistle valve was opened the air that rushed through the whistle had almost as much effect on it as had the steam used formerly. The water entering the pipe kept the pressure almost constant, and the whistle could be blown for several seconds or for short blasts.

A LIBERTY BOND *will soon become a badge of loyalty.*

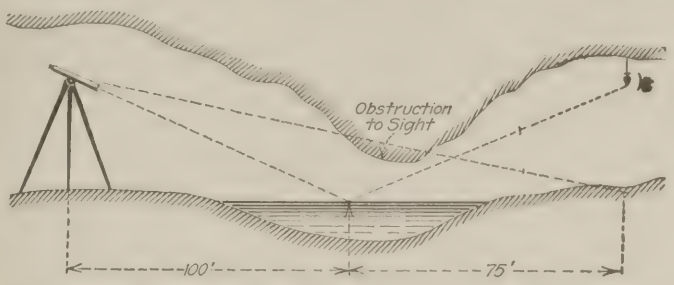
Expedients in Surveying Practice

BY MINING ENGINEER
Punxsutawney, Penn.

The practice of surveying is often attended with difficulties that tax the ingenuity of the engineer to overcome without loss of time. The incident I am about to recite occurred recently when making a survey of an old mine. Being one of the party, I was much interested and impressed with the ease with which the transitman overcame what would, but for his ingenuity, have proved a serious and delaying obstacle.

As illustrated in the accompanying figure, at one point in the entry there was a deep swale where water had collected to a depth of 2 or 3 ft. The sudden dip and rise of the entry made it impossible for the transitman and head-sight to see each other. However, taking advantage of the reflection of the head-sight's lamp in the water, the transitman ordered him to hold his lamp immediately behind the plumb bob, which was suspended from the point in the roof. This being done, the transitman sighted his instrument to the reflection of the bob in the water.

The trick set me to thinking and I wondered if it would interfere with the accuracy of the sight if the



SIGHT TAKEN TO OBJECT REFLECTED IN WATER

lamp should be held a little to one side or the other of the plumb bob. The manner in which the survey checked, however, showed that the scheme adopted by the transitman was correct.

Studying over the matter, later, I found that as the surface of the water was level, the line of sight was in a vertical plane passing through the instrument and the plumb bob, and the result would have been the same if the transitman had been able to take his sight directly through the plumb bob. The expedient was, to my mind, an interesting one that is well worthy of mention, as it will often be of assistance to engineers when surveying mines under such conditions.

The boys in the trenches feel more confident if they know the folks at home are backing them.

Loosening the Journals

BY HENRY M. PAYNE
Pittsburgh, Penn.

In severe weather, such as has been experienced this winter, it is sometimes found difficult to move freight cars on sidings both above and below the tipple because of cold journals. This may be overcome by pouring about ½ pint (no more) of ordinary coal oil or kerosene into each journal box. The car may then be started with a pinch bar, and if the grade is sufficient to permit the car to run in summer it will move equally well even in severe weather.

The company with which I am connected has tried this method when the thermometer stood at 15 deg. below zero, and the results were such that car movers, teams, etc., have been done away with. The total cost is about 6c. per car; the saving in time is about 95 per cent.

This treatment does no harm to packing or oil in the car journal and is exactly analogous to using a light oil in an automobile in winter instead of the heavy oil used in summer.

This method of limbering up car journals may not be new, but I never heard of it. We tried it as an experiment and hailed the result with joy.

Montour No. 8 Plant of the Pittsburgh Coal Co.

By GEORGE W. HARRIS
Editorial Staff, "Coal Age"

THE Pittsburgh Coal Co., the largest miner of bituminous coal in the world, has a daily capacity of over 100,000 tons, or 32,000,000 tons each year. This company is the owner and operator of 100 active coal mines in the states of Pennsylvania, Ohio, Illinois and Kentucky. Nine-tenths of these collieries are located in the heart of the Pittsburgh district, and the fields are known as the Youghiogheny and Westmoreland. In this district the Pittsburgh company is the owner of about 190,000 acres of unmined coal, comprising the highest grade of gas, coking and steam fuel.

The seventeenth annual report of the Pittsburgh Coal Co., for 1916—the latest official source of information—states that 18,709,926 tons of coal were produced and handled during that year; the gross net earnings from all sources were $5,592,798.80. Both production and net earnings would likely have been larger had the use of the facilities provided been permitted by the always dominant factors of labor and transportation.

On Apr. 1, 1916, practically a general suspension of work at the mines occurred. This continued for a period of about six weeks, a full month after the heavy Lake shipments usually begin. An unusual scarcity of cars then set in, which continued and was greatly added to by railway congestion with the result that, except during the first quarter, the company had no free shipping month during the year in question.

A map of the bituminous coal region of western Pennsylvania (Fig. 1) shows the location of the Pittsburgh Coal Co.'s mines and the line of the Montour R.R. The company's mines in the Youghiogheny and Westmoreland fields are joined by its own railroad, a line 150 miles in length. Connections are made direct with Lake Erie ports and to all railways east, south and west. Thus the distribution of the concern's product is provided for in such a way as normally to avoid all delay in transportation.

The Pittsburgh Coal Co. has established excellent facilities for loading coal into ocean vessels, for export shipments to South American and other countries, at the ports of New York, Baltimore, Philadelphia and New Orleans. The demands of the south and Gulf of Mexico ports are supplied by shipments down the Ohio and Mississippi Rivers. At the lower lake ports extensive and modern loading plants are operated by the company. Millions of tons of Pittsburgh Coal Co.'s gas and steam coal are forwarded during the summer months via the Great Lakes to its docks on Lake Superior and Lake Michigan, from where it is distributed throughout the west, northwest and Canada.

A large coal company like the Pittsburgh always has construction in the planning or under way. Old tipples require entire rebuilding on account of being worn out from long service, or the method of handling coal may be too antiquated. Then new properties are acquired and developed to increase tonnage or maintain a steady production as old mines become exhausted.

A few years ago the Pittsburgh Coal Co. decided on extensive development in its First Pool section. Old First Pool Mines No. 1 and No. 2 hauled coal long distances to the tipples on the Baltimore & Ohio R.R. just above Willock station, owing to the coal near the tipple being worked out. About this time the Montour plants were projected and No. 8 tipple was designed.

Montour No. 8 plant is about 8 miles from Pittsburgh (see Fig. 1) as the crow flies, on the Lewis Run branch of the Montour R.R., some 2 miles southeast from Willock station on the Baltimore & Ohio R.R. The montour line connects with the Pittsburgh & Lake Erie R.R. at the Ohio River. No. 8 plant was reached by the writer on a mine locomotive traveling through miles of old entries, in which could be seen thousands of tons of the best Pittsburgh seam—a sight that brought with it vivid recollections of coal lines in New York City waiting for their pitiful allowance of 25 or 50 lb. of coal on a bitter winter's day.

Pacific Coast Timber for Tipple

In looking around for building material the Pittsburgh Coal Co. discovered that steel could not be promised for delivery short of 12 months. In this emergency it was decided to use wood, and Oregon fir was adopted, shipments being made from the Pacific coast. This fir somewhat resembles coarse white pine in texture and is slightly pinkish in color. It was adopted by reason of its being strong, straight lumber, free from knots. Long sticks are readily obtainable.

Ordinarily, some objections exist to wood as building material, especially for tipples, their life being estimated at about 20 years when constructed of wood. As is well known, the Pittsburgh company has many fine steel structures. To secure greater permanence and prolong the life of the tipple, a wood preservative was used. Carbolineum was obtained from the Monongahela Wood Preserving Co., with offices in the Fulton Building, Pittsburgh, Penn. The source of this preservative is anthracine oil, a coal-tar product, whose worth has been proved by the test of years of service. The Monongahela company's product is made in America, and is used by many large railroads, telegraph, telephone and mining companies for open-tank and brush treatment.

Carbolineum has many advantages. The company in question guarantees every gallon and states that it contains no tar and is the most economical preservative to use as there is no loss on heating—the sun's heat drives the oil deeper. It is self-penetrating on account of its high capillary attraction in the wood fiber. It is also permanent in the wood, penetrating deeply without forming a film to crack or peel off. It is said to be the least volatile, most toxic to fungi after long exposure, and least soluble in water of all wood preservatives.

The French and the British have nobly stood behind their governments in war loans. Where do you stand?

The Montour No. 8 tipple contains 350,000 ft. B.M. of timber which was treated with 45 bbl. of carbolineum, or 6½ gal. per 1000 ft. B.M. of rough lumber. This preservative was applied hot with 4-in. brushes by hand after the timber was framed. If the timber is dry and in good shape to receive the oil, carbolineum can be applied liberally at close to $1 per 100 sq.ft. of surface, labor and material. This cost is for the highest grade of carbolineum, showing no distillate under 275 deg. C., thoroughly filtered by pressing and containing no tarry or volatile matter. The oil costs from 60 to 70c. per gal. in 50-gal. drums. Two coats of oil are sometimes applied. Usually the framed ends are treated before the timbers are erected, and later the completed structure is painted with brushes or by spraying. Labor in the Pittsburgh district costs about $3 per day for rough painters, who should paint out some 10 squares per day of average climbing work on tipples, with extension brushes, etc. It is well to use with caution various so-called "creosotes" in "improved" forms and untried materials, on account of their inflammability.

Montour No. 8 tipple is shown in perspective in Figs. 2 and 3; the former was taken from the upper side and the latter from the opposite side, while the tipple was under construction. The office work on this tipple



FIG. 1. MAP SHOWING LOCATION OF PITTSBURGH COAL CO. MINES AND MONTOUR R.R.

—design and working drawings—was done by Ernest S. Taylor, the son of the chief engineer of the company. The management in charge of construction of the plant specially comments on the accuracy of the plans, which greatly facilitated the erection of the tipple. The tipple is partly shown in plan in Fig. 4 with the mine tracks leading from mine openings Nos. 1 and 2 to their respective dumps. An elevation with coal-handling equipment in place is given in Fig. 5.

The framing of the tipple consists of 12 x 12-in. posts, caps and sills, to which are bolted two pieces of 6 x 12-in timbers for diagonal and other bracing. The stringers are made up of two pieces of 6 x 16-in. sticks, between which and the caps are corbels. The main timbers are secured by 1-in. bolts, and ¾-in. bolts are used on the bracing.

The coal from each mine is handled by its own dump, that from Mine No. 1 going to dump No. 1 with its own



FIG. 2. MONTOUR NO. 8 TIPPLE—UPPER SIDE

set of chutes and screens; the coal from Mine No. 2 goes to dump No. 2 with its separate or combined equipment for loading cars. The dumps, chutes, screens, etc., with which the tipple is equipped for handling coal from mine dump to railroad cars, was furnished by the Phillips Mine and Mill Supply Co., of Pittsburgh, Penn., with one exception—the lump coal loading booms came from the Jeffrey Manufacturing Co., of Columbus, Ohio.

The course of the coal through the tipple is as follows: After leaving the mine car at the Phillips cross-over dumps, the coal runs into the mine-run weigh baskets which are built over the same dimensions except that the drop door of No. 2 discharges the coal in the opposite direction of dumping. The doors are automatic in operation, being opened by the weight of the coal and closed by means of the back balance weights. The doors are controlled by means of band brakes.

The coal, after passing over the lump screens, runs into chutes or baskets which discharge into radial chutes, these delivering the coal (at right angles to the direction it takes on leaving the mine cars) onto a picking table and loading boom. The radial chute has the advantage over the usual hopper in that the direction of the flow of the coal is not changed by bumping plates, but is turned gradually and easily by the curved chute. The weigh hoppers and all attachments are suspended underneath the floor on a 10-ton hopper scale of the suspension type, which leaves the floor above clear so that the men are not hampered or in danger of being crushed or injured between scale rods and car. The scales are also free from all interference or damage.

In these equipments the coal is spread out over the picking table by means of a weighted plate instead of by a reciprocating feeder. However, a feeder can be used if it is desired. The nut coal can also be delivered onto the picking table by means of a radial chute. As the nut coal is delivered onto the picking table first, it forms a cushion for the lump coal when ¾-in. coal is being loaded. The fly in the top of the lump screen deflects the coal to a conveyor, which carries it to a locomotive coaling pocket when desired.

The cars on the lump tracks are loaded by loading booms with 1¼-in. lump, ¾-in. lump and mine-run coal. To load run-of-mine coal, the screening surface of the lump screens are covered by doors. The third loading track receives nut, nut and slack, or slack, from both No. 1 and No. 2 equipment. Track No. 4 receives slack or nut and slack from both rigs.

Fig. 6 shows a car stop or trip controller back of the dump that gives the man at the dump full control of the cars coming into the dump. After a loaded car has passed through the car stop, it depresses the treadle ahead of the stop, closing the horns of the stop which are automatically locked; the main trip of cars advances until it runs against the car stop. When the dumper is ready for another car, the man in control releases a spring by means of a conveniently located foot treadle; the spring opens the stop, allowing another car to pass through. This device is also manufactured by the Phillips Mine and Mill Supply Company.

Mechanical provision has been made to facilitate moving both empty and loaded cars on the Montour tipple. An endless ⅝-in. rope haulage system moves empties from the tipple to a point where the mine locomotive attaches to the trip. This method of gathering empties is in duplicate on each side of the tipple; each system is independently motor driven. The loaded cars are moved by chain car hauls.

Ample provision has been made to guard against fire. Three-inch pipe connects with a large tank on the top of a near-by hill, giving a head of 120 ft. at the tipple dump. This pipe system also connects with the pump supplying water to the tank, so that there are actually two sources of water supply in emergency. The tipple is well covered by this water system, and valves and hose are located at various convenient points on the structure.

As noted, the tipple is supplied with coal from two openings, one on either side of the valley in which the

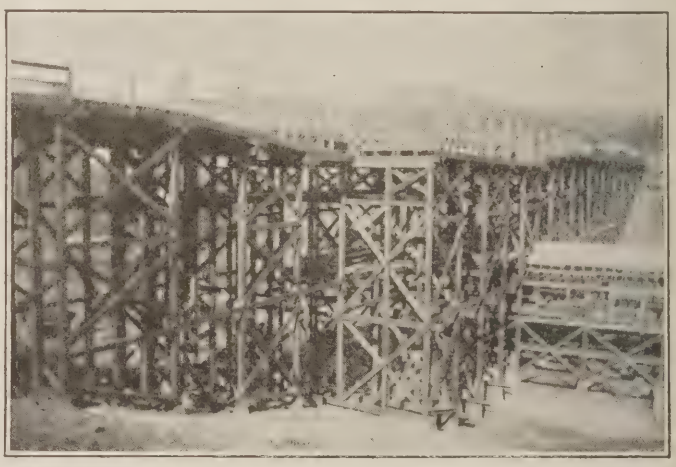


FIG. 3. MONTOUR NO. 8 TIPPLE DURING CONSTRUCTION

plant is located. The Pittsburgh No. 8 seam is mined and here attains a thickness of about 4 ft. 8 in. The "bands" run from ¼ to 1 in. in thickness and are from 14 to 18 in. above the bottom. Over the seam is 8 to 12 in. of fireclay drawslate; then 18 to 24 in. of top coal, over which is the main top rock of soapstone or shale.

Fig. 2 shows the nature of the country in the vicinity of Montour No. 8. The topography includes low hills and numerous ravines. The coal seam has only about

150 to 250 ft. maximum cover and the continuity of the seam is much broken up by the ravines. This "lay of the land" determines largely the mine development. Main or face entries are driven, and from these are pairs of butt entries on about 580-ft. centers. This permits rooms to be driven on the face of the coal, thus facilitating mining. Rooms are 24 ft. wide and pillars 15 ft. A 100-ft. pillar of solid coal is left on each side of face entries as protection. In robbing pillars, one pillar is kept about 16 to 18 ft. back of the adjoining pillar to secure a diagonal break across the workings and protect those doing the robbing.

The mines are electrically equipped and soon all coal is expected to be moved by motors. Four-ton storage-battery gathering locomotives are being installed; two are operating here now, and others will follow until mules are entirely replaced in these mines. Trips of loaded cars are hauled to the tipple by three motors—one Westinghouse and two of Jeffrey make. Sixteen Morgan-Gardner electric machines undercut the coal. Power is furnished from a central station, being transmitted from a distance at high voltage. At substations the electricity is converted and transformed to the usual mine direct-current of 250 volts for machines and 500 for haulage.

In connection with haulage, attention is directed to the plan of the tipple (Fig. 4) and the track layout from the mines to the dumps at the tipple. The three parallel tracks greatly facilitate handling trips. The motor brings in the loads on the track so indicated and readily attaches to the empties, made up in a trip on its siding, by means of the third open track. In Fig. 3 the plan for facilitating the movement of loaded cars near the dumps is shown. This is partly accomplished by increasing the grade over a space of several bents on the loaded tracks. These grades, on either side of the center of the tipple, show in the broken line of the stringers on the floor of the top of the tipple.

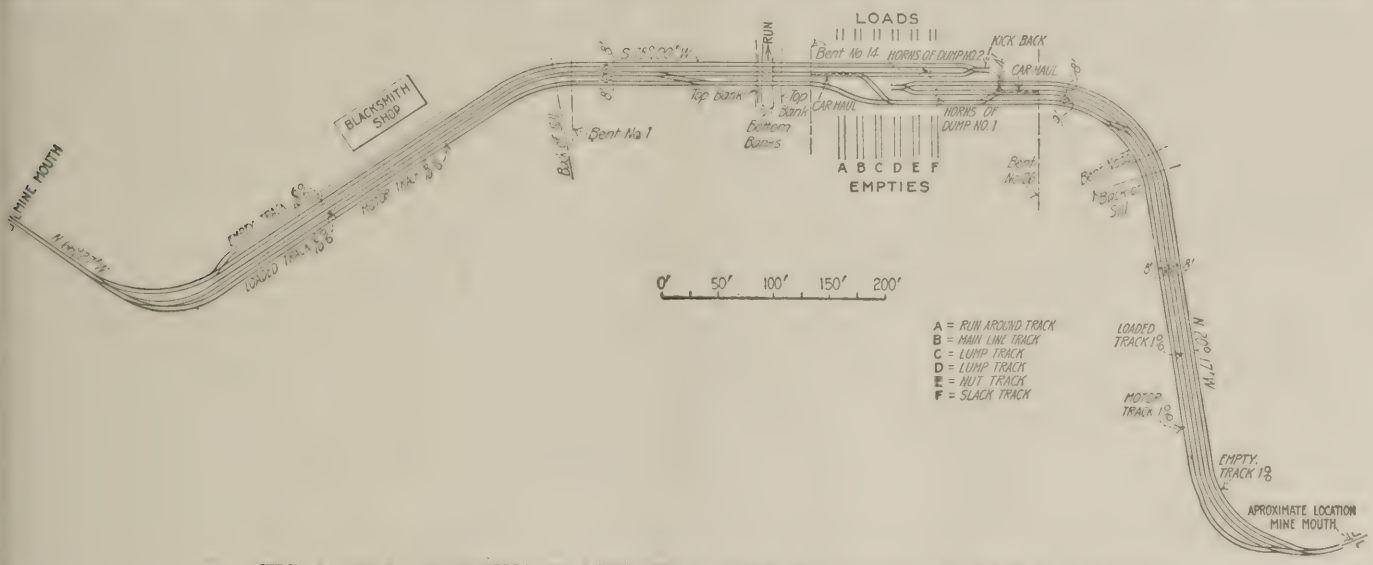


FIG. 4. PLAN SHOWING TRACKS FROM MINE MOUTHS TO DUMPS AT TIPPLE

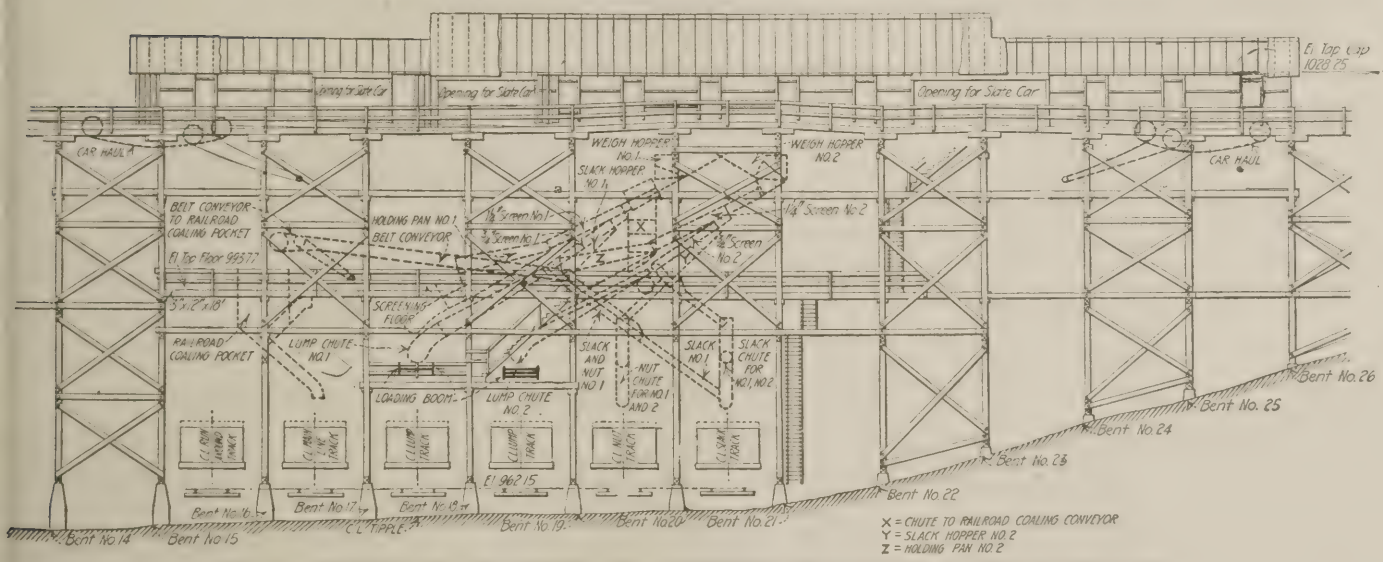


FIG. 5. ELEVATION AT TIPPLE AND LOCATION OF COAL-HANDLING APPARATUS

The capacity of the Montour No. 8 plant depends on the mine development, number of miners, facilities for shoving cars through the Phillips dumps, and railroad cars at the loading chutes. The mines are under development and miners are employed as they present themselves as applicants for rooms. Haulage facilities are being strengthened by the purchase of additional gathering motors.

The two Phillips crossover dumps will easily handle four two-ton cars per minute. Strictly speaking, the capacity of the dumps is not the sole limiting factor in the amount of coal handled over the screens, but rather

the mine-run weigh basket. The Phillips company claims that its dump can readily handle six cars per minute, but to dump, weigh and properly screen the coal, the basket will handle just about four cars per minute. If the coal is not screened, speed of operation can be increased.

The uncertain factors in the matter are labor and transportation. Were it not for these elements, the production of a mine in the Pittsburgh district under average conditions would be almost unlimited. The coal from 1600 acres of new ground is planned to be handled by the No. 8 plant.

In working out the details for the plant just described, the Pittsburgh Coal Co. had in mind further and similar development in the First Pool section. One or more Montour plants are under way or contemplated

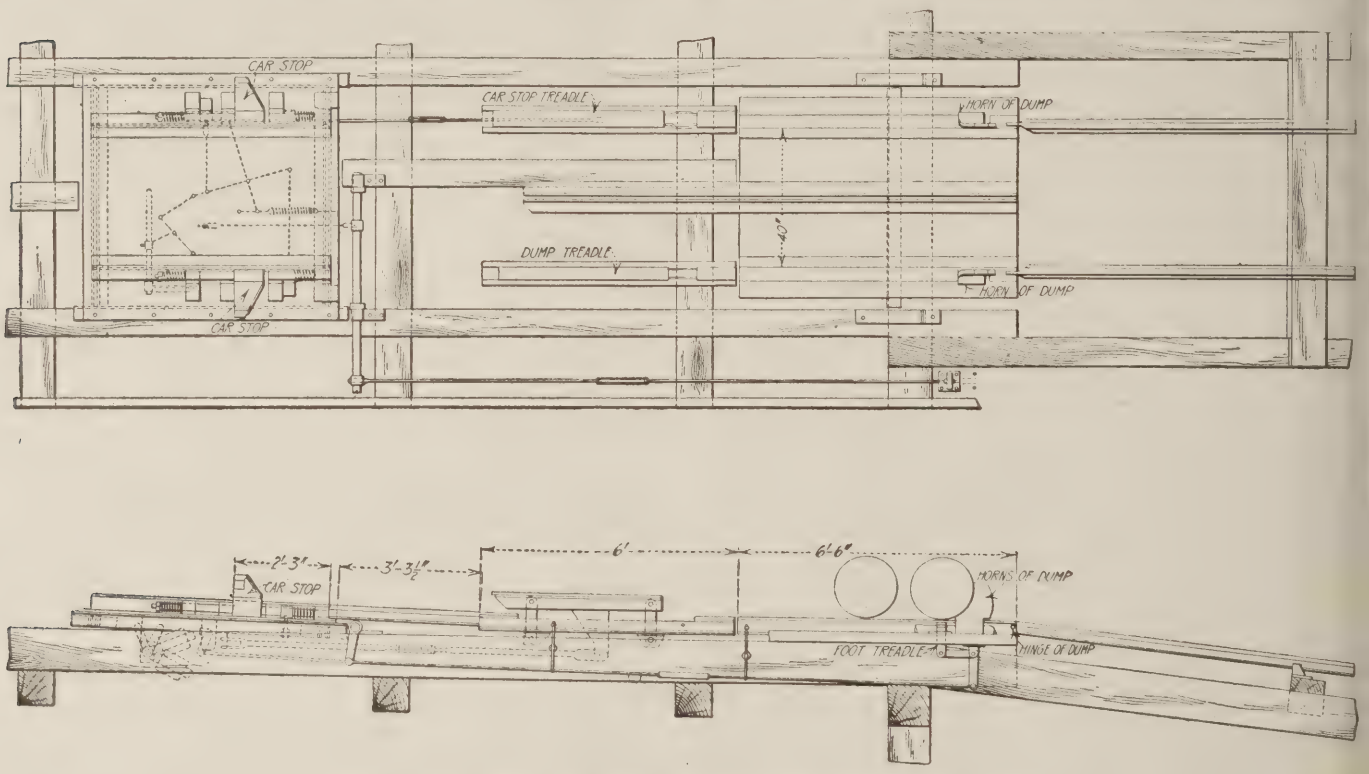


FIG. 6. CAR STOP OR TRIP CONTROLLER NEAR THE DUMP

—a shipment of Oregon fir is expected for another tipple which is to be similarly treated with carbolineum.

In the preparation of this article, *Coal Age* is greatly indebted to E. J. Taylor, chief engineer of the Pittsburgh Coal Co., and his assistants, H. L. Auchmuty and E. S. Taylor, for courtesies extended to the writer facilitating the gathering of information and for the privilege of visiting their plant. At the Montour No. 8 colliery H. D. Thompson, superintendent, and D. J. Ryan, mine foreman, gave every opportunity to inspect mines and tipple and furnished much interesting information. Acknowledgment should also be made to the publicity department of the Pittsburgh company for reports and pamphlets.

The enemy buys bonds so that his soldiers may be well equipped for the struggle. Your failure to invest in THIRD LIBERTY LOAN BONDS *may result in death or injury to an American fighter.*

Cornstarch-Asphaltum Binder for Briquets*

BY BURKE BAKER
Philadelphia, Penn.

The American Briquet Co. has built a small plant for briquetting coal at 25th St. and Washington Ave., Philadelphia, primarily for demonstration purposes. Its output per hour is 4 tons of 2-oz. briquets, which have been retailed in the vicinity during the year that the plant has been in operation. They have proved very acceptable for use in the ranges, heaters and grates of homes, and in the steam-heating plants of apartment houses and hotels. None of these briquets has been sold for power purposes, although satisfactory tests have been made in this field. Anthracite silt is used and is shipped direct from breaker or washery, the only preparation it receives being the removal of excess moisture by means of a Ruggles-Coles rotary dryer. Care is taken, however, to purchase silt that contains less than 18 per cent. ash.

The method of briquetting is covered by U. S. Patent No. 941,454, issued to Charles E. Hite, and is known as the "emulsion process." The binder, which is the basis of the patent, is composed of 0.5 per cent. cornstarch or wheat flour; 1 per cent. asphaltum or hydrolene, and 6.5 per cent. water, the percentages being based on the weight of coal dust. It is prepared in a tank equipped with paddle agitators and heated by steam jets. The starch and water are first made into a paste and brought to the boiling point by live steam; the melted asphaltum is then introduced and thoroughly beaten into the paste by the agitators. This rapid stirring breaks the hot asphaltum into minute particles

*Discussion of a paper presented at the New York meeting of the American Institute of Mining Engineers, Feb. 18, 1918, and entitled "The Briquetting of Anthracite Coal." This paper was printed in "Coal Age," Feb. 9, 1918, page 278.

Three periods urge purchasing LIBERTY BONDS: *Past, for the gift of Democracy; Present, for our boys in France; Future, for the safety of the world.*

which are distributed through the paste, producing a smooth chemical emulsion. This emulsion, when dried, is not soluble in water.

The binder is mixed with the dry coal dust in a horizontal paddle mixer, 8 parts by weight of binder being used for 100 parts by weight of coal dust. The resultant plastic mass is then discharged into the press, which is of the simple roll type. Since the binder is a liquid and is not sticky or gummy until partly dried, it is readily mixed with the coal dust in a fairly uniform manner.

From the press, the briquets are conveyed to a drying oven. Here they are distributed 6 in. deep over a broad screen-conveyor which passes through a "tunnel" constructed of hollow tile. Through this tunnel and up through the layer of briquets, a current of air is drawn by an exhaust fan at one end of the dryer, the air having been heated to approximately 225 deg. F. by a furnace at the other end. The speed of the screen-conveyor is such that the briquets are in the dryer one hour before they are discharged into an elevator which carries them to the loading chutes. This dryer is similar in design to those used in the textile industry and in the drying of ores.

The briquets thus made constitute a thoroughly satisfactory fuel for use wherever the prepared sizes of anthracite are consumed. They are water-proof and weather-proof; they withstand rain, freezing and thawing, the hot sun, or the heat of a boiler room, or all in succession. They are hard and tough enough to withstand rough handling, and can be piled in large quantities without softening or sticking. They hold their shape in the fire until completely consumed, and do not soften or fuse at any time. They are practically free from odor or smoke, and are entirely free from fumes or gases that hurt the eyes or skin, or injure flues and grates. The emulsion process has certain distinct advantages, which may be outlined as follows:

The total cost of binder, of drying, and of interest and depreciation on additional equipment in the emulsion process, is 65c. per ton of briquets. On the other hand, the cost of the asphaltum binder, estimating 7 per cent. to the weight of briquets and $17.50 as the price of hydrolene, is $1.22 per ton. Thus there is an actual saving in the cost of manufacture of 57c. per ton.

The emulsion binder, with its 1.5 per cent. of outside raw materials, instead of 7 per cent., greatly reduces the dependence upon outside sources of supply, thus avoiding many shutdowns due to delayed deliveries of asphaltum.

An asphaltum of a high melting-point and low penetration is required in the oil process. This is produced by only one or two of the large refineries. In the emulsion process, any grade of asphalt from crude petroleum to that having the highest melting-point can be used, thus permitting the purchase of the lowest-priced product from any refinery. The other raw material—½ per cent. of cornstarch or wheat flour—can be bought in the open market and from many sources.

By using only 1 per cent. instead of 7 per cent. of oil, the objectionable features of smoke, odor and soot are correspondingly reduced. The amount of smoke or odor produced by the 1 per cent. of asphaltum in its emulsified form is almost negligible; and there is no soot whatever.

The emulsion-binder briquets do not soften under heat. They can therefore be shipped in hot weather and to any latitude without danger of sticking in the cars; they can be stored in large quantities in summer without softening, and they do not soften and fuse in the fire, even under forced draught.

The emulsion process is not so simple as the asphaltum process, since the preparation of the binder and the drying of the briquets, although simple enough in themselves, require additional equipment. But this is compensated by the greater ease of mixing the binder with the dust The "masticator" is unnecessary and the need of keeping the flux at the proper temperature is obviated. On the other hand, the lower cost of production and the superior character of the product would seem to mark this as a forward step in the industry.

The American Briquet Co., after having operated its small plant in Philadelphia for a year, and having thoroughly proved the quality of the product and the practicability of manufacture on this small but commercial scale, is now making contracts for the erection of a plant of 50 tons per hour at Lykens, Penn., where arrangements have been made with the Susquehanna Collieries Co. for a supply of the silt produced by the colliery at that point.

The Methanephone

A young Welsh professor in London has recently perfected an invention with which he hopes to relieve considerably the mineworker from the fear of methane gas. The little instrument has been appropriately named the "Methanephone."

It consists of a small wooden box about 9 in. in height, containing an electric battery. At the top of the box is a fuse head cap upon which a tiny light always glows from the battery beneath. As soon as a certain low percentage of methane gas enters the workings its presence causes a tiny explosion in the fuse head, the explosion in turn melting a fine wire filament, which starts a bell to ringing continuously. The men in the vicinity are thus notified that gas has made its appearance and can take the necessary precautions. Officials of the Miners' Federation of Great Britain have witnessed effective tests of the methanephone.

If we help Uncle Sam by buying LIBERTY BONDS, *we help ourselves. The buying of* LIBERTY BONDS *resolves itself into an expression of the highest form of intelligent self-interest. A British sergeant told a cocky young American, just off a troopship, "You aren't fightin' to save France an' you aren't fightin' to save Belgium; you're jolly well fightin' to save your children and your grandchildren." The same line of reasoning applies to the buying of* LIBERTY BONDS, *for in the last analysis you aren't buying them to help a mythical old gentleman in a be-starred swallow-tailed coat and striped trousers who is having a lot of trouble purchasing ships and shoes and sealing wax; you're jolly well buying them to help yourself.*

Drifton Breaker of the Lehigh Valley Coal Company*

By EFFINGHAM P. HUMPHREY
Assistant Superintendent, J. S. Wentz Co., Upper Lehigh, Penn.

THE Lehigh Valley Coal Co. finished the rebuilding of its Drifton No. 2 breaker at Drifton, Penn., in the summer of 1917. The new construction comprises an addition and the complete remodeling of the old breaker. It is of interest to note that the old structure was the first iron breaker erected in the anthracite region. This old breaker was built by the Cross Creek Coal Co., under the direction of the late Eckley B. Coxe, in 1888-89, and was fully described by him in the *Transactions*[1]. The columns were cast iron, 8, 10 and 12 in. square. The floors and partitions in pockets were cast-iron ribbed plates. The struts were cast iron of "H" section; the other members were of structural iron either rolled I-beams or built-up sections. The sizes of the rolled beams varied from 6 to 20 in. deep, while the built-up sections, made of plates and angles, varied from 6 to 63 in. in depth, so that there apparently was no rule to determine the type of section used.

In the remodeling of the old structure, practically everything was taken down except the columns and roof, and such beams as were necessary for temporary construction purposes, and therefore a close inspection of the old structural members could be made and the effect of the acid water on them could be noted. The cast-iron members were but slightly attacked by the water, while the wrought-iron beams, in the wet places, were corroded almost to failure.

The following are analyses of cast-iron, wrought-iron and structural-steel samples taken from the old and the new structure:

	Si	S	P	Mn	C
Old part, rolled structural iron	0.13	0.06	0.29	0.013	0.17
New part, rolled structural steel	0.03	0.04	0.11	0.240	0.26
Old part, cast iron	1.18	0.12	0.93	0.229	....
New part, cast iron	2.41	0.13	0.72	0.280	....

The mine water contained 71.79 parts per million of free sulphuric acid and 320.88 parts per million of total sulphuric acid as sulphates. The temperature of the water was 72 deg. Fahrenheit.

The depreciation of a structural-steel breaker for dry preparation is unknown, but is estimated at 1.25 per cent., while for a breaker using acidulous mine water during preparation I estimate the depreciation at 4 per cent., as determined by the life of the steel in the old Drifton breaker, which was 26 years. This figure may be high, for repairs and replacements to broken beams, due to corrosion, were frequently made in the old Drifton breaker. Water-tight construction of chutes and hoppers, to prevent the water from coming in contact with the iron, would certainly have prolonged its life; but little or no attention was given to this when the old breaker was built; in fact very little water was used then as compared with the quantity now required.

An interesting phenomenon was noticed in the effect of the corrosion where wrought and cast iron were in contact in the presence of the acidulous water. In such instances the corrosion of both pieces was more rapid than separate pieces under the same condition. It may be probable that the action was assisted by a very weak electrolytic action caused by the slight difference in the metals. Slag holes in the casting showed more rapid corrosion than any of the other places, probably due to the same action.

The new addition is a modern fireproof structure built of structural steel with corrugated metal roof and siding, steel window frames and concrete floors. There are 332 tons of structural steel, or 1.35 lb. per cu.ft. of breaker volume, distributed as follows:

	Tons
Columns	67.0
Pockets and beams	192.0
Stairs and treads	8.5
Bracing	16.5
Roof	20.0
Girts	22.0
Miscellaneous, rivets, etc.	6.0
	332.0

The average length of column is 72.5 ft. and the ground area 6730 sq.ft. The cubical contents is 48,792 cu.ft. The roof area is 7400 sq.ft. and the metal sides 18,500 sq.ft. The floors are 3½ in. thick, of concrete laid on deep-rib Hy-rib. The hoppers, chutes and jigs are of wood and waterproofed to protect the iron work from the mine water. The structural steel was painted with two coats of red lead and graphite paint. The arrangement of the jigs along each side of the breaker gives them the maximum amount of light. The machinery and shafting are accessible, and the rope drives are located in one bay, not scattered throughout the addition, as is frequently the case. The building is well lighted throughout and contains 6700 sq.ft. of glass.

The cast-iron columns of the old breaker were practically the only members re-used. New columns, girts, machinery supports, hoppers, chutes and stairs are of wood. Distortion of the old structure and the difficulty of plumbing it prohibited the use of steel except at great expense. The worn-out sheet-metal sides and roof were duplicated, using 16,500 sq.ft. of siding and 5720 sq.ft. of roofing. Its cubical content is 389,000 cu.ft. The window area is 5700 square feet.

The new plant at Drifton was built under the direction of Paul Sterling, mechanical engineer, Lehigh Valley Coal Co., and is designed to prepare 1500 tons of coal in an 8-hour working day. The author was engineer in charge of the entire remodeling and construction.

The new preparation plan (Fig. 1) required more height than was available in the old breaker; additional height was obtained by using elevators, and the addition was erected without seriously interfering with the

*Paper presented at the February meeting of the Institute of Mining Engineers, New York City.

[1](1890-91), 19, 398.

There will be joy in Washington and gloom in Berlin if the THIRD LIBERTY LOAN *is a success.*

operation of the colliery. While the use of elevators to handle prepared coal is not recommended, yet the conditions at Drifton did not warrant the adoption of a plan involving a shutdown, or the expenditure required to replace the entire old breaker by one that was new and costly.

The best daily output to date is 1735 tons, and it is expected that the breaker will be able to prepare and load 2500 tons daily. At present, the average dump is approximately 600 mine cars a day, 35 per cent. of this coming from the Lattimer stripping. This coal is of medium quality, one-half being good big-vein coal, and the other half of poorer quality that is mined from a small vein containing about 15 per cent. of divider rock. Three per cent. of the input comes from the Buck Mountain stripping, and is a very poor grade of coal, shaly and full of clay; the remainder of the breaker input is mine coal, hand loaded and of good quality.

The force on preparation is as follows: One breaker boss, 1 jig boss, 1 picking-table boss, 1 ticket taker and docking boss, 2 dumpers, 4 pickers on platform, 3 pickers on broken coal, 2 pickers on jig refuse, 2 jig runners, 4 machinery attendants (screen men and roll tenders), 1 breaker engineer, 1 oiler, 1 ropeman, 1 breaker cleaner; total 25 men. The force loading coal and charged against loading is: One loader engineer, 4 loaders, 2 runners; a total of 32 men in the breaker.

One man attends the rock crusher in the breaker, but part of his time is charged against the disposition of refuse. The rock crusher is driven by its own engine, so that it may be independent of the breaker, which permits of refuse disposition after quitting time, a necessary measure because rock may accumulate on the picking head when there is an interruption in the operation of the refuse conveyor.

The method of elevating the run-of-mine coal in the remodeled breaker was not changed from that originally devised and installed by Mr. Coxe. There are two

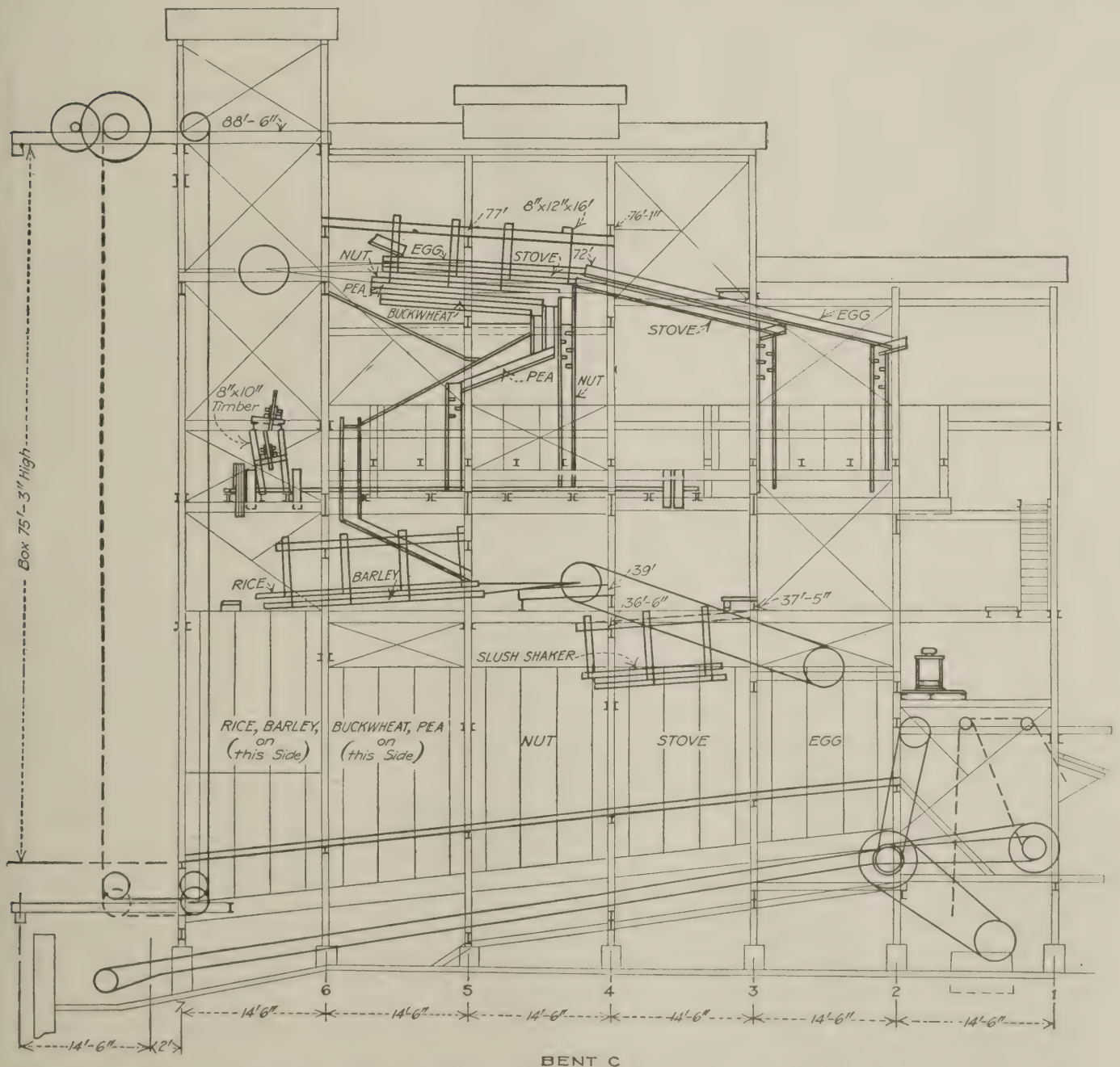


FIG. 1. NEW SCHEME OF PREPARATION, DRIFTON BREAKER

hoists, a single barney-plane hoist from the surface for all coal transported over ground from distant openings and strippings, and a balanced gunboat or skip hoist on the slope which connects a dump in the mines with the receiving hopper in the head of the breaker. The gunboat also serves a surface dump, which is used to handle the cars in excess of the barney-hoist capacity. The receiving hopper is large and permits continued dumping during short stops of the breaker. From this hopper, the run-of-mine gravitates to a reciprocating feeder, which delivers to a bifurcated chute which divides the flow so that it runs onto two banks of mud screen shakers, of four decks each, sizing lump, steamboat, broken and egg. The first two sizes gravitate to their respective moving picking tables. It is intended that pure coal shall be made in the future, but at present all prepared coal is jigged, and the pickers on the moving tables only "skin" the pure-coal product of impurities. No hand chipping is done, all half-and-half or capped pieces are left on the tables. The picked rock and impurities are thrown into a large chute of sufficient capacity to store a day's run, should any delay or breakdown occur to the refuse-handling machinery. This chute delivers to a No. 9 Gates gyratory crusher which reduces the material to about 3-in. lumps, and delivers it to a refuse conveyor to be conveyed to the rock bank.

The lump and steamboat products from the tables flow to a slow-speed No. 1 roll, breaking to steamboat and smaller, with a small percentage of steamboat oversize. The broken-down material flows to two banks of two-deck shakers, sizing steamboat and broken. The former size is broken down in a slow-speed re-breaker, or No. 3 pure-coal roll, to egg and smaller. The broken is inspected, any impurities being removed by hand picking, and then flows to the main broken loading pocket, or is switched to a separate pocket for use on the locomotive.

When there is no sale for broken, it mixes with the steamboat going to the pure-coal roll. The re-broken product from the pure-coal roll gravitates to the pure-coal elevator feeding pocket, of 20 tons storage capacity, to act as a reservoir in front of the fixed-capacity elevators; and is stored there during periods of fast dumping.

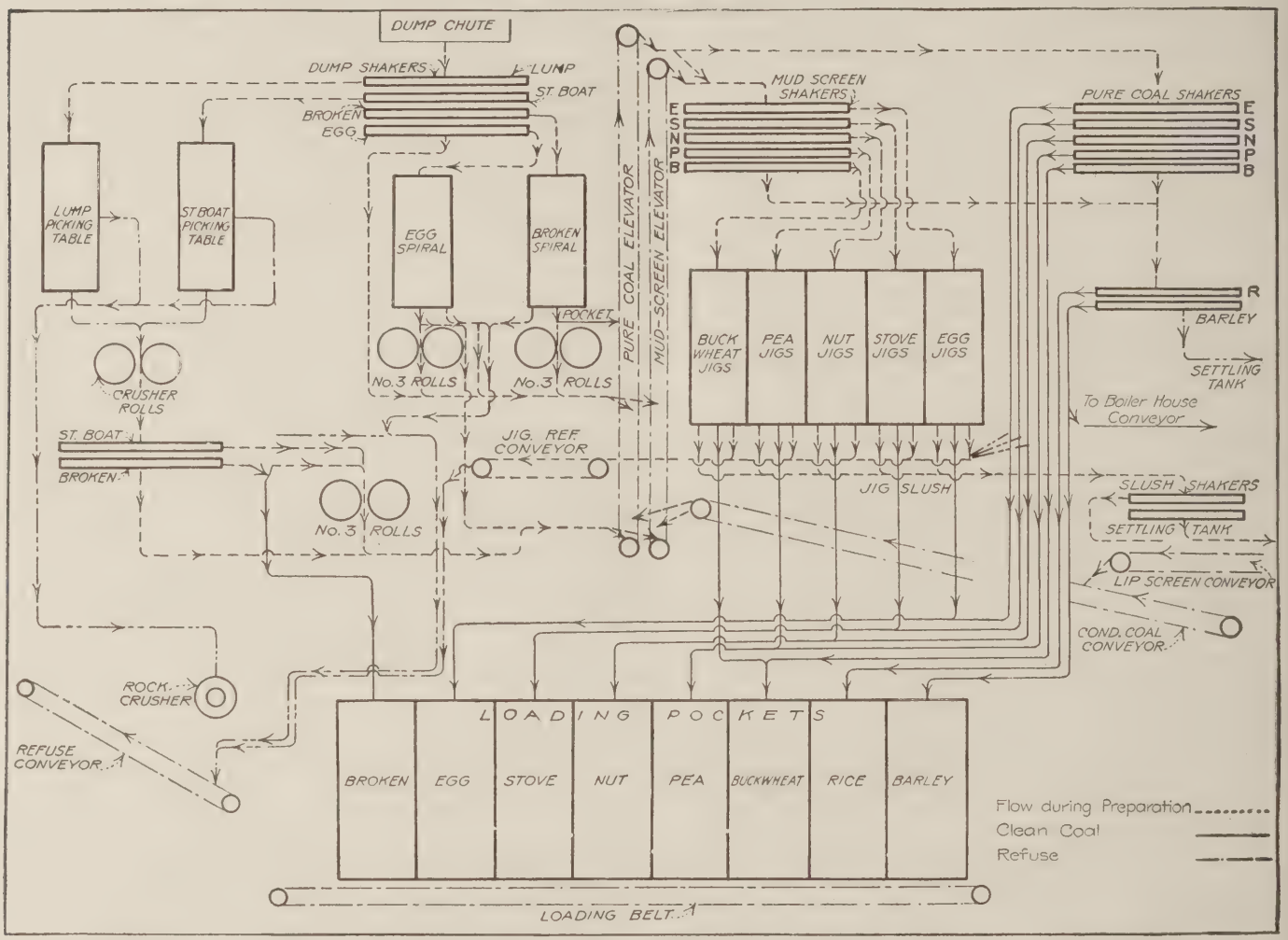


FIG. 2. LONGITUDINAL SECTION THROUGH BREAKER ADDITION

The mud-screen broken and egg is run over anthracite spirals, three for each size. These are adjusted to remove the maximum amount of rock so that one picker on the refuse, from each set of three spirals, can clean the product by hand, picking out the pure coal. The refuse from all spirals flows to the rock-handling machinery. The spirals, in addition to relieving the jigs of handling this refuse material, also protect the re-breaker rolls, receiving the spiraled product, as it has been found that rock dulls the roll teeth more quickly than the coal, thereby reducing the roll efficiency and the prepared sizes.

The spiraled mud-screen broken flows to its slow-

speed re-breaker, or No. 3 mud-screen roll, which breaks to egg, stove and smaller. The spiraled mud-screen egg flows to its No. 3 roll, or, when there is a demand for it, the egg is switched around the roll. The entire mud-screen product from both of the No. 3 rolls, also the egg (when not broken down) is mixed in the mud-screen coal elevator feeding pocket, a duplicate of the one for the pure coal.

Two elevators, one for pure and one for mud-screen coal, lift the products from the elevator feeding pockets to the top of the new addition (Fig. 2). There are four banks of five-deck shakers, arranged parallel. The two outside banks are for pure coal and the inside banks for mud-screen. At present (as already mentioned) no pure coal is made, as it has been found cheaper to remove refuse by jigging. This method of preparation will be continued until the quantity of the run-of-mine is increased to such an extent that it is necessary to make a pure-coal product, or if the quality of the present run-of-mine should change, producing a tremendous quantity of large lumps of pure coal, then the hand-picking force will be increased in order to clean the product on the moving tables.

With the present plan, the elevated pure and mud-screen products are dumped into the mud-screen bifurcated chute delivering to the two mud-screen shakers (the outside, or pure-coal shakers, are not operating). These shakers size egg, stove, chestnut, pea and buckwheat. Each size flows into its respective jig storage pocket. The jig pocket acts as a reservoir behind the jigs, storing up during rush periods and feeding out when no coal is coming. These pockets are equipped with adjustable partitions, arranged so that the capacity of any one pocket may be increased, by decreasing the capacity of the adjacent one. The partitions are changed to accommodate the quantity of each size made, and thereby increase or decrease the number of jigs on any one size, where it is necessary to handle a greater or lesser quantity of any size to meet the varying market demands. For example, when breaking down all coal to stove and smaller, no egg jigs are needed; therefore egg jigs can be run on stove, and vice versa.

The coal from the jig pockets flows to the jigs. These are equipped with automatic starting and stopping devices, actuated by the weight of coal in the chute, connecting the jig pocket to the jig, and operating a belt shifter through a system of levers. By means of this control, jigs will stop when no coal is coming and the jig pocket is empty, and will start up as soon as the feed starts again.

The clean coal from the jigs gravitates to the loading pockets, while the refuse is conveyed to the refuse-conveyor line. The coal is loaded into cars by a belt conveyor, which system was first used in the anthracite region by the Lehigh Valley Coal Co. The pocket gates differ from those previously used in being located at the end of the chute leading to the belt instead of several feet up the chute, at the point where the chute enters the loading pocket, thereby reducing the initial breakage resulting from the sudden rush of coal down the chute when the gate is opened, and permitting the use of a lifting check gate rather than a cutoff gate. The latter gate requires more power to operate than the former and was steam operated on previous installations of the company. The latter is opened by the weight of coal against the gate, when the operating chain is raised and closed by the belt loader operator, who pulls a chain connected to the gate.

The rice and smaller from the buckwheat shakers flows to two banks of two-deck shakers, sizing rice and barley. The material falling through the lower deck flows to settling tanks. The chutes from the rice and barley shakers are arranged so that both or either size may go to its respective loading pocket, or to the boiler-house conveyor line.

The jig slush or hutch product is delivered on a single-deck shaker, the material passing over is conveyed, together with the lip screenings, to a screening storage pocket. The product falling through goes to the settling tanks. Condemned coal is dumped into a hopper connected to the foot of the elevators by a conveyor. This conveyor will deliver to either the pure or the mud-screen coal elevator, by changing a switch in the discharge chute. Coal condemned for impurities can be switched to the mud-screen elevator, while coal condemned for screening can be sent to the pure-coal elevator. The condemned-coal conveyor also handles the lip screenings from their storage pocket. When the pocket is full, the conveyor is started and operates until the pocket is empty. When it is necessary to make a pure-coal product, the pure-coal elevator will discharge into the pure-coal bifurcated chute leading to the outside pure-coal shakers. The sized coal from the shakers will mix with the clean coal from the jig and flow to the loading pockets.

No controls to handle the coal in the old breaker have been installed, as usually the product is unsized and the breakage is practically nil. Abrupt turns and high drops are avoided as much as possible.

Elevator breakage is minimized by proper feed at bottom and proper discharge at the top. In the addition, White chute controls are used where thought necessary and vertical stepped telegraphs for lowering into jig and loading pockets. Spiral chutes are installed to lower pure coal. A movable pocket-filler chute is used on broken. Loading gates are as previously mentioned. The adjustable boom on the end of the belt conveyor, with curved chute, prevents a high drop into cars and assures a fairly uniform distribution of any screenings through the loaded car.

Water for preparation is required in the addition only. It is pumped direct from the mines to a 6000-gal. wooden storage tank, placed in the top of the old breaker. A cast-iron distributing main is connected to the bottom of the tank; branch lines run from this main: (1) to the pure-coal and mud-screen shakers; (2) to the jigs and (3) to the lip screen. Outlets are placed throughout the breaker for hose connections for

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washing down, and for fire; cutout valves are placed on each branch line. At present, an outlet is furnished for each jig, but this is to be changed to an automatic jig-filler trough. This arrangement consists of a trough running back of the jigs with a 3-in. cast-iron connecting pipe leading from the bottom of the trough to each jig.

A connection will be made from the distributing main to the trough, with an automatic float valve on the end arranged to maintain a constant level of water in the trough. The trough will be filled with water up to a height to balance the water in the jigs through the connecting pipe. If the height of water in any jig falls below the proper level, water in the trough will flow into the jig and the automatic float valve will open and the water fill the trough until the balance is reached, when the automatic float valve will close. This arrangement maintains a constant water level in the jigs and results in better jigging due to the uniform conditions. It should also result in a saving in the quantity of water used by the jigs, as compared to the amount used when inefficiently controlled by hand.

CHANGES IN METHODS OF PREPARATION

The machinery in the old structure was the subject of an article by E. B. Coxe[2], 1890. It is interesting to note the changes in the methods of preparation. The more modern plants have more machinery and less men for the same tonnage even though the quality of the coal in many cases is poorer.

In the Drifton breaker shakers are made of 3 x 6-in. wood sides with 3½ x 3½ x ⅜-in. cross-frame angles, suspended by 1 x 6-in. hanger boards. They are driven by 3-in. throw eccentrics at 150 r.p.m. connected to the shaker by 3 x 6-in. Parrish flexible wood arms. The shakers are 4 ft. and 4 ft. 6 in. wide by 15 to 24 ft. long.

Rolls are of the slow-speed type, 36 x 36-in., compound geared with cast-iron chilled teeth built up in segments. The peripheral speed is 300 ft. per minute and they have a capacity of about 300 tons an hour.

The jigs are the Simplex pan type, running at 137 r.p.m. with automatic slate gate and automatic starter. There are 20 jigs placed back to back in two rows of 10 each, facing opposite sides of the breaker, affording excellent light for refuse and coal inspection. At present there are five jigs for egg, four for stove, four for nut, three for pea and two for buckwheat. Jigging results for the month of October, 1916 (189.5 working hours), were as follows:

Size	Tons	Tons per Hour per Jig
Egg	5,212	5.5
Stove	7,342	7.7
Nut	5,152	6.8
Pea	2,038	5.4
Buck	3,773	9.9

The delays for "no coal" for the same month were 24¼ hours, but these are not considered in the results given in the foregoing table.

[2]Transactions (1890-91), 19, 398.

The average percentages of coal and chipped coal in the refuse for the same month were as follows:

Size	Per Cent. Coal	Per Cent. Chipped Coal	Average Per Cent. Pure Coal for Prepared Sizes	Average Per Cent. Pure Coal, All Sizes
Egg	1.00	0.89	1.14	1.25
Stove	1.12	0.50		
Nut	1.50	....		
Pea	2.90	....	3.38	
Buck	3.75	....		

The only hand pickers on refuse from the jigs were two boys on egg coal. During that month one car of chestnut was condemned for stained coal and one-half car of chestnut for screenings.

The number of tons per jig per hour for the best day (1735 tons total) with no coal condemned and 1 hour delay for "no coal" was as follows:

Size	Tons per Hour per Jig
Egg	7.4
Stove	7.5
Nut	11.7
Pea	11.0
Buck	14.7

On this day there were four jigs for egg, six for stove, five for nut, two for pea and two for buckwheat.

All the conveyors have 6 x 18-in. flights with 9-in. pitch Keystone chain. The elevators have 22 x 25 x 12-in. buckets at 18-in. centers with two strands of 9-in. pitch heavy pattern Keystone chain. The elevators travel 90 ft. per minute and have a capacity of 200 tons an hour.

The moving picking tables, 4 ft. 6 in. wide, are of the overlapping pan type and run at about 30 ft. a minute. Each table is equipped with a friction clutch for starting and stopping and a moving apron discharge chute.

The breaker engine is an 18 x 36-in. double reversible Corliss valve type, noncondensing, running at 100 r.p.m. belted to the main lineshaft by a 24-in., 10-ply rubber belt. The average indicated-horsepower is 272 loaded and 165 when running light. This power is distributed approximately as follows:

1	Feeder	2
2	Banks dump shakers—8 single shakers	16
1	Crusher roll	12
2	Tables	8
2	Banks pure-coal shakers—4 single decks	8
2	Sets No. 3 re-breakers	18
2	Elevators	65
2	Banks shakers, two of 2 decks, two of 3 decks	20
18	Simplex jigs	72
3	Sections of refuse lines—174 ft.	19
2	Banks rice and barley shakers—4 single decks	8
1	Bank slush shakers—2 single decks	3
1	Condemned-coal line—200 ft.	29

The above figures are the indicated-horsepower for each machine at the engine and include the friction of lineshafts and drives.

Several of the drives from the main lineshaft are equipped with friction clutches. These drives are arranged so that combinations of machines may be operated while other combinations are momentarily stopped for attention or repairs. Generally speaking, all rope sheaves are 60 in. in diameter for 1½ in. manilla rope, and belt pulleys are 48 in. in diameter. In the addition rope drives are used exclusively between the main lineshaft and the main countershafts.

The feeder is built like the shakers, but is fitted with

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blank plates and is driven by adjustable-throw eccentrics in order to vary the feed.

The loading belt conveyor is a 36-in. by 6-ply ½-in. rubber-covered belt, running on Robins troughing and return idlers. The speed ranges from 300 to 500 ft. per minute, according to the size of the coal handled, and is adjusted by hand control of the 8 x 10-in. driving engine; the larger the size of coal, the slower the speed.

A gravity return system is used for steam heat, the returned condensed steam being wasted. The pipe radiator coils consist of 15,300 lin.ft. of 2-in. pipe, or 155 cu.ft. of breaker contents per foot of 2-in. pipe. Exhaust steam from the breaker engine is used when operating; live steam at other times.

The addition was erected over the old loading tracks, and clearance was provided for admitting the cars through the addition during the operation by omitting some of the structural steel. A new loading track was built in front of the addition, and the loading belt conveyor erected. New holes were cut in the bottom of the loading pockets in the old breaker and chutes were run to a common point to deliver to the loading belt conveyor. When this work was completed, the change from the old method of loading to the present one was made over a Sunday. This did away with the old loading track and permitted the completion of the addition without interruption.

In the meantime, as the addition was being finished, one elevator was installed and as soon as the new part was complete, by a temporary chute arrangement the coal was carried into the addition and prepared there, thus allowing the removal of all machinery in the old part except the rolls, dump bars and picking head. These rolls were set to pass nothing larger than broken, and by putting an extra broken deck on the shakers, in the addition, this broken was removed and cleaned by hand picking and run to a temporary loading pocket.

New rolls, tables, shakers and elevator were then placed in the old breaker and gradually put into service. The remodeling was finally completed without any serious loss in production due to erection delays.

During construction, much overtime and Sunday work were necessary to change and install the temporary chutes for connecting old work with new, which usually had to be torn out or replaced by permanent construction as the work proceeded. The greatest difficulty was found in supporting old machinery in the old structure, because of the corrosion of steel beams, which in many cases were held in place by old chutes, hoppers, etc. When these were removed, the steel member frequently fell out or came loose, adding to the danger. By safety-first methods at all times, the job was completed without serious accident of any kind.

American citizens should buy LIBERTY BONDS, *because they are the bulwark of defense, keeping from the women and children of America the horrors which Germany visited upon the women and children of Belgium.*

Hints on the Storage of Coal

Coal should be stored in small quantities as near to the point of consumption as possible, says a recent statement of the Bureau of Mines on the subject of stocking coal in piles. Small coal piles rarely ignite from spontaneous combustion. Coal should be stored near the point of use to avoid rehandling, extra transportation and the degradation of size which follows each rehandling. For these reasons the bureau would advocate storage, so far as possible, in the bins and yards of the ultimate consumer, thus dividing the risk of loss from spontaneous combustion. If large storage piles are necessary, certain general principles must be borne in mind. The generation of heat is the result of slow oxidation of the coal surface. The oxidation is much more rapid from freshly mined coal or from freshly broken surfaces. The oxidation rate increases rapidly with increased temperature. Different coals have different oxidizing rates. These facts lead to the following recommendations:

Where there is choice of coal to be stored, that having the lowest oxidizing rate should be chosen, if known.

Between two coals, that which is least friable, and therefore which presents the least total coal surface in the pile, should be selected.

The method of handling should be such as to produce the least freshly broken coal surface.

The coal should be as cool as possible when piled. Piling warm coal on a hot day is more likely to produce spontaneous combustion.

The coal must be kept from any extraneous source of heat.

Alternate wetting and drying of coal during piling is to be avoided if possible.

The fine coal, or slack, which furnishes the larger coal surface in the pile, is the part from which spontaneous combustion is to be expected. Piling of lump coal where possible is therefore desirable.

In the process of handling, if the lump coal can be stored and the fine coal removed and used immediately, the practice prevents spontaneous combustion in coals which would have otherwise given trouble.

The sulphur content of coal is believed by many to play an important rôle in spontaneous combustion. The evidence on this point is still conflicting, but to play safe it is desirable to choose coal having a lower sulphur content, when choice is possible.

There is a current belief that dissimilar coals stored in one pile are more liable to spontaneous combustion. The evidence on this point is also conflicting, but, to play safe, it is advisable to store only one kind of coal in a pile.

The ground on which a coal pile is built should be dry.

The foregoing recommendations are all derived from the factors affecting the heating of coal.

There should be no spontaneous combustion, whatever the heating rate, provided the heat is carried away as rapidly as produced. This fact brings about the following recommendations:

Coal piles should be so made that there is ready movement of air for ventilation throughout all parts of the coal pile. This is the condition when the entire pile is made of coarse lump coal. With ordinary coal piling this is difficult. Surfaces of coal piles should be exposed to allow the pile to cool; or else the coal should be so stored that air circulation within the pile is very small. When the air circulation is reduced to a minimum, as in an air-tight bin with no opening in the bottom, the oxygen of the air is soon removed and the mass of the coal lies in an inert atmosphere, except for small local circulation near the surface. Air-tight bins are usually impracticable, but the following practice is recommended to approximate these conditions.

In making a coal pile of mixed sizes, the coal should be so handled as to make a homogeneous pile and prevent the segregation of coarse and fine coal. This frequently determines the most desirable machinery for unloading coal.

It is common practice to limit the height of a coal pile, this for two reasons: A pile too high crushes the lower layers of coal, producing more fines; the larger the pile the less heat-dissipating surface there is exposed in proportion to the heat generating capacity of the pile. Twelve feet in height is a common limit.

Whatever precautions are taken in choice and handling of coal, provision should be made for keeping track of the temperature rise in a coal pile and for rapid rehandling of portions of a pile in case of excessive heating. In a coal pile covering a considerable area, it should be so subdivided that in case of spontaneous combustion of a portion, the heat will not be transmitted to the whole pile, thus accelerating the heating of portions of the pile which normally would have remained cool.

To keep track of the temperature of coal piles, it is recommended that ½-in. iron pipe be driven vertically into the pile at distances of 15 or 20 ft. apart. A maximum thermometer lowered into the pipe to varying depths will indicate the temperature of the pile opposite the thermometer.

A survey of the pile and a survey of the temperature of all parts of the pile should be made twice a week during the first three months after the pile is made, and once a week thereafter until the pile has evidently ceased to heat. As soon as any portion of the pile reaches a temperature of 150 deg., provision should be made for removing that portion of the pile. Actual removal need not begin until the temperature has reached 180 deg., but at these temperatures the rate of oxidation is dangerously rapid. The object of rehandling the coal is to allow it to cool below a dangerous temperature. Any method of rehandling which does not allow of cooling will only transfer the difficulty from the old pile to the new one. It is usually useless to employ water in an attempt to cool a coal pile.

Lack of provision for rapid reloading, cooling and repiling of coal is the cause of serious loss from spontaneous combustion.

New England Coal Dealers' Association Meets

Retail Dealers Hold Best Meeting in Sixteen Years—Many Interesting Papers Read—James J. Storrow, the Principal Speaker of the Meeting, Pays High Tribute to Coal Dealers—Animated Discussion Followed Mr. Storrow's Remarks

THE annual meeting of the New England Coal Dealers' Association, which was held at Springfield, Mass., Mar. 20-21, was easily the best in the sixteen years that the New England retail coal dealers have been organized. The Auditorium, in which the sessions were held, has a seating capacity of 4000, but the coal men with a registration of nearly 500 made a respectable showing when Mayor Stacy extended them a cordial welcome. The first day was taken up with reports and other routine matters, having special regard, however, for dealers' local problems. William A. Clark, of Northampton, Mass., in his report as president of the Association, paid a high tribute to Harry A. Garfield for his painstaking effort to be fair with retailers and other human factors in the distribution of coal. When the United States Fuel Administrator was shown that mistakes had been made he quickly corrected them and was always in the position of one endeavoring to the utmost of his ability to deal with difficult problems. Mr. Clark showed that some of the mistakes had been made before Mr. Garfield went into office.

There was the usual dinner in the evening, 426 being in attendance, the largest thus far. R. C. Faulkner, of Poli's circuit, delighted the company with his rapid-fire talk, together with impersonations of President Wilson, and through the evening the entire gathering joined in singing. One of the popular songs was "Coal-less Days," written for the occasion by a Springfield coal man and set to the music of "School Days."

Thursday forenoon the meeting settled down to the business in hand. A resolution was adopted calling upon the Fuel Administration, both Federal and state, to insist that coal be marketed through retail dealers, except when destined strictly for manufacturing purposes. Speakers suggested that regular customers be favored, that dealers instruct their trade as to the value or otherwise of substitutes for coal, and that emphasis be placed upon conservation.

The election of officers was followed by short papers which were exceptionally good. George E. Copeland, of Worcester, urged serious consideration of the decrease of labor supply, a situation that will make more difficult any increase in production next winter. The obligation of a coal dealer to his community is to fight for coal. Yet the coal business has been the football of misinformation during the past winter. The reserve storage should be in the cellars of consumers first, and then in community storage piles as suggested in the press, but not in the community piles first. Mr. Copeland's paper was warmly received.

C. R. Elder, of Amherst, Mass., spoke on "Having Backbone in the Coal Trade," with special reference to retail prices. Frank A. Whiting, of Holyoke, Mass., asked the dealers for a better application of the Golden Rule as between dealer and customer, but, said he, it should be applied to regular customers first and then to others if possible.

F. H. Johnson, of New Britain, Conn., accounted in general terms for the shortage and then added that the coal dealers, as a whole, appreciated Mr. Garfield's selection of advisers from among men familiar with the industry and that he would continue to have their loyal support.

Maurice F. Reidy, of the Worcester Fuel Committee, advised that all connected with the coal business, whether dealers or administrators, profit by the experi-

Bondholders, don't shout until you are out of the war woods. The danger is still here. Buy bonds until the war is over.

ence of the past season. He told in detail of the careful plans of his Fuel Committee to work in close harmony with local retailers. Only in that way could unfortunate complications be avoided.

The important feature came on Thursday afternoon, when James J. Storrow addressed the meeting, giving a summary of his work and plans as Federal Fuel Administrator for New England. Mr. Storrow was enthusiastically cheered and could not have left the meeting without feeling that the retailers appreciate and approve not only his labors of the past year but his strong efforts at Washington and elsewhere this season in the interest of more coal for New England. Mr. Storrow's remarks were followed with the closest attention, and there were repeated bursts of applause as he outlined the difficulties of the present situation.

"Where does the Government intend to stop?" Mr. Storrow asked in emphasizing the commandeering of ships. "We have lost so many ships that at the present time New England is menaced with a shortage of steam coal which will be much worse than last winter. The limit of our steam coal this year will be the limit of the carrying capacity of our ships. This is plain talk, but it is the plain truth, and the people of New England are entitled to know it."

In his address Mr. Storrow paid a high tribute to the coal dealers for their loyal help in the acute period just passed. "The people do not yet realize," he continued, "how narrow was the margin last winter. Remember that during the entire months of January and February there was at all times more coal on cars at our four New England gateways, waiting to be pulled in to us, than our New England railroads could haul. By constant intercession with the coal companies we kept this coal in ample supply at the gateways, but New England railways could not pull it in as fast as we needed it."

Mr. Storrow rather took the breath away from many of the anthracite men present when he referred to deliveries by July 1 to consumers up to two-thirds of their yearly consumption, but aside from that there was marked approval. At the close of his formal address Mr. Storrow invited questions and further showed his hold upon the members by the way they greeted his prompt answers. Thomas W. Russell, Connecticut Fuel Administrator, also participated in the discussion. The impression made was strong, particularly when Mr. Storrow emphasized his belief that distribution should follow just as far as possible the normal channels, the useful services of dealers and "jobbers" alike included, and stated frankly his opinion that municipal coal yards would not be likely to improve upon the methods employed by retail dealers with their experience and their desire to give the public necessary service.

In the basement of the Auditorium was an exhibit of mechanical contrivances for the use of coal dealers. The visitors were especially interested in conveyors and wagon loaders, although a kerosene air-type thawing outfit attracted a good deal of attention. There never was a season when it was so hard to unload cars. Next year the association will meet in Worcester.

Purchasing a LIBERTY BOND *will mean helping insure these United States against depredatory powers for ages to come.*

Utah Leads in Production per Man

The United States Geological Survey has just published a table showing the coal produced per man employed in 1916. To it we have added columns II, IV and VI showing the order in which the states stand in days worked, in average tonnage per year and in average tonnage per day per man employed.

Utah leads in daily and annual tonnage per man, though it is only thirteenth in its regularity of work. Texas is last in both daily and yearly tonnage per man, though it is next below Utah in its regularity of work. Utah has thick coal, whereas the Texas coal

COAL PRODUCED PER MAN EMPLOYED, 1916

	—Days Worked—		Average Tonnage			
		Number	Per Year		Per Day	
State	Order	of Days	Order	Tons	Order	Tons
I	II	III	IV	V	VI	VII
Alabama	(3)	262	(15)	715	(19)	2 73
Arkansas	(24)	184	(20)	528	(16)	2 87
Colorado	(12)	233	(13)	800	(12)	3 43
Illinois	(21)	198	(8)	876	(4)	4 42
Indiana	(23)	187	(11)	838	(3)	4 48
Iowa	(20)	202	(21)	503	(21)	2 49
Kansas	(19)	204	(18)	567	(18)	2 78
Kentucky	(17)	208	(12)	813	(8)	3 91
Maryland	(5)	256	(14)	792	(13)	3 09
Michigan	(16)	216	(23)	466	(24)	2 16
Missouri	(18)	207	(22)	491	(22)	2 37
Montana	(8)	244	(6)	961	(7)	3 93
New Mexico	(1)	292	(10)	839	(15)	2 87
North Dakota	(9)	244	(7)	889	(11)	3 64
Ohio	(22)	197	(9)	839	(6)	4 26
Oklahoma	(25)	178	(24)	463	(20)	2 60
Pennsylvania:						
Bituminous	(4)	253	(4)	548	(23)	2 17
Anthracite	(6)	259	(19)	1,012	(9)	3 91
Tennessee	(10)	239	(16)	666	(17)	2 79
Texas	(14)	218	(25)	444	(25)	2 04
Utah	(13)	228	(1)	1,140	(1)	5 00
Virginia	(2)	272	(5)	993	(10)	3 65
Washington	(15)	217	(17)	633	(14)	2 92
West Virginia	(11)	237	(2)	1,198	(2)	4 68
Wyoming	(7)	248	(3)	1,090	(5)	4 40

is quite thin. Utah is a state with progressive ideas in mining; Texas is somewhat backward. It is interesting to note that West Virginia stands so high both in the yearly and daily production per man. Indiana and Illinois come next in the average daily production.

New Mexico led in regularity of work. To do this it works practically every day except Sundays and holidays. Oklahoma has the lowest running record of all the states—only 178 days per year.

The reader will also note that the production per man even in Texas averages 2.04 tons, which would look a big tonnage at the best of mines in Europe, where, however, there is more conservation and where, moreover, the mining conditions are usually none too favorable.

Germany's Fuel Predominance

In 1916, before Germany assisted in the preservation of order in Russia by coolly annexing large parts of its territory, O. Simmersbach wrote in *Stahl und Eisen* that Germany's reserves represented 54 per cent. of the whole available coal supply in Europe whereas Great Britain and Ireland's supply represented only 24.17 per cent. In this estimate, the coal stolen from Belgium and France by unjustifiable invasion was not included. As the British coal is being worked at a rate 45 per cent. greater than the coal of Germany, Great Britain is justified in having some apprehension when she notes that a country which has always regarded her resources as material of war will soon outstrip her as a producer of minerals. Fifty per cent. of the German coal in Westphalia and more than 40 per cent. in Upper Silesia.

Storage Battery Locomotive from Manufacturer's Standpoint

By R. L. Heberling
New York, N. Y.

Mine locomotive service presents an entirely different problem to the storage battery manufacturer than any other form of service. I do not know of any service where storage batteries are used, where abuse need not be figured on, regardless of the opinion of manufacturers and operators of apparatus using such batteries. This abuse should be expected and provided for by the battery manufacturer or it is evident that success will not be met.

Before beginning the manufacture of locomotive batteries, the Philadelphia Storage Battery Co. detailed me to investigate the service and observe the operation of locomotives equipped with various types of batteries. The first thing noticed was the need for extremely high capacity and a policy was immediately put into effect under which no batteries could be installed unless they had sufficient capacity to finish a hard day's work with 20 per cent. reserve. This was accomplished by standardizing on a high capacity type of storage battery and insisting upon its occupying all of the space that was available.

In supplying a battery with more than enough capacity to do a hard day's work, the worst abuse, that of over-discharge, was automatically eliminated. Breakage of rubber jars was eliminated by furnishing extremely heavy jars of extra high-grade compound, assembled in heavy trays, and fitted with special molded covers to absolutely prevent sloppage of acid. These covers are designed so it is easy to fill the battery with water without overfilling. While it is only necessary to fill a battery of this type about once every week or ten days, overfilling, even slightly, causes rotting of the trays, with consequent breakage of jars and connectors, if the acid can splash out.

In addition to designing a battery which would have all of the features described above, it was thought necessary to assemble the battery in such a way that it would be easy to keep clean. This was done and it is only necessary to turn the hose on the battery, or flush the tops of the trays with water, in order to clean them.

The matter of installation and service was the next problem. This work was placed directly in the hands of competent sales engineers who were responsible for not only service, but sales as well. There are so many places where storage-battery locomotives can be used to advantage that it certainly does not pay to recommend their use for any sort of service for which they are not adapted.

It was felt that it was necessary, to some extent, for the storage-battery manufacturer to assume the responsibility for installing the proper battery equipment, as they are, or should be, in better position than the operator to know what equipment will do the work properly.

A $100 Liberty Bond *will clothe a soldier or feed a soldier for eight months, or purchase 5 rifles or 30 rifle grenades, or 43 hand grenades, or 25 lb. of ether, or 145 hot-water bags, or 2000 surgical needles. A $100 and a $50 bond will clothe and equip an infantry soldier for service overseas, or feed a soldier for a year. Two $100 bonds will purchase a horse or mule for cavalry, artillery or other service. Three $100 bonds will clothe a soldier and feed him for one year in France, or buy a motorcycle for a machine-gun company. Four $100 bonds will buy an X-ray outfit. One $500 bond will supply bicycles for the headquarters company of an infantry regiment.*

The Opportunity

By BERTON BRALEY

NOW is the time to prove
The worth that is in you.
Now is the time to move
With spirit and sinew,
Body and heart and soul
In your occupation,
Making of trade in coal
But a consecration.

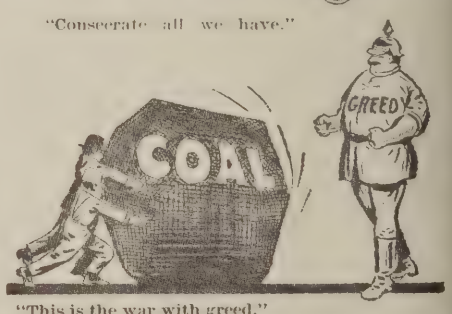
Aye, let us consecrate
To the Nation's service
All that we have. No fate
From our task shall swerve us.
Not for the sake of pelf
Shall we plan and labor,
Each shall forget himself
As he aids his neighbor.

THIS is a war with Greed
And we fight to win it.
Coal is the nation's need
Every hour and minute,
Coal for the ships that steam
On their daring missions,
Coal to keep up the stream
Of the war's munitions.

Let us not fret or muse
On the wealth bereft us;
For, if this war we lose,
There will naught be left us;
So let us do our share
Of the work that's given—
Fighting for all things fair
In the world we live in.



"Consecrate all we have."



"This is the war with greed."


ONE
TWO
THREE
NOW, ALL TOGETHER!
THIRD
LIBERTY
LOAN

How Some Companies Pushed the Sale of Liberty Bonds

AS WE go about our daily tasks in peace and safety men are dying every minute on the battlefields of Europe to save civilization. Our own gallant soldiers are shedding their blood in France and our sailors engulfed in the waters of the Atlantic as they go in defense of America's rights and honor.

Upon our performance of the work committed to us depend the lives of thousands of men and women, the fate of many nations, the preservation of civilization and humanity itself; and the more efficient and prompt we people of America are in doing our part, the more quickly will this war come to an end and the greater the number of our soldiers and sailors who will be saved from death and suffering and the greater number of the people of other nations released from bondage and saved from death.

To work, to save, to economize, to give financial support to the Government is a duty of the Nation and to the world and it is especially a duty to our fighting men who on land and sea are offering their lives for their country and their countrymen to further this duty. We reproduce below extracts from letters received from a number of concerns in answer to the question of what plans were followed in the drive on the Second Liberty Loan. The workingmen of America have a tremendous interest to serve, a vital cause to defend, a work of surpassing importance to accomplish. What is vital to them is vital to America and to the world. How they will see their duty and how the great mass of them will perform it depends in large measure on what you—the employer—does to drive home the fact that this Third Liberty Loan must be oversubscribed.

Found Personal Solicitation Necessary

Personal solicitation by each foreman in his own department followed and our experience is that it is the one great factor which sells Bonds. We have found that no matter how much advertising we do, the personal solicitation is necessary.

Daily Charts Showed How Different Departments Were Responding—Thus Arousing Competition

The loan was brought to the attention of the employees by a poster on the bulletin boards and principally by personal solicitation. The signatures were secured on application blanks printed by our company and each man was solicited by a member of the general committee. The biggest advertising that the Loan got was through daily charts posted up showing the various standings of the different plants. The subscriptions were taken in person.

This Firm Promised To Redeem Bonds at Par Any Time Employees Desired

Each employee was solicited personally, and where we could secure subscriptions, we arranged that they could pay cash, which some of them did, and we arranged a great many of them for weekly payments. We helped the matter along as far as we possibly could by agreeing to take the loans off their hands at any time they were dissatisfied and to return their money to them at par. . . . Practically all of our men receiving good wages, they each subscribed for one or more of the bonds.

Permitted Employees To Pay Weekly

We assembled the employees of the company in one large room and had our Works Manager give them a short talk explaining in a few words what should be done. After that the members of the Loan Committee made their address and immediately started to take subscriptions themselves. These subscriptions were later turned over to us and we purchased the bonds outright in the company's name allowing the employees to pay for them weekly on the basis of $1 for each $50 of the loan subscribed.

Posters and Shop Talks Brought Response from 60 Per Cent. of Force

Large posters were distributed in all parts of the shop and short talks were given to the men at various times by Liberty Loan Committee of this city. The foremen were interviewed personally by the writer, and urged to talk to the men to buy bonds with result that about 60 per cent. of our force made subscriptions.

Eighty Per Cent. of This Firm's Employees Were Germans—the Way They Subscribed Was a Surprise to All

The writer personally used every influence with the men to get them to subscribe. We had a rather peculiar situation here as probably 80 per cent. of our men are Germans, or of German descent. We were very agreeably surprised at the results. Some of our men bought bonds outright and also subscribed on the installment plan. Most of the men subscribed at the rate of one or two dollars a week.

Called Each Employee Into Office and Spoke the Matter Over

We called each employee into the office, talked the matter over with him, advised the savings features connected with the same as well as the patriotic side of the loan and we agreed to buy the bonds for them, taking from their weekly wages what they felt they could afford to pay. We to carry the bonds for them until payment is made complete, when the bond would be turned over. We also gave them to understand that if anything happened to them whereby they could not meet their payments we would gladly take the bonds off their hands.

Push the sale of LIBERTY BONDS. *If this issue is not oversubscribed, this country would deserve to get everything the Kaiser chose to hand it. Back our boys' bayonets with bonds.*

This Plan Brought 300 Per Cent. More Suscriptions Than Were Received for the First Loan

About one week previous to the day on which the Liberty Loan salesmen from the Local Board of Commerce were to go through our plant, we distributed folders which we ourselves prepared, explaining in detail just what the bonds were for, their various denominations, the reason why all should buy, and in fact gave a full explanation of such a nature that the man in the shop would understand all about the Loan, and this in a way prepared his mind before the day of the drive arrived. We, of course, had the plant placarded with attractive posters and the whole atmosphere throughout our organization before the week mentioned, was thoroughly Liberty Loan. On the day appointed, we had a great meeting which every employee attended. We had a number of speakers, provided by the Board of Commerce, some speaking in English and others in Polish. Immediately after the general meeting, which was at noon, we had a meeting of all of the foremen and department heads and went over the proposition with them. We then had the Liberty Bond salesmen go through the various departments with the foremen of those departments and secure the applications. The result was that we secured 300 per cent. more subscriptions than for the first loan, which, while handled systematically, was not taken care of as thoroughly as the second one.



Asks Sixty-Day Extension on Contracts for Railroad Fuel

As the railroad fuel situation has not been threshed out as yet, railroad officials are asking coal operators to extend existing contracts for a temporary period not to exceed 60 days. A. H. Smith, the regional director of railroads in the East, has sent the following letter to the president of each railroad under his jurisdiction: "The matter of renewal of railroad fuel contracts is now under consideration. Pending determination in regard thereto, you are authorized to arrange with mines at present supplying your company with fuel coal to continue supply on basis of existing contracts expiring Apr. 1, for temporary period not to exceed 60 days. If this cannot be done, please advise, with your recommendation as to meeting temporary needs."

Weekly Production Statistics

Coal specialists in Washington are at a loss to explain a decrease of more than half a million tons in the coal production during the week ended Mar. 16. Production for that week is estimated by the Geological Survey at 10,686 tons. Beehive coke production increased. The week's output was 644,000 tons. A slight increase also was registered at the byproduct ovens. The amount of coke produced there was 461,846 tons. Anthracite shipments continue to increase. The week's record was 42,265 cars.

Senator Jones Answers Critics of Fuel Administration

In answer to Senator Lodge's recent arraignment of the Fuel Administration, Senator Jones, of New Mexico, reviewed the coal situation which existed when Dr. H. A. Garfield was appointed to the position of Fuel Administrator, in a speech delivered in the United States Senate.

Indicating that Dr. Garfield was an experienced business man, and that he possessed an intimate knowledge of the coal-mining industry through connection with a large corporation which developed a number of coal mines in the Piney Fork district of Ohio, the Senator went on to show that the order closing down industry was not the "reckless" ruling some consider it.

"What was it worth to bring to full capacity the manufacture of steel plates, projectile steel and war munitions?" asked Senator Jones. "What was it worth to bring to the shipyards ample supplies for the building of ships? What was it worth to increase the output of clothing for the armies in France and the armies assembled in the cantonments? What was it worth to say to the soldiers in France the first consideration at home is their welfare and their support? What was it worth to the mothers of our country to say to them that their boys, who are making the supreme sacrifice, shall be sustained? What was it worth to bring to the business interests of this country a keen realization of the actualities of war? What was it worth to say to France, Italy, Serbia, Belgium and England that their sacrifices for the preservation of world civilization shall not be in vain? What was it worth to say to them that when we pledged the whole of our resources to the conduct of the war that we meant what we said? What was it worth to say to Imperial Germany that the whole of America is willing to stand at attention, cease ordinary industry, and in patriotic fervor watch the increasing glow of furnaces, listen to the ceaseless movement of trains, watch the departure of ships, all for the purpose of sustaining this war and convincing the imperialistic autocracy that civilization shall not be crushed and that democracy shall endure? A balance sheet showing only debits and credits in dollars is incomplete. There are some things which cannot be valued in dollars."

May Insert Clause To Cancel Existing Contracts If Price Is Changed

A ruling of the United States Fuel Administration relative to the interpretation of certain provisions of Publication No. 16, entitled "Order of the United States Fuel Administrator Regulating the Making of Contracts by Operators, Producers and Jobbers of Coal and Coke," makes it possible for either party to a contract to provide for its cancellation in the event that prices are raised or lowered. The ruling is as follows:

Paragraphs 2 and 3 of the "Order of the United States Fuel Administrator regulating the making of contracts by operators, producers and jobbers of coal and coke," dated Dec. 24, 1917, and effective Dec. 29, 1917, do not restrict or otherwise affect the right of the parties to any contract of the kind mentioned in either of said paragraphs to include in such contract a provision reserving to the operator or producer the power to terminate the same in the event of a reduction in the Government price after the execution of the contract, or such a provision reserving to the consumer or purchaser named in such contract a power to terminate the same in the event of an increase in the Government price after the execution of the same.

New Coal Prices Announced

New coal prices, effective Mar. 23, were announced by the Fuel Administration last week as follows:

Ohio and West Virginia—No. 8, or Pittsburgh seam, including Hancock, Brook, Ohio, and Marshall Counties, West Virginia, and Jefferson, Harrison, Belmont, Carroll and Monroe Counties, Ohio: Run-of-mine, $2; prepared sizes, $2.25; slack or screenings, $1.75.

Pennsylvania—Pittsburgh field, including the Counties of Washington, Green, Fayette, Westmoreland and Allegheny, except (1) that portion of Allegheny County from the lower end of Tarentum Borough north of the county line; (2) the territory in Westmoreland County from a point opposite the lower end of Tarentum Borough north along the Allegheny River to the Kiskiminitas River and along that river eastward to the Conemaugh River to the county line of Cambrai County; (3) operations on Indian Creek in Westmoreland County; (4) operations in the Ohiopyle district of Fayette County: Run-of-mine, $2; prepared sizes, $2.25; slack or screenings, $1.75.

Illinois—District No. 1—Including Mercer, Bureau, Kankakee, Lasalle, Grundy, Will, Putnam, Marshall, Livingston, Woodford and McLean Counties: Run-of-mine, $2.65; prepared sizes, $2.90; slack or screenings, $2.40.

District No. 2—Including Rock Island, Henry, Warren, Knox, Stark, Peoria, Hancock, McDonough, Henderson, Fulton, Tazewell and Schuyler: Run-of-mine, $2.40; prepared sizes, $2.60; slack or screenings, $2.10.

District No. 3—Including Menard, Logan, Dewitt, Champagne, Vermillion, Sangamon, Macon, Pratt, Christian, Moultrie, Shelby, Green, Macoupin and Montgomery Counties, and Madison County north of the latitude of Alton, also all mines included in other rulings: Run-of-mine, $2; prepared sizes, $2.20; slack or screenings, $1.70.

District No. 4—Including Bond, St. Clair, Monroe and Randolph Counties, and Madison County south of the latitude of Alton and Clinton, Washington and Perry Counties, not including mines along the line of the Illinois Central between Vandalia and Carbondale: Run-of-mine, $2; prepared sizes, $2.20; slack or screenings, $1.70.

District No. 5—Including Jackson County, not including mines on the Illinois Central between Carbondale and Duquoin: Run-of-mine, $2.40; prepared sizes, $2.60; slack or screenings, $2.10.

District No. 6—Including Marion, Jefferson, Franklin, Williamson, Johnson, Hamilton, Saline, White, Gallatin and mines along the main line of the Illinois Central between Vandalia and Carbondale in Clinton, Washington, Perry and Jackson Counties: Run-of-mine, $2; prepared sizes, $2.20; slack or screenings, $1.70.

Virginia and West Virginia—Pocahontas District—Operations on the Norfolk and branches west of Graham, Va., to Welch, including Newhall, Berwind Crane Brake, Hartwell and Beechwood branches, also operations on the Virginian R.R. and branches west of Rock to Herndon: Run-of-mine, $2; prepared sizes, $2.25; slack or screenings, $1.75.

You buy LIBERTY BONDS *because they help to arm, outfit and feed the soldiers and sailors who are fighting Democracy's battle under your flag.*

District Representative Appointed for Illinois and Indiana

F. C. Honnold, secretary of the Franklin County Coal Operators' Association, has been named district representative of the Fuel Administration for Illinois and Indiana. His headquarters will be in Chicago. C. G Hall, of Terre Haute, will be deputy district representative from Indiana. In Illinois, the following assistant representatives have been appointed: O. G. Scott, Springfield; P. H. Greenlaw, St. Louis; J. A. Fenelon, Galesburg; T. R. Carty, J. L. Keirlin and Charles O. Ostrom, Chicago. In Indiana assistant district representatives were named as follows: Jonas Waffles, Terre Haute; C. G. Fletcher, Indianapolis; H. W. Little, Evansville, and Eugene Wardlaw, Brazil.

Arthur Fancher, of Bay City, has been appointed district representative from Michigan.

"When innocent blood from the four corners of the world cries out for justice," what will your answer be? Speak through the THIRD LIBERTY LOAN.

Reduction in Hard Coal Shipments to West and Northwest

A reduction in anthracite shipments to the West and Northwest has been announced by the Fuel Administration in connection with an order placing the supervision of anthracite distribution in the hands of J. B. Dickson, S. B. Warriner and W. J. Richards. They will act as district representatives in Pennsylvania under the general direction of J. D. A. Morrow. The coal year beginning Apr. 1, 1916, will be used as the basis for distributing after Apr. 1.

Do It Now!

THERE'S not much time left before April 13—the date on which the Annual Success Number of Coal Age makes its appearance. We have already received a number of splendid articles for this issue, which promises to be much superior to any Success Number we have published in the past. If you are working on a success story, or are still thinking of writing one, don't delay. Get to it immediately and mail it this week, with the necessary photographs or diagrams.

Brief Washington Notes

Jobbers who have made application for licenses prior to Apr. 1, but who have not received their licenses on that date, will be allowed to continue business as usual.

A survey of the production and consumption of all paper and pulp products is being made by the Federal Trade Commission at the request of the Fuel Administration. Pending the outcome of this investigation, the restriction in the use of fuel by the manufacturers of box board has been suspended.

In order to relieve operators from unnecessary work in their accounting departments, the Federal Trade Commission has decided that hereafter those petitioning a revision of mining prices may furnish sworn cost sheets showing combined operating results from Apr. 1 to Aug. 1, 1917, and month by month from Aug. 1 to date of application.

Canada will continue to be granted the same treatment in coal matters as is accorded a state of the United States. Permits are being issued to a large number of operators allowing exports to the Dominion. The matter is being handled in a way which will prevent any abnormal flow of coal into Canada.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The "Every man for himself" movement that has ruined Russia is lifting its evil head in America. It desires now to break up the United Mine Workers of America. Some of the union men are already preaching "self determination." They do not like higher dues; they do not approve of affiliation with the bituminous mine workers; they want to determine for themselves what their action shall be. They are disruptionists in every union, the union with the small "u"—the United Mine Workers of America—and the union with the big "U"—the United States of America.

Now it is local 1594 at Tresckow that has decided on self-determination. This little body of men in the Hazleton region of Pennsylvania has voted to each individual in the union the funds that are in the local treasury, and the union is disbanded. The union men have been instructed that they must restore those funds as the personal use of local funds is unconstitutional.

THIRTY-SEVEN LOCALS REPUDIATE THE UNION

At least 37 local unions in the anthracite region have voted against the payment of the 50 per cent. increase in monthly dues. In consequence the leaders of the movement against the increase have determined to send out circular letters into districts Nos. 1 and 7 to ascertain the sentiment in favor of a separate organization of anthracite mine workers.

What makes the difficulty more delicate to cope with is the fact that the mine workers are bitterly opposed to the 86 international organizers who have been brought in to preserve the union. The miners resent this incursion of "white-collared" men drawing $6 to $7 a day and expenses.

While the men in the anthracite region are trying to throw off their allegiance to the union because the union is too large and membership in it involves helping in some movements in which the mine workers of the anthracite region are only indirectly interested, the mine workers in the Sydney field of Nova Scotia are preparing to enter the union to secure protection against the introduction of Chinese labor.

AMALGAMATED MINE WORKERS SEEK ADMISSION

The mine workers of Nova Scotia were unionized in a local organization known as the Amalgamated Mine Workers of Nova Scotia, formerly known as the Provincial Workman's Association. There are about 10,000 men in the Nova Scotia mines, and it is said that in some of the largest locals the vote for amalgamation with the larger organization reached 100 per cent. and where the opposition was strongest 94 per cent. voted for union. The vote as a whole is said to have stood at 98 per cent. for affiliation with the United Mine Workers of America.

Several years ago some Nova Scotia mine workers broke away from the Provincial Workman's Association and joined the United Mine Workers. A bitter strike, which then took place, was not participated in by the P. W. A's. The U. M. W. of A. spent about a million dollars trying to win the strike, but, not being in control of all the mine workers, that organization failed in its effort and so lost its whole standing in eastern Canada.

National feeling had something to do with the matter, but that feeling has largely died since the United States entered the war. When Neil J. Ferry of Hazleton, Penn., and Andrew Steele, of Novinger, Mo., both of the International Executive Board, advocated union they found the Nova Scotians ready to accept it, and it is likely that the Inverness and Pictou fields, also in Nova Scotia, will add their mine workers to the others, in which event the United Mine Workers will receive into union some 4,000 more men. The mine workers had reason to believe that Chinese would be brought in, announcements by both Fuel Controller Magrath and Mark Workman, president of the Dominion Iron and Steel Co., of which the Dominion Coal Co. is a branch, having been in advocacy of this unpopular course.

And now as to strikes; when will we be through with the record of them? In the anthracite region the Reliance mine of the Philadelphia & Reading Coal and Iron Co. which struck on Mar. 8, because the company refused to put on an extra fireman per shift, and later returned to work, struck again on Mar. 18.

STRIKE AGAINST FUEL ADMINISTRATION ORDER

On Monday, Mar. 18, there were several strikes in the Kanawha district of West Virginia against an order of the Fuel Administration dated Feb. 19. This order required some of the mines in the district to begin work at 1:30 in the afternoon pending repairs to the plant of the Virginian Power Co.

The mine workers in 11 mines on Cabin Creek were the first to refuse to go to work. The men demanded that the whistle blow at 7 a.m. The next day the mine workers employed in the plant of the Kanawha & Hocking Coal and Coke Co. refused to go to work for the same reason. On Wednesday five mines of the Kelly's Creek Colliery Co. followed suit. The Federal Fuel Administrator was promptly apprised of the situation and sent a special investigator into the field. The strike ended on Friday, Mar. 22.

In Illinois, 200 miners have struck against the United States railroad administration. The miners were employed by the United States Fuel Co., at Bunsenville, Ill., to the southwest of Danville. A change in the time table of the only railroad running through the mining village closed out the miners' way of reaching the mine and in consequence they went on strike. There are plenty of houses at Bunsenville but the mine workers prefer to live in Danville and to go to and from their work on the railroad.

DR. GARFIELD PROVES HIS POINT ABUNDANTLY

The situation in central Pennsylvania is interesting and perplexing. The Fuel Administration after careful investigation concluded that the price of coal should be raised 60c. a ton so as to make it possible for all the operable mines to continue their production. The mine workers without any investigation came to the conclusion that they were entitled to that increase and demanded it. Fortunately the district officials, who form the policy committee, have been willing to submit the matter to the Fuel Administrator before a vote in conference is taken as to the advisability of a strike. An agreement will in all probability be reached.

Central Pennsylvania is most important in itself, but the matter is broader by far than central Pennsylvania. Dr. Garfield had to decide on prices for coal immediately after his appointment, and he did so without any really adequate investigation. No one, certainly not Dr. Garfield himself, would deny that the prices as set were not based on the ascertained costs of production. They were in some cases set quite low. The result was not disastrous, because all the companies were selling most of their coal on long-term contracts. With these Dr. Garfield did not interfere.

Since that time Dr. Garfield has been getting real costs of production. In some cases he has found that injustices have been done or rather would have been done had Government prices alone been procurable. He is rectifying prices where these injustices occur, but certain mine

workers do not recognize the justification for these corrections. They say a patriotic man would stand for a slight loss, but where are the miners who are willing to dig coal and pay for the privilege of digging it?

On Mar. 10 the British Government announced that on Mar. 21 it would proceed to the enlistment of 50,000 miners. The miners actually thought that it should not be done. They thought that the miners who have given less than their proportion should be exempted, not because miners were more needed than soldiers, but because the miners declared themselves self determining and so free from conscription. Lloyd George, the Premier, put the matter in his happy way on Mar. 22:

"I am utterly at a loss to know where the men are to be found if first the engineers and then the miners say we will not find the men. Other trades will quickly take the same course. That would mean anarchy, not government.

"I have just had news that the Germans have attacked us on a front of nearly sixty miles with overwhelming forces. I am amazed that it should be considered debatable whether the miners and engineers are going to make their contribution to the defense of the country.

"If the sanction of the community is going to decide whether a law should be obeyed, then, believe me, you will have a condition of things where the people who will suffer most will not be the people at the top, who are generally able to take care of themselves, but the poor devils at the bottom. It has always been so in the history of the world.

"It is better to talk plainly, and I am speaking with a great deal of feeling because I have just heard of this overwhelming attack brought about by the failure of the Russian democracy to have its orders obeyed. If the attack succeeds, the Germans might be at Calais, and the only answer we can give is a vote of the Miners' Confederation saying that they are not prepared to fight. You cannot give that answer."

The outcome, as might have been expected, was that the executive board of the federation adopted a resolution advising the men not to resist the combing-out process.

Our boys in France are as anxious as the Germans to to know whether you have bought your THIRD LIBERTY LOAN. *Which will you disappoint?*

Central Pennsylvanians To Be Patriots

Let no one believe that the central Pennsylvanians are going on strike for more wages just when the nation needs all the coal it can get and the administration is regulating the price at which coal shall be sold. The Pennsylvania mine workers are inquiring as to the right course to follow and are getting duly informed, and so long as they do that they are not likely to go far wrong.

Before they called a convention of delegates to find whether a strike should be called as a protest against the operators' refusal to pay more wages, the policy committee held a meeting at Clearfield, Penn., and there decided to have a conference with the Federal Fuel Administration. The subcommittee chosen for that conference consisted of President John Brophy, Vice President Charles O'Neill, Secretary-treasurer Richard Gilbert, Frank Waite and Edward Swartzenstruver. To these the National Board Member William Donaldson was added.

The subcommittee met Dr. Garfield on Tuesday, Mar. 26, and he made a convincing argument for peace and order. He said that there must be no strikes anywhere and that the terms of the Washington Agreement must everywhere be complied with. All adjustments of price, upward and downward, were based on the wage under the Washington Agreement. If the increases in central Pennsylvania were a cause for increased wages, then the decreases in Colorado might equally be shown a reason for decreased wages. The Fuel Administrator demonstrated by charts and figures that the price now provided allows only a fair profit.

A LIBERTY BOND *gives you a look into the future, but defeat in the war will keep you tied to an unfortunate past.*

Labor Quits Mines Believed Unsafe

Unsafe mines are becoming a factor in the labor situation in Illinois. It is said that the high pressure under which the mines have been operated during the past winter has led to laxness in the matter of safety precautions, and as a result there have been several explosions, in which a number of lives have been lost. Reports that certain mines are unsafe have made the miners uneasy and there is a good deal of talk about quitting the mines for the farms.

The state employment agency at Springfield has received a number of communications from miners inquiring about farm work. It has been found that these come from employees of mines about the safety of which there is some doubt. How much of truth and how much of false rumor there is in the reports of the condition of the mines is not known. The reports are substantiated in a measure by the fact that there have been a number of disasters. Advantage may have been taken of this fact to spread unfounded reports. It is probable that the situation will lead to a more rigid inspection and that steps will be taken to compel operators to make their mines safe wherever their safety is questioned. Complaints were filed a few days ago against a mine at Virden, and it was ordered closed until certain safety precautions had been taken.

It is better to wear a LIBERTY BOND *button on your coat than the print of the Kaiser's heel on your neck.*

Miners' Attitude to Legislative Problems

The coal miners of Illinois were urged by State President Frank Farrington, in his biennial report, to lay aside commonplace aims and give the fullest measure of service in the war to crush autocracy. "Our immediate and fundamental problem," he says, "is to win the war. Commonplaces must be laid aside for the time and we must so design our action as to enable us to give the fullest measure of service and devotion to this all-absorbing issue. When the war is over we shall take up the commonplace, strengthened and helped by our devotion to duty, and fight on and on to the end that industrial justice shall prevail."

The report shows that during the year ending June 30, 1917, 207 men, or one out of every 391 men employed, were killed. This was one death for every 381,563 tons of coal mined. The number injured was 1634, or one for every 50 in the state. Each miner hurt represented 48,338 tons.

The legislation to be sought in 1919 is outlined as follows:

1. Further improvements in the workmen's compensation act, and especially one providing a penalty for employers who delay the payment of compensation claims.

2. The elision from the act of the waiting period of one week in compensation cases where the disability extends over a period of weeks.

3. Providing some form of guarantee behind the compensation awards so that when they are made one may be assured of their payment.

4. An old-age pension law.

5. Improvements in the mining laws, looking particularly to the prevention of gas and dust explosions in the mines.

The campaign for the THIRD LIBERTY LOAN *is a spring drive in which every American is summoned over the top. And let us all be shock troops. If we purpose to make the attack we must be prepared to make the sacrifices.*

Missouri's Midsummer Idleness Starts

The Missouri Coal War Board, consisting of members of the United Mine Workers of America and representatives of the Southwestern State Coal Operators Association, District 25, met in Kansas City Mar. 18 and issued a statement as to the reasons for the suspension of work in several Missouri mines. This coal war board is an excursion in coöperation into which the operators and miners in Missouri have entered. It has received and considered the important complaints of the miners and solved many of them and it has done so without resort to the usual courses of arbitration and strikes.

When, several weeks ago, warm weather came and the demand from the railroads slackened, domestic consumers ceased to buy for their winter needs and did not purchase fuel for fall and next winter because of the hint that the fuel administration might set lower prices. The miners in the field soon noted that operations in the mines were slowing down. The miners who were laid off did not understand why this should take place, and miners in other sections were wondering whether their mine would not be next. Newspaper publicity on coal mining has given the impression to everybody that the mines must be kept working all the time to supply the fuel necessary, and to prepare for the 62,000,000 excess tons that must be mined in 1918.

Many miners seem to have an impression that the coal operators have something up their sleeves. In Missouri the miners did as they have been doing all winter, they took these doubts and suspicions to their local efficiency committee which immediately took them up with the Missouri Coal War Board. The statement of the Coal War Board is being transmitted to the coal operators and to the miners and is having the effect of reconciling the miners to the situation.

The miners and operators have paid the local efficiency committees for the time spent in committee meetings; this expense is temporarily suspended until July 1, 1918, in order to relieve the burden on the local unions where work has been discontinued temporarily.

Missouri has about 8000 miners; perhaps 15 or 20 per cent. of these are in comparatively small mines which ordinarily work only in the winter and which will have difficulty reassembling their forces if the mines are not operated this spring and summer. The miners' officials are doing their best to hold the miners together in the hope that arrangements can be made for the moving of the coal from the mines and its disposition so that the shafts can be kept in operation continuously this summer.

Every LIBERTY BOND *you buy is safe financial investment in the future happiness and self-respect of your children. Buy as many as you can and let them inherit as good a country as you did.*

Pay By the Ton or the Carload

The mine workers in West Virginia are still agitating in favor of payment by weight and not by measure. A large number of men are now paid by weight and that method of appraisement is certainly preferable, especially as it is the normal manner of payment in most states of the union, though there are exceptions in many of the states.

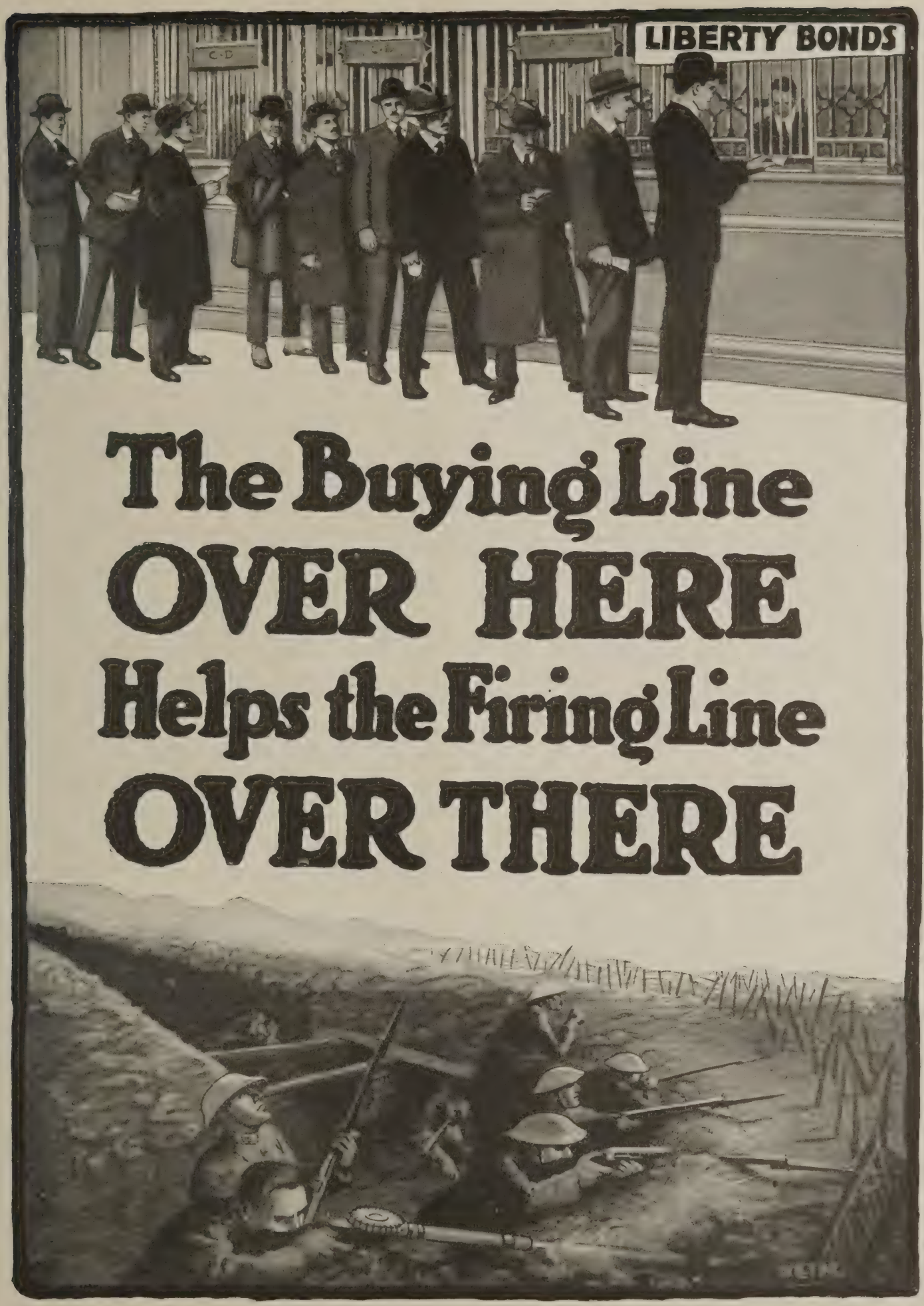
The convention of state sealers of weights and measures in West Virginia has advised that scales shall be installed on a solid foundation, of concrete where practicable and possible; that the foundation should be separate from the tipple; that all weighing shall be done within 200 ft. from the drift mouth of the mine and 2000 lb. shall constitute a standard or legal ton; that six additional state inspectors of weights and measures shall be provided to inspect mine scales; that justices of the peace shall have jurisdiction in trials for violations of weights and measures laws; that county sealers in counties of the first class shall be paid a minimum salary of $150 a month and legitimate expenses; that counties of the second class the salary shall be $100 a month and legitimate expenses; that the appointment shall be made compulsory on the counties and that the appointees shall be placed under the civil-service rules.

Lawrence Dwyer, international board member of District 29, says that the operators of the Winding Gulf region last November gave the miner an 8c. advance per car of three tons, whereas the requirement of the Washington agreement was for 10c. per ton, or 30c. per car. He also adds that the operators are getting a 45c. increase per ton as compensation for the 8c. advance to the miner and the increases granted to the other mine workers at the same time. In this biassed statement Dwyer overlooks entirely the large and more important increases given to the day men.

Of course, the provision for weighing coal close to the mine mouth while it has its points of reason is objectionable unless it can be done mechanically. There are frequently several drift mouths to a mine, each producing a little coal. It would be inadvisable to require a man at each drift mouth to weigh the coal. We may be sure the miners would not want to pay for that number of check weighmen. The operators look to the weighman to be boss at the tipple and frequently to do the docking also. How can he dock the miner for dirty coal if inspection is denied him? So to the many new weigh bosses and checkweighmen necessary a dock boss would have to be added, and all this to protect the miners against the loss which occurs between mine mouth and tipple. This is unfortunately often considerable, and it does seem that at mines with steep planes the miner is entitled to have the weight taken at the top of the plane before the company spills his coal. But in most cases the uncertain loss from the bumping of cars in a trip would not pay the many check weighmen for which the state scales are indirectly asking.



When you buy a LIBERTY BOND *you do two good turns—one to yourself and one to your country.* LIBERTY BONDS *are the best investment and they help have lives.*


LIBERTY BONDS
The Buying Line
OVER HERE
Helps the Firing Line
OVER THERE

EDITORIALS

Do We Really Want To Win the War?

IF WE really want to win the war we shall have to go a somewhat different way about it than we have gone hitherto. When a man decides to open a mine or build a house he does without this and that and scrapes the money together to get it. But now that we go to war, we do not show any such devotion. We hope to do just what we have always done, buy just as much as ever and purchase Liberty Bonds on the side, if there is anything left with which to do it.

This war is our leading interest and comes first. We cannot buy ships, munitions, an army, a navy, aëroplanes, railroad equipment and guns if we are investing as much as ever on ourselves. Something must be given up. The war cannot be won by the money we borrow to lend to the Government. It cannot be won by selling stocks and bonds and so obtaining money to lend to Uncle Sam. It cannot be waged by foreclosing mortgages and handing over such ill-gotten money to the nation, nor can we win it by uncovering hoarded money.

It is necessary that we should provide the money by present-day saving. He who does without and pays the money to the Government: (1) Releases labor for the Government service (2) releases material for the Government use and (3) gives the Government money to buy the released labor and material. If you go on buying just as ever, the Government must compete with you for labor, it must bid against you for material, and it must try to do it with the paltry sums of money you will be able to provide.

Spend meagerly and Uncle Sam can spend generously. Save manfully and the Government will be sustained by your savings. A billion dollars means $10 per person; about $50 per family. We must average a Liberty Bond per family for every billion dollars the Government demands. Three billion dollars will mean $150 per family and five billion dollars $250, or five Liberty Bonds.

Unfortunately we do not understand this. We formerly were in the habit of regarding billions as immeasurable quantities of money, but now we go to the other extreme and fail to realize how much privation they will mean to us who try to provide them. We put a button on our lapel—that is good for one billion dollars. We need one on every member in the family if we are going to do a full part to the purchase of a Liberty Loan issue.

Let us look at it another way. The gross income of the United States is only about forty billion dollars. A loan of a billion dollars represents 2½ per cent. on one's yearly income; a loan of three billion dollars is 7½ per cent. Just visualize it. It cannot be raised with housekeeping as usual, luxury as usual, comfort as usual, hours of labor as usual. It can be made only by a new life and a new purpose—a life and a purpose that might not be feasible, needful or perhaps even desirable for ever, but a purpose feasible, needful and desirable so long as the war lasts.

This is the meaning of the war to us. If we really want to win it, we must really want to provide the sinews of war. The country has fewer to do that work than it had before it sent the boys away with its blessing. We shall have to work hard and keep steadily before us what the war demands mean. It is our duty also as citizens to let other people know what it means. It is obligatory on us to preach and teach it everywhere to the end that the Third Liberty Loan will be oversubscribed like the two that have preceded it.

American citizens should buy LIBERTY BONDS, *because they are for the purpose of maintaining the principles of the Declaration of Independence and the Constitution of the United States.*

Miners Active "Over There"

FEW people know the important rôle being played by miners on the Western front. When the front-line trenches settle into the customary deadlock that has prevailed in France and Belgium for more than three years, mining operations are aggressively started by both sides, and the one that gets started first has the advantage and usually comes off victorious.

While it would not be politic to give current figures on this subject, some idea of the magnitude of the operations can be judged by the fact that 1 per cent. of the entire British forces were engaged solely in mining work some time ago. Assuming that the British Army totaled 5,000,000 men, this would mean that we would have to strip the State of Ohio clean of all the men engaged in the mining industry to equal this number.

In the real pioneer work in the front-line trenches the miner is substantially the most important personage there is in the engineer corps. It is no secret that 75 per cent. of the engineers' work at the fighting front is mining. This does not mean three-fourths of all the engineers in service, but only of the pioneer troops in the trenches.

In this class of work the miner is at home. The oppressive darkness of the underground galleries holds no terrors for him. He will recognize the mine-rescue station along the Western front and all the other appurtenances that have become a part of this highly developed phase of the Great War.

Mining organizations are being formed to meet the growing demand "over there," and will be one of the branches for which the First Replacement Regiment of Engineers at Washington Barracks, D. C., will receive recruits. This regiment has been organized for the express purpose of keeping all the different branches of the engineers abroad up to their full authorized strength. Applications for enlistment in this regiment should be addressed to the Commanding Officer, First Replacement Regiment Engineers, Washington Barracks, D. C.

Need for Providing Steady Work

THE working man must feed and clothe himself whether he works or not. Somehow he must spread his wage so that his annual needs are taken care of. It is therefore essential that he should work almost every day. Lack of cars, strikes, lack of orders, sickness, breakdowns and shutdowns need to be eliminated. No changes are more desirable than those which stabilize industry.

The report for the year 1916 just received from the United States Geological Survey shows that Oklahoma mines worked only 178 days in the year and Arkansas 184 days. This fact is an indictment on our methods of doing business. For some reason there is no adequate flywheel to keep business working regularly.

What we need is a greater differential between winter and summer prices, and it would appear that all the elements in coal service should be regulated so as to spread the production, transportation and delivery of coal more evenly over the whole year.

There was a time when the miner was willing to receive a lower rate of pay in summer than in winter. He might be willing to do that again. We do not advocate any real lowering of pay, but when a new scale is arranged why not put the bulk of the burden or all the burden on the winter months?

The railroads find the winter a trying time for railroading. The removal of snow is, of course, a heavy burden, but that has to be met in any event so there is not, for that reason, any purpose in reducing the amount of winter traffic. In fact the more traffic the better the managers, if not the investing public, are pleased, for where there is much traffic there is more tonnage over which to distribute the charge for snow removed. Still as stated the winter's snow has to be removed in any event whether the removal is paid out of summer or winter earnings.

But the railroads find that it is harder to haul trains in cold weather. The rails are slippery, the winds are high, the lubricant in the axle boxes is sluggish and the train crews are less efficient. The New York, New Haven & Hartford R.R. Co., using electric locomotives, estimates this loss in hauling ability per locomotive at 0.65 per cent. per degree below 55 degrees Fahrenheit.

The railroads have a direct interest in having the work of transporting coal either evenly spread or at a maximum in the summer months. They certainly cannot gain anything from the excessive activity of the winter season with its overcrowded switches, its delays and its embargoes. They could therefore well afford to ask that the bulk of the increases in the rates charged for transportation should be put on the winter business. We do not suggest lowered rates at any time, only an increase in rates confined to the winter schedule.

The operator has likewise an interest in summer operation from the fact that 100 per cent. business is better than 75 per cent. Not only does steady work give more satisfied men, it saves stand-by losses, all the losses of overhead; it cuts down pumping charges per ton of product. But it is unnecessary to argue the differential with the operator. He is the only wise man on the chain of coal handlers. He is always ready, if not willing, to forego his summer profits for the purpose of stimulating business in that season.

The jobber and retailer have a far greater interest in a brisk movement of coal in the summer. It is then that haulage in motor trucks and wagons is easy. It is then that the coal does not freeze. The barges are not interfered with in the summer. The summer work is the most satisfactory that is done. Moreover it is work that is not hurried and can be done therefore in the most efficient manner.

Everyone is interested in getting what the differential will provide, but only the operator is willing to provide it. Why, no one can tell. This is certain, however, that no one will provide storage unless he is reasonably certain it will pay him. The miner has an idea that the consumer ought to store coal, but when did any miner do anything for which he was not paid? Let us endeavor to get away from the idea that the consumer of coal will do in the name of patriotism and coöperation what the miner has never been willing to do.

No miner will work for wages to be delivered to him six months hence. Not one of them is willing to buy coal in the summer for the winter's use unless there is a differential. Why should the consumer pay for his coal in the summer and wait six months for the benefit unless there is a profit in his long wait? No miner would dig a cellar for another man to use. Why should a consumer dig one in which to store the miner's coal so that the miner will be able to work in the summer? The differential is the only cure for the present condition of unsteady work. The consumer should be willing to pay it in the winter, and miner, operator, railroad, jobber and dealer should be ready to accept it in the summer months.

Time enough to beat the sword into ploughshares after the Kaiser is beaten into submission. The THIRD LIBERTY LOAN *is an effective weapon against him.*

Improve Our Transportation Facilities

IT has become perfectly evident to all observers that the capacity of the nation for production of war material is enormously greater than its capacity for shipping it to Europe, and that we must at once not only balance this production, but slow it down in order to prevent such a choking of our Eastern ports as may produce an impossible condition. The answer comes that if we are making too much war material we had better turn some of our activities into the manufacture of articles of peace. Immediately we run into the financial situation, which at present seems to seriously hamper new undertakings.

It would seem that the claim of the railroads that they need $1,000,000,000 worth of improvements should at this juncture be considered. Here is one organization now devoted exclusively to the service of the community, which, being under the control of the Federal Government, can be financed directly by that Government, and there would seem no reason why the production programs of war material should not be limited, and a certain amount of the energy now being expended in that direction turned at once toward the improvement of our transportation facilities.

DISCUSSION BY READERS

Composition of Natural Gas

Letter No. 1—A short time ago there appeared in *Coal Age* an interesting bit of correspondence with regard to the composition of natural gas and it inclined me to think that the following reference to an unusual gas analysis would be of interest. The full text of the report on this gas is to be found in the 1918 Year-Book and Souvenir Program of the Spokane Mining Convention, on page 87, under the title:

EXPLORING FOR WASHINGTON OIL

"National gas and oil fields have not been developed to any extent in the Pacific Northwest, but there are indications of both oil and gas . . . . In at least one district natural gas has been found in quantities that suggest important possibilities and the probability, also, of oil deposits of value. This district is Beaton County, Washington, near the center of the state.

"The Spokane-Benton Natural Gas Co. are the operators and they propose to pipe the gas to Spokane, a distance of 120 miles. One well is producing one million cubic feet of gas per diem, from a depth of 706 ft. A pond of water on the anticline keeps at one level all the time and has a scum of petroleum oil always showing on the surface.

"The analysis of the gas is the remarkable point, this analysis gave methane 76.6 per cent., ethane 12 per cent., propane 7.20 per cent., butane 8.80 per cent. and oxygen 0.40 per cent."

It may be remembered that in my previous communication on this subject I referred to the occurrence of other gases than methane, and also of hydrogen. I am satisfied that if other gas-well products were examined and reported on we might have very valuable information in regard thereto. It is the belief that the gas reported above is a wet gas. JAMES ASHWORTH,

Vancouver, B. C., Canada. Mining Engineer.

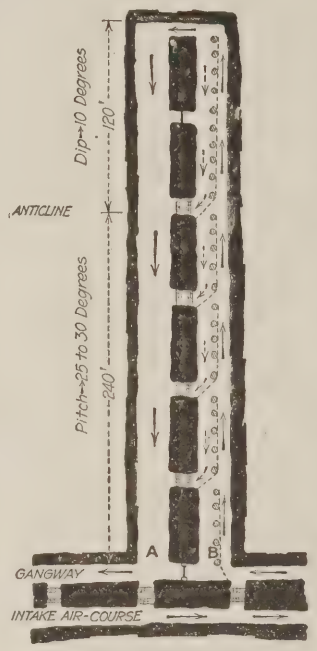
A LIBERTY BOND *will pay you interest on the future of America. Defeat will make you pay compound interest on the future of Germany.*

Experiences in Gas

Letter No. 1—The account given by Jacob Riley, *Coal Age*, Feb. 9, p. 302, of the plan he adopted to remove a body of gas from the face of a heading, recalls an instance in my own experience that required considerable perseverance in order to successfully remove the gas from a couple of chambers driven to the rise of a gangway.

In this case, the chambers had been driven up a pitch of 25 or 30 deg. for a distance of 240 ft. from the gangway, where an anticline in the measures caused the seam to dip at about 10 deg. for a distance of 120 ft. to the face of the chambers.

As I have shown in the accompanying sketch, these two chambers were connected by six crosscuts. The first four of these crosscuts had been walled up with good stoppings, while No. 5 was closed by a brattice and No. 6 crosscut at the face remained open. In addition to the pitch and dip of the chambers that I have mentioned, there was a cross-pitch of about 6 deg. from chamber *A* to the one marked *B*. At the time of my story, these chambers were found to be full of gas from the face to the gangway. In the sketch, the arrows show the direction of the ventilating current, which was conducted to the face of the air-course or heading and returned to chamber *B* where it was deflected to the face by a door on the gangway and returned through chamber *A*.



REMOVING GAS FROM PITCHING CHAMBERS

These two chambers having filled with gas, owing to a temporary derangement of the circulation, it was found that when the air current was restored it proved not strong enough to remove the gas. Most practical firebosses will agree that the place to start to remove the gas from these chambers was at the mouth of chamber *B*.

As shown in the sketch, a brattice was erected at the corner of the gangway stump so as to deflect the air into chamber *B*. By extending this brattice one length at a time, the gas was removed as far as the first crosscut where further progress was arrested, the gas then proving too strong for the air. Increasing the current by every means available did not alter the situation, and the experiment was tried of opening No. 1 crosscut by breaking a hole through the wall.

As indicated in the figure, a canvas was started from the corner of this crosscut and carried across the chamber to where a line of brattice could be extended up the pitch along the opposite rib. This had the desired effect and the gas was removed as far as the second crosscut, by extending this brattice one length at a time as before, the gas passing out through the hole in No. 1 crosscut.

The hole in No. 1 crosscut was now closed, and a similar hole opened in No. 2 crosscut. The same plan was then carried out and the gas removed from the chamber up to No. 3 crosscut; and then, by the same plan, No. 4 crosscut was reached, which was at the anticline. Beyond this point there was no further trouble in removing the gas by extending the brattice

down the dip to the face, setting the posts and hanging the canvas 2 or 3 ft. from the rib.

What made the gas difficult to remove, in this case, was the fact that, owing to the pitch of the formation, sidewise, from chamber *A* to chamber *B*, the gas tended to drift from chamber *A* to chamber *B*, which made it difficult to work the air against the gas in ascending the pitch to the anticline. Beyond the anticline, the tendency of the gas to rise from the face to that point assisted the work of its removal from the chambers.

The work, of course, was all done with safety lamps, and no men were permitted to remain in the mine except those engaged in removing the gas. Believing that the method adopted here would prove of interest to other firebosses when working under similar conditions, I have tried to describe the plan adopted as clearly as possible. L. R. THOMAS.

Edwardsville, Penn.

Conscription limits the age of the fighting man to thirty years, but there is no age limit for buying LIBERTY BONDS.

Loading and Shipping Clean Coal

Letter No. 1.—Reading the many interesting letters in *Coal Age* makes me wonder that any mine official can afford to be without the paper. There is one item referred to in the letter of W. R. Jones, on "The Fuel Situation," Mar. 16, p. 513, that I feel should be fully discussed, especially at the present time, when there is a strong temptation for miners to load dirty coal and for operators to ship an inferior quality of coal, believing that the great demand for fuel will excuse the practice.

Looking back a few years, I recall a time when a certain mine official gave orders to load out certain inferior qualities of bony coal that had been discarded and thrown into the gob, claiming that the company could sell the stuff for coal at that time. At some other operations in that vicinity teams were loaded at the rock dump with the same discarded bone that had been thrown out previously as unmarketable. This stuff was hauled to the railroad, loaded and shipped as coal.

It cannot be denied that a similar condition exists today, and that large quantities of unsalable stuff is being shipped to market for coal. At times the character of the material has been such that it could not be burned on the furnace grate, under forced draft, without being mixed with coal of good quality, and then only at a great loss in heat value.

Operators guilty of such a practice fail to realize that little is required to start a bad habit that it will take weeks and months to overcome. It is of the utmost importance, then, that everyone, operators and miners alike, use their best efforts to load and ship clean coal. The best quality of coal is required now more than ever, as only a good grade of fuel can give the highest efficiency when burned in ships, munitions plants and other industries working to win the war.

It is gratifying to note the patriotic action of many of the officers of the United Mine Workers' organization, who have not hesitated to address their members and urge the need of loading clean coal if they desire to assist the Government in the present war crisis. I noticed that a board member, Peter Farrar, and a district organizer, Patrick Eagen, proved their patriotism recently when addressing a local meeting of the miners, by urging with great emphasis the need of every man loading clean coal to be sent to the top for shipment.

It is to be hoped that all officers of the union and officials of mining companies everywhere will do the same and urge their men to put their shoulders to the wheel and do their part to keep the fires burning and win the war. JOHN BUGGY.

Chambersville, Penn.

You must buy or pay—buy a LIBERTY BOND *or pay Germany.*

The Fuel Situation

Letter No. 3—The discussion of this question, recently started in *Coal Age*, should result in throwing much light on the actual situation regarding the coal supply of this country. Let us hope that it will receive the earnest attention of coal-mining men.

The daily press still contends that a coal shortage threatens the entire country, claiming that the production of bituminous coal fell far short of the requirements during the last two months, which is quite true, owing to the unprecedented demand for fuel to supply the bunkers of the navy and industrial power plants, whose activities have been more than doubled in attempting to furnish what the war demands.

The prediction that the output of coal in this country will be 40,000,000 tons less in the present year than in 1917 and the quoting, by uninformed reporters, of other misstatements of so-called statistics are calculated to stir public opinion and cause the lash to be used where it is least deserved. Such reports are conspicuous for their destructive rather than their constructive policy, and for their failure to fix the responsibility for the actual shortage of coal.

In contrast to this condition it is observed that the coal mines, in many parts of the country, are working little more than half the time and miners are drifting from place to place in search of regular work, telling their hard-luck stories of the scarcity of jobs. In some respects the situation is similar to that which prevails when cars are plentiful and there are no coal orders.

EFFORTS OF THE GOVERNMENT

Knowing the ability of the coal mines of the country to handle an aggregate output of 100,000,000 to 150,000,000 tons more than the present yield, the Fuel Administration has very properly been organized, as an arm of the Government, for the purpose of securing an increased production of coal. As suggested by N. H. S. in his letter, *Coal Age*, Mar. 2, p. 428, it is probable that the Administration should have adopted a more liberal and expansive policy and turned its attention earlier to the great underlying cause of the coal shortage, which has been found to be the transportation problem.

From all appearances it would seem that the railroads are striving to do their bit in the trying situation, but are practically unable to handle the coal that the mines can produce. I agree with N. H. S. when he says that "what the nation needs is constructive criticism." In general we are inclined to criticize by tearing down in

stead of lending a hand to build up and supply what is needed.

Few of the contributors to these columns, it may be assumed, have a knowledge of the first principles of transportation and would care to chance the deserved laugh by assuming to dictate a policy intended to unravel the transportation entanglement. Such an attempt would sound ridiculous to the well informed, and the guilty one would be quickly "railroaded" back to the mine where he belonged. Nevertheless even an amateur efficiency expert may suggest something that might prove of service to your Uncle Samuel in his hour of trial.

TRANSPORTATION THE REAL PROBLEM

It is evident to the onlooker that the great need of the railroads today is more cars and engines. We understand that there are thousands of railroad cars sidetracked over the country and awaiting repairs. It is natural to assume that the Administration is making every effort to have these cars repaired and again put in service, but the work progresses slowly owing in part to a lack of material and in part to a want of labor, since the work affords a lower wage than can be secured elsewhere. It is human nature for a man to prefer to work one or two days a week at $5 a day than to work six days out of the week for a less wage.

I have wondered if it would be impracticable to use some of these cars that are partially defective through the lack of one or more minor parts on short hauls and level grades where the standards of safety are not so severe, and thereby release other cars for service on the main lines.

As has been suggested at different times, use can be made of the lakes, canals and navigable rivers in many instances, which would relieve the congestion of traffic on the railroads. More barges should be built for this service. If necessary river towns like Pittsburgh might even be permitted to stock the coal, for distribution later when the congestion of traffic is not as great as at present. Barge transportation should be encouraged everywhere in order to release, as far as possible, cars for the transportation of coal to inland towns and other points not reached by water. Present indications are that the coal shortage will exist next winter if it is not felt during the coming summer. W. H. NOONE.

Thomas, W. V.

You owe a debt of freedom to America. Buy a LIBERTY BOND *and pay the debt.*

Examination of a Mine

Letter No. 5—As James H. Taylor has intimated in his letter, *Coal Age*, Mar. 9, p. 472, it is too often the case that the fireboss in a mine is made the "goat." My experience of 15 years in this state enables me to say that this is frequently true in Colorado. The fireboss in our mines has not the authority to act but, as has been stated by Robert A. Marshall (Feb. 2, p. 256) he must obey the orders of the mine foreman and do the work given him.

Since the introduction of electric mine lamps in coal mining the idea has become more or less prevalent that there is not the same need of taking precautions in regard to gas as when the mine was worked with open lights or safety lamps. It is commonly believed that the use of electric mine lamps makes it almost impossible for the gas to be ignited. For this reason the work of the fireboss is much underestimated and it would seem that almost anyone is thought to be capable of performing the duties of a fireboss, just so he complies with the mining law.

I fully indorse the suggestion made by Mr. Taylor that all firebosses should act as assistant mine inspectors and be appointed by the state inspector and under his jurisdiction. The fireboss would then be free to perform the duties of his office without fear or prejudice, since the mine foreman would have no authority over him.

There is, again, another consideration affecting this question, which is that the mine foreman would exert more care in the operation of a mine in his charge and give more attention to matters relating to safety if the fireboss was a state officer. The foreman would then live in daily fear of a bad report of the mine being sent to the state mine inspector.

In any event it is my conviction that the safe operation of a mine demands the constant inspection of the working places by the fireboss, who should devote all of his time to that end. The numerous other things that he is now called upon to do, such as hanging doors, building stoppings, repairing curtains, etc., should be done by someone else than the fireboss.

Under the present system, which is the custom in this state, the fireboss has little time to devote to the examination of the mine during working hours, this work being wholly confined to his first examination of the mine in the morning, before the men go to work. Allow me to say that, in my opinion, the fireboss is the most important man in a coal mine and should be so considered in the interest of safety. COLORADO MINER.

———, Colo.

The price of a LIBERTY BOND *is $100. The price of defeat in the war is a lifetime of servitude to German interests.*

Miners and the War

Letter No. 9—Coal mining is an industry that has suffered greatly during the past year, owing chiefly to the scarcity of labor and the shortage of cars to transport the coal to the markets, but, as has been said, the Government is making every effort to counteract that difficulty by assuming control of the railroads and assisting them to handle all the coal that the mines can produce without further delay.

At the present time, it is up to the miners themselves to keep the markets supplied with coal this summer and the coming winter and avoid another great coal shortage that caused so much suffering last winter. The companies are planning for a larger output this year than ever before. And with the coöperation of the miners there is little doubt that the year 1918 will never be forgotten for record production of coal.

With an increase output of coal there will be a larger production of other materials all of which go to help win this great world war. The miner, therefore, holds

a position that places him in the forefront of the great army that is struggling for democracy. While the miner is at home, it does not follow that he is not doing his bit for his country. The President has said that if the miner and farmer fail, armies and statesmen are helpless. Now is the time then, for the miner to show the President that he is behind him in his hour of trial.

The way for us miners to do our part is to report for work on all the coming holidays and work the mines to their fullest capacity. Then, we can say that we have done our duty, but we will not be able to say that until we have taken our share of the war on our own shoulders. So lets get together, boys, and make this a banner year for the mines. Hoist old glory to the top of the pole. Wave the Stars and Stripes over Germany and free the world from Prussian militarism.

Plymouth, Penn. A MINER.

Buy LIBERTY BONDS *because you want your daughter and her children (when they come to her) to enjoy the freedom of American life, American institutions and American Liberty.*

Shotfiring re Explosion

Letter No 8.—I glean from the reading of John Verner's letter, *Coal Age*, Jan. 5, p. 33, that the miners in Iowa were permitted to fire their own shots, at the end of each shift, and that ordinarily two or more shots were fired in each working place, with the result that the shots following the first, in a place, "had to be fired in the presence of a hot, dense cloud of powder smoke produced by the preceding shot or shots."

Mr. Verner states that this practice continued during a period of many years and claims that the results showed that the powder smoke had a quenching effect on the flame of a possible explosion. He argues therefrom that "a reduced circulation of air in the workings of a mine, at the time of firing, lessens the liability of an explosion taking place."

REASONS FOR NOT REDUCING CIRCULATION AT FIRING TIME

Kindly allow me to give a few reasons why I consider these conclusions are wrong:

1. Coal-mining conditions seem to require that, in the use of black powder, the exposure of new faces of coal caused by the firing of shots affords a greater emission of gas as the work proceeds and a larger production of fine coal dust, either of which, combined with the hot powder smoke produced in firing, will generate an explosive mixture that should not be allowed to accumulate in the workings.

2. When shots are fired in a reduced quantity of air in a mine, no one can tell just what is going to happen. The shots may liberate a feeder of gas in the coal or a sudden inrush of gas may result from a heavy fall of coal or roof. Few mining men will be willing to say that it is safe to experiment with a reduced circulation of air, in the face of these conditions.

3. Assuming that the mine workings are extensive and a considerable area of goaf exists, containing accumulations of blackdamp and possibly other gases, the fall of pressure caused by reducing the circulation in the mine will produce an outflow of these gases onto the main roads, which may hinder the escape of the men after firing their shots. I note that Mr. Verner frankly admits that the mixture of gases produced, in blasting in a close place, is injurious to health and may even prove dangerous to life.

4. In my judgment, the firing of two or more shots, which means as many as the miner chooses, in a working place at one time is an unsafe practice and, if allowed, would require the thorough ventilation of the place where the shots are fired.

I fully agree with R. W. Lightburn, who states, Feb. 9, p. 301, that "in order to properly and safely perform this work, it should be done in an abundance of pure, fresh air." My opinion is that the quantity of air circulating in a mine should be increased, rather than decreased, at the time of firing, in order that the gases, produced by the explosion of the powder and otherwise, would be swept out of the mine and the working faces kept clear of any explosive mixture.

In closing, let me say that an experience of 20 years in shotfiring and bossing, as mine foreman, has taught me that the first consideration in all mine work is the safety and efficiency of its performance. I consider it an unsafe practice for a man to thrust an open light into a crevice behind a shot where an explosive mixture may exist and result in disaster and loss of life. In general, I would say that any condition that involves a deficiency in the oxygen content of mine air is injurious and unsafe. J. M. RODDY.

Springfield, Ill.

Letter No. 9.—I fully agree with the conclusion of R. W. Lightburn, *Coal Age*, Feb. 9, p. 300, as to the necessity of having plenty of fresh air circulating in a mine, at the time of firing shots. This will not only allow the shotfirers to work in pure air, but the smoke and gases produced by the firing of previous shots are swept into the return airway and carried out of the mine before they can do any harm. It is assumed, of course, that the work is properly started on the end of the air and that the shots are fired in regular order, advancing against the air current.

I cannot agree with Mr. Lightburn, however, when he asks, "Is it not true that, in a limited supply of air, a larger quantity of carbon monoxide will be produced?" My opinion is that when a shot is properly tamped the mine air is completely excluded and the combustion of the carbon is supported by the oxygen contained in the powder. This being the case, the gases resulting from the combustion are independent of the oxygen of the air.

If it were true that the complete combustion of the powder depended on securing the necessary oxygen from the air, it would follow that the explosion of the powder in blasting must be completed in the air, which Mr. Lightburn will probably agree is only true of a windy or blownout shot where the force of the explosion is partly expended on the air.

In the same issue of *Coal Age*, page 301, R. J. Pickett expressed the belief that "present-day methods of mining and blasting coal are responsible for the explosions that occur so frequently in blasting." He mentions the old practice of firing shots by the use of a needle and squib. Does he mean to say that men using these former methods and knowing that their daily

wages depend on the amount of coal they can blast down and load out are safer miners than the shotfirers of today, who are specially trained for that class of work and responsible to a Mines Department for its proper performance?

What appeals to me as the chief cause for the frequent explosions resulting from shotfiring is the continued use of a long-flame explosive such as black powder. Frequent reference has been made to the danger of the use of black powder in blasting coal. In the 30 years of my experience in coal mining I have never known of an explosion being traced directly to the firing of a blast when the explosive used was one named in the permitted list of this province and required by the Mines Regulation Act.

Safety in Use of Permissible Explosives

There is always an element of danger attending shotfiring in coal mines; but the danger is reduced to a minimum by using a permissible explosive, because of the short flame and comparatively low temperature of the explosion. It has been shown that the ignition of a firedamp mixture requires a temperature of 1200 deg. F., which must be maintained a certain length of time before the gas can be ignited.

The presence of fine inflammable dust floating in the air lowers the temperature of ignition of firedamp and the mixture is inflamed more readily. On this account the use of the short-flame permissible explosives is important in a dusty mine generating gas These conditions have led manufacturers of explosives to introduce certain ingredients that will exert an extinctive effect on the gases produced in the explosion.

In my opinion the surest safeguard against explosions occurring in blasting is the employment of thoroughly trained and experienced shotfirers who will fire but one shot at a time in a single place and who are authorized to examine, charge and fire all holes that, in their judgment, are unsafe.

The use of an electric battery for firing the shots will also, I believe, reduce the number of fatal accidents due to blasting. Under these conditions it is my belief that the more fresh air in circulation at the time of firing the greater safety will be secured in the performance of the work. James Touhey.

Cumberland, B. C., Canada.

If you can't go to the front yourself, put your name on your money and send it. A Liberty Bond *does it.*

Favoritism in Mine Management

Letter No. 4—The letters on this subject have been interesting to me, and, while I cannot agree with some things that have been said, there is much that is undoubtedly true with respect to the incoming of a new superintendent and his treatment of the old employees.

It is not always the case, however, that a new man will cost the company thousands of dollars, as one correspondent would have us believe. A new man is bound to bring with him and, in time, introduce into the mine new ideas and new methods. But, no wise and practical man will attempt radical changes in the operation of a mine immediately upon his assuming authority.

Any man of executive ability will be willing to admit that such a course as that just mentioned will almost invariably fail. A man of experience on taking a new position will recognize his responsibility and proceed with caution. He will allow things to follow along the old lines, and gradually correct minor difficulties but leave more important changes until he has become thoroughly familiar with all the conditions existing in the mine.

It is evident that a new man cannot show the best results when starting a new plan or making an important change in methods, but time will prove or disprove the wisdom of making the change. It is not to be supposed that a new plan will always work out successfully. In some instances, the attempted improvement will result in failure, although the experiment was worth the trying.

Success in Failure

Speaking of failures, give me the man who is willing to admit that he has one or more failures to his credit, rather than one who boasts of unvarying successes. It is the ability to accept a situation, admit failure, and start afresh that makes men strong. Such men are prepared against future reverses that are sure to come sooner or later.

In arguing this question, reference has been made to the fact that workers are frequently skeptical about accepting the new rules or adopting a new system introduced by a newly appointed superintendent. It is my experience, however, that where fairness has characterized the new official and still there are those who murmur and complain in regard to his management, they will generally be found to be the ones who stood in with the former boss and were his particular favorites.

Who Complain of "Favoritism"?

It is my belief that men who complain the most about favoritism being shown to others belong to one of two classes: (1) Those who were specially favored by the boss before the change was made and, as a result of the change, lose their prestige. (2) Those who, in a spirit of demanding their rights, complain that justice has not been accorded them. The latter class, generally, have no difficulty in securing a hearing with any boss who is fair, and he it is who is able to hold the respect of all his men.

There is an old saying: "Play favorites and make enemies." Fairplay is always recognized and commands the respect of every honest worker. In all positions of responsibility, a man should resolve to play fair and have no favorites. Favoritism in a boss makes few friends—I would say very few—but many enemies.

Let me suggest that, in contemplating changes, a newly appointed superintendent, if wise, will undertake the same gradually, giving time for the advantage of the change to be shown by the results, before completing his proposed plan. By this means, prejudices, which are often strong, are overcome and ill feeling avoided. The impartial boss makes for efficiency, which is the watchword in the industrial world today.

Golden, Colo. Fred L. Serviss.

INQUIRIES OF GENERAL INTEREST

Reversing a Mine Fan

I want to ask why the mine law of Illinois requires that the fan be reversed in case of an explosion occurring in the mine. I have studied over this matter considerably and fail to understand how such a requirement could be made a part of the law.

I reason as follows: Assuming that I was at work in a mine at a time when an explosion occurred at some point in the workings, suppose that, being thoroughly familiar with every portion of the workings and, understanding the direction of the ventilating currents, I undertook to lead the men out of the mine by a route that I believed would enable us to reach fresh air the quickest. Now, if the fan was to be reversed, the air current circulating in the mine would be changed, with the result that my calculations would all be wrong and we would soon find ourselves enveloped in the smoke and afterdamp of the explosion.

Or, again, assuming that two or more panels in a mine are ventilated by the same air split and that an explosion takes place in one of the panels, let me ask if it is not probable that the reversing of the fan would result in a second explosion taking place.

In my opinion, the reversing of the fan following an explosion in a mine would be a grave error and endanger the lives of any men who may have survived the explosion and who were working their way out of the mine by a chosen route that they hoped would enable them to reach fresh air without coming in contact with the afterdamp.

Harrisburg, Ill. INQUIRER.

As far as our knowledge goes, the Coal Mining Laws of Illinois, as revised and approved June 28, 1915, contain no provision authorizing or suggesting the reversal of the mine fan following an explosion in a mine. As has been suggested by this correspondent, such a proceeding would endanger the lives of any persons who may have survived the explosion. Mine workers should always be assured that, in case of trouble or disaster occurring in the workings, there would be no change made in the circulation of the air currents due to the reversing of the ventilating fan.

It is true that conditions might exist that would cause a temporary reversal of the air current in one or more sections of the mine. This, however, would be unavoidable should it occur, and its effect would generally be only temporary, as the pressure of the general circulation would tend to overcome those local conditions to which reference has been made.

A safe rule to follow, in respect to the circulation of air in a mine, is that the reversal of the fan should only be considered as a last resort in an extreme case, where the conditions following the explosion are found to be such that to maintain the old circulation would mean the destruction of the only avenues of escape for the unfortunate men entrapped in the mine.

A fire at or near the foot of a downcast shaft or slope, or on the intake airway of a drift mine, may make it wise or necessary to change the direction of the circulation by reversing the fan, unless it is possible to short-circuit the air current at a point inby of the fire and thereby prevent the smoke and gases generated by the fire from being carried into the mine. This is almost the only instance that would warrant the reversing of the ventilating fan.

Centrifugal Pumping

Kindly permit me to submit the following question regarding the operation of two centrifugal pumps. These pumps are capable of delivering 1500 gal. per min. under a head of 125 ft. when running at a speed of 1750 r.p.m. The driving unit is a 150-hp. Westinghouse motor, which is set up between the two pumps, one being on either side of the motor.

I would like to ask, what head would these pumps operate under when connected up in series; that is to say, so that one of the pumps will discharge into the other. Also, with this arangement, what should be the capacity of the two pumps and would the motor be overloaded by this arrangement? Is it necessary to lubricate graphite bearings?

Seward, Penn. CHARLES MARTIN.

A prominent manufacturer of centrifugal pumps to whom this question was submitted stated that it would be better to ask the information desired of the manufacturer of the pump, since much depends on the particular type of pump and details of construction. However, assuming that each of the pumps mentioned by this correspondent is good for a 125-ft. head ordinarily the two pumps when connected in series would be capable of handling practically the same quantity of water under double the head of a single pump.

Again, assuming that these pumps are designed for a capacity of 1500 gal. per min., under a 125-ft. head, the two pumps working in series should be able to handle about the same amount of water against a head of 250 ft.

Replying to the question of overloading the motor in this operation, it may be stated that a peculiarity of the centrifugal type of pump is that the horsepower required for its operation increases as the head decreases, in a pump designed for a given service. Also, the pump will develop its maximum efficiency at a given speed. For these reasons, when the two pumps in question are not operated under the full head for which they are designed, there would be a tendency to overload the motor.

The lubrication of the so-called graphite bearings is generally supplied through an oil reservoir connected with the bushing of the bearing. It is necessary to keep the graphite, which is contained in grooves cut in the bushing, in a moist condition.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—If 40,000 cu.ft. of air is to be delivered per minute; (a) what should be the diameter of the port of entry of a fan having two ports [the fan being double intake]? (b) What should be the width of the fan blades?

Ans.—(a) For a double intake fan, circulating a quantity of air (Q), the diameter (d) of the port of entry or the intake circle is found by the formula

$$d = 0.023\sqrt{Q} = 0.023\sqrt{40{,}000} = 4.6 \text{ ft.}$$

(b) In a properly designed double-intake centrifugal fan the width of the fan blades may be taken as $\frac{5}{8}$ of the diameter of the intake orifice. Applying this rule, the width of the blades, in this case, would be $\frac{5}{8} \times 4.6 = 2.875$ feet.

The diameter of the intake circle is therefore 4 ft. $7\frac{1}{4}$ in. and the width of the fan blades is 2 ft. $10\frac{1}{2}$ inches.

Ques.—An entry in a mine is 7 x 10 ft. in section and 6720 ft. long; what is the velocity of the ventilating current passing through this entry when the water gage stands at 2 inches?

Ans.—First, find the rubbing surface and sectional area of the airway and the unit pressure corresponding to a 2-in. water gage; thus, $s = 6720 \times 2(7 + 10) = 228{,}480$ sq.ft.; $a = 7 \times 10 = 70$ sq.ft.; $p = 2 \times 5.2 = 10.4$ lb. per sq.ft. Then, substituting these values in the formula for the velocity of the air current we have

$$v = \sqrt{\frac{pa}{ks}} = \sqrt{\frac{10.4 \times 70}{0.00000002 \times 228{,}480}} = \text{say } 400 \text{ ft. per min.}$$

Ques.—A point that may be designated as *B* is 33 yd. east of another point *A;* a third point *C* is 18 yd. north of *B;* and a fourth point *D* is 24 yd. east of *C*. What is the distance from *A* to *D?*

Ans.—From the data given the point *D* is 33 + 24 = 57 yd. east and 18 yards north from *A*. Therefore, the distance from *A* to *D* is equal to the hypotenuse of a right triangle whose sides are 57 and 18 yd., respectively. The length of the hypotenuse *AD* is therefore $\sqrt{18^2 + 57^2} = 59.77$ yd.

Ques.—How many cartridges 24 in. long and $1\frac{7}{8}$ in. diameter can be made from a full keg of powder 11 in. long and 9 in. in diameter?

Ans.—The cubic contents of this keg is $11(0.7854 \times 9^2) = 699.787$ cu.in. The volume of a single cartridge is $24(0.7854 \times 1.75^2) = 57.72$ cu.in. Hence, the number of cartridges that can be filled from a single keg, in this case, is 699.787 ÷ 57.72 = 12.1, or slightly over 12 cartridges.

Ques.—Suppose that, in a fiery mine, the quantity of air in circulation is 175,000 cu.ft. per min., measured on the return, and contains 4 per cent. (or 1 in 25) of firedamp when the barometer is 30 in. (a) What quantity of firedamp is given off in the mine? (b) What is the least decrease of the quantity of air that will render the return air explosive? (c) What increase of gas will render the return air explosive?

Ans.—(a) In this case, the gas being $\frac{1}{25}$ of the volume of the return current, the quantity of gas given off in the mine is 175,000 ÷ 25 = 7000 cu.ft. per min.

(b) The lower explosive limit of pure methane and air is reached when the proportion of gas to air is 1:13; and, at this point, the firedamp mixture would be 14 times the volume of the gas, or 14 × 7000 = 98,000 cu.ft. per min. Therefore, the decrease in the quantity of air that will cause this condition is 175,000 — 98,000 = 77,000 cu.ft. per min.

(c) To produce the same condition by an increase of the quantity of gas would require 175,000 ÷ 14 = 12,500 cu.ft. of gas per minute. The required increase in the volume of gas is therefore 12,500 — 7000 = 5500 cu.ft. per minute.

Ques.—How many 3-in. pipes will be required to run off as much water as one 12-in. pipe, all the pipes being of equal length?

Ans.—For the same head, the flow of water in each pipe is proportional to the square root of the fifth power of the dameter of the pipe. Hence, the number of 3-in. pipes that will carry the same volume of water as one 12-in. pipe, under the same head, is equal to the square root of the fifth power of the ratio of the diameters. The ratio of the diameters being 12 ÷ 3 = 4, the number of 3-in. pipes required is $\sqrt{(4)^5} = 2^5 = 32$ pipes.

Ques.—The airways of a mine are one mile long and the water gage is 0.7 in. If the length of these airways is now increased four times and the velocity of the air current is also increased from 500 to 700 ft. per min., what will be the water gage reading?

Ans.—The unit pressure or the water gage due to the circulation of an air current in a mine or airway varies as the length of the airways and the square of the velocity of the current. In other words, the water-gage ratio is equal to the product of the length ratio and the square of the velocity ratio, which gives, in this case

$$\frac{w.g.}{0.7} = \frac{4}{1}\left(\frac{700}{500}\right)^2 = 4\left(\frac{7}{5}\right)^2 = 4 \times 1.4^2 = 4 \times 1.96$$
$$= 7.84, \text{ say } 8 \text{ in.}$$

Ques.—If 20,000 cu.ft. of air per minute is passing into a mine, how would this quantity divide itself between two splits of the following dimensions:

(a) 4 ft. high, 12 ft. wide and 14,000 ft. long;

(b) 6 ft. high, 8 ft. wide and 16,000 ft. long?

Ans.—The air current will divide equally between the two splits given in this question, because they have equal sectional areas and equal amounts of rubbing surface. The sectional area (*a*) and rubbing surface (*s*), in the two splits, are as follows:

Split A, $a = 4 \times 12 = 48$ sq.ft.

Split B, $a = 6 \times 8 = 48$ sq.ft.

Split A, $s = 2(4 + 12)$ 14,000 = 448,000 sq.ft.

Split B, $s = 2(6 + 8)$ 16,000 = 448,000 sq.ft.

COAL AND COKE NEWS

Harrisburg, Penn.

In a resolution adopted by 300 coal operators in the central bituminous field, meeting at Altoona at the call of J. P. Cameron, district representative of the state fuel administration, the shippers urged that if all priority orders and assigned cars were abolished production would be increased, labor unrest assuaged and discrimination ended. The present method of assigning cars for railroad fuel supply was also disapproved. A more equitable method was asked and the matter was left in the hands of a committee of fifteen with instructions that it be taken up with the Fuel Administration and the Director General of Railroads.

Stimulated by the note of impending labor trouble, if the present method of car distribution is continued, the operators pledged themselves to coöperate with the district representative so that he can distribute equitably among the shippers emergency tonnage required by the Government. He has been unable to do this because operators have neglected to give him complete reports as to the amount of coal produced.

That 1,000,000 tons of coal could be transported each year from the anthracite fields of Pennsylvania to tidewater by boat if some part of the $500,000,000 Government appropriation for shipbuilding were used to build 200 barges will be made the substance of a report to the railway administration in Washington by William H. Schoff, secretary-treasurer of the Atlantic Deeper Waterways Commission, who has completed a two days' inspection of the old Schuylkill canal from Fairmount dam to Port Clinton.

Birmingham, Ala.

Mining operations in the Birmingham district are picking up steadily, and the coal output is correspondingly on the increase. Despite the bad start in January and part of February operators assert there is no doubt but that a record production is certain for 1918. Announcement that the Tennessee Coal, Iron and Railroad Co. will open a new mine in Blue Creek will be followed shortly by other announcements of equal importance, gossip in mining circles here indicate. The Cullman Coal Co., before the year is out, will be mining coal on a large basis at Bremen, in that county, while in Walker and even in Jefferson County new developments are promised.

The coke market in the southern territory is strong. Many of the larger consumers are making inquiries here for coke and local representatives are being provided. Harold McDermott, of the New Castle Coal Co. is working on possible contracts for the Guggenheimer interests in the smelting line, but so far as can be learned there has not been a great amount of the product obtained for that concern. Government prices prevail for both coal and coke and there is contentions as to prices.

Labor in the mining sections of the state is doing better, though the men are not striving for limit production. In other words, there are many men working in the mines who will not put in a full day, nor will they work a full week. The earnings of short time apparently are sufficient to satisfy their needs as a result of the advance scale now being paid.

A final showing of coal immediately available for river transportation, character of craft now on the river and other data regarding the Warrior River development has been prepared by the Birmingham district operators and will be forwarded to Washington the latter part of this week. The data is intended for presentation to Secretary McAdoo before the consideration of the Warrior development is resumed two weeks hence. Mr. McAdoo has taken personal charge of this proposition and, as a result, river coal operators expect quick results.

As to the amount of good bunkerage coal immediately available from running mines the following data showing daily capacity is authoritative:

Sipsey mine, 1000 tons; Empire, 1000 tons; Dilworth, 250 tons; Summit, 150 tons.

Total in Black Creek seam on the Frisco, 2400 tons.

Corona, 500 tons; Coal Valley, 1500 tons.

Total in Corona seam, on the Southern, 2000 tons.

Total available by short rail hauls to the river 4400 tons.

Payne's bend, 500 tons; Maxine, 500 tons.

Total Pratt seam, 1000 tons.

Grand total of bunker coal available 5400 tons daily, or 1,620,000 tons per annum. Bunkerage needs are estimated at 1,000,000 tons per annum. The Warrior River showing more than covers the situation.

Charleston, W. Va.

The Ohio River bids fair within the next few years to become as important a channel of commerce as it was before the advent of many railroads. Numerous projects are on foot to restore the Ohio to its former commercial status. Capitalists of Pittsburgh, Wheeling and other Ohio River points are planning to organize a corporation with a capital of $500,000 to build boats which will ply between Pittsburgh and Cincinnati, and only recently a meeting was held in Huntington, W. Va., at which the initial steps were taken by officers of commercial bodies of Parkersburg, Huntington, Cincinnati and other river cities to finance a transportation company to operate a line between Parkersburg and Cincinnati.

Greater attention is to be given the mines along the Monongahela R.R. in the future than has heretofore been the case, according to a statement recently made by Floyd J. Patton, one of the district fuel administrators in West Virginia, the National Administration having urged that more attention be given to the district referred to so as to encourage mine production there. Recent reports from the mines located on the Monongahela indicate that the car supply is much improved, operators on the Scott's Run line, for instance, stating that they had received more than 60 per cent. of their quota. Even though the Monongahela R.R. has no cars of its own, coal operators are confident that if the Government is to require fuel orders to be placed at the point nearest at hand, then the Government will require the Monongahela to furnish a sufficient number of cars to meet requirements.

Some of the more pessimistically inclined coal men in the southern part of West Virginia paint a rather gloomy picture of the outlook for production in the southern part of the state during the present year, and even go so far as to predict that the coal production in the Pocahontas and Tug River bituminous fields will fall short six million tons of last year's output, predicating their forecast on the fact that for the week of Mar. 9, about 180,000 tons were "lost," as they term it, through a shortage of cars and scarcity of labor. They also contend that the decline has been steady since last July and that there is therefore little probability of any increase in tonnage. Other coal men in the same section find encouragement in the fact that twenty large locomotives are to be put into service on the Norfolk & Western, having been sent to that road from a Western road to be used in furnishing power for additional coal trains. It is also argued that under the new system of shipments there will be much improvement in transportation facilities and that unless unusual conditions arise there will be a marked improvement in the movement of coal to market.

Fairmont, W. Va.

Senator C. W. Watson, head of the Consolidation Coal Co., is believed to be a candidate for the Democratic nomination for the United States Senate. Although he has been quoted as saying that there was too much work connected with the position for a business man, he is believed to have changed his ideas and that his candidacy will be announced formally in the very near future. Senator Watson has recently applied for a commission in the Ordnance Department of the Government. Former Senator Davis Elkins, also a coal man, is a candidate for the Republican nomination for the United States Senate. He served in that position for a short time following the death of his father, being appointed by the governor.

The Consolidation Coal Co. recently completed a coal storage bin at its Owings mine, near Fairmont, which is of frame construction, placed on a concrete foundation, and has a capacity of approximately 1800 tons of run-of-mine coal. The size of the bin is 35 x 100 ft. It is constructed of longleaf yellow pine thoroughly treated with K.R. wood preservative, and extends over two railroad tracks, making it possible to load four railroad cars simultaneously. The coal is dumped over the tipple in the usual way, going from the chutes into a conveyor by which it is carried to the top of the bin and deposited where desired by gates which can be opened or closed. The machinery employed is electrically driven.

PENNSYLVANIA

Anthracite

Scranton—Former Senator E. F. Blewitt, a local mining engineer, has asked the Scranton Board of Trade to take up the matter of having 16,000 or more mine workers who were taken from the anthracite field to serve in the Italian army returned to work in this region. According to Mr. Blewitt the mines in the hard-coal field can increase production from 60,000 to 70,000 tons a day, if the former number of mine workers can be obtained.

Tower City—The Philadelphia & Reading Coal and Iron Co. has announced its intention to build at once a new town on top of Broad Mountain. Fifty houses will be erected and will be models of miners' houses in every respect, containing good water, electric light and all sanitary accessories. Vocational training for children will be provided.

Port Bowkley—No. 14 colliery of the Pennsylvania Coal Co., on Mar. 23 dumped 2335 mine cars in nine hours. The men requested Superintendent Edgar Weichel to have a big day, so that they could show their patriotism by producing extra coal. The normal run of the colliery is 1100 mine cars per day, and the increase to 2335 cars shows the feeling of the men. The result meant that 7677 tons of coal were shipped from the breaker.

Lost Creek—The State Compensation Board has ordered a rehearing in the claim of Frank Lokus against the Harleigh-Brookwood Coal Co., in which compensation was asked because the claimant and a companion were caught in a rush of coal and imprisoned for 36 hours. The board said he was undoubtedly injured to some extent, but that it is not satisfied that the medical testimony sustains the findings of the referee. The case is the first of the kind to come before the board.

Plymouth—One double and four single frame dwellings at Carver St. were materially damaged on Mar. 20 by a settling of the surface. The cave extended as far as the Delaware & Hudson Co. coal tracks, making it impossible for the company to transfer cars of coal by this route. This same section was visited by a similar cave several months ago.

Pittston Junction—As a result of the activity of the fuel administration there will be little immediate mining of coal by the White Coal Co., where operations in the Checker vein have been followed by extensive surface subsidence. For shipping unclean coal the White Company, it is stated, will be denied any more cars, according to orders issued to the Lehigh Valley Coal Co. by the district coal administrator.

Pittston—At the direction of County Fuel Administrator A. C. Campbell, the shipping of culm from two culm banks in Dupont borough and coal from a slope in Pittston township has been stopped under the regulations requiring that run-of-mine coal cannot be sold on the market.

Bituminous

Uniontown—J. H. Hillman, Jr., of Pittsburgh, has purchased the Fuller coal tract of Coal and Redstone townships for $468,000, it was learned here. The tract includes 260 acres and was purchased at a price of $18,000 an acre. It was purchased directly

from R. M. Fry and Homer Birchnal, who held options on it.

Ebensburg—Three flat cars, brought into Revloc, the new mining town two miles from here, over the Coal and Iron R.R., were loaded and shipped on Mar. 19, making the first real shipment of coal by rail to be sent out from the new mines. There are two large shafts at Revloc, which will have a capacity of about 3000 tons a day when the mines are in full working order.

ALABAMA

Cullman—The Cullman Coal Co., recently incorporated, has filed in the office of the probate judge a deed from the Parker Bank and Trust Co. as the receiver of the Cullman Coal and Coke Co., conveying the fee simple right and the mineral and surface rights to 17,000 acres of coal lands, also the right-of-way and line of railroad of the Cullman Coal and Coke Co., extending from a point of connection with the South and North Alabama Railroad Co. at Cullman, to Bremen, a distance of some 20 miles. It is understood that the intention of the Cullman Coal company is to begin at once the development of the coal fields at Bremen.

VIRGINIA

Elkhorn City—A group of Huntington business men has acquired a tract of 462 acres of Elkhorn coal land on the Russell Creek fork of the Big Sandy River near here, and arrangements are being made to develop it on an extensive scale. Operations will begin immediately and it is expected to ship coal by July 1. A capacity of 1000 tons a day is planned.

WEST VIRGINIA

Caperton—Owing to a slide at its plant which carried the sidetracks away, in addition to about 200 ft. of the incline, the Sewell Smokeless Coal Co. has had to suspend operations for several weeks.

Weston—A mining machine is being installed at the plant of the Stone Coal Co., near here.

Clarksburg—Offices have been opened here by the Madigan Coal Co., of Connellsville, Penn., which recently began stripping coal at Meadowbrook with a steam shovel.

Shelmore—The Wolf Den Coal Co. is building 300 new miners' houses.

Austed—The Mill Creek Colliery Co. has found it necessary to suspend operations from 20 to 30 days, recent floods having washed away the power house, tramway and siding at the plant.

Fairmont—Two 3½-ton trucks with steel bodies and automatic dumps have been purchased by the Sines Coal Co. in order to haul the coal from its mines at Tammond, near Grafton.

Dodson—Extensive improvements are being made by the Garrett County Coal and Mining Co. at its tipple here.

Kingwood—The Kingwood mine of the West Virginia Coal Co. has been sold to a Greensburg, Penn., syndicate. The sale includes about 250 acres of coal land and a working mine with a capacity of 300 tons daily. The mine will be operated by the Inland Fuel Co., with headquarters at Greensburg, Penn. However, 750 acres of land are retained by the West Virginia company which plans to expend about $75,000 in driving a 60-ft. shaft and in building a power plant.

Downs—The new Rachel mine at Downs, W. Va., will be electrically equipped throughout. A 700-hp. electric engine for the coal shaft and a 350-hp. electric engine for the supply shaft are on the way. Three Sullivan shortwall machines were installed last week. Six punchers will be installed this week.

KENTUCKY

Hopkinsville—The Memphis Coal and Mining Co., a subsidiary of the Memphis Gas and Electric Co., a heat, light and power company similar to the Kentucky Utilities Co., last season started purchasing coal lands near Mannington, Ky., to supply the necessary fuel for the company's operations. The company has recently purchased about 1600 acres of additional coal land at Mannington, where the company now has three mine openings and is starting a fourth. About $40,000 will be spent on a tipple, of all-steel construction, while the coal from the various openings will all come to this tipple by tramlines. It is planned to erect large storage arrangements, so that the mines may operate steadily even when transportation facilities are at a low ebb. It is planned to expend about $200,000 in all for land and improvements at this plant.

Madisonville—The Linton Colliery Coal Co. has started work on opening a new mine at Moorman, Ky., the shaft to be only 22 ft. deep. When in operation it is claimed the mine will have a daily capacity of 2500 tons. The coal mined will be shipped out over the Madisonville, Hartford & Eastern and the Owensboro & Nashville R.R., two small feeders.

Louisville—G. M. Matthews, who for the past year has been with the J. B. Allen engineering office at Hazard, Ky., has been made general manager of the Amburgy Coal Co., recently organized by Louisville capitalists, and will shortly take up his headquarters with the company's Louisville office. The new coal company has started work on developing properties on Smoot Creek, in Letcher County, where a branch of the Louisville & Nashville is being brought in. A tipple-height seam is being developed.

Hellier—It is reported that the Elkhorn Consolidated Coal and Coke Co., of Syracuse, N. Y., will expend several hundred thousand dollars in the development of a large tract of coking coal lands which this corporation has purchased in the Marrowbone Creek section, near here.

Madisonville—The Linton Colliery Coal Co. will soon begin to sink a shaft at the new mine to be opened 2½ miles from Moorman, in Muhlenberg County. When the mine is ready for operation it will have a daily capacity of 2500 tons. The shaft will be 22 ft. deep and the coal mined will be shipped over the Madisonville, Hartford & Eastern R.R. and the Owensboro & Nashville Railroad.

Greenville—The W. G. Duncan Coal Co. has broken ground for its new central power plant to be erected at Graham, Ky. Contracts have been let for the equipment, which consists of turbo-generators, boilers, stokers and auxiliaries. The building will be of steel and brick construction. Charles M. Means, of Pittsburgh, is the consulting engineer.

INDIANA

Terre Haute—A meeting of operators whose mines are served by the Chicago, Terre Haute & Southwestern R.R. was called for Mar. 26 by President Will J. Freeman of the Indiana Bituminous Coal Operators' Association. Plans were laid to send a commission to Washington to confer with Secretary McAdoo about the scarcity of cars on that road and to demand that cars be furnished. There are thirty-one mines located on that railroad, which is almost entirely a coal road, and during the last fortnight many of the mines have been idle because cars were not available.

ILLINOIS

Tamaroa—George W. Dowell has disposed of his holdings in the Paradise and Franklin County Coal Co., of which he was president, to the Northern States Coal and Mining Co., of Chicago. The mine, which is near here, is in the heart of a field that is just being developed. Dowell will devote his attention to other mining interests in southern Illinois.

Belleville—Belleville miners are making plans to erect a labor temple at an estimated cost of about $60,000. The proposition is to be acted on by the locals and then submitted by a referendum vote to the membership.

Carbondale—News has been received here of the death at Brunswick, N. J., of Mrs. J. D. Peters, who with her husband was interested in southern Illinois mining properties, in Williamson County. Peters died a few weeks ago in New York.

Kewanee—A cave-in at the mine of the Grice Coal Co. here has left the mine in such bad shape that it can hardly be reopened. It is not thought that the expense of putting it in shape would be justified, inasmuch as there is not more than another year's mining supply in the company's holdings.

A 4½ ft. seam of coal at a depth of 140 ft. was struck by the force of the Bradford Mining Co. on the farm of Andrew Tychon, 2½ miles west of the village of Bradford. A deposit of quicksand made the opening of a second shaft necessary after operations had been carried on to within a few feet of the coal deposit. Coal will be mined within the next two months.

Springfield—The charge of disloyalty against Severino Oberdan, of Nokomis, who was tarred and feathered by "loyalist" miners at Staunton, Ill., recently, has been dismissed in the Federal Court by direction of the United States Department of Justice.

Murphysboro—Twenty-five sticks of dynamite were found in an airshaft of the Shoal Creek mine, 12 miles from this city. The failure of a percussion cap to discharge prevented an explosion. It is believed that an attempt was made to blow up the mine.

Christopher—The Christopher mine was reopened Mar. 25. The mine has been closed since November, wher an explosion occurred which wrecked the mine and caused the death of a number of miners. It is one of the largest in the state and employs 700 men when running at capacity.

Carlinville—Mulville Bros., who have the contracts for putting in a line of railroad from Anderson, on the Chicago & Alton Ry., to the Standard Oil Co.'s mine site at Schoper, have a large force of men at work and have completed over 2000 feet of new road, graded with track laid. They expect to have the bridges built and all work on the line completed by July 1. The railroad will be used to convey workmen from Carlinville to the new mines when they are opened up for work.

Athens—Mine No. 2 will be reopened.

Morris—The Mitchell mine, which was closed for repairs ordered by the State Department of Mines and Minerals, has been reopened.

Edinburg—The mine here has been closed down indefinitely on account of its dangerous condition.

Mount Vernon—The Brennan drill, operating in the southern part of Jefferson County, has struck two seams of the highest class of coal. In Prairie township, section 36, a seam 6 ft. 7 in. wide has been struck. This coal is of superior quality and is free from foreign matter. Another core drawn from another hole showed even better results. The coal is located only 600 ft. below the surface.

Herrin—The Watson Coal Co. has been incorporated here by W. A. Perrin, of this place. J. E. Allen, A. G. F. A. of the Cotton Belt Ry., at St. Louis, and G. W. Allen, of St. Louis. They took over the property of the Carbon Coal Co. and contemplate sinking a new slope mine between here and Marion. They also succeed in St. Louis the Allen Coal Co., which is liquidated and retired.

OHIO

Steubenville—Work will soon be started on the erection of a new coal tipple at the Henry Walker mine in Tiltonville. The old tipple, which has been in use for the past several years, is too far worn to carry the heavy cars of coal down the incline and has become weakened by several years of steady use. The new tipple will be finished within a month.

MISSOURI

Martinsville—The first coal taken from the new mine developed by the Chamber of Commerce of this town has been brought to the surface and sold. The project, it is said, will save the average local consumer 7c. on each bushel of coal used.

NORTH DAKOTA

Dickinson—Official announcement has been made that the Federal Fuel Co. has taken over the Lehigh mines and will erect a 24-unit briqueting plant, starting with a two-unit machine and gradually adding the other units. A $2,000,000 plant is the eventual aim of the company. The capacity of the complete plant will be 864 tons every 24 hours. Among the members of the Federal Fuel Co. are Judge Frank McNulty and J. W. Martin, both of Aberdeen, and J. C. Thompson, of Fargo.

Personals

J. E. Virgin, for the past seven years general mine foreman for the E. E. White Coal Co., at Stotesbury, W. Va., has resigned his position to take charge of No. 6 mine of the Raleigh Coal and Coke Co., at Raleigh, West Virginia.

Thomas Duffy, of McAdoo, first president of the United Mine Workers of the seventh anthracite district, forsook the mines on Mar. 19 and took a job at the Jeanesville Iron Works, a local munition plant. Duffy was in office when the 1900 strike took place and was for years a confidential lieutenant of John Mitchell, head of the international union.

Obituary

D. C. Tiffany, aged 62 years, superintendent for the Lehigh & Wilkes-Barre Coal Co., in the Ashley district, died at his home in Ashley on Mar. 19, after less than 24 hours illness of pneumonia. Mr. Tiffany had been in the employ of the Lehigh company for 48 years, most of the time in an official capacity.

Foreign News

Clover Bar, Alta.—The mine of the Edmonton Collieries, Ltd., on which work was begun last summer, has made its initial shipment, one car going to Manitoba and one to Saskatchewan, and is now in a condition to supply all orders. It has an up-to-date coal-handling plant. L. C. Stevens is president and H. C. Anderson secretary-treasurer of the company.

Nanaimo, B. C.—An attempt was made on Mar. 23 to reopen the Jingle Pot mine, which was sealed up some three months ago on account of an outbreak of fire. It was found, however, on breaking through the first stoping that a large quantity of water had gathered in the stope, and further progress was barred. Pumps will be started immediately, but it is estimated that it will take three weeks to pump the water out. Apart from the water, all the other conditions are favorable, and Manager Freeman is hopeful that as soon as the water is pumped out he will be able to resume operations.

Montreal, Can.—Mark Workman, president of the Dominion Coal Co., speaking in reference to a statement by Hon. W. Armstrong, Minister of Mines for Nova Scotia, to the effect that the St. Lawrence market for coal might be permanently lost to Nova Scotia operators, said that the Dominion Coal Co. would have little difficulty in starting in where they left off in the St. Lawrence market just as soon as the required tonnage was available. He believed that the St. Lawrence trade of the Cape Breton mines would grow to greater proportions than ever after the war, as their coal was so much better than the American coal for steam purposes that manufacturers were willing to pay more for it.

Industrial News

Erie, Penn.—Harry Hamilton, said to be the first coal dealer arrested on a charge of profiteering in that commodity, was fined $500 in the United States district court of this city.

Pittsburgh, Penn.—The Duquesne Electric and Manufacturing Co., Bessemer Building, dealers in new and used electrical and power-plant equipment, announces the opening of a branch office at 230 So. LaSalle St., Chicago.

Philadelphia, Penn.—The Supreme Court on Mar. 21 dismissed appeals taken by coal companies in Lackawanna County from the action of the court there in fixing the value of coal for assessment purposes at $300 a foot-acre. The decision to dismiss was based on a per curiam made Mar. 23, 1917.

Scarbro, W. Va.—The Plum Eagle Coal Co. will mine the Eagle seam, which is a byproduct coal. An incline or rope conveyor about 600 ft. long will be built. The equipment includes twenty 1¼-ton mine cars, one 6 to 8 ton steam locomotive and six 8 to 10 ton two-way dump cars. About $30,000 will be invested in the plant. J. M. Randich is superintendent.

Maysville, Ky.—The coal docks of the Chesapeake & Ohio Railroad Co., built at this point nine years ago at a cost of $30,000, were burned along with 500 tons of coal on Mar. 18, fire having started in the boiler room in lighting a torch close to an oil tank. Practically the entire plant was consumed, the loss being estimated at $55,000.

Charleston, W. Va.—Despite unusual handicaps, the February report of coal and coke loadings on the Chesapeake & Ohio reveal a large increase over the same month of the previous year and an improvement over the first month of this year. The total loadings for February were 2,250,305 tons as against 1,921,685 tons for February, 1917. In January of the present year the tonnage loaded was 1,690,680.

Pittsburgh, Penn.—Directors of the Pittsburgh Coal Co. of Pennsylvania have declared dividends of $1.50 a share on the preferred stock and $5 a share on the common stock. The common dividend is payable in quarterly installments of $1.25 a share beginning Apr. 25, 1918. Directors of the Pittsburgh Coal Co. of New Jersey declared a dividend of $1.25 a share on the preferred stock.

Columbus, Ohio—Engineers from the Norfolk & Western R. R. have made extensive surveys over the 250-acre tract purchased southeast of Columbus several years ago, which will be improved by building a large yard for the assembling and collection of coal cargoes from West Virginia and southern Ohio. The Norfolk & Western connects at Columbus with the Hocking Valley, which carries lake shipments to Toledo.

Erie, Penn.—Action of coal operators in the western Pennsylvania district of the United States Court, demanding the return of their books and papers seized by Federal agents when the "profiteering" charges were made, will not handicap the grand jury to any great extent, Government authorities say. Officials of the seven concerns under charges have been subpoenaed and they will be compelled to submit whatever books are needed.

Cincinnati, Ohio—Plans for the convention of the Michigan-Ohio-Indiana Coal Dealers' Association, to be held here Apr. 15, include an address by J. A. D. Morrow, director in charge of coal distribution with the United States Fuel Administration. R. A. Colter, president of the Cincinnati Coal Exchange, states that full information will be given to the dealers regarding the Fuel Administration's program, and its orders will be made plain. A two-day convention will be held.

Nashville, Tenn.—The Dayton Coal, Iron & Railroad Co., of Wilmington, Del., capital $5,000,000, has filed articles in Tennessee, with plans to establish headquarters at Chattanooga, and plans to take over the equipment, etc., of the Dayton Coal and Iron Co., which was in the Chattanooga bankruptcy courts last August, the assets being purchased by H. S. Matthews, of Rome, Ga. The company has large holdings in the Dayton (Tenn.) district, and it is planned to start operations again.

Louisville, Ky.—The value of moving-picture theaters as an aid in holding miners in isolated districts is generally recognized by large coal-mining companies, many of which operate their own picture theaters, commissary stores, etc. A recent advertisement of the Climax Coal Co., of Shamrock, Ky., asking for miners to go to Edgewood, Ky., near Middlesboro, called attention to the following requisites: "An excellent camp, good schools, picture show and other amusements." Full time was also offered.

Fairmont, W. Va.—A new organization of West Virginia Coal Operators, to be known as the West Virginia Mining Association, is to be formed, and C. H. Janims, president of the Central West Virginia Coal Operators' Association, has circularized the leading operators of the state asking their coöperation in the move. It is planned to make the new state organization a branch of the American Mining Congress, 50 West Virginia operators now being members of the Congress. A meeting to organize will be held soon, probably at Washington.

Charleston, W. Va.—Two sets of appraisers have been appointed by State Tax Comissioner Walter S. Hallanan to pass on the value of approximately 5000 acres of coal land in Harrison and Raleigh Counties, belonging to the estate of the late Nathaniel Ewing, of Uniontown, Penn. The appraisements are to be made for the purpose of levying an inheritance tax. The Board of Appraisers for the Harrison County holdings consists of James N. Hess, Howard Robinson and C. J. Ryan; and for Raleigh County, J. Q. Hutchinson, C. L. Heaberlin and W. O. McGinnis.

Sullivan, Ind.—Foreclosure of a mortgage against the Consolidated Indiana Coal Co. as to its ownership and rights on 4500 acres of coal land in Sullivan County has been asked for in a suit filed in the Federal District Court at Indianapolis by the Guaranty Trust Company of New York, trustee under a mortgage securing a bond issue of $2,773,000. The coal company was placed in a receivership in the Federal Court in Illinois in 1915. Stewart K. Smith, of Chicago, was appointed receiver of the company, which owned coal property in Illinois and Iowa as well as in Indiana.

Cincinnati, Ohio—The Union Gas and Electric Co. has issued an announcement to its industrial customers that during the coming summer there will be no gas furnished manufacturing plants at the former industrial rates, all gas consumed being charged for at domestic rates. This, it is estimated, will result in consumption by industrial concerns being reduced by three-fourths, and will mean a correspondingly greater use of coal. Formerly summer rates to industrial consumers were extremely low, and made it possible for them to use gas at a considerable saving over the cost of coal.

Frankfort, Ky.—Suit has been filed by the Carterville Washed Coal Co. against the Kentucky Jewel Coal Co., before Charles N. Wiard, clerk of the United States District Court, Frankfort, similar to the R. A. Brawer suit against the Clear Creek Coal Co., which was recently before the court. The petition of the Carterville people alleges that defendant entered a contract on Apr. 25, 1916, to furnish plaintiff 500 cars of block coal and 700 cars of egg coal at prices ranging from $1.35 per ton to $1.80; that 227 cars were delivered and 373 cars were not, and asking for judgment of $23,872 with interest from April, 1917. Humphrey, Middleton & Humphrey, of Louisville, filed the suit.

Columbus, Ohio—The Ore and Coal Exchange, which takes the place of the Lake Shippers' Pool Association of last year, was organized recently at Cleveland by a meeting of coal operators, ore shippers and vessel men. The organization will be under governmental regulation and will have absolute charge of all lake shipments from the lower lake ports during the season of 1918. The association was formed by the naming of the following executive committeemen: A. A. Augustus, chairman; George E. Cameron, Edward A. Uhrig, representing upper dock interests; W. M. Collins, R. S. McVeigh, Horace Robbins, C. C. Maurer and J. P. Walsh. Mr. Walsh represents Pennsylvania and eastern Ohio interests on the committee. The executive committee will be called together soon for the selection of a director and assistants. Headquarters will be located at Cleveland.

Dallas, Tex.—At the suggestion of Wiley Blair of Dallas, Federal Fuel Administrator for Texas, the Federal Fuel Administration has authorized a graduated scale of reductions for consumers of coal in Texas who make purchases during the summer months when there is better transportation and coal can be transported to cities and towns where needed. The present price of Colorado bituminous coal at the mine on prepared sizes is $4.45 a ton, and on Oklahoma coal $5 a ton. The reductions authorized to Texas dealers are as follows: On April shipments, 75c. per ton; on May shipments, 60c. per ton; on June shipments, 45c. per ton; on July shipments, 30c. per ton; on August shipments, 15c. per ton. September shipments will be made at present prices. All reductions are effective Apr. 1 and will make the price of Colorado coal to dealers $3.70 a ton and on Oklahoma coal $4.25 a ton.

St. Louis, Mo.—The American Coke and Chemical Co., of Chicago, has purchased for its subsidiary, the St. Louis Coke and Chemical Co., a 300-acre tract just outside the city limits of Granite City, in the St. Louis industrial district. The purchase price is said to have been approximately $200,000. Operations will begin at once on the erection of a Roberts byproduct coke-oven plant and two blast furnaces, at a cost of about $5,000,000. East St. Louis sites were under consideration, but the Granite City site was found to be more desirable. The plant will be devoted exclusively to the production of high-grade metallurgical and domestic coke and byproducts from Illinois bituminous coal. It is expected that the plant, with its utilization of Illinois coal for this purpose, will have a tendency to make the Mississippi Valley the center of steel manufacture, on account of the proximity of the coal fields. The company also expects to supply coke to St. Louis consumers at a price little in excess of what bituminous coal costs.

New York, N. Y.—The financial statement for 1917 of the Elk Horn Coal Corporation gives the corporation's assets as $27,445,390, of which $20,747,334 is real estate and buildings, and $4,317,812 stocks of other companies, the balance being current assets in money, coal on hand, etc. The income account for the year follows: Earnings from all sources, $4,497,120.72; operating expenses, taxes, insurance and royalties (exclusive of income and excess profits taxes), $1,972,936.81; depreciation, $168,902.66; depletion, $109,492.37; net earnings from operations, $2,245,788.88; interest on funded debt, $414,630.98; net earnings for the year (before deducting income and excess profits taxes), $1,831,157.90; less reserve for income and excess profits taxes, $107,959.52; net surplus for the year, $1,723,198.38; less dividends declared and paid on preferred capital stock during 1917, $393,363; net surplus for the year 1917 carried to profit and loss, $1,329,835.38; profit and loss account, Dec. 31, 1916, $313,257.92; total, $1,643,093.30; less adjustment of accounts of previous years, $217,854.69; profit and loss account, Dec. 31, 1917, $1,425,238.61.

MARKET DEPARTMENT

Weekly Review

Zoning Plan Announced—Car Supply Not Only Limits Production but Creates Labor Unrest—Demand for Steam Coal Unabated—Domestic Inquiry Light—Some Contracting Reported

THE long-awaited zoning plan has at last been announced by the Fuel Administration, as have also new price rulings in a few producing districts. No one can foretell with any degree of assurance just what will be the results of the new zoning policy, which goes into effect Apr. 1, as the scheme virtually amounts to a reorganization of the entire soft-coal industry. The country has been divided into a number of producing zones within which consumption will largely be confined. In this way thousands of miles of long cross-hauls will be eliminated, thus making for an increase in car utility. A reduction in anthracite shipments to the West and Northwest has also been announced by the Fuel Administration.

Transportation facilities are still bad, the sidings in and around many collieries being congested with loaded coal cars. Considering the urgent need existing for coal, the situation cannot but be viewed with alarm. Bituminous has suffered a large falling off in production, many mines being compelled to shut down because of insufficient empty cars to load. It is stated that in two West Virginia fields alone, during the 17 working days ending Feb. 25, an average of more than 10,000 men were idle every day. During March there was little improvement. If this condition is not remedied soon it will be exceedingly difficult for the operators to preserve intact their working organizations, as the mine workers, notably in the central Pennsylvania region, are dissatisfied with working only two or three days a week and threaten to leave the mines for more certain employment. The running time at the mines should be equalized, and this can only be brought about by the abolition of the pernicious "assigned car" policy of the railroads with its unequal apportionment of cars and inadequate distribution of tonnage.

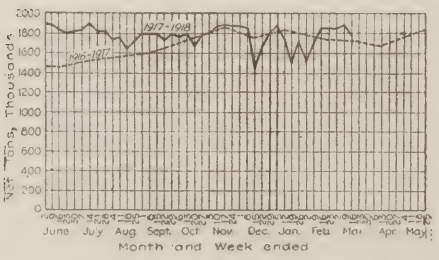
The heavy requirements for steam coal preclude any let-up in the demand. Shippers have not been in position to guarantee plenty of coal, and buyers have been ready to purchase every ton available. Here and there coal is still being confiscated by the fuel authorities for the use of public utilities which do not seem able to get an adequate supply from their regular sources.

Retail dealers report many orders for next winter's requirements, and these are being accepted subject to regulations and prices at the time of delivery. Some contracting is reported for the new coal year, though uncertainty on the part of jobbers as to where their supply is to come from serves as a deterrent to the closing of contracts.

So that the consumer will not be forced to hunt for a licensed jobber through whom to obtain coal, the Fuel Administration has stated that jobbers who have made application for licenses prior to Apr. 1, but who have not received their licenses on that date, will be allowed to do business as usual.

COAL PRODUCTION

Bituminous production declined 579,000 tons during the week ended Mar. 16. The total production of soft coal (including lignite and coal made into coke) is estimated on the basis of railway shipments at 10,686,000 net tons. The rate of production per working day was 1,781,000 tons as compared with 1,878,000 tons during the preceding week. For the first time in five weeks the production per working day has fallen below 1,800,000. It is still, however, considerably in excess of 1,729,000 tons, the average during March, 1917. Pre-



liminary estimates place the week's production of beehive coke at 644,000 net tons, or 107,000 tons per working day. The production in the Connellsville and Lower Connellsville districts, as reported by the "Courier," increased from 314,409 tons during the week of Mar. 9 to 335,122 tons. Shipments of anthracite also increased slightly, from 41,807 to 42,265 cars.

For the country as a whole almost no change occurred during the week ended Mar. 9. The ratio of production to full-time capacity was 70.6 per cent., as compared with 70.7 per cent. during the preceding week. Fluctuations in output were reported in certain localities, but in general operating conditions have been singularly constant for the last two weeks.

The most favorable operating conditions are reported by the South, Southwest, Far West, and Rocky Mountain States. In the Middle West the output at present ranges from 70 to 75 per cent. of full-time capacity. It is in the great producing districts of Pennsylvania and West Virginia that car shortage continues most acute. In only three districts in those states has the output exceeded 70 per cent., of capacity during the last two weeks.

In the beehive coke industry the 65 operators reporting produced 296,030 net tons of coke during the week ended Mar. 16. The ratio of production to capacity, as reported by the railroads, increased from 60.8 per cent. during the preceding week to

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended:			
	Feb. 23	Mar. 2	Mar. 9	Mar. 16
Bituminous shipments, 121 roads	189,691	197,415	200,239*	188,631†
Anthracite shipments, 9 roads	36,612	39,875	41,807*	42,265†
Beehive coke shipments, 4 roads	11,634	12,911	13,032*	13,218†

* Revised from last report. † Subject to revision.

64.1 per cent. The improvement was made possible by a better supply of cars. Losses due to shortage of coke cars fell from 27.4 to 23.8 per cent. of capacity. Losses of output attributed to shortage of labor remained constant. The same operators shipped 161,350 tons of coal, or 37.3 per cent. of their capacity as shippers of coal.

The high standard of performance reported from byproduct operators last week was equaled and even exceeded during the week ended Mar. 16. The ratio of production to maximum capacity rose from 86.4 per cent. during the preceding week to 87.7 per cent.

Out of the 12.3 per cent. of maximum capacity which the byproduct plants of the country failed to realize in actual output, 6.5 per cent. was lost through lack of coal; 0.2 per cent. because of labor trouble; 3.3 per cent. on account of repairs to plants, and 2.3 per cent. for all other causes.

Operating conditions in the several states varied but little from the performance of the week before. Kentucky was the only state to record a material decrease. The great improvement in byproduct operation during the last two weeks is evidenced by the fact that the state reporting the least favorable conditions—New Jersey—is now operating at over 75 per cent. of capacity.

BUSINESS OPINIONS

Bradstreet's—The two great salient features of the week are the large number of reports of insufficient stocks in hands of jobbers, final distributers and manufacturers and the advices that despite improvement noted at a few centers where grain movement has been and is large, the country's railroads and railroad terminals are still congested and that the opening of water routes is longed for to lift some of the burdens of superabundant traffic. That governmental buying dominates everything is hardly worth repeating.

R. G. Dun—Movements in business have continued mainly in the right direction, with steady acceleration of manufacturing and distribution and a quickening of retail demands under favoring weather conditions. The development of Spring trade, while limited by the various war restrictions and the economies of the period, is satisfactory in many instances, and financial obligations are met more promptly as shipments go forward to points of destination with less general interruption.

American Wool and Cotton Reporter—Considerable South American wool not subject to Government control has been sold during the week under review. Much more wool is now in demand for civilian purposes. Medium and fine grades of territory wools have been in large demand. The cotton situation is very mixed. Many look for higher prices. One man states that it

will reach 50c. per pound. The labor situation is a difficult one. The woolen goods market is exceedingly inactive, as the heavy weight selling season is largely over. The situation appears reasonably satisfactory to both buyers and sellers.

Dry Goods Economist—This week saw spot transactions in cotton on the New York Exchange at 34.30c. and contracts for March delivery at 33.65c., with sales for later months up to January, 1919, at various prices, the lowest being 30.44c. No such quotations have previously obtained for any substantial quantities of cotton in the history of the United States. Speed in the movement of goods from factories to stores is increasing so slowly that conditions are still far from satisfactory. In many cases goods continue to reach their destination, though far behind time. As has been the case since the first of the year, or earlier, the reliance of buyers is still on the parcel post and on the express companies.

Marshall Field & Co.—The current wholesale distribution of dry goods is greatly ahead of the corresponding period a year ago. The volume of road sales for both immediate and future deliveries shows a large gain over the same week in 1917. Customers have been into market in greater numbers. The market on domestic cotton continues strong. Collections are good.

The Iron Age—The President announced on Tuesday that the agreed prices on iron and steel products would be continued for three months beyond Mar. 31, except that basic pig iron and heavy melting steel scrap would be reduced $1 in April. This means that a maximum price of $32 at furnace for basic iron, $35.20 for bessemer iron, or a reduction of $1.10 a ton, and $29 instead of $30 for heavy melting scrap. The Government's car and locomotive orders, on which the reasons for delay have been inscrutable, are expected any day. First expectations must be revised, and if the total of car contracts distributed from time to time in the next few months proves to be but 50,000, the year's plate requirements on car and locomotives account may be 1,000,000 tons less than early estimates.

Atlantic Seaboard

BOSTON

Situation grows complicated. "Emergency" receipts light, and increased movement on contract coal not enough to give industries the reserve they want. Railroads and utilities operating on narrow margins, especially the larger ones, although New Haven Road is now in comfortable shape. J. J. Storrow's speech at Springfield makes a deep impression. Much hard work being put in for better supply of tonnage to bring New England's coal. Rail movement averages well. Still great perplexity over season after Apr. 1. Premium coal rumored. "Zoning" plan on paper throws an increase in volume toward Hampton Roads. It means a further access of regulation. Disparity in price between Pocahontas and New River. At piers a surplus of coal over bottoms. Anthracite water movement dependent upon number of tugs available. Outlook for more power is dubious.

Bituminous—A lean period was predicted for Mar. 15 and it looks as if the time had arrived. Receipts here are dependent now almost exclusively on steamers, and it happens that they are so placed at this writing that arrivals are not keeping up with coal consumption. Relatively few bottoms were at the Virginia terminals last week, and the Boston & Maine R.R., for instance, has been obliged to land heavily on what cargoes were discharging. The result is that a number of plants relying upon shipments that they were listed to receive are going to be without fuel unless some other source yields relief. Many large factories that were comfortably supplied during the season thus far are now exhausting their reserves and are finding to their surprise that prompt deliveries are not forthcoming.

The fuel administration for the present is taking less coal from the Shipping Board and other Government pools at Hampton Roads and is suggesting to the regular coal agencies that the latter furnish their own coal for such steamers as are in the service of the New England fuel administrator. Practically all the shippers have plenty of coal to their credit in the Tidewater Coal Exchange, so marked has been the shortage of bottoms, particularly among the factors who are less consistent shippers to this market but who at the same time account for a considerable tonnage.

The immediate situation falls hardest upon the largest users. The railroads and big utilities like the Boston Elevated Ry. are running on a hand-to-mouth basis and most of the large textiles are in the same position. Buyers are getting apprehensive and in the absence of any program the anxiety is fast increasing. New England has been accustomed to stocking coal, has done it as a matter of necessity, and the inability to get more than a few days' supply at a time is causing real alarm. One large consumer in easy position at this time is the New Haven R.R. A week ago this situation was so obvious that the Fuel Administration at Washington ordered coal that was standing to the credit of the New Haven in the Tidewater Coal Exchange to be turned over at the piers for emergency use. This was mainly at the New York ports, where there is now relatively much less on hand than there are boats waiting.

J. J. Storrow's speech to the New England Coal Dealers Association at Springfield on Mar. 21 focused public attention on the state of coastwise shipping. It drew forth editorial comment and answered many of the criticisms that have been heaped upon the fuel authorities for not making adequate plans to deal with the problem.

The New England fuel administrator is making every effort at Washington to get consideration in the matter of ships. The work is incessant, else no bottoms are forthcoming. Something has been said about wooden ships under one of the early programs of the Emergency Fleet Corporation, but as carriers of any tonnage worth while there seems to be some question. It is said that for oversea traffic, after allowing for ship stores, bunker coal, and other supplies, a so-called 3000-ton ship would actually take about 1000 tons of coal across the Atlantic.

Effective Mar. 23, the authorized price on coal in the Pocahontas district is $2.45 per net ton of 2000 lb. for run-of-mine. This makes a disparity of 60c. between New River and Pocahontas, two grades that have always been competitors in the same markets and until last fall were upon the same price basis. If price were any consideration this ruling would be certain to upset selling arrangements of long standing and would cause no end of confusion. As it is, buyers will gladly take either coal, provided they can get the bottoms to move it, and the mine operator in the more favored field will smilingly pocket his extra money.

A similar price adjustment has been ordered for part of the Pittsburgh field in Pennsylvania. The effect of these moves on the volume of coal produced remains to be seen. Operators will not be so likely to exert themselves getting labor, if the selling price is continued on a $2.45 basis.

Rail movement through the gateways continues favorable. On the 25th nearly 1400 cars of coal came through all the transfer points, although Harlem River and Maybrook on the New Haven are still difficult. There is a marked shortage of locomotives, although improvement in this respect is promised within a few days. The total accumulation at both points on the same day was in excess of 3000 cars, all kinds of freight.

Buyers who return from certain of the bituminous regions report an utter inability to negotiate contracts for next season. No program with regard to priorities or "assigned cars" has yet been announced, and the perplexity of New England consumers is something large. Meanwhile there are very definite rumors that liberal premiums are being exacted.

Anthracite—The great anxiety of retailers along the coast is over the prospect for tugs to move barges. Our company alone is reported to have had 24 loaded barges in the Delaware River at one time awaiting power, and only three tugs en route. The prospect for more tugs cannot be said to be hopeful.

NEW YORK

Complaints made of lack of anthracite domestic sizes. Situation serious and shipments are slow. Retail dealers receive plan of distribution. Retail prices may be reduced 35c. Bituminous miners restless. Car supply poor and production is light.

Anthracite—Everywhere one hears complaints of the lack of supplies. The demand for coal continues unabated notwithstanding the discount of 30c. per ton at the mine which Dr. Garfield has announced goes into effect on Apr. 1. The heavy production at the mines has had no apparent effect on stocks at the loading docks here. On all sides is heard the plea for more coal, but receipts do not increase. No one seems to have any surplus to sell to the spot buyer, and the retail dealers who have their usual source of supply are among those who complain. At the wholesale offices it is stated that the usual shipments are being made, but that the demand is unusually heavy for this time of the year.

The mines are working steadily and almost every conceivable kind of a car is being filled with coal, but there are days when cars are not to be had and the mines are idle.

The retail distribution plan for the year ending Mar. 31, 1919, was announced on Monday of this week by County Fuel Administrator Reeve Scaley after a conference with the retail dealers of Manhattan Borough. Dealers are to fill orders for consumers on their books during the previous year, but no order shall be filled until an order blank signed by the consumer shall be presented, the order shall then be given a serial number. The dealer may then make delivery in full when the order does not exceed six (6) tons. Should such order exceed in the aggregate six tons, no dealer shall deliver or cause to be delivered more than two-thirds of the amount of the necessary requirements for the year ending Mar. 31, 1919, until each customer who has placed an order and is willing to receive delivery has received two-thirds of his necessary requirements. Afterward the other one-third shall be delivered.

Dealers are required to file with the County Fuel Administrator a statement containing names and addresses of household consumers to whom aggregate delivery of more than 50 tons has been made, together with the amount of tonnages so delivered in the previous month, and a statement containing the names and addresses of apartment houses or consumers to whom an aggregate of more than 100 tons has been delivered for storage.

No coal shall be delivered for storage in areaways, backyards, vacant lots, etc., without the special permission of the Fuel Administrator, and no dealer shall deliver carload or bargeload lots to any domestic consumer or group of consumers without the permission of the United States Fuel Administrator. Any dealer or consumer who violates the regulations is subject to the penalties prescribed by the Lever Act, which imposes a penalty of $5000 fine or two years' imprisonment, or both.

There has been no let up in buying in anticipation of the discount announced to become effective on Monday next. Shippers have not been in a position to guarantee plenty of coal and buyers have been ready to purchase every ton available.

Retail dealers report many orders for next winter's requirements on hand, all of which have been accepted subject to regulations and prices at the time of delivery.

The anthracite steam coal situation is easier. No announcement has come from Washington as to Government prices for these coals. Buckwheat No. 1 is hard to get, but rice and barley are easier, the latter particularly so because of the scarcity of bituminous with which it is mixed in many instances.

Current quotations, per gross tons, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.30	$7.05
Egg	6.20	6.95
Stove	6.45	7.20
Chestnut	6.55	7.30
Pea	5.05	5.80
Buckwheat	4.30@5.00	5.50@5.80
Rice	3.75@3.95	4.50@4.80
Barley	3.25@3.50	4.00@4.25
Boiler	3.50@3.75	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—Local conditions are anything but satisfactory. Supplies are short and there is little coal left for the spot buyer. Dealers generally are of the opinion that unless conditions change quickly the situation here will become serious. They also believe that a change for the better must come shortly or there will not be much chance of preventing a serious shortage of coal in this market next winter.

Conditions at the mines are serious. Car supply has been so bad that day after day the miners have been idle until now they are in many cases without money, some of them have been unable to earn more than enough to pay running expenses. They are now becoming discouraged and unless conditions improve quickly the operator believes many will seek other means of employment. Government reports show that for the week ended Mar. 16 bituminous production shows a decrease of 579,000 tons.

Dealers are more favorably impressed with the plan to license jobbers, and at the conclusion of the two days' sessions of the National Coal Jobbers Association held here

it was announced that the Association recognized the distinct advance which the Fuel Administration has made in deciding to license the jobbers, which plan the Association takes as evidence that the coal jobbers will be permitted to use their capital and organization to help solve the war problems.

The bunkering committee of the Wholesale Coal Trade Association of this city has issued a supplemental list of pools suitable for bunkering purposes, as follows: South Amboy, Nos. 9 and 10—Any good Greenburg coal or its equal; Port Reading, Nos. 9, 10, 22, 23, 31, 33, 34 and 36; B. R. & P., 12, 14 and 15; St. George, Nos. 22, 23, 31, 33, 34 and 36, and Port Liberty, Nos. 9, 10, 23; B. R. & P., 12, 14 and 15. The bunkering situation is steadily improving and there is very little delay now in coaling vessels.

PHILADELPHIA

Anthracite trade still extremely active. New rules for dealers. Cross margin again fixed at $2.50. Cash discount eliminated. Steam prices now controlled. Short weights to stop. Distribution plans being worked out. Bituminous zoning plan announced. Development anxiously awaited. Modifications expected. Brokers almost idle. Traffic improves slowly. Priority orders objected to.

Anthracite—The month just closing has probably been the busiest March ever experienced by the trade. Ordinarily there is considerable easing off in business in anticipation of the April reduction, but this year the retailers have been busy straight through the month. As a matter of fact the householders have never really caught up on the shortage of last winter and the business now is created by the need of sufficient fuel to tide the people over the cool days of spring, and no anxiety is shown by them in the event that they will have a ton or two over for next year purchased at high prices. The receipts from the shipping companies have been fairly large, but not nearly so heavy as most dealers, especially the larger ones, would wish. Large tonnages continue to be sent to other markets by the operators and local dealers are wondering how long this will continue, as they are particularly anxious to start actively on their storage orders.

Aside from the business of selling coal the dealers have had a busy week familiarizing themselves with the rulings of the Federal Fuel Administration by which they are to be governed during the new coal year commencing Apr. 1. In a three-page letter of instructions mailed this week to all retail men in the county every detail is covered. The outstanding feature is that the gross margin of $2.50 per ton on egg, stove, chestnut and pea, as now allowed by the authorities, is not to be disturbed.

While the dealers are not loud in their complaints, yet they feel a great injustice has been done them by the rule that forbids them to charge more than 25c. per ton for carrying coal into cellars. This is particularly unfortunate for the suburban dealers who serve few homes where coal can be unloaded directly from the street into cellars.

For the first time the gross margin of profit on anthracite steam sizes delivered by retailers to steam trade, including buckwheat and smaller sizes, and also bituminous coal, is to be regulated beginning with Apr. 1. On the former it is not to exceed $1.75 per ton for chute delivery, where the fuel is for power, commercial, hotel or apartment house purposes. On the latter where the uses and method of delivery are the same, $2 is the limit fixed as the gross profit.

This week the Federal Fuel Administrator for Pennsylvania stated he believes he has succeeded in convincing the operators they must stop mixing relatively low-priced pea coal with high-priced chestnut. This practice was one of the most difficult problems confronting his administration.

The basis of distribution for the coming coal year has now been about worked out by the operating companies. All shipments will be based on deliveries made for the period from Apr. 1, 1916, to Mar. 31, 1917. It is understood that no company will accept any business from buyers who have had no shipments during that period, except for some very good reason, such as slow pay or poor financial condition. While the plan is believed in a general way to be a fair one, there are bound to be many difficulties crop out if it is strictly adhered to.

It seems now that the question of carload deliveries to private consumers is about to be satisfactorily settled. The fuel committee has let it be known that it is not its intention to interfere with legitimate deliveries of this kind, particularly where the hauling of the coal is done by a regular retail dealer. This applies particularly to such parties who have been accustomed to buying their coal in this manner for a number of years, or at least prior to April, 1916. It will be necessary to have the approval of the local committees so that the usual check to prevent hoarding may obtain.

There has been some little lull in the very small sizes of steam coal recently. Some of the larger companies have been long on barley and have actually solicited new business. Among the individuals, who are the principal shippers of culm, it is reported that this size is also somewhat dull.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—With the announcement of the zoning system by the Government the trade anxiously awaits the working out of the plan. While some doubts have been expressed from the very beginning of the plan, it can be taken for granted that the coal men will do the utmost to give it a fair trial.

The railroad traffic conditions while very much improved over the past winter are still far from meeting the demand. It now seems to be almost entirely a problem of motive power, and it is stated that if locomotives could be kept in repair this phase of the problem would soon be eliminated. However, the railroad officials continue to assure shippers that they can note a constant change for the better and it is hoped that they will soon be able to show real results.

BALTIMORE

Easiest market for weeks despite drop in national tonnage report. Jobbing trade busy making new connections. Retailers wait for orders.

Bituminous—While official Washington reported a decidedly decreased mining tonnage for the past week, the supply situation here was the easiest for weeks past. There was no longer evidence of scramble, although the fuel administrator is still directing certain apportionments. The local relief was probably largely due to the fact that the railroads managed to clean up part of the considerable congestion of loaded cars at Brunswick and Cumberland. Because of congestion that continued on some of the northern connections, considerable coal that was billed that way was reconsigned and moved here in order to get the sidings cleaned up. The supplies both at tide and for all rail trading were therefore fairly easy. The jobbing trade is busy adjusting itself to the new conditions to exist after Apr. 1. Many large consumers have already signed up with jobbers to retain the latter as purchasing agents. The public as a whole in fact seems more concerned with establishing some stable supply connection for the coming year than with the method of exact price. There appears to be little complaint on the plan of allowing jobbers the commission for service and credit extension in many cases. The jobbers themselves, while they did not get all they asked through the modification of the original drastic order wiping out jobbing commissions, appear to be well satisfied with developments.

Anthracite—The fuel administrator here has not announced his definite plan of action for retailers after Apr. 1, or the schedule of prices. It is generally accepted that the card application system will be put in force for purchasers. A plan to supply but two-thirds of the book orders to any one consumer at the outset of the year seems a strong probability.

Lake Markets

PITTSBURGH

New zoning system studied. Arrangements for Pittsburgh and Connellsville districts quite satisfactory. Prices reaffirmed. Heavy contracting done. Some free coal offered.

Interest in the coal trade this week is centered largely upon the details of the new zoning system, which became available at the beginning of the week. Satisfaction is universally expressed that the Pittsburgh district has been given so much latitude, that indeed it is not confined to one exclusive zone at all, as is the case with the great majority of producing districts.

Such necessary movement of Pittsburgh and Connellsville coal into Ohio as would be interfered with by the zoning system will be taken care of by the special permits provided. All the normal movements of byproduct coal will be thus covered.

The reaffirmation of former prices as applied to the Pittsburgh district, as announced late last week, seems to have been fully expected by the trade. The basis price of $2 was reaffirmed and this carries with it the 45c. extra as well as the differentials for slack and screened coal. Thus the only change that will occur Apr. 1 is the slight change in the position of brokers, whereby they must be licensed and will be permitted to make a profit by buying under the set price and selling at any price up to the set price, being permitted also to make brokerage transactions as formerly, with a charge up to 15c. to the consumer. In view of the latest costs reported to Washington the price is a favorable one for the district and leaves no possible ground for complaint on the part of producers with mines that are in the least efficient.

There has been a heavy contracting movement in the past few weeks, for the twelve months beginning Apr. 1, the fact that prices were not fixed for the period not being a drawback, as buyers knew they would have to buy and sellers knew they would have to sell, and there was no fear that prices would be prohibitively high or prohibitively low. The possibility that free coal may at times sell below the set price did not discourage large consumers from making contracts, as it has been a common experience in the past for spot coal to sell below contract prices, the contracts being advantageous to buyers nevertheless on account of the steadier deliveries obtained. There is now a moderate amount of free coal offered in the market, but it is chiefly of relatively low grade. The local fuel administration is just beginning to appoint inspectors to watch coal and indicate any that must be improved or sold at a 50c. discount. The market remains quotable as follows: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with permission to brokers to charge 15c. extra to buyers when regularly commissioned to make a purchase for them.

BUFFALO

Coal more plentiful. With enough cars the situation would be easy. Jobbers still wondering over their fate. Not much faith in the zoning plan.

Bituminous—The supply is not good, but it is so much better than it was that nobody is complaining now. At the same time all of the former uncertainty remains. The jobbers are making haste to get licenses and they will live up to them if they know what is required. The difficulty now is that so many new orders come out that nobody knows what to do. This has been the case for a long time.

The jobbers are gaining in confidence, though they hardly think that all of them will be needed. All effort is being made to obtain contracts with the mines and quite a good many have been made, though they are not much more than understandings between producer and distributor. Everything has to be made subject to Government regulation. Still it is the idea that a contract of any sort tends to keep the jobber and the operator closer together. It at least appears to be certain that if the operator turns his back on the jobber the consumer will take him up. The complaint is that the arrangement of prices gives all the profits to the operator.

Price quotations are about out of the question, especially since the zoning order has come out, for it is doubtful just what the special coals which may go anywhere, really are. If this section is to be confined regularly to Allegheny Valley coal, there is going to be difficulty, for it is hard to get miners to work the thin veins of that region.

Anthracite—The situation turns on the coming April prices. The supposed decline of 30c. a ton has not yet been confirmed by the companies, so the shipping agents here are not able to make any prices and some of them send the April orders back to the retailers. They do not exactly know what to do. Meanwhile the city supply is good enough to meet all emergencies and the county fuel administration is finding little to do. It is not expected that the supply will run down again this season. At the same time there is clamor for next winter's coal, but that cannot be met now. Canada is uneasy. Shippers are saying that more anthracite was shipped there last season than should have been and advise the buying of bituminous to help out.

DETROIT

Receipts of bituminous coal comfortably offset requirements. Anthracite supply is short. Retailers ask $3 margin.

Bituminous—There is quite a satisfactory movement of bituminous coal into De-

troit, the amount arriving offsetting in large degree the current requirements of steam and domestic consumers, though the quantity is not so great that any free coal is to be found on tracks. The larger proportion of the shipments are from West Virginia and Ohio mines and practically no smokeless coal is to be found.

Steam coal users are maintaining a steady demand, which has been somewhat increased in volume by the operation of several large new industrial plants employed in the manufacture of war munitions. Wholesalers and jobbers are advising customers to take advantage of present conditions, wherever possible, by creating reserves. There is reason to believe some effort is being exerted to accomplish this, though in the case of many of the industrial plants the lack of facilities for coal storage in quantities greater than would provide for a few days' needs prevents any important accumulation.

Uncertainty as to what prices will prevail later in the year is serving quite effectually as a handicap on the closing of contracts for future delivery. This is especially true in reference to retail dealers who fear that coal bought at present price might hinder distribution to customers, if competing dealers by delaying their buying should obtain coal cheaper. Meantime the period when lake navigation will reopen is rapidly approaching, and with its arrival there is great probability the shipments by rail will be largely diminished.

Anthracite—Jobbers and retailers are puzzled over the anthracite problem. Receipts are light, so small in fact that retail dealers are in many cases unable to supply customers requiring stove and egg sizes. Efforts to obtain an explanation of this condition at a season of the year when the movement of anthracite might be expected to show good volume have been unsuccessful.

Detroit retailers are protesting against the contention of W. K. Prudden, Michigan fuel administrator, that a margin of $2 a ton should be adequate on domestic business in the period after Apr. 1. The retailers insist a $3 margin is necessary to offset increased costs.

COLUMBUS

Steam demand is keeping up well, but there is a slight falling off in domestic orders. Contracting is held up awaiting the revised price list and the completion of the zone plan of distribution.

The continued warm weather has taken the edge off the domestic trade in Ohio and consequently there is a slightly softening tendency shown during the past week. The steam trade continues strong in every particular, and producers as well as distributors believe that the present status of the market is merely a breathing spell before the coming of the lake trade, which is expected to be strenuous. The tone of the market is fairly good and future prospects are considered bright.

Consumers of steam grades have been taking advantage of the slight lull to accumulate some surplus stocks and many have succeeded in laying in quite a surplus. This is especially true of the public utilities corporations, which suffered a great deal last winter. Manufacturing plants of all kinds are now being operated with a full fuel supply. Railroads are also using a large tonnage as the freight movement is as heavy as formerly. Contracting for steam tonnage is being held in abeyance until after Government prices are readjusted.

The domestic trade is rather quiet, which is something new in that branch of the business. Retailers are stocking up to a certain extent, and many householders are laying in their next winter's supply of fuel. Nevertheless there is a slight softening noticeable and this is expected to continue until after the lake season opens. Retail prices are firm at the levels which have prevailed for some time. Pocahontas is in good demand and stocks are extremely scarce. Some West Virginia splints are finding their way into the local market. Anthracite is arriving only in limited quantities.

The production in Ohio fields has been fairly good during the past week. This is especially true of the Hocking Valley and Pomeroy Bend fields. In eastern Ohio there is still a shortage of transportation and the output is restricted to about 65 per cent., a part of which is taken for railroad fuel. Other fields are producing a good tonnage.

The lake trade is expected to open earlier than formerly, judging from reports from the upper lake region. At least producers and jobbers are looking forward to an early opening and preparations have been made to rush a large tonnage to lake ports as soon as possible. Some fix the date for the opening of navigation at Apr. 15.

Prices of short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.80	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

Heavy demand from all departments of the trade, for summer delivery and for immediate use, continues. Freight congestion is hampering business, although the car supply is better.

With the complete realization which exists among coal consumers, large and small, of the necessity for getting an adequate supply of fuel in storage during the spring and summer months, the demand for coal is continuing at a figure never before known this early in the season, and bids fair to increase, rather than diminish, as the spring advances. It is also true that the current season of consumption for heating purposes is not yet over, as a period of warm weather has been succeeded in this section by colder weather, necessitating further consumption of coal by domestic consumers, which has furnished additional stimulus to the demand in the retail market. The restrictions imposed upon purchases by domestic consumers have also served as a warning that it will not be possible to obtain coal at any time and in any quantities desired; while industrial consumers, on the other hand, have fresh in mind the conditions which existed during the past winter, from which many are only now recovering. The serious congestion of freight at all terminals, including Cincinnati, and on the tracks of all of the railroads, is interfering badly with the movement of coal, and gives every indication of hampering the movement of fuel during the summer months to an extent which will prevent a normal movement. This is a factor which the trade is fully aware of, and is one which cannot, apparently, be disposed of.

LOUISVILLE

Short car supply is handicapping operations in both eastern and western Kentucky fields, increasing difficulty of operators in holding labor. Domestic and steam demand both good, with dealers anxiously awaiting summer prices.

The coal mine operators of the city and state are sitting still, and waiting with much interest such a time as the Government decides to fix summer coal prices. Many dealers believe that prices will be fixed at the mine about Apr. 1, but actions of state fuel administrators in calling on the public to lay in their coal supplies now make it appear as though there will be no price-fixing done this year. Eastern Kentucky operators feel confident that mine quotations will be readjusted and are not anxious to book much additional business until the question of prices is settled. In the eastern Kentucky field the general situation is about the same, the supply of coal cars continuing short, with labor scarce and hard to hold.

In western Kentucky the car supply has been uncertain. The Louisville & Nashville has been supplying about 40 per cent. of coal car requirements, while the Illinois Central has been in worse shape, some mines not having a car on Illinois Central sidings for four days at a time. Under such conditions it has been hard to hold labor. However, there is a good demand for western Kentucky steam coal, with manufacturers endeavoring to buy nut and screenings, and domestic demand picking up somewhat due to many consumers endeavoring to place orders early. Yard stocks are picking up somewhat, and retailers are endeavoring to lay up stocks before booking any orders that are not for immediate consumption.

BIRMINGHAM

Current consumption causes a steady movement of steam coal, but booking of business for extended deliveries of both steam and domestic grades awaits new Federal schedules and regulations. Production improves little, as miners decline to work full time.

The heavy requirements for steam coal prevents any interruption in the demand and movement of this grade, but operators and consumers are holding off from the placing of orders for any large tonnages for delivery over an extended period until Government prices and regulations are announced. Domestic inquiry is light, dealers expecting some price concessions by Apr. 1, and the demand from consumers can be met early from present stocks.

Coal brokers view the new regulations philosphically and announce that they will be strictly observed when received. The opinion is expressed that legitimate business will hardly be impaired under existing conditions in the coal industry, the broker merely having to look to the buyer for his commission instead of the operator, the compensation allowed him being the same that is now being received.

Complaint is general that coal production is being curtailed seriously by the continued indifference of the miners to observe full-time schedules. The high rate of compensation mine workers are now receiving is principally accountable for these conditions.

Coke

CONNELLSVILLE

Movement improving slowly. Trouble on the Pennsylvania main line. Occasional foundry coke offerings. Screenings from old dumps offered.

The coke movement continues to improve at times and rarely loses any of the ground gained. In the first two months of the year there was no week in which shipments amounted to as much as 300,000 tons, but each of the first two weeks in March showed about 335,000 tons, and last week's shipments are estimated at 350,000 tons or more, while this week may show a slight further increase. Car supplies on the Monongahela R.R. were 60 per cent Monday of this week and 30 per cent. Tuesday, with expectations of better supplies later. One difficulty of late has been that a number of the cars furnished have been gondolas, some capable of carrying only 20 or 25 tons of coke.

Offerings of foundry coke in the open market are somewhat less infrequent than formerly, but there is still a great shortage and buyers usually have to show necessity before they can make purchases. Sometimes this can be done between buyer and operator, but frequently the good offices of the fuel administration are invoked. There is little spot furnace coke offered. As operations are irregular an operator with a surplus usually has some that has been in the oven 72 hours, and that is classifiable as foundry coke if sold to a foundry, hence it is offered in that form.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 16 at 335,122 tons, an increase of 20,713 tons, and shipments at 334,584 tons, a decrease of 631 tons. Rail shipments, however, increased a shade, as river shipments were only 4000 tons, against 9200 tons the preceding week.

The market remains quotable at the set prices: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1 in., $7.30, per net ton at ovens. Considerable business is now being done in screenings obtained from old dumps. A favorite method is for a contractor to buy a pile outright and get what he can. Some of this, fairly clean but with occasional lumps of "ash" and raw coal, has been sold at $5.50; but the brokers handling the business expect to get better prices as consumers become familiar with the quality of this material as salamander fuel and similar functions.

Birmingham—Movement of coke out of the district to which track equipment is restricted is being much hampered by inability to secure the necessary box-car equipment, and producers are getting behind with foreign deliveries. The demand continues good, and inquiries for foundry coke come from many distant points—Saginaw, Mich., for instance. Mexican interests have been negotiating for a large tonnage, but so far have been unable to place it.

Middle Western

GENERAL REVIEW

Market extremely quiet. Few storage orders of any consequence have been placed.

Market conditions the past week have been dull. The trade has been in a stage of expectancy, awaiting the announcement of the definite program to be outlined by the Federal Fuel Administration. The matter of zoning held up the placing of orders, and also to some extent the hopes of the buyer that Illinois and Indiana coal would be reduced in price.

The announcement of both a definite zone plan and the new prices for Illinois and Indiana has had the effect of putting the producer's mind at rest as to what he will be able to get for coal, as well as to the place he may ship the coming year. The trade is therefore planning to get down to business at an early date.

One of the shocks of the week is the announcement that there will be no smokeless Eastern coal allowed to move into this section. This does not include hard coal, which will be undisturbed other than what is naturally to be expected by reason of limited car supply and embargoes. Those who have used Eastern bituminous coal in former years are rearranging their boiler walls so as to get the highest possible efficiency from Western coal.

Car supply has shown some improvement over the preceding week. Particularly is this true on the Burlington and Missouri Pacific. The Illinois Central and Chicago & Eastern Illinois lines have not made so good a showing as the two former named. As a whole Williamson, Franklin and Saline Counties have had a 75 per cent. car supply. At no time so far has there been plenty of orders to take care of all the coal produced in any of the three foregoing counties. However, reports indicate that some of the mines in the Springfield and fifth and ninth districts are having some difficulty in moving promptly their outputs.

The new prices affect but two groups in Illinois, with the exception of mine-run, which will be 5c. per ton higher beginning Mar. 23.

CHICAGO

Market quiet on domestic, but steam users are absorbing all the better grades offered.

The announcement during the week that no Eastern bituminous coal would be allowed to come west has had a marked effect on the dealers. The policy in the past was to get as much Eastern coal as possible as soon as the winter demands were out of the way. It was expected that this course would also be followed this season, but since reliance will now have to be placed solely on Illinois and Indiana coals, dealers in most instances have made no plans to obtain a supply. Now that zone and price questions are settled, dealers expect to arrange their next year's connection at once and start the filling of customers' orders as rapidly as possible.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	.....
Washed egg	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.45@2.60	2.50@2.65	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Hocking	West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Warm weather brings tranquility to the fuel market. Coal and coke easily obtainable. Shutting down of malt houses releases anthracite buckwheat stocks.

Genuine spring weather has retired the subject of coal for the time being, but consumers are ready for a drive upon the coal piles as soon as April arrives and the Federal Fuel Administrator makes public his edict as to prices and limitation of supplies.

All kinds of coal and coke, except chestnut anthracite, seem to be easily obtainable in moderate quantities. The shutting down of malt houses released considerable buckwheat anthracite which had been held in reserve for that industry.

State Fuel Administrator W. N. Fitzgerald, upon his return from Washington, whither he went to consult the Federal fuel authorities, made a statement that in his opinion the supply of hard coal for Wisconsin the coming winter would be as great as, if not greater than, that of last year. A report from the East that many western states would receive nothing but soft coal caused much uneasiness among consumers whose furnaces or heaters will not consume bituminous coal.

ST. LOUIS

Extremely quiet situation with an abundance of coal from all fields and no absorbing market. Car supply still short on some roads. Steam demand quiet. Anthracite shipments good.

The market has been an extremely quiet one with plenty of coal under demurrage at East St. Louis from all fields. There has been a holding up of business by the buyers generally, anticipating new prices.

The prices announced under date of the 23d, showing an increase of 5c. a ton at the mine for Illinois mine-run and other prices, same as heretofore, should open up an extremely good business from now on.

The arrangement whereby western Missouri is not to get any Illinois coal is going to work an extreme hardship on a certain section of the state that has to a large extent depended upon Illinois for its principal fuel. Especially is this so when it comes to storage coal for the spring and summer months, inasmuch as Missouri coal will not store at all and Kansas coal is an extremely poor stocker.

Locally, the situation is quiet. There has been no domestic business, and the steam trade has been overloaded. From the Carterville field there has been an abundance of coal. The Wabash and Chicago & Alton embargoes against Chicago still hold, and this has caused an unusual supply of coal to be thrown in here.

Working time in the Carterville field is better than it has been for some time past. The car supply on the Illinois Central and Iron Mountain, however, is not good and motive power on both these lines is extremely poor. In the Duquoin the same condition practically exists.

The Mt. Olive field seems to be working better than the others and is finding a ready market for practically all of its tonnage. The car supply here is good, and there has been an abundance of this coal for the local market, as well as outside.

In the Standard field the same complicated conditions prevail. The Missouri & Ohio and the Illinois Central have been reduced to as low as one to two days a week car supply. The Illinois Southern Ry. transfer at St. Genevieve being out of order has thrown a great deal of Missouri & Ohio coal into the St. Louis market.

Practically all the roads at East St. Louis have unbilled coal. Working conditions in the Standard field have improved considerably. There is no dissension among the workers and conditions in a general way are very satisfactory.

There has been a considerable tonnage of anthracite coming in. The past week has probably seen 1500 to 2000 tons. A few cars of West Virginia smokeless has gone through and considerable Arkansas has been booked but not moving as yet.

Coke for domestic purposes is more plentiful than at any time since last summer.

There will be no change in the retail price of coal until some time in the early part of April, and the prevailing market here is per net ton f.o.b. mine:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.40@2.55	2.40@2.55	2.40@2.55
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	

I. C. C. Decisions

No. 8298—P. Dougherty Co. vs. Baltimore & Ohio Railroad Co. et al. Submitted Sept. 27, 1916. Decided Feb. 6, 1917.

Charges at Baltimore, Md., for trimming bituminous coal in single-deck vessels, with hatch openings of certain sizes, not found to have been or to be unreasonable or unduly prejudicial. Complaint dismissed.

No. 9558—West Virginia Rail Co. vs. Chesapeake & Ohio Railway Co. et al. Submitted Nov. 5, 1917. Decided Feb. 9, 1918.

Rates for the interstate transportation of light section steel rails in carloads from Huntington, in the state of West Virginia, to points on the line of the Norfolk & Western Ry. in West Virginia and Virginia, certain of which were prescribed by the Commission in West Virginia Rail Co. vs. Baltimore & Ohio Railroad Co., 26 I. C. C., 622, not shown to have been or to be unreasonable, unjustly discriminatory, or unduly prejudicial Complaint dismissed.

No. 9354—Lincoln Commercial Club vs. Colorado & Southern Railway Co. et al. Submitted May 14, 1917. Decided Dec. 15, 1917.

Upon complaint that rates on bituminous coal, nut, pea and slack, in carloads, to stations on the Chicago, Burlington & Quincy R.R., in the state of Nebraska—Sweetwater to Angora, both inclusive—from mines in the State of Colorado are unreasonable; and that the failure of defendants to publish and maintain lower rates on nut, pea and slack coal to the same stations subjects complainants' members to undue and unreasonable prejudice and disadvantage and gives to other coal dealers located at other stations in the same general territory undue and unreasonable preference and advantage; Held, that the evidence shows the adjustment of rates complained of is, as regards nut coal, unduly prejudicial within the meaning of the act.

General Statistics

SOUTHWESTERN INTERSTATE COAL OPERATORS ASSOCIATION

The following table, which gives a comparative statement of tonnage for the years 1916 and 1917, covers only tonnage of Association members estimated as approximately 95 per cent. of production in Missouri, Kansas and Arkansas and 20 per cent. in Oklahoma since September, 1916.

State	1916	1917	Increase	Decrease
Missouri	3,088,734	3,627,418	538,684	.....
Kansas	6,116,351	6,511,860	395,509	.....
Arkansas	1,364,274	1,487,774	123,500	.....
Oklahoma	1,851,207	651,816	.....	1,199,391
	12,420,566	12,278,868	1,057,693	1,199,391

NORFOLK & WESTERN

Below is a statement of the coal tonnage from mines on the Norfolk & Western Ry. and from other railroads, for the month of February, 1918:

From:	Net Tons
Pocahontas field	1,309,126
Tug River field	272,704
Thacker field	234,624
Kenova field	77,658
Clinch Valley field	121,156
Other Northern and Western fields	16,532
Total Northern and Western fields	2,031,800
Williamson & Pond Creek R.R.	151,588
Tug River & Kentucky R.R.	49,623
All other railroads	71,070
Total	2,304,08.

COAL AGE

Volume 13 NEW YORK, APRIL 6, 1918 Number 14

The Loan—A Great Opportunity

THE Liberty Loan offers to the coal operator an opportunity to transform his employees from men without a definite aim into men with a well-defined purpose in life. Some men have never saved anything except what they have spent in sundry furnishings for their homes, which furnishings are already sadly mauled and disfigured by frequent shiftings from village to village.



"MA, THAT'S THE COMPANY WE'RE STOCKHOLDERS IN"

The chance is good to sell them something that will stand by them in the future, something that will make them feel that they have a recognized place in the order of things. We do not really become a part of the country till we have contributed to its support, whether as tax payers or as bond buyers, for "where our treasure is there will our heart be also."

The Liberty Loan furnishes the opportunity for starting America on a road of thrift, a chance to remodel our old shiftless habits and give us a steadiness, a determination and a purpose which too many of our workingmen have hitherto not had.

Drift will give place to thrift. It is time that some such change should take place, and the coal operator will fail to do his duty to the country and himself if he neglects to take advantage of it.

The recognition of a public duty, the exhibit of public spirit on the part of a citizen raises him out of the narrow rut of his individualism. If to spend money on a flag makes a man a better citizen, lending and spending money to defend that flag will make him a super-citizen.

There is too much disposition to say that large sales of bonds cannot be made. They can be sold if we have the necessary enthusiasm and faith and put the right energy in our canvass. Properly appealed to, there are few workingmen at mines that work with reasonable steadiness who will not buy bonds and pay for them in short order.

The need of our country appeals forcibly to every man, woman and child. Let every operator get the men together, and if he can't make a convincing speech himself, after a few words of introduction, let him call on some politician or some church orator. Let him post the timely bulletins that he will find in *Coal Age*, both in the editorial and advertising departments of the paper. Let him supplement these by the telling cartoons in the daily newspapers and such bulletins as are being distributed by the various Government departments and the National Safety Council.

But the appeal by word of mouth is worth all the others. The coal operator should lead in this Liberty Loan movement and indeed in all good movements. He should identify himself with every good work. He should put himself always in the position of leader among his men.

Our social work is too much restricted to mere talk as to the appropriate relation of the employee to the employer, to the stupidity of class antagonism and to the value of co-operation. All such disquisitions are true but unconvincing.

What we need is a positive programme, a national purpose, an actual co-operation, an act of faith and service in which we are all equally engaged, and there will be less need then to discuss just exactly where we all stand in relation to one another.

IDEAS AND SUGGESTIONS

Frog, Switch and Track Formulas

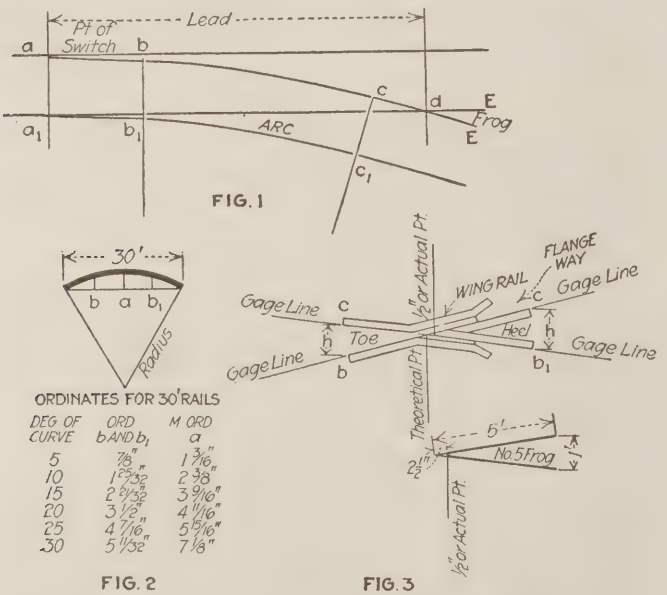
BY O. H. HAMPSCH
Washington, D. C.

In the figures and tables below I have given several simple and fundamental principles of track laying as applied to mine work. Too often little or no care is taken in laying track in important places in mines, whereas if the foremen were familiar with a few track rules and tables more regular turnouts could be made.

A poorly laid switch or frog is a weak point in a track and the cause of many derailments and accidents. These cost time, output and money. They might be avoided if a little pains were taken in laying switches.

In most cases I have found the trouble with switches to be that the curvature and angle of frog do not correspond with each other as they should (a No. 4 frog, say, having a No. 6 lead) or that the stiffness or flatness of the curve is out of proportion to the frog angle. It must be remembered that in manufacture the switch points and frogs are made straight and not curved with the lead rail as many suppose. In Fig. 1 only the distance bc or bc_1 is curved to connect switch points and frog, the position of the frog to vary with the angle and lead.

Fig. 3 shows the terms most commonly used in handbooks and track tables. Simple rules for measuring frog members are as follows: Measure the spread h on the toe of the frog and add to it the spread h_1 on the



FIGS. 1, 2 AND 3. ILLUSTRATING SWITCH DATA

heel of the frog, taking care that the measurements are made to the running or gage line of the rail. Next measure the length of the frog bc or bc_1 of the same unit—that is, in inches or feet and decimals thereof. Divide the spread $h + h_1$ into the distance bc (or bc_1) and the number corresponding will give the number of the frog. Example: If $h = 6$ in., $h_1 = 9$ in. and $bc = 60$ in., the frog number equals $\frac{60}{6 + 9} = 4$.

Another rule for ascertaining the frog number is to find the point f on the frog where the spread equals 1 ft., and from this point measure the distance to the theoretical point or the intersection of the gage lines. This point is in front of the actual or ½-in. point, the distance being one-half of the frog number in inches—that is, a No. 6 frog distance from the actual to the theoretical point equals 3 in., a No. 5 frog 2½ in., etc.

The observance of a few of the fundamental rules regarding frog, switch and track laying, and the exercise of more care in laying tracks by trackmen will do much to diminish the many derailments and accidents caused in mine work. These have heretofore too often been disregarded.

You buy LIBERTY BONDS *because you believe with every American in backing this war to the last dollar, the last soldier, the last ounce of energy.*

Counting Revolutions Without a Counter

BY W. F. SCHAPHORST
New York City

A speed counter is not an absolute necessity for determining the speed of a turbine, motor, spindle, shaft or other rapidly rotating machine part. Speed can be counted "by hand" to a surprisingly high limit by using the fingers in connection with the nimble mind.

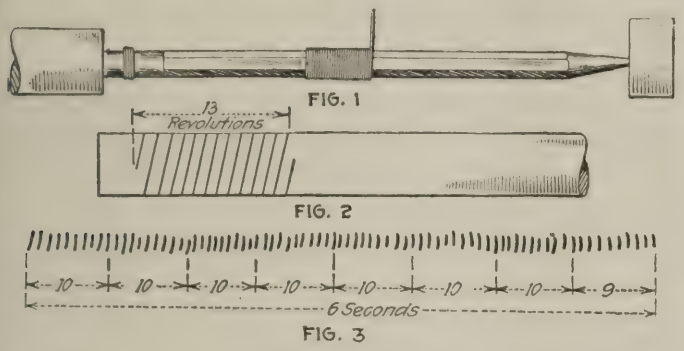
For instance, you can count up to 10 very quickly—much more quickly than you can from 10 to 20. This is because it takes more time to allow the longer names to pass through your mind, such as 13, 14, 15, etc. They are all two-syllable words, whereas one, two, three, four, etc., are mainly one-syllable words. The logical way to count rapidly, therefore, is to count up to 10 over and over and keep tab on the number of times counted to 10 on your fingers. It will surprise you how easy it is to count in that way. To count 400 or 500 r.p.m. in that manner is no trick at all. If one should try counting "straight," however, he will find it too cumbersome to say "twenty-one," "thirty-seven," etc., even mentally, and the job will have to be abandoned.

I stumbled upon this method of counting mentally quite by accident one day while testing a gasoline engine. I permitted the key in the main shaft to strike my finger at every revolution and mechanically tried to count. I found that I could get up to 10 easily, but not far beyond, and as a result I thought of this repetition method of counting.

Just let some projecting piece from the shaft, pulley, or whatever it may be, strike a finger of one hand as it rotates, and with the fingers of the other hand keep tab on the number of tens. It is not necessary to count

a full minute, of course. If you count for 15 seconds, multiply the result by four and the product is the revolutions per minute. If you count for 10 seconds, multiply the result by six and the product, again, is the revolutions per minute.

Another simple way is to attach a long thread to a lead pencil (Fig. 1). The pencil should have a rubber



FIGS. 1, 2 AND 3. VARIOUS METHODS OF COUNTING REVOLUTIONS

eraser at one end. Hold the eraser end against the end of the shaft in the same way that the regular speed counter is used, pressing against the point of the pencil with a piece of hard wood or metal to provide a pivot bearing, and the thread will wind upon the pencil as it spins around.

At the end of a half minute, or five seconds, or any convenient interval, remove the pencil and count the number of turns of thread upon it. It is then a simple matter to compute the revolutions per minute. If you have had the pencil winding the thread for six seconds, multiply the number of turns by 10 and the result is the revolutions per minute.

If conditions are such that the machine or shaft can be stopped temporarily, a simple way to count the revolutions is to run a lead pencil lengthwise of the shaft for a period of five, ten, or more seconds, making a mark on the shaft during that period (Fig. 2). The mark made, of course, will take the form of a spiral, and all that is necessary is to count the number of turns made during the test period and then compute the revolutions per minute, which is done as already explained.

This method is valueless if the shaft cannot be stopped. One point worthy of remembering, however, is that the mark will remain on a shaft for some time. At the end of the day's run, therefore, it would be possible to count the revolutions per minute made during any period of the day. If the shaft is a long one it can be made to register the speed during any hour or every hour.

Another effective and simple method is to file a nick in the end of the shaft and run a piece of cardboard or paper along against the edge with the result seen in Fig. 3. A series of marks will be made on the paper as indicated in the sketch, and by timing the operation and counting the number of marks it is a simple matter again, just as above, to determine the speed of the shaft. Even if the speed is 3000 r.p.m. or more it makes no difference with this method.

For example, this record shows 79 marks made on the paper in six seconds. It will be noticed that I have divided the record into groups of 10 marks to facilitate counting and in order to guard against error. "Divide the number of seconds into 60 and multiply by the number of marks" is the rule that applies to this and cases explained in the foregoing.

$$60 \div 6 = 10$$
$$79 \times 10 = 790$$

Therefore the shaft makes 790 r.p.m.

It is now clear that a special speed counter is not an absolute necessity. There are many ways in which problems can be overcome that appear difficult at first blush. A speed counter is handy, to be sure, and one should be owned if it is necessary to determine speeds often. But for special cases any one of the above hand-made counters will do quite well indeed.

You buy LIBERTY BONDS *because the man behind the gun is doing his bit and you want to do yours. He cannot fight long without your help.*

Coal Mining in Relation to Engineering

BY L. H. FRIEND, M. E.
Denver, Colo.

Many coal mines develop, become producers and get along for some time without the assistance of an engineer other than to comply with the law which requires a map of the mine to be made every six months, showing the area of coal extracted. This is possible where an expert looked over the ground before operations were started and had an accurate survey made to show the topography of the ground at the probable site of the plant.

Anyone laying out a plant would also often advise prospecting by drill and otherwise to determine conditions under which the coal seam existed. Drill holes should give the thickness and quality of the coal, the nature of the top and bottom rock and the elevation of the seam at different points. If the drill holes have been put down systematically and in sufficient number, then the strike and dip of the coal seam can be determined.

The consulting engineer, being provided with complete information, determines the best underground development, harmonizing it and the surface improvements to secure the best results in the mining, preparation and shipment of the coal. It is important that a system of mining be planned which will give not only a satisfactory daily tonnage but also recover a large percentage of the coal—give a plant which will at the same time be a source of pride and profit to the owner.

In the operation of the mine, an engineer can to advantage set sights in rooms and entries, thereby securing uniform development and tend to prevent a squeeze and other difficulties. Levels run on haulage roads give a profile which discloses at once where hollows should be filled in and high points be cut down. A more uniform grade permits of cheaper haulage and increased tonnage.

If a mine is to show satisfactory results it should have in the management a capable man who will pay strict attention to details of operation—good ventilation and drainage, straight rooms and entries with adequate pillars, good rolling stock and sufficient power to move it, etc.—one who thoroughly understands men and machinery.

New Plant and Mines of the Coal Run Mining Company

BY DEVER C. ASHMEAD
Tarrytown, N. Y.

SYNOPSIS—*Article describes a new plant under construction and a standard system of mining to be adopted—a panel system is to be employed which is somewhat different from that ordinarily followed. Trolley and storage-battery locomotives will be installed. Tipples are standard in design.*

TWO old mines are being remodeled and four new mines opened by the Coal Run Mining Co., at Coal Run, Penn. These operations at the present time have an output of 1700 tons a day, but when the new developments are completed about 4600 tons of coal a day will be produced. The company owns approximately 4000 acres of coal land and intends to take all the coal out through the six openings mentioned above. Four of these openings are in the upper Freeport seam, the other two being in the lower Freeport. The upper Freeport seam has 4 ft. of clean coal and a slate top and fireclay bottom, while the lower Freeport has 5 ft. 2 in. of clean coal, the top and bottom being of the same nature as that in the other seam.

Although the upper seam is 72 ft. above the lower, it is possible to open all the mines at tipple height, because the axis of the Jacksonville-Saltsburg anticline passes through this property. The lower Freeport outcrops on one edge of the tract, but soon dips below the surface. Of course, the upper Freeport dips with it, bringing it in a short distance to tipple height. The general dip of the coal is 5 per cent. N 62 deg. W.

The Coal Run Mining Co. is associated with one of the large operating companies in Indiana County and has adopted the methods used by its larger brother. Everything in connection with the operation has been standardized—for instance, the drift opening, the tipple, the mine workings, the substations, the fans, the crossovers, the cars, and the houses. The system of mining has also been standardized, and is followed as closely as the underground conditions will permit.

The walls supporting the drift mouths are built of cut sandstone laid in mortar, making an attractive approach to the openings. The mine is opened on the four-story system, having a right air-course, a main

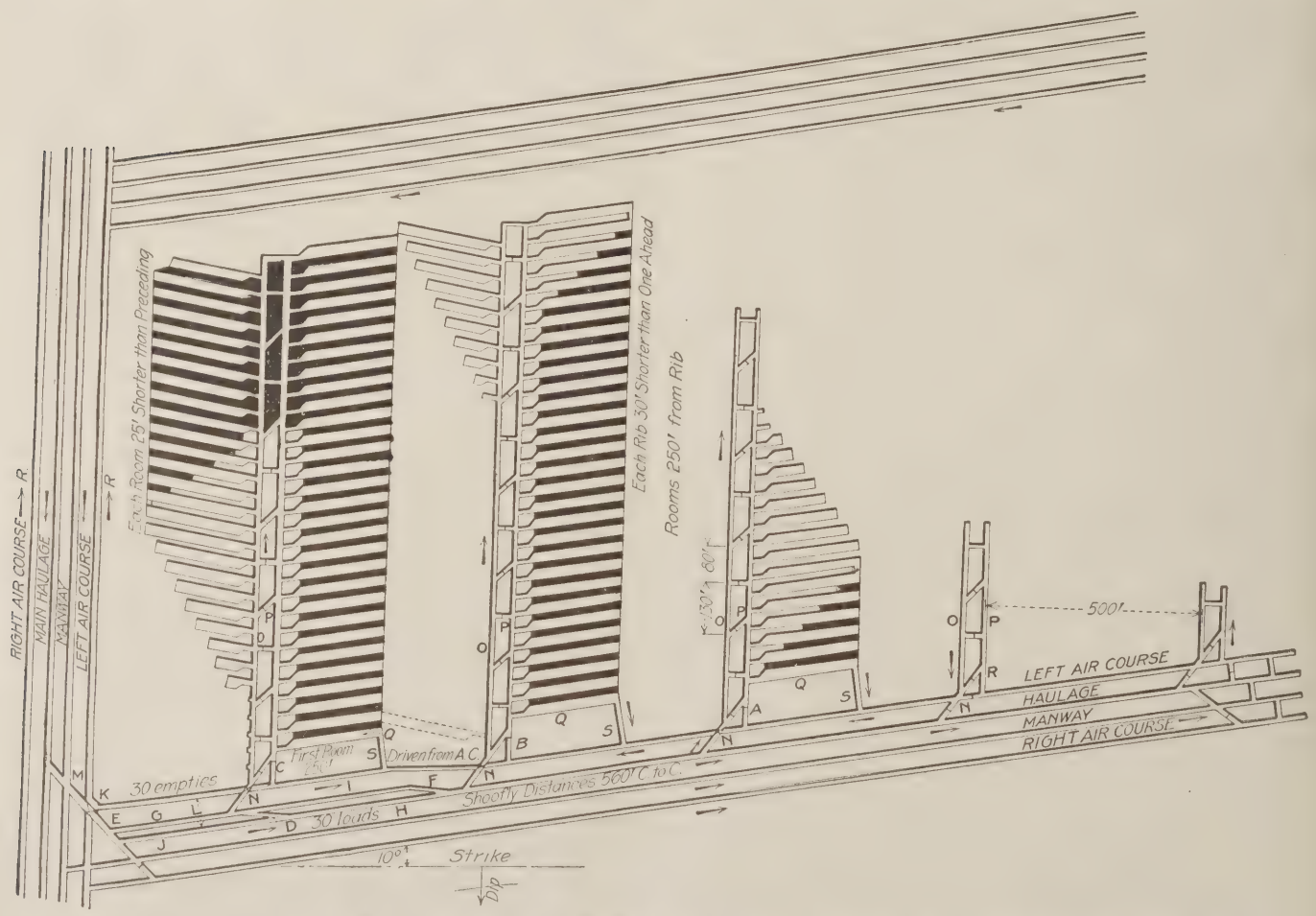


FIG. 1. DETAILS OF THE STANDARDIZED SYSTEM OF MINING OF THE COAL RUN MINING COMPANY

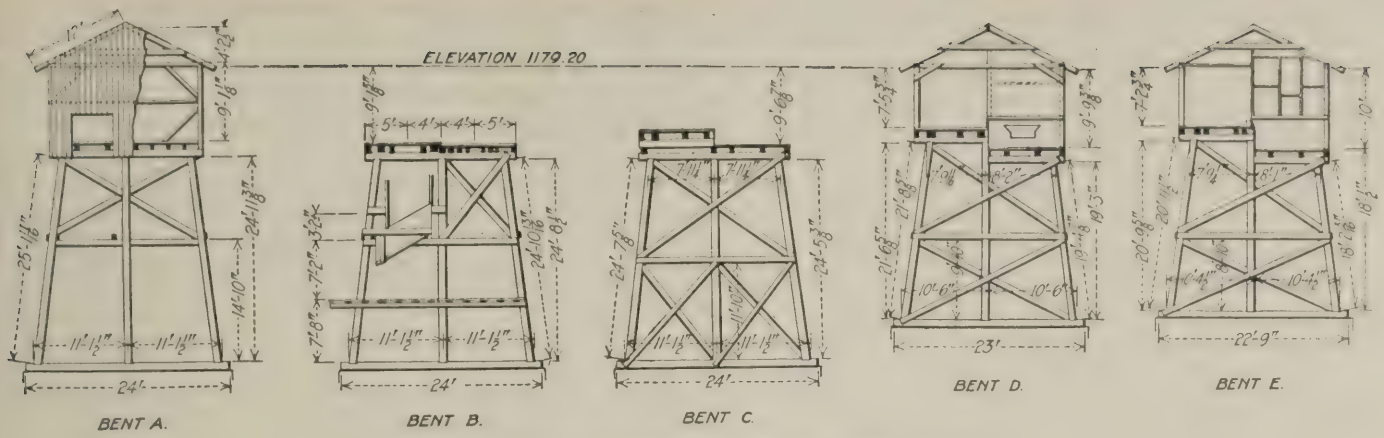


FIG. 2. CONSTRUCTION DETAILS OF THE TIPPLE

haulage road, a manway and a left air-course. The main entries are driven to the greatest dip of the coal and on 50-ft. centers. As each entry is supposed to be 10 ft. wide, a 40-ft. pillar is thus left.

Fig. 1 shows the standardized system in detail. Cross-entries with the same number of headings are driven at an angle of 80 deg. to the main headings. This allows sufficient grade to take care of the drainage. These cross-entries are driven on 1500-ft. centers. The four cross-entries with their pillars take 150 of the 1500 ft., leaving a 1350-ft. pillar to be worked. In case the cross-entries are short the manway and one air-course are omitted.

Butt entries are driven parallel to the main entry up the pitch of the coal. As the rooms are 250 ft. long, and a pillar of 100 ft. is left between the ends of the rooms and the main left air-course, the first butt entry on each cross-entry is driven, starting 350 ft. from the left air-course of the main entry. Then every 560 ft. a new butt entry is turned parallel to the first butt entry. These entries are 1250 ft. long.

As stated above, the rooms are 250 ft. long. They are driven on 40-ft. centers, the room itself being 22 ft. wide and the pillars 18 ft. The rooms are turned off both sides of the butt entries at an angle of 80 deg., giving them a pitch of about 1 per cent. and allowing them to drain.

The panel *A*, Fig. 1, shows the rooms being driven on the right side of the butt entry as it advances. The rooms are so driven that the face of one is always 25 ft. in advance of the one immediately following. As soon as the rooms reach their proper length, the robbing of the pillar commences. It is planned to pull about five of these pillars at one time, the face of each being kept 30 ft. behind the one immediately preceding. This gives the robbing face a straight line at an angle of about 45 deg. to the face of the rooms. All the pillars are taken out except 40 ft. which is left at the end of the room pillars to support the butt entries.

When the butt entry has been driven to within 100 ft. of the cross-entry above (this is left for a barrier pillar) it is stopped, and the rooms are turned on the left side of the butt entry coming back. When three or four rooms are driven up the robbing of their pillars is commenced, and the same method of keeping each rib 30 ft. shorter than the one ahead is followed. In this case, instead of leaving a heading stump to protect the haulage road this is robbed, as is also the pillar between the headings and the heading stump on the other heading (see panel *C*, Fig. 1; the shaded portions show robbing). This method brings the whole butt entry back at the same time.

Near the main entry at the beginning of each cross-entry a sidetrack is provided to handle all the coal for the cross-entry unless this entry should be over eight to ten panels, when another sidetrack would be provided further along.

The left air-course of the cross-entry is started about 30 ft. nearer the outside at *K*, Fig. 1, than it ordinarily would be if there were no sidetrack. This leaves the pillar *L*, of about 70 ft., between the airway and the haulage road. This pillar is split by the heading *GI* for a distance of about 700 ft. where this heading joins



FIG. 3. ARRANGEMENT OF TRACKS FROM NO. 5 MINE

the haulage road, and the left air-course comes back to its normal position. The short heading *GI*, at its halfway point *D*, is connected to the haulage road. Track is laid in both the haulage road and the heading *GI*, and switches are installed at *E* and *F*, a cross-over switch being located at *D*. The heading *GI* and the haulage road are connected to the main haulage road by the diagonal drift *M*.

The sidetrack is operated as follows: The main-line

motor comes from the main haulage road through *M* to the empty track *G*. Here it drops 30 empties, uncouples, runs through *D* and couples to the loads waiting at *H*. The loaded cars are taken through *J* to *M*, then to the main haulage road and outside. The first gathering motor leaves its loads on *H*, where 30 cars can be stored, then runs through *D* and back on *I*, and waits until the main-line motor brings the empties. The gathering motor then couples to the empties and runs through *I* and *F* to the haulage road. The second motor, if there are loads on *H*, makes a flying switch at *F* and then goes through the same performance as the first motor. The haulage roads and the butt entries are connected by the shooflys *N*.

The main haulage road and the manway act as the intake for the air, while the left and right air-courses serve as the return. The air for each panel passes from the haulage road *HJ* through the shoofly *N*, then through the left butt entry *O* into the rooms on that side (if any), then across to the light butt entry *P* and through the rooms (if any) to the first room on the right *Q*, or *R* if the first room has not been finished. If the room has been finished, *R* is bratticed and air passes through *Q* and *S* to the left air-course and then to the outside.

The arrangements for directing the air are such that the men at the working faces breathe pure air. None of the air that passes through old workings or over falls goes to the miners. Bricks are used for all stoppings. These are embedded in mortar for the permanent stoppings and are loose for temporary ones. The doors are only temporary and are of wood. The overcasts have brick piers and sidewalls, and the floors are made of steel rail with brick laid endways between the webs. The overcasts have a cross-section 10 x 5 ft. In Fig. 1 the stoppings are shown by double lines, doors by one line and overcasts by a cross.

The ventilation is supplied by two small Stine fans. These are 6 ft. in diameter and are driven by 10-hp., 440-volt, three-phase motors. One of the fans is at the No. 1 mine, the other being at No. 3. These fans will soon be replaced by 150,000-cu.ft. Jeffrey fans. These will be 6 ft. in diameter and driven by a 100-hp., multi-speed, 440-volt, three-phase, alternate-current motor. The small fans will be moved to the new operations and used until the development warrants their replacement by the large Jeffrey fans.

The grades in the butt entries are 5 per cent. in favor of the loads, the cross-entries ½ per cent. in favor of the loads and the main entry 5 per cent. against the loads. The rooms are driven as near level as possible, but the grade is not allowed to exceed 1 per cent.

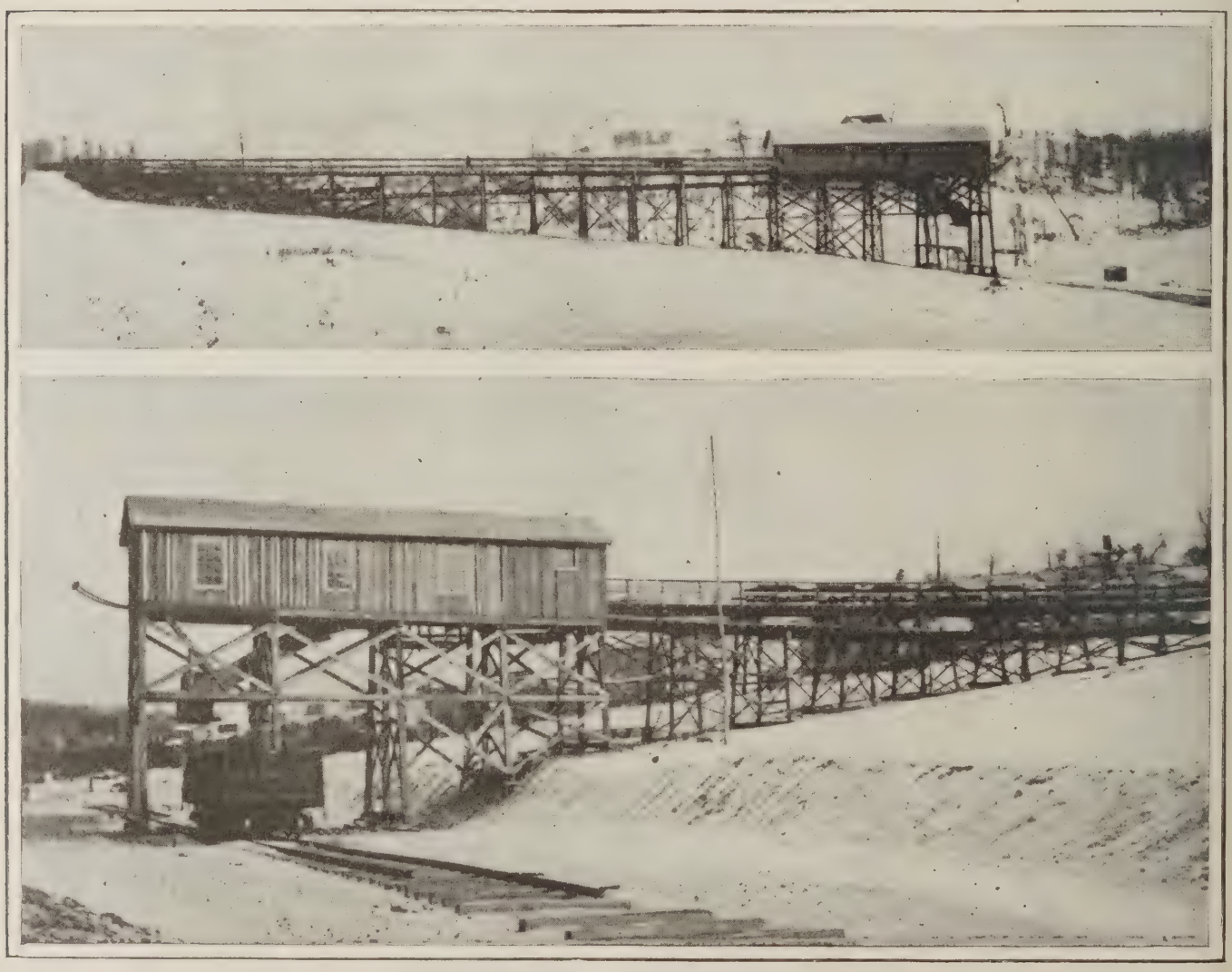


FIG. 4. VIEWS OF TWO OF THE TIPPLES BUILT BY THE COAL RUN MINING COMPANY
Above—Tipple at Nos. 4 and 5 mines. Below—Tipple at Nos. 6 and 7 mines

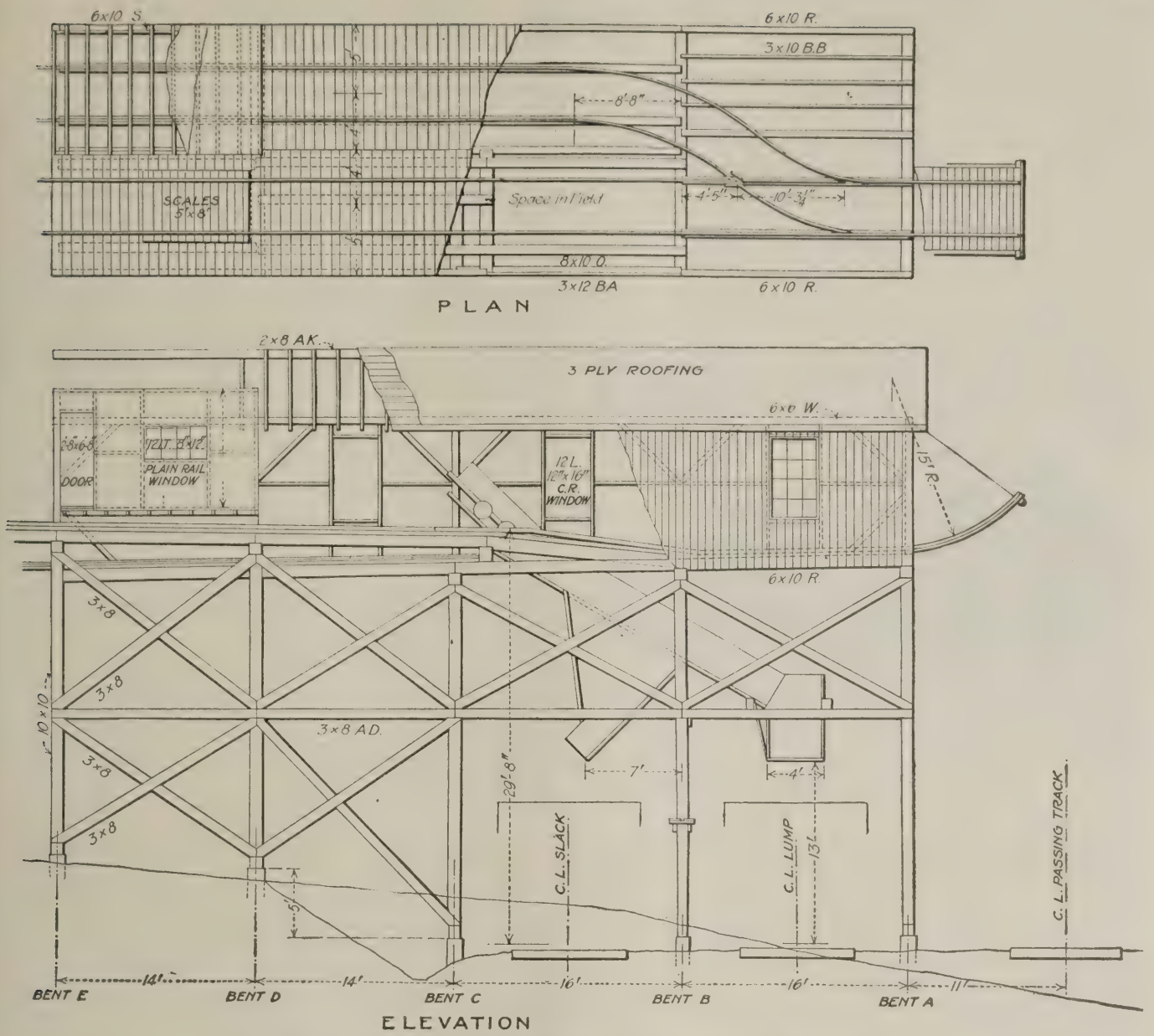


FIG. 5. PLAN AND ELEVATION OF STANDARDIZED TIPPLE

As the main headings are driven to the dip it is necessary to handle the water with pumps. At present only mines Nos. 1 and 3 have their main headings driven in any considerable distance and their territory developed. Therefore they are the only ones that have pumps. No. 1 mine has two 300-gal. triplex pumps, and mine No. 3 has one of the same kind and type. These pumps work against a head of 100 ft. and are operated by direct-current motors, the discharge pipe from which comes to the surface through a borehole.

The coal is undercut by Goodman machines of the shortwall type. The coal company now has sixteen of these machines and is adding as many more as it can get delivered. The coal is loaded into cars of 3000-lb. capacity. These cars are built of wood, are 9 ft. long, 4 ft. 4 in. wide across the top, 32 in. high, 42 in. gage and weigh 175 lb. They are equipped with hand brakes. Phillips car wheels are used. These wheels are greased once a month. The rail in the rooms is 16 lb., while that on the headings is 40 lb. Cambria steel ties are used for the room tracks and 5 x 7-in. wood ties are used on the haulage roads.

The company has three 10-ton and four 6-ton General Electric trolley locomotives. Besides these is one 6-ton Goodman cable-and-reel gathering locomotive. All tnese are at mines Nos. 1 and 3, the old operation. At mines Nos. 4 and 5 is one 5½-ton Ironton storage-battery locomotive equipped with Edison storage batteries. At mines Nos. 6 and 7 is another Ironton

TABLE I. LENGTH OF OUTSIDE HAUL AND GRADES

Mine No.	Length of Haul, Ft.	Grade
1	100	1.75 per cent. in favor of loads
3	300	1.75 per cent. in favor of loads
4	1,500	3 per cent. in favor of loads
5	1,500	Level
6	1,200	4 per cent. against loads
7	1,200	4 per cent. against loads

locomotive of the same size with the same equipment. Thus far these storage-battery locomotives have been used only for construction work, and they have given good satisfaction. It is the intention of the company to try them at gathering, and if they prove satisfactory they will be adopted for this purpose through all the mines, using the trolley locomotives only for main-line haulage.

The outside haulage problem is a simple one, as all the distances from the mine openings to the tipples are short, as shown in Table I.

Fig. 3 shows the general arrangements of the tracks from the No. 5 mine before ballasting (the track to No. 4 mine was not laid when photograph was taken). The opening to the No. 4 mine can be seen in the upper right-hand corner of the illustration. The track from this opening curves around the hill on a 2 per cent. grade and connects with the track on the curve in the foreground of the illustration.

Coal from mines Nos. 1 and 3 is dumped over a double tipple. The side nearest the No. 1 mine is an



FIG. 6. TYPE OF TWO-STORY HOUSES ERECTED AT COAL RUN

old tipple which is being remodeled. The No. 3 side is new and up to date, and is similar to the tipples at the other four mines with the exception that horned instead of crossover dumps are used. No. 1 mine has an output at present of about 600 tons and No. 3 mine of about 1100 tons a day. The production will be increased shortly to 1000 tons and 1200 tons respectively.

Coal from the Nos. 4 and 5 mines is dumped over the same tipple that serves mines Nos. 6 and 7. These tipples, standardized in design and exceedingly simple in construction, are of a type that has been adopted for use by this company and its associated companies throughout central Pennsylvania. The tipples at the Coal Run mines are designed for a capacity of 1200 tons a day and for the preparation of two kinds of coal, either straight run-of-mine or run-of-mine with the slack removed. The main timbers in the bents are 10 x 10 in. and the cross and longitudinal bracing is 3 x 8 in. The stringers for the loaded tracks are 6 x 10 in. The tipple proper consists of five bents, and as many more bents as are necessary are used to connect the tipple with the track grade. See Figs. 2 and 5 for construction details of the tipple.

The loaded cars are dropped by gravity on a 1¾ per cent. grade to the scales on the tipple, where they are weighed. Thence they run by gravity to a crossover dump of the Phillips type, on which they are dumped. The car is then kicked off by the next loaded car and runs about 20 ft. to a kickback, which is suspended over the end of the tipple by iron rods, as is shown in Fig. 2. From this kickback the cars run on a 1½ per cent. grade to the empty track. Two tipples are illustrated in Fig. 4. The upper view is of the tipple at the Nos. 4 and 5 mines while the lower is of the one at the Nos. 6 and 7 mines.

At the tipple are three railroad tracks, one a passing track, one a run-of-mine loading track and the other a slack-loading track. The loading chute is so arranged (see Fig. 3) that one plate on bottom can be removed and screen bars put in its place.

One substation supplies power to all six mines. This substation is contained in one-half of a red brick building, the other half of which houses the machine shop. At present the substation equipment consists of one 25-cycle, 575-volt, 522-amp., three-phase, 6600-volt, alternate-current synchronous converter built by the General Electric Co. The alternate current will be changed later to 22,000 volts. The machinery for doubling the capacity of the substation has already been purchased.

The current is carried by a high-tension transmission line from a central station at Luzerne, 11 miles away. All the oil switches and transformers are in the substation. The feeders for mines Nos. 1 and 3 pass through boreholes to the mine workings.

Of the 85 houses now on the property 74 are four-room double frame houses two stories high. These houses are shown in Fig. 6.

Ask yourself what would be the financial attitude of Washington and Lincoln toward this war were they alive today. Do you think they would refuse to buy LIBERTY BONDS?

Bulgaria Has Only One Railroad Mine

The first coal mine in Bulgaria was opened by the government in 1879. Apparently it was soon worked out. The authorities then opened a mine at Pernik, about 15 miles from Sophia, on a branch railroad to the main line running from Sophia, southwesterly to Kustendil. It is a mine of some pretensions, producing, in 1916, 610,000 tons and employing one quarter of all the miners in the country. The coal is bituminous and runs in seams 6 to 10 ft. thick with light cover.

But though this is, or was, Nov. 10 of last year, according to the United States Consular report, the only railroad mine there are plenty of coal showings and many mines from the east to the west end of Bulgaria. Thus there is the government mine at Bobovdol in the southwestern part of Bulgaria and the Prince Boris mine, perched in the Balkan Mountains, operated on a government lease. The Boteff mine is near-by, and a German company also has several mines, first operated in 1912. The coal is 3 to 23 ft. thick but crushed as fine as sand and needing briqueting before marketing.

Further east are lots of coal areas between Gabrovo and Sliven, but the coal is only 2 ft. thick and pulverized. A coal mine, without any of the necessary facilities, is producing about 30 tons per day. Still further east are many other mines. Brown coal is found only 15 miles from the important Black Sea port of Bourgas. More northerly is an 8½-ft. bed of anthracite. Bulgaria is a land of possibilities if it only had railroads, capital and progressiveness.

Working Thin Beds by Longwall

BY ROWLAND GASCOYNE
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SYNOPSIS—*Both mining engineers and miners are as a rule strongly prejudiced in favor of the method of working to which they are accustomed. Unless market conditions are abnormal it requires considerable courage to attempt the operation of a thin coal bed on the longwall system, when the only labor available has been accustomed to some other method. Generally speaking, however, longwall is the more economical system to follow in beds less than about 2 ft. 6 in. in thickness.*

JUDGING from the questions frequently asked in *Coal Age* regarding the best way of working thin beds of coal, and the fact that longwall seems to be frequently recommended where conditions seem suitable, it would appear that in the States and Canada some attempts are being made to work abnormally thin beds of coal.

As a rule mining engineers brought up to longwall methods are as prejudiced against the adoption of other systems as those brought up to room-and-entry are to the adoption of longwall. The same prejudice prevails with the workmen, and nothing militates against the change from one system to another, even if conditions underground call for such a change so much as this prejudice.

A Puzzle in Mining Costs

Take for instance the experience related by J. F. K. Brown in an article entitled "A Puzzle in Mining Costs" (*Coal Age*, Vol. 9, No. 6) wherein it soon becomes evident that the prejudice of the men against the adoption of longwall was as fatal to its success as the abnormal thinness of the measure—namely, 16 inches.

One would think that to attempt to work successfully under normal market conditions such a thin bed as 16 in. requires some courage, without being hampered by prejudice on the part of the workmen. To try a new method of working under such underground conditions, and in face of this prejudice, requires even more courage and tact; and it is no wonder that it was regarded as somewhat of a puzzle.

With a bed as thin as 16 in. under 30 ft. of shale, which again is overlaid by 30 ft. of sandstone, the conditions for longwall working ought to be more favorable than working by room-and-entry. An engineer accustomed to longwall would probably always adopt that method with such a thickness of shale for a roof, but in the successful working of longwall the floor has also to be taken into consideration as well as a host of other conditions.

It would perhaps be an advantage and more easily understood if we attempt to follow and deal with the difficulties as they arose in Mr. Brown's experiments. In the first place to make a longwall face parallel to the "cleats" cannot always be recommended. In a bed of fragile coal the proportion of small coal made by working parallel to the cleats might make all the difference between working at a loss and a profit, and with a shale roof the cleats might act as lines of weakness and thus add to the timbering difficulties. With a hard coal and sandstone roof, working parallel to the cleats might prove an advantage. All such small details must be taken into consideration.

With regard to timbering it was stated that the men had never previously worked in longwall workings, and were prejudiced against the system. Under these circumstances it is impossible for the longwall method to have had a fair trial, unless there was some one practically acquainted with all the troubles of this system to act as instructor and take a leading part. It is no wonder that the roof was kept in what Mr. Brown describes as a state of "animated suspension." Had he continued to work under these conditions until the "top weight movement" came on there would probably have been much more animation observable, and less suspension.

With a roof like the one described and the working face running parallel to the cleats the area of roof exposed must be kept down to a minimum and as little of it permitted to rest on timber as will allow of the conveyance of coal along the face. This is shown by the fact that the timber along the face had to be frequently changed, a practice always to be avoided if possible, as in itself it may be regarded as proof that the face is not being advanced at a sufficient rate. The acceleration of the speed of the face would also, as suggested, reduce the difficulty experienced in transporting the coal.

Should Have Adhered to Longwall

It is evident that Mr. Brown's failure in the first section of longwall opened was due to the causes stated, and it is perhaps fortunate that work was suspended before the top weight came on, otherwise the whole of the workings might have collapsed.

Mr. Brown did not state whether the waste was closely packed. Presumably it was, but it may be pointed out that with such a roof, until the floor and roof have come together, and the gateway is constructed in solid ground, there would be little hope of settled conditions prevailing. It may be true that work was stopped just when earth movements were commencing to show themselves, but had the longwall method of working been persevered with until the conditions mentioned above had prevailed, there would perhaps be quite a different tale to tell about the adaptation of the longwall method of working to this thin bed of coal.

When we come to consider the No. 2 section of longwall in the experiment mentioned by Mr. Brown, we find that several of the suggestions mentioned above with regard to the No. 1 section were adopted with advantage, and it would almost appear that had operations been continued some degree of success would probably have been obtained.

Working at right angles to the cleat and reducing the exposed roof to a minimum seems to have proved bene-

ficial, while the timbering seems to have been better arranged. It is to be noticed, also, that to facilitate the loading of the mine cars a cut was made in the floor of the gateway and small cars used along the face. No information is given as to the method adopted in stowing up the wastes so as to steady the roof. It is presumed that every care was taken to stow the waste as solidly as possible, but whether packs of either stone or timber were used nothing definite is stated.

An intermediate pack of waste often saves considerable timber and should be used wherever practicable, and props regarded only as instruments of safety to prevent falls in the working place and not to resist subsidence, which in any form of longwall working is impossible to attain. It is impossible to say whether in the course of time it would be possible to use less timber in the shape of packs in the gateway, and thus reduce the cost of timber. At all events, in the starting off of a longwall face to stint the packs of timber would be doubtful economy. It is pointed out, however, that although the No. 2 longwall experiment was more successful than the No. 1 experiment, the results were not yet entirely satisfactory, the troublesome part being the removal of the coal and rock from the face to the mine mouth.

In one place Mr. Brown states that no attempt was made to build up the cavity formed by taking out the coal, as no stone fit for the purpose was obtained from the roof. I hope this does not mean that the waste rock made at the face was taken out of the mine while empty spaces were left in the goaf in which it was possible to stow this waste rock. If this waste rock was not deemed good enough to build packs with, there can be no excuse for leaving empty spaces in the waste and sending rock out of the mine, which, however unsuited for packs, was valuable for stowing material.

Removal of Waste Material Expensive

Any system of working which involves the removal of a larger quantity of waste material than coal must necessarily be expensive, and the question arises could not this handling of waste material be reduced? The extraction of only a thickness of 15 in. of coal does not leave much room for the stowage of waste rock, and if to work 15 in. of coal it is absolutely necessary to take down 18 in. of roof, there seems little hope of avoiding the transport of waste rock out of the mine. Many collieries are working beds of coal 2 ft. and 2 ft. 6 in. thick successfully by longwall, without taking down the roof in the working places, and if only Mr. Brown can reduce this taking down of the roof in the working places, say to the extent of one-third, the benefit ought to be considerable.

With such a thin bed as 16 in. Mr. Brown gives interesting figures as to the comparative costs between longwall and pillar-and-room working. The outstanding features of these are the higher costs of timbering and tramming in the longwall system as compared with the pillar-and-room working. It is easy to understand perhaps why timber should cost more in longwall than in pillar-and-room, but one would expect that this extra cost would be more than counterbalanced by cheaper mining and stonework. These Mr. Brown estimates the same in both systems. Tramming costs in longwall ought not to be more than in pillar-and-room under the same conditions underground. But it seems reasonable to lay the blame on the amount of waste rock handled, which brings us back to the thinness of the bed worked. Mr. Brown suggests that the adoption of mechanical haulage would prove a solution to all these troubles. This, of course, will depend upon the distance the coal has to be moved, but it ought not to have any bearing on the mining merits of the two systems of working discussed, as practically the same amount of transportation will have to be done in both cases.

The problem here to be solved is how to obtain an output of 50 tons per day from a bed of coal 15 in. thick. There is no spare power available, so that coal cutters are out of the question. If the longwall system was adopted and the necessary power available, five coal cutters and the use of coal conveyors at the face would solve the whole question, but we are asked here to obtain an output of 50 tons of coal per day with no mechanical facilities worth mentioning.

Have Gateways as Far Apart as Possible

We will assume that the longwall method of working is decided upon, and in such a thin coal bed it will be advisable to have the gateways as far apart as possible. I would fix them 100 yd. apart so as to save the cost of stonework and its handling as much as possible. Each gateway would therefore serve 50 yd. on either side. I would use small cars to convey the coal along the faces to the gateways. The floor in the gateway would have to be taken up to make the requisite height, say 6 ft.

To obtain the required amount of coal five stalls would be necessary, each 100 yd. long, and the face would advance about 4 ft. per week. Every effort must be made to keep the waste down so that it can be all stowed in the goaves, and if possible none sent out of the mine. The packs along the gateway sides should be built 12 ft. wide and strengthened with old timber chocks, and if intervening packs between the gateways can be built to steady the roof, so much the better. The solid stowing of the goaf must be kept as close to the working face as possible, so as to reduce the weight on the timbers.

If these instructions are followed five or six working places 300 ft. in length ought to produce 50 tons per day. To increase the output additional working places would of course be required. Gateways 100 yd. apart may seem abnormal, but to work a 15 in. bed of coal successfully such a distance between the gateways seems necessary in order to reduce to a minimum the unprofitable handling of stone.

In the same issue of *Coal Age*, under the heading of "Inquiries of General Interest," a novel proposition is made to run an endless rope along a longwall working face, in order to reduce the number of roads and their maintenance.

The thickness of the bed in this instance is said to vary from 20 to 27 in., while the depth is given as 110 ft. The coal measured is overlaid by 2 ft. of soft, sandy shale, followed by 2 ft. of impure, compact, hard coal. Then follows 6 ft. of block slate overlaid by sandstone. The roadways are driven 30 ft. apart. The inclination of the bed is not stated, but as it is proposed to use an endless rope along the face, it may be presumed that the inclination is small. As the coal is said to be hard,

probably the cutting is done in the 2 ft. of soft, sandy shale, so that the height along the working faces will probably be about 4 ft. The impure coal is taken down in the roadways, making them 6 ft. high in the first construction.

The object sought here by the inquirer is to reduce the number of roadways to a minimum, as also their cost of maintenance. At the outset it may be stated that the number and cost of the road can not be materially reduced without complicating matters along the working face by installing an endless rope, even if it was practicable to do so. The roof must be good to allow such a suggestion to be seriously made, since clearly any fall of roof along the face would incur serious stoppages.

The question one is inclined to ask is why are the gate roads, in face of their cost, constructed only 30 ft. apart, which for a bed of coal averaging only 2 ft. thick seems quite unnecessary? Why not have the roadways farther apart by abandoning three out of every four of the present roadways? If the roadways are constructed so close together with the object of supporting the roof by the packs, why not build packs in the goaf without going to the expense of constructing roadways? If, as supposed, the 2 ft. of soft sandy shale is taken down at the face, it ought to go far toward filling the goaf in a solid manner and thus reduce the number of waste packs required.

Why Not One Good Main Gateway?

It would be interesting to know at what distance from the face the roadways when brushed up to the block slate become too low to use without re-brushing. If all the gateways need this re-brushing, would it not be more profitable to make one good main gateway, say every 250 yd., even if it involved the brushing of the block slate, and so cut off three gateways on either side by new slant roadways when the old roads got too low for use without re-brushing?

It is, of course, difficult to make suggestions when all the facts and conditions are not known, but providing the conditions are as surmised, the making of a roadway over 30 ft. in the exploitation of a coal bed averaging only 2 ft. in thickness seems quite unnecessary. The primary use of roadways is of course to facilitate the removal of the coal from the working face, and it ought to be manifest that fewer roadways are required for this purpose in a 2-ft. bed, say, than where the seam worked is 6 ft. thick or over. To make roadways only 30 ft. apart in a 2-ft. seam, appears therefore to be incurring unnecessary expense, unless some satisfactory explanation can be given for such an unusual practice.

In a case like this the minimum distance between the gateways ought to be, say 120 ft., and even this may prove too small if the roof is good, or where it is possible to use mechanical coal conveyors along the face. The objection may be urged that if the number of gateways be reduced, the working face will not advance as rapidly, and the roof will rest longer on the timbers. A little reflection, however, will show that in a thin coal it is not the number of gate roads that causes the face to advance, but the number of machines or men put to work at the face.

To increase the number of gate roads by placing them only 30 ft. apart would rather deter than advance the face, owing to the additional labor required in connection with the construction and brushing of these passages, especially if that labor could be utilized along the face. There may be of course some prejudice among the men against working in longer places than 30 ft., but a little reflection will show that in a thin coal bed this extra construction of gateways must add materially to the working costs.

In the two instances already dealt with the thinness of the beds, say from 16 in. to 24 in., makes the propositions anything but attractive and demands an abnormal selling price to enable the collieries to be worked at a reasonable profit. Coal-cutting machines and coal conveyors along the face are to be recommended, but it frequently happens that these appliances are not available.

There can be little doubt that where the underground conditions are favorable the longwall method of working ought to be more suited to the extraction of thin beds than the pillar-and-stall system. In a bed of coal, say 2 ft. 6 in. thick, possessing a good roof, where mechanical coal cutters and conveyors can be installed along the face, no great or noticeable difficulty ought to be experienced; but where the thickness is less than 2 ft. 6 in., many difficulties are encountered, the most formidable of course being the large amount of stone handled in these ultra-thin beds.

Prejudice on the part of the workmen against the longwall method of working is a serious obstacle and one exceedingly difficult to overcome. It may be found expedient to counteract this prejudice by introducing a compromise between pillar-and-room and longwall working, so that by a process of evolution as it were the longwall method is gradually introduced. In instances like this it may even be necessary to adopt retreating longwall where underground conditions will admit of this method being practiced. Generally speaking, however, where the coal bed is under 3 ft thick and conditions are suitable, the longwall method of working ought to be adopted.

Cost of Producing Anthracite

The cost of producing anthracite coal ready for market, according to data compiled by the general committee of anthracite operators of Philadelphia, Penn., divides roughly into 60 per cent. for mining, 30 per cent. for preparation and 10 per cent. for taxes, insurance, workman's compensation, royalties and fixed charges. Of the total cost of production about 70 per cent., sometimes above 75 per cent., is labor cost. The average production of anthracite per mine worker per working day for ten days prior to the war was 1.96 tons. For the decade to 1916 the breakers ran an average of only 221 days a year. The largest number of mine workers in the anthracite regions was 180,000 in 1914. It averaged 175,000 to 177,000 prior to the war, but is now 153,000.

As the mining industry has been more and more scientifically conducted, the waste of anthracite—that left in the ground and that discarded on the dumps—has been greatly reduced. In 1887 steam sizes made only 6.9 per cent. of the total anthracite sent to market. For 1917 30.7 per cent. of all was of the small steam sizes—coal which 25 years before would have been thrown away as useless.

The Byproduct Coke Oven, Its Coke and Its Byproducts—I*

By WILLIAM HUTTON BLAUVELT
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SYNOPSIS—*The United States may lag behind Europe in the percentage of coke produced by the byproduct process but not in the efficient operation of such byproduct ovens as are in operation. Advantages in the use of silica brick and the gain derivable from great intensity of operation.*

THE technical and engineering problems in the manufacture of coke are today the problems of the byproduct oven. Except in a few special localities, practically no beehive ovens have been built in the United States for the last 5 or 6 years except as renewals of old plants, and during these years the total number of beehive ovens in existence has been steadily falling. On the other hand, the number of byproduct ovens has increased from 4624 in 1911 to a total of about 7660 in operation at the end of 1917; with 2800 building this makes a total of about 10,460 which will be in operation in 1918, or shortly thereafter.

Preliminary Government estimates place the total production of coke for 1917 at 56,600,000 tons, the largest tonnage in the history of the industry. Of this 34,000,000 tons or 60 per cent. was beehive, and 22,600,000 tons, or 40 per cent. was byproduct coke. Some time in 1918 the production of byproduct coke should pass the beehive output, and when the byproduct ovens now building are completed the total byproduct capacity will be about 40,000,000 tons of coke per annum, which is over 70 per cent. of the record-breaking total coke production of 1918. The reasons for these changes in the coking industry are familiar to all of us, and need not be discussed here.

Improvement in Oven Design

Since the byproduct oven was brought to this country from Europe, in 1892, it has been radically improved, and from the point of view of American metallurgical practice it is safe to say that the American ovens are superior to those of Europe. The points of superiority are mainly those of larger units and larger output per unit, and the greater extent to which labor-saving machinery has been introduced. The increased output is largely due to the use of silica refractory material, which permits higher heats and shorter coking time than are employed in Europe. The modern American oven will carbonize commercially more than 20 tons of coal per day, and contrary to the European idea that slower operation is necessary to conserve the plant, this rate of operation with only current repairs, can be maintained for an indefinite time. The byproduct oven is not old enough in the United States to make it possible to state from experience how long an oven can be operated at maximum efficiency. There are a number of plants in different parts of the country which were built 16 or 18 years ago, which are more efficient today than in the first year of operation, and which show costs of operation which compete well with those of the most modern plants.

The accompanying illustrations, Figs. 1 and 2, show the earliest and the latest development of one of the prominent types of ovens in use in this country. It is not the purpose of this paper to discuss mechanical details of oven development, and the illustrations show sufficiently well the principal changes in the design. The first ovens had a capacity for carbonizing 4.4 tons of coal per day, as compared with the present capacity of over 20 tons mentioned above.

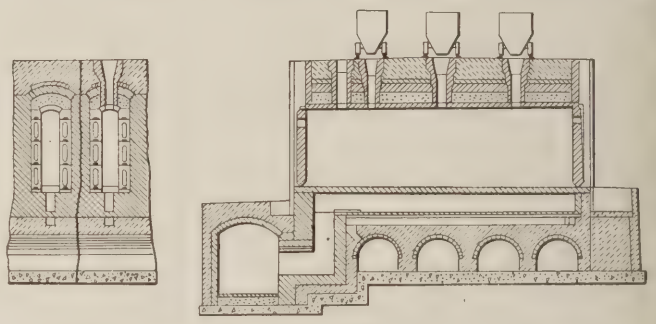


FIG. 1. EARLY DESIGN OF BYPRODUCT OVEN

The early ovens were economical in heat consumption because the heat in the waste gases was utilized efficiently in raising steam for the operation of the plant. On account of the growing demand for oven gas for metallurgical and other uses, the change to the regenerative type of oven has been general. While this type of oven is not so economical of the total heat produced by the combustion of the gas as is the combined oven and boiler plant, it makes available for use half again as much of the surplus gas as did the older type of oven. Modern ovens require for carbonization of the coal less than 40 per cent. of the total heat in the gas produced.

Description of Oven

Fig. 2 illustrates one of the principal types of the modern oven, and a few words of description may be appropriate here. The byproduct oven is essentially a closed chamber, heated from the outside, and in the coking process the volatile matter of the coal is distilled off with careful exclusion of air. This point distinguishes it in principle from a beehive oven, where the heat is generated by combustion within the oven itself, with the resulting destruction of everything except the coke. The oven shown consists of a chamber about 36 ft. long, 12 ft. high, and of a width depending upon the coal that is to be carbonized. In American practice the

*Paper presented at the New York meeting of the American Institute of Mining Engineers, February, 1918, entitled "The Byproduct Coke Oven and Its Products."

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average width varies from 16.5 to 21 in. Modern ovens usually have about 2 in. of taper toward the discharge end to facilitate the pushing of the coke.

The ovens are usually heated by a portion of the gas recovered from the distillation of the coal, although sometimes producer gas is substituted. In all the successful ovens this gas is burned in a series of flues which control the travel of the burning gases and distribute the heat over the entire side of the oven. The success of any oven design depends very largely upon its ability to distribute the heat evenly over the entire surface which forms the wall of the oven, and it is by no means an easy problem to control this distribution accurately over an area of 432 sq.ft. In some ovens the flues composing the heating system are vertical and in others horizontal. The oven shown is the chief exponent of the latter arrangement.

Horizontal vs. Vertical Oven Flues

Both systems have their advocates, and the details of both have been worked out so that they can be relied upon to give the uniformity of heating necessary for satisfactory operation. Naturally the representatives of each system prefer their own type. The advocates of the horizontal flues find them more accessible for supervision, easier to control, and easier to maintain. The somewhat lower temperature that can be maintained in the upper flues under all conditions of operation is a desirable feature for the best results. One feature of the oven shown is the strong middle wall between the ovens extending from the foundation to the top, which gives the structure great stability and permanence and acts as a heat reservoir to help maintain uniform temperatures, which is important, because when a new charge of cold wet coal is dropped in the oven there is a great demand for heat to start the coking process quickly. These middle walls also permit any oven to be repaired or entirely relined with a minimum interference with adjacent ovens.

Fig. 3 shows the flow of the air and gases through the system. From this illustration it will be noted that one pair of dampers near the stack does all the reversing of the air and gas. The cold air enters the system from a fan located at a point near these dampers, flows through one of the two main flues, and is distributed to the regenerators by a system of firebrick slides. The air is heated in the regenerators to about 1000 to 1100 deg. C. before entering the flue system of the oven and meeting the gas to be consumed.

It will be noted that this gas is supplied at several points in the flue system, and that it flows steadily through the supply pipes, its direction in the oven being reversed by the reversal of the current of air, so that no attention need be given to this point by the operator. That is, when the currents are flowing upward through the flue system each gas stream is bent upward and burns in the flue above the gas pipe, which is opposite the partition wall. When the flow is downward, the gas streams are bent downward. By means of these several supplies of gas the heat is supplemented as needed and all the air supplied is consumed by the last admission of gas. The products of combustion pass out to the other regenerator and thence to the reversing dampers and chimney in the same manner as in an openhearth furnace.

In the earlier types of ovens, when luminous gas was used, much of the heating was done by radiation, but in modern practice, where the benzol is removed from the gas, the combustion is not luminous and the heating is done mainly by conduction. To this end, in the system described it has been found quite advantageous to maintain a reasonably high velocity of the hot gases in the flues, making use of the principle which has been developed in some types of hot-blast furnace stoves and other furnaces, where a high velocity of the hot gases has been shown to be most effective in the transfer of heat to the adjacent surfaces because it sweeps away the sluggish layers of gas lying against the surfaces, which, if not removed, would form efficient nonconductors of the heat which we desire to transmit to the coal charges in the oven.

Operation of Byproduct Oven

The total amount of heat delivered to the combustion flues is usually regulated by the pressure on the supply of air and gas; and the distribution of the heat among the various flues is controlled by a simple regulation of the relative amount of gas to each flue. Each flue may be conveniently inspected through a peephole accessible from the working platform outside; and it is found that the convenience of this inspection and control is an important factor in obtaining the best heating conditions.

The coal is charged into the oven from a hoppered larry car running on the top of the oven structure, the fuel usually being delivered through four charging-holes. The fifth hole, shown in the illustration, serves to carry off the volatile products of the distillation. The

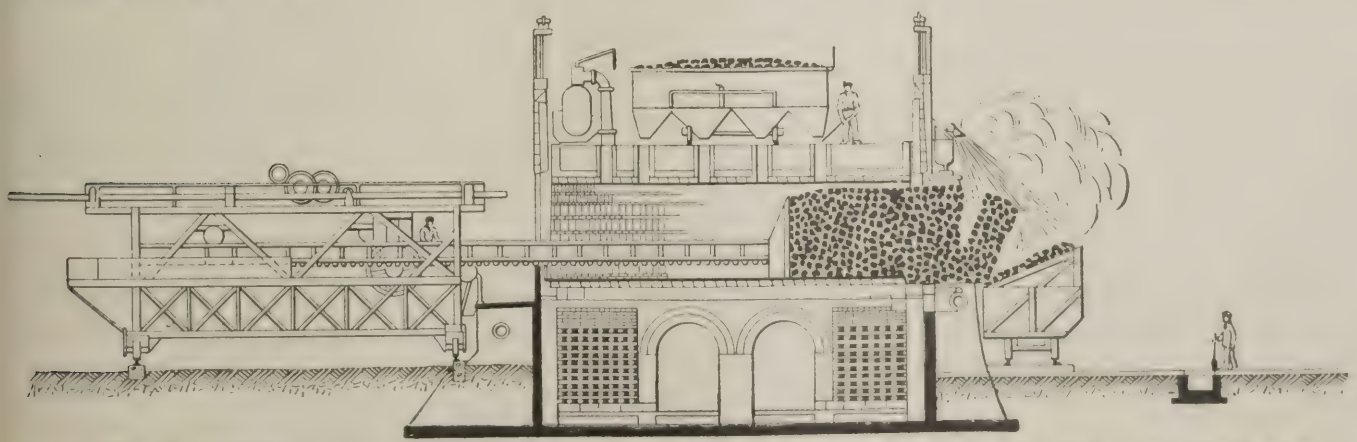


FIG. 2 MODERN BYPRODUCT OVEN WITH CHARGING LARRY, DISCHARGING RAM AND COKE CAR

coal is leveled, after charging, by an auxiliary ram on the coke pusher, the space being left between the top of the coal and the top of the oven for the outgoing gases to reach the point of discharge.

Upon completion of the coking process the doors are raised, and the coke is pushed out by an electrically operated ram. The doors are then lowered and sealed and the oven is ready for another charge. Many attempts have been made to develop a mechanically sealed

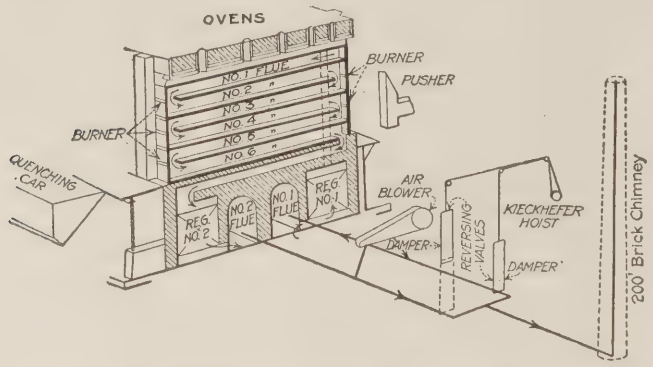


FIG. 3. DIAGRAM OF OVEN VENTILATING SYSTEM

door, but the conditions of operation make this mechanical sealing a difficult problem, and nearly all plants still use the mud joint. Careful designing of the door and its seat make this mudding a much less serious matter than might be supposed.

Use of Silica Brick

As stated above, silica brick is largely used in modern byproduct oven construction. There seemed at first many obstacles to its successful use for such construction, the principal objections being the large amount of expansion of the brick when heated and the tendency to spall, due to sudden changes in temperature. When silica brick was first used in the crowns of beehive ovens it was thought that it would be an absolute failure, but it was unexpectedly successful. It was first employed in byproduct ovens at the plant of the Cambria Steel Co. and was soon after generally adopted.

It has been found that, since most of the expansion takes place below a red heat, the variations in temperature during operation do not give any trouble, and the superior resistance of silica brick to high temperatures and its satisfactory conductivity under operating heats make it a superior material. Notwithstanding its success in American practice, I understand it has not been employed to any extent in Europe, and only a few years ago some prominent English brick makers stated that they did not believe it could be employed, notwithstanding statements that came from America.

Size and Width of Ovens

The cubic capacity of a byproduct oven has increased nearly four-fold since its first introduction into this country. The larger capacity has the advantage of reducing the cost of operation per unit of product, and the smaller number of units also reduces cost of construction and repairs. Increases in length and height of the oven chamber have no effect on the product and are limited only by structural and heating conditions. The width of the oven, however, is a more important factor in the coking process.

In the early days of the byproduct oven in Europe it was thought that the lean coals of Belgium, running as low as 15 per cent. volatile, required a very narrow oven, perhaps not over 14 in. wide, while for high-volatile coals a width of 20 in. was not infrequent. American practice has not demonstrated any such simple rule as this, and perhaps the reason may be found partly in the fact that oven plants are generally located at the point of consumption of the coke. Hence mixtures of coals can be more easily obtained, and for this reason most plants operate on about the same average percentage of volatile matter. It has not been definitely shown in American practice that a particular width of oven is best suited to coal of a certain composition. Narrower ovens have certain advantages.

First, a faster coking time per inch of width with a given flue temperature.

Second, a somewhat higher yield of byproducts.

Third, a somewhat more uniform cell structure as between the portion of the coke nearest the wall and that nearest the center of the oven.

On the other hand, the larger number of operations of the oven crew when handling the narrower ovens increase the labor cost and the repairs. It has yet to be developed what is the best oven width to average these conditions. The widest ovens operating in this country have an average width of 21 in. and the narrowest 15 inches.

It will probably take much further investigation to determine where between these limits can be obtained the best equalizing of conditions, and whether the mixture of coals naturally available for a given plant will be a factor in determining the best average width. Some coals require higher temperatures than others to produce the best coke, but it is not clear that this fact will lead to the selection of wider ovens for such coals. It is not clear that we can say today that any width is definitely the best for a given set of conditions, but much study is being given to this subject, and we may before long have some better data.

Quality of Coke

In the discussion of this subject I shall not go into the chemical composition of coke, since the permissible amount of any impurity for a given use is well understood, and the different elements are easily determinable. The physical structure of the coke is quite as important as its chemical composition. It is the physical structure which gives coke its advantage for metallurgical work over other forms of solid fuel, and it is important that the structure should be adapted to the conditions under which the coke is to be used.

The blast furnace is the great coke consumer. In the days of the beehive oven one kind of coal gave a coke with a certain physical structure, and another coal gave another structure. Furnaces either adapted their practice to the coke, or changed their coke supply. Coke was recognized as hard or soft, porous or dense, and that was about all we knew regarding physical structure.

Mr. Brassert says in his paper on "Modern American Blast Furnace Practice," read in 1914, that "the early coke produced in our byproduct ovens, even from the same coals as were successful in the beehive oven, burned too slowly and made our furnace operations exceedingly difficult, by preventing rapid and continuous movement

of the stock. The lack of knowledge and experience along these lines was responsible for the slow progress attending the introduction of byproduct ovens in this country." The economy of the byproduct oven practically forced its adoption by the furnace operators, and for several years, as Mr. Brassert states, "at a number of American plants byproduct coke has been made which rivals in quality our best beehive product."

The byproduct oven, with its variable mixtures of coals, variable heats, coking time, width of oven, fineness of coal charged, and other controlling factors, permits a control of coke structure formerly impossible. The problem is to determine first, what is the structure best adapted to standard furnace practice, while recognizing that special practice requires modifications of structure; second, what conditions are necessary to produce that structure.

Notwithstanding the general acceptance of Gruner's theory of ideal combustion in the furnace, the production of a high thermal heat at the tuyeres is of the first importance, and the best coke is that which reaches the tuyeres in proper condition to produce the highest temperatures in the tuyere area, and in just sufficient quantity to do the amount of work required there under the conditions produced at this maximum temperature.

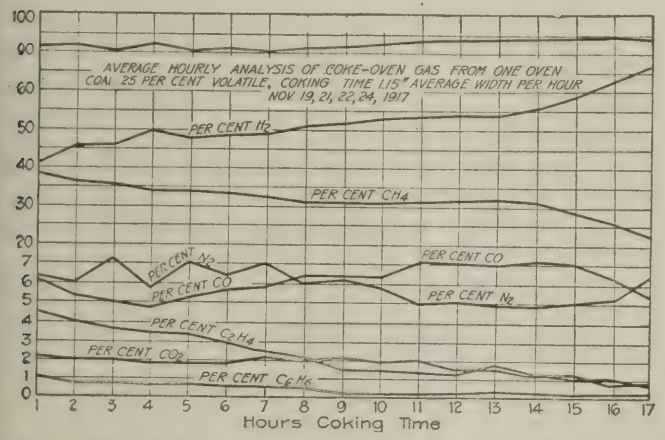


FIG. 4 SHOWS WHAT GASES ARE MADE EVERY HOUR OF THE COOKING PROCESS.
Upper line shows percentage of combustible gas in oven

The ideal coke is one which will descend through a furnace shaft to the combustion zone in front of the tuyeres with the least loss from attrition and oxidation, and when it arrives there will burn at the highest possible rate. Of course, there are paradoxical qualities. However, Mr. Walther Mathesius points out in his interesting paper on "Chemical Reactions of Iron Smelting" that "modern American coke-oven practice has made enormous strides toward approaching this apparently paradoxical ideal." He stated that this is accomplished by producing coke with an open-cell structure, in which the cell walls themselves are amply strong and well protected by a graphitic coating.

The time of contact of the blast with the coke in the tuyere area can be only a few seconds and the speed of any chemical reaction decreases as the relative quantities of reacting and resulting substances approach equilibrium. Therefore, the farther these relative quantities remain from the status of equilibrium, the higher the rate of resultant combustion. With the facts now before us I am disposed to believe that we should, in seeking to produce the best blast-furnace coke, aim to produce an open-cell structure, with cell walls strong and hard. Later experience may, however, show that there are other requirements that are not now known to us. It is not necessarily true that the open-cell structure is the same thing as a high percentage of cell space. The advantage of an open-cell structure is that it gives the oxygen of the air easy access to the carbon. It is

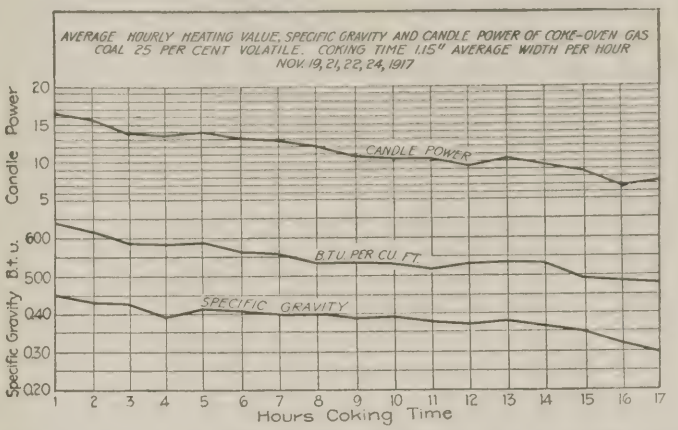


FIG. 5 GRAPH SHOWING LIGHT, HEAT AND WEIGHT OF COKE-OVEN GAS HOUR BY HOUR

entirely possible that a coke of very fine cell structure, having say 50 per cent. of cell space, might offer less surface for prompt combustion under practical conditions than another coke containing larger cells but having the same percentage of total cell space.

The composition of the cell wall, which it is agreed should be hard, thin and strong, and, according to Mr. Mathesius, covered with a graphitic coating that is smooth and bright, is a much more complicated matter. What are the conditions of coal mixture and coking which produce this kind of wall? I think we have not yet found the answer to this question, although we know some of the conditions that are favorable to this result. The coal mixture, the degree of fineness of grinding, the coking time, and the heats are probably all factors.

Our search for the best coke structure to meet a given set of furnace conditions is not an easy one, but we know better which path to start on than we did even a few years ago. Are we not agreed on the following points at least?

1. The coke must be hard.
2. It must have an open structure; that is, cells of good size, filling about 50 per cent. of the coke volume.
3. It must have a high rate of combustibility.

Can we add anything more to this list? Some investigators have concentrated their comparisons on the rate of combustibility, but I cannot believe that this test alone is sufficient to determine the best coke structure, because it ignores one of the sides of the paradox. While the best coke must burn rapidly at the tuyeres, it must also resist attrition and oxidation during its descent in the furnace. Good-sized cells and a good percentage of cell space, coupled with a hard structure, would seem to give a coke corresponding to Mr. Mathesius' definition. Testing the rate of combustion has been a help to us, and I hope we will find a test for hardness of structure better than the crushing of the 14-in. cube specimens, over which so much time used to be spent in the days when John Fulton wrote his book on "Coke."

(To be continued)

Two Readers Condemn the "Resistless Stopping"

This from John Verner of Chariton, Iowa. He believes that an open cross cut betters the air supply and so helps to feed the explosion. A weak stopping may therefore aid in extending the explosion and a strong stopping may help to confine it to a small area.

I HAVE read the report of the proceedings at the Coal Mining Institute of America, as published in *Coal Age* of Dec. 15, 22 and 29, 1917, and I was especially interested in the discussion of the question: "What are the prime requisites of a satisfactory permanent stopping?" The discussion of the question apparently was wholly confined to the consideration of the probable effects of strong or weak stoppings on the propagation of mine explosions.

Mr. Affelder, who propounded the question, stated that in a certain mine the stoppings were so constructed that they would break down in the presence of a comparatively low pressure. An explosion occurred in that mine and soon came to an end, the stoppings in its path being destroyed. In view of this Mr. Affelder expressed the opinion that the early subsidence of the explosion appeared to be due to the collapse of the stoppings affording release of pressure and to the opportunity given in consequence for the expansion and dissipation of the heated gases. For this reason Mr. Affelder believed that the presence of weak stoppings was of value in checking an explosion.

End of Drift Hard Place to Start Explosion

According to the report in *Coal Age*, "the institute did not take very kindly to W. L. Affelder's resistless stoppings as a means of limiting explosions in coal mines," and the view was expressed "it is questionable whether the release of pressure has much effect except at the point of origin."

It has been found that by using the same means of ignition it is much easier to start a dust explosion in a small than in a large area and that reproduction of explosive combustion in unusually high and wide places has sometimes failed to occur. These well-known facts probably gave rise to the theory that release of pressure or opportunity for the comparatively easy projection of the heated gases tends to prevent or obstruct the start and propagation of a dust explosion. The theory, however, is not in harmony with the facts.

The experimental gallery at Eskmeals is about 800 ft. in length and 7 ft. 6 in. in diameter. On page 496, Vol. 6 of *Coal Age*, this statement appears: "It has been found extremely difficult if not impossible to start a dust explosion from a shot fired from the face or closed end of the gallery and to assure success the shots are fired 50 ft. from the closed end." In the absence of the opportunity for the expansion of the heated gases in opposite directions it was extremely difficult if not impossible to start a dust explosion, whereas with the opportunity provided, the start of the explosion was assured.

On page 39, Bulletin 56, of the Bureau of Mines, is found a description of tests made at the Bruceton mine, showing practically the same results as at Eskmeals. Tests were first made in the Bruceton exterior gallery, consisting of a steel tube about 100 ft. in length, 6 ft. 4 in. in diameter, closed at one end by a plank stopping and open at the other. The cannon was placed against the plank stopping of the closed end and a hole was cut through the stopping opposite the bore of the cannon. Shots fired from the cannon into the gallery produced explosions without fail.

Suggest That Mr. Affelder Explain This

This exterior gallery is so arranged that it can readily be connected with the mine itself. When the gallery was so connected and in consequence the distance from the cannon to the opening was increased from 100 ft. to approximately 1200 ft. with two right-angled turns greatly increasing the resistance to the rapid projection of the heated gases from the shot at the closed end, the effect, as the report states, was striking. When the shot was fired in the steel gallery with its open end affording an easy release of pressure, the flame not only traversed the full length of the gallery but extended into the air for many feet, but, under otherwise the same conditions, when the gallery was connected with the mine, the dust was inflamed only in the first half of the gallery and the mine itself was not affected at all.

Here is another significant fact. It has been found that old mines, where the mine resistance is great, are practically immune from dust explosions and that they occur frequently in new mines where the mine resistance is comparatively small.

It is well known that the easy removal of insufficient tamping increases the danger from a blown-out shot and that an increase in the depth of the hole and a corresponding increase in the length of the tamping, the amount of the explosive used remaining the same, lessens the danger. The application of this lesson should help in measuring the probable influence of the easy collapse of weak stoppings in checking a mine explosion.

Strongly Built Stoppings Throttle Explosions

In view of the above it can be said that the presence of strongly built stoppings, capable of resisting the pressure of the initial blast, tends to help in throttling the explosion at its point of origin, and that the release of pressure by the destruction of weak stoppings by the force of an incipient explosion and the consequent easier projection of the heated gases, may be of material assistance in spreading the explosion throughout the mine.

I think it can be safely stated that the subsidence of the explosion in Mr. Affelder's mine was not due to the collapse of the stoppings, but was brought about by other causes not observed by him.

This from W. H. Noone, P. O. Box 5, Thomas, W. Va. He contends that all stoppings should be strongly built of mine refuse faced with concrete.

THE Coal Mining Institute of America, held recently in Pittsburgh, discussed the resistless stopping in reference to limiting the force and area of an explosion. It appears that the history of mine explosions attests that there have been no absolutely indestructible stoppings built, and that neither a wood nor other resistless stopping has the capacity of confining an explosion to the area of its origin. Personally, I believe in good stoppings—as nearly indestructible as possible.

I would not like to assume that we are faced by the alternative of either having men asphyxiated by reason of a number of stoppings being blown down or having them killed outright because the stoppings were too strong to afford the explosion an opportunity to lose force by expansion. The answer of the Mining Institute of America was both "yes" and "no," which is no answer.

F. W. Cunningham's plan to have a strong center wall with rock piled to the roof on either side appears to be a good one and such a stopping should be capable of withstanding the force of an explosion.

Wood stoppings are not to be recommended in a mine where the coal is gaseous or highly inflammable. Neither are wood stoppings any longer economical on account of the high cost of lumber. The most practical and economical stoppings are built with the rock and refuse of your mine, assuming that it makes plenty of this material. Start your wall four, five or six feet thick at the pavement, according to the amount of rock and dirt available, and gradually incline the wall on both sides toward the top.

The outsides of the wall being evenly and substantially built, the inside should be filled with the finer dirt and refuse. The wall should then be given a good coat of concrete to make it practically fireproof and airtight. If you have any dirt left you can pile it clear up to the roof on either side in the manner indicated by Mr. Cunningham. The impurities of the coal, the slate, roof rock and coal from the falls, and the refuse that accumulates on the haulages will furnish enough material for stoppings in almost any mine. It is cheaper to keep haulages clean by filling up the crosscuts than to build stoppings of brick, lumber or other material.

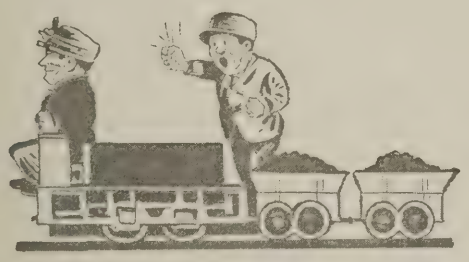
If it is possible to reckon with the phenomena of mine explosions in building our stoppings, we should try and do so; and perhaps many of our readers can give valuable advice on the subject, the result of their experience. In some instances it seems that an explosion will blow down a stopping or two and expend itself in a small area adjacent to the point of origin and thus do but little damage. Another will have force enough to be felt throughout the mine.

Emphasis, of course, must be laid on other conditions that either favor explosions, or develop the mine's security against them. It must be remembered also that stoppings are fundamentally a part of the ventilating system, and they should be made sufficiently permanent and tight to assure satisfactory ventilation.

The Patrioteer

Written expressly for Coal Age

By Rufus T. Strohm



I bellered an' I swore



Why they don't pin one on me

I've bin readin' in the papers how the boys that's over there
Hev bin fightin' like the devil on the land an' in the air;
Every day some airplane feller does a little flyin' roun'
An' to keep himself in practice brings a dozen Taubes down;
Er some Sammy single-handed raids a piece of German trench
An' they both git hero's medals from the pleased, admirin' French.
They deserve the praise they're gittin', but it seems to me, by gum,
That the world is quite fergittin' all us heroes here to hum.

Turn your eyes on me, fer instance, cast yer optics on my chest,
An' you won't find any medals dingle-danglin' on my breast;
Yet in bein' patriotic an' in service that I've done
I don't reckon that there's any that can beat me, barrin' none.
For when winter took the country in his big an' frosty hand,
An' a mighty yell fer fuel echoed up an' down the land,
Then I turned my whole attention to the workin' of a mine
That had not been doin' nothin' since the days of 'ninety-nine.

Now, the stuff was full of sulphur, there was lumps of slate and bone,
There was rock an' dirt in pieces, there was chunks of gob an' stone;
But a bit of it was shiny, an' the most of it was black,
So I sold it free an' gladly, never holdin' nothin' back;
Fer the cries of freezin' millions sorter tetched my tender soul,
An' I did my best to warm 'em with my cars an' cars of coal;
So I driv an' urged the miners, an' I bellered an' I swore,
An' I bullied 'em an' bribed 'em so they'd dig a little more.

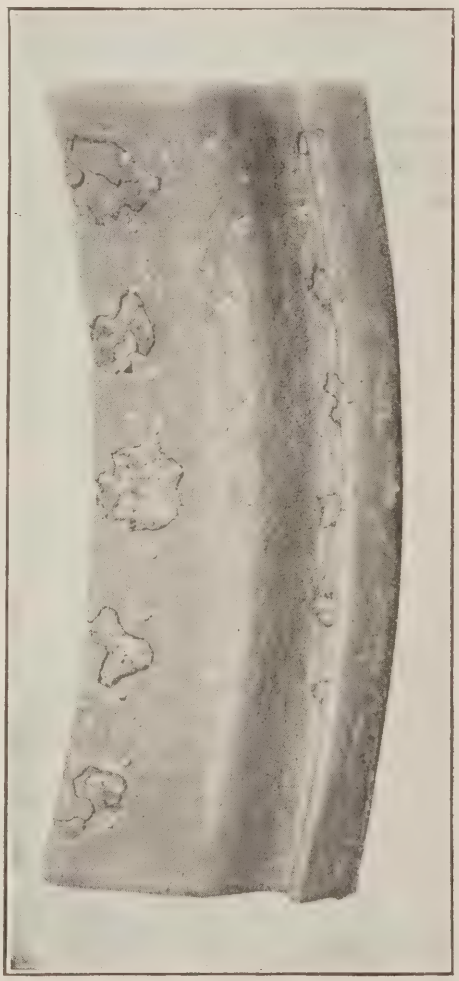
Nights I hardly tetched a pillow, days I scarcely stopped to eat,
All fer fear the shiv'rin' people wouldn't git sufficient heat;
But when springtime come cavortin' puttin' winter on the trot,
Did they shower me with praises an' with blessings? They did NOT!
'Stid of that, they damned me plenty, up the hill an' down the dale,
An' they said I was a traitor an' I'd ought to be in jail—
Me, that slaved to give 'em fuel! So, I say, it's hard to see,
When they're handin' out their medals, why they don't pin one on me.

NEW APPARATUS AND EQUIPMENT

The Feralun Brake Shoe

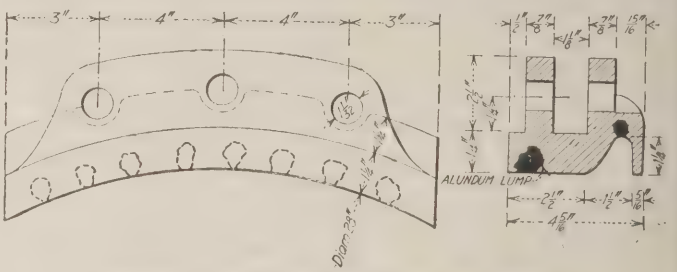
A source of great inconvenience and expense in coal mines is the "double flanging" of locomotive drivers. This process is particularly rapid on electric locomotives where much sand is employed as the sand not only grinds away the metal of the tire, but the electric sparking between wheel and rail has an important effect. The rail thus cuts into the locomotive tire rapidly, with the result that a second, or false, flange appears on the outer edge of the tire while the true flange becomes higher than it should be. Either or both of these circumstances may cause trouble at frogs and switches.

The truing of such treads is not an easy job. After running a few weeks or months the tires become extremely hard at and near the surface. Turning tools, be they of ever so good quality and carefully tempered, are soon dulled or broken in removing this extremely hard skin. Of course, alloyed and high-speed steels are, in such work as this, vastly superior to the older carbon steels; but even tools forged from the former material often have their edges or points damaged or are broken in two in truing tires in the lathe. To obviate the difficulty and inconvenience arising from double, or false, flanging the American Abrasive Metals Co. some years ago developed what it calls the "feralun" brake shoes. These brake shoes are shown in the accompanying illustrations. The feralun brake shoe does not differ materially in form or shape from the ordinary cast-iron shoe. It is distinctive, however, in that along the outer edge and over the flange pieces of alundum are embedded in the metal. These alundum fragments are placed within the mold before pouring and are held in their proper position by nails or other means while the molten iron is run around them. As the iron solidifies and contracts these lumps of abrasive material are gripped and held in place with great firmness and rigidity.



PHOTOGRAPH OF SHOE SHOWING ALUNDUM CAST IN PLACE

When such a brake shoe is applied to a locomotive, the alundum cuts away the false flange along the outer edge of the wheel tread as rapidly as it is formed.



SIDE VIEW AND SECTION OF SHOE

In similar manner the true flange is ground down and kept at approximately its proper height.

Of course, the rapidity with which the wheel tread wears down depends largely on how profusely the motorman uses sand. In some instances where little sand is used it has been found profitable to alternate the use of the feralun shoe with that of the ordinary cast-iron shoe. In most cases, however, this procedure is unnecessary.

The feralun brake shoe is made in all standard sizes and shapes. Because of the construction of the shoe it sometimes has been found advantageous to make it of a slightly different shape than the one regularly supplied on the locomotive, also somewhat heavier. In some instances the shoe and holder are cast in one piece, as is shown in Fig. 2, thus insuring strength and long wear.

This type of shoe has been tried so long and so often that it is by no means an experiment. The first cost of the shoe is naturally higher than that of a plain cast-iron piece of the same dimensions, but its wearing qualities more than compensate for this difference. In addition, wheels fitted with these shoes are effectively prevented from grooving or double flanging.

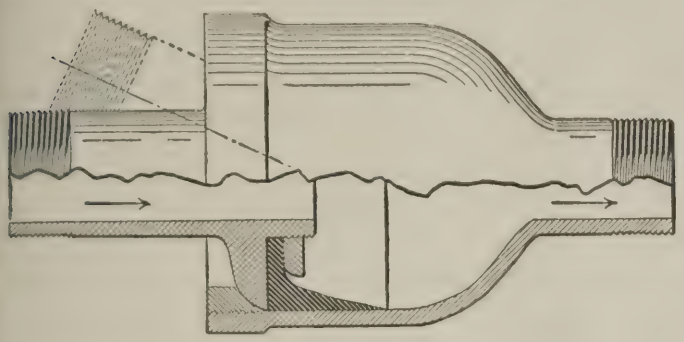
Germany has announced her eighth tyranny loan. We are about to offer our THIRD LIBERTY LOAN. *Can we allow ourselves to be outdone by Germany?*

Flexible Pipe Joint

A useful fitting for pipe lines has recently been devised, and is being offered for use on steam, air, water and other pipe lines. It consists primarily of a cup-shaped end screwed inflexibly to a joint in the line. Into this fits a movable, curved socket which screws to the

end of another joint in the line, as shown in the illustration.

This ball-joint fitting is known as the Berry flexible joint, and where it is inserted an angle may readily be formed in the line. It will act also as an expansion joint, since the ball fits into the cup in such a way that it is free to move backward and forward, thus taking up the variations in the length of the pipe due to



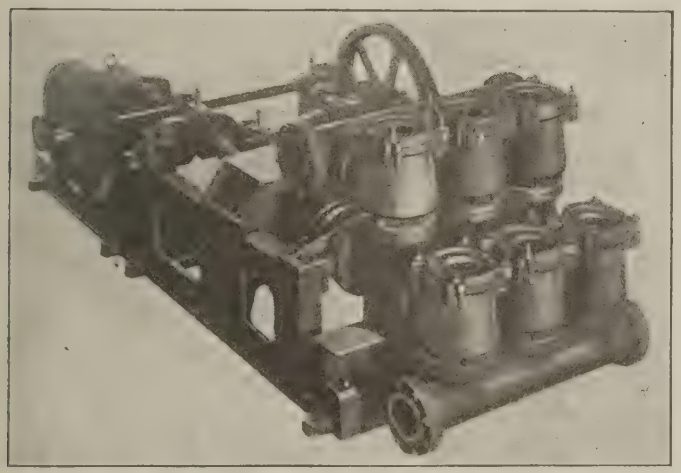
HALF SECTION OF JOINT

temperature. The flexibility of the joint allows it to absorb vibrations satisfactorily and thus saves the line from damage from this source. The device is manufactured by the Iron Clad Joint Co., of New Orleans, Louisiana.

Germans believe the citizen exists for the state, while Americans insist that the state lives for the citizen. Buy a LIBERTY BOND *and preserve the American view.*

A New Mine Pump

The accompanying photograph shows a new pump which the Harris Pump and Supply Co., of Pittsburgh, Penn., has recently completed and placed on the market. It is a horizontal wood-lined station pump, ranging in size from 300 to 500 g.p.m. The pump is heavily built for severe mine pumping conditions. The pump is of the pot-valve type, with the water end made up of 12



separate pieces, all parts coming in contact with the water being protected by wood lining, except the valve pot covers, which are coated on the inside with lead, and the plungers, which are made to suit local conditions.

A new patented valve of the hidden reinforced type is being used. This, by its construction, affords the max imum free area through the seat for a given port area, with a consequent lower water velocity through the valves. This greatly lengthens the life of the seats and valves and gives much less trouble from clogging by dirt.

All parts of this pump are interchangeable. Pumps of this design are now running and giving excellent service.

Unless we lend the Government voluntarily by investing in LIBERTY BONDS, *the Government will be forced to conscript our wealth.*

Inclosed Float Switch for Automatic Control of Pumps

Some of the first float switches were doubtless used in connection with sump pumps in basements of buildings. Present-day uses of these switches, however, cover a wide field of manufacturing and industrial applications.

As an improvement on the open type of float switch, the Cutler-Hammer Co., of Milwaukee, Wis., is now manufacturing a new inclosed switch which is built to stand hard usage and has a switching mechanism that is positive in its operation. The opening and closing of the switch blades is accomplished by the rise and fall of a heavy copper float, which by means of a rod and lever drives a roller, against the action of a spring, over the point of a cam. This opens and closes the switch with a quick action.



THE FLOAT AND SWITCH

This switch will not get out of step, which is the chief objection to some devices of this kind. The upper part of the switch carries all the operating mechanism and is also provided with mounting lugs. They are made for several different methods of mounting. The inclosing tank can be removed easily for inspection or making connections. The upper casting is provided with an opening and bushing for the entrance of conduit.

These switches are made with one, two, three and four poles. The single-pole switches are intended for use with self-starters for automatically controlling direct- or alternating-current motors. The two-, three- and four-pole switches are intended for use with single and polyphase motors which may be thrown directly on the line when starting.

India Has Some Deep Shafts

According to G. George, who delivered a paper before the Mining and Geological Institute of India, there are three collieries in India with shafts 1000 ft. deep. At one colliery shafts 1200 ft. deep are being sunk and at another the shafts will be 1500 ft. deep. A colliery is planned with shafts as deep as 1800 feet.



More New Prices

New coal prices, effective Mar. 29, were announced by the Fuel Administration last week as follows:

State or Field	Run-of-Mine	Prepared Sizes	Slack or Screenings
Arkansas—(see Note 1):			
Johnson, Franklin and Sebastian, except the Excelsior district	$3.70	$4.60	$2.40
Logan and Scott Counties and the Excelsior district of Sebastian County	4.35	5.15	2.60
Oklahoma—(see Note 1):			
Leflore, Haskell, Okmulgee, Tulsa, Rogers and Coal Counties and the Hartshorn-Wilburton vein in Pittsburg and Latimer Counties	3.70	4.60	2.40
McAlister vein in Pittsburg and Latimer Counties	4.25	5.10	3.00
Washington:			
Screened Coal (sub-bituminous):			
Kittitas County	3.55	3.95 (See Note 2)	2.50
Screened Coal (bituminous):			
Lewis and Thurston Counties	2.75	3.95 (See Note 3)	1.25
Washed Coal (bituminous):			
Kittitas County	.....	4.00	....
Pierce, King, Lewis and Skagit Counties	.....	6.00 (See Note 4)	2.50
Washed Coal (sub-bituminous):			
King County	.....	5.00 (See Note 5)	1.50
Lewis County	.....	3.95 (See Note 6)	1.25

Note 1.—Summer reductions must be made in prices on all grades, except slack as follows: March, 75c.; April, 60c.; May, 45c.; June, 30c.; July, 15c.
Note 2.—Special steam and gas, $3.25.
Note 3.—Lump nut, $3.25; nut, $3.
Note 4.—Mixed steam, $5.25; straight steam and gas, $4.80.
Note 5.—Pea, $3.50; buckwheat, $3.25.
Note 6.—Nut, $3.75; pea, $3; buckwheat, $1.50.

The following prices are effective as of Apr. 1:

State and Field	Run-of-Mine	Prepared Sizes	Slack or Screenings
New Mexico (See Note):			
Raton District	$2.35	$3.25	$1.65
Gallup	3.05	4.05	2.00
Carthage	4.25	5.05	3.55
Cerillos	4.05	4.55	3.55
Sugarite and Monero	3.00	4.00	2.00

Note—Summer reductions: April, 50c.; May, 40c.; June, 30c.; July, 20c.; Aug., 10c.

All operators who have complied with the Washington wage agreement are authorized to add 45c. per ton to the foregoing prices.

Coke Prices Fixed to July 1

Coke prices fixed by the War Industries Board will continue in effect until July 1. All matters of price now are being handled by the new Price Fixing Committee of the War Industries Board. The announcement as to coke prices was made in connection with that relating to the Price Fixing Committee of the War Industries Board ment reads as follows:

"The President has approved the recommendation of the Price Fixing Committee of the War Industries Board that the maximum prices heretofore fixed by the President upon the recommendation of the Board, upon ore, coke, steel and steel products, subject to revision on Apr. 1, 1918, be continued in effect until July 1, 1918; from Apr. 1 to July 1; however, the maximum price of basic pig iron be reduced from $33 to $32 per gross ton, and that the maximum price of scrap steel be reduced from $30 to $29 per gross ton. No new contracts calling for delivery of any of said commodities or articles on or after July 1, 1918, are to specify a price unless coupled with a clause making the price subject to revision by any authorized United States Government agency, so that all deliveries after that date shall not exceed the maximum price then in force, although ordered or contracted for in the meantime. It is expected that all manufacturers and producers will observe the maximum prices now fixed."

Buy a LIBERTY BOND. *Everybody is doing it.*

Warns Public To Buy Early

No chance exists for a misunderstanding of the attitude of the Fuel Administration this year in the matter of early purchase and storage of coal by domestic consumers. In a formal statement given out Monday by Dr. Harry A. Garfield, the Fuel Administrator, he said: "The great storage capacity of the country lies in the bins of the individual consumer and there the country's coal reserve must be built up during the spring and summer when coal production is unhindered and the transportation facilities of the country operating at their highest efficiency."

He sounds a warning, however, against overstocking: "Every ton of coal that is hoarded against future needs and is not used during the winter is actual waste. The labor and transportation used to bring the coal to the consumer and the actual energy of the coal itself are withheld from doing their part toward speedy victory. Consumers should secure just a little less coal than they believe they need and should make every shovelful give its full value in heat and power. Every shovelful saved means help for the industries in turning out supplies for our troops abroad, help for the ships that must bridge the 3000-mile gap between our shores and the battle-front, and help toward ultimate victory."

The Fuel Administration is even going so far in the matter of securing early buying as to make this offer: "The Fuel Administration will coöperate with all communities in an effort to provide storage for emergency stocks of coal to be set aside during the spring and summer to meet emergencies of weather and transportation which may arise next winter."

Increased Freight Rates on Anthracite

The order providing for an increase of 15c. per ton in the railroad rates on anthracite coal in official classification territory, with the limitations provided, reads as follows:

It is ordered that the order of Mar. 12, 1918, entered in this proceeding authorizing certain increases in rates on anthracite coal between points in official classification territory named in the suspended schedules, be, and it is hereby, modified in the fifth paragraph thereof to read as follows:

It is further ordered that the commodity rates on anthracite coal, contained in the schedules under suspension in this proceeding, in so far as increased by 15c. per long ton, or less, as stated in said schedules, be, and they are hereby, approved; provided that such rates between points in official classification territory shall not be increased by more than 15c. per long ton. Provided further, that where a through rate between two such points in the United States is made by combination, appropriate provision is made in the schedules that the aggregate increase of the factors applicable in such combination shall not exceed 15c. per long ton; provided further, that where through rates from points in official classification territory in the United States to Canadian destinations are made by combination the factors applicable to the Canadian frontier used in such combinations may be increased by not more than 15c. per long ton, which increase shall accrue to carriers within the United States.

Higher Price for Clean Coal

Twenty cents a ton may be added to the Government coal price by operators who use special means for eliminating impurities. A permit, however, must be obtained from the legal department of the Fuel Administration before the addition may be made. Coal which has been specially cleaned will be designated by cards buried in the coal at the time of loading and by notations on the invoice. The initial permits are to expire July 31, but in cases where operators have complied carefully with the regulations they will be extended.

Interstate Commerce Commission Retracts Statement Made on Previous Opinion

The Interstate Commerce Commission took unusual action last week when it withdrew certain statements reflecting on the Delaware, Lackawanna & Western Coal Co. and the Delaware, Lackawanna & Western Railroad Co. The statement made in the previous opinion is as follows:

"The record shows that when the shipments in question moved the complainant was, and that it still is, a subsidiary of the defendant, and that the defendant has endeavored in various ways, both lawful and unlawful, to give preference and advantages to the complainant. The payment of freight charges by the complainant to the defendant seems to have been largely the transfer of money from one pocket to another. The fact, however, does not simplify or aid the complainant's demand for an order of reparation. Moreover, an award of damages in the present proceeding, from some points of view, would simply be an extension, under our authority and with our approval, of the practices condemned in the Anthracite Case."

In retracting the foregoing statement, the Commission now says:

"That language was based largely on the facts before us in the Anthracite Case, 35 I. C. C., 702, the record in which was referred to and made a part of the record in this proceeding. The history both of the past and present relationship between the coal company and the railroad company was fully developed on the rehearing, and it was made clear that the language in question, in so far as it concerns this relationship, must be withdrawn as not being justified by the conditions existing at the time the report was written."

Weekly Production Statistics

Bituminous coal production for the week ended Mar. 23 was 10,972,000 tons, or a little gain over the week preceding, when there was a decided falling off. Anthracite shipments showed a gain of over 200 carloads, or 42,487 cars for the week. Beehive coke production continues to make a good showing, the week's figures having been 635,000 tons. Byproduct-coke ovens are working at 88 per cent. of full-time capacity and produced during the week under review 464,264 tons.

Brief Washington Notes

J. A. Galligan, of Chicago, and James A. Ballard, of Detroit, have been named district coke representatives of the Fuel Administration in the territory contingent to their respective cities.

Pending the preparation of forms for permits and applications, retailers may add to their selling price allowances made to operators for special preparation of coal. In granting this permission, however, the Fuel Administration orders all retailers to keep an accurate record covering all purchases and sales of specially prepared coal as reports on these purchases will be required later.

Coming Meetings

AMERICAN ASSOCIATION OF ENGINEERS will hold its fourth annual convention May 14 in Chicago, Ill. Secretary, A. H. Krom, 29 South La Salle St., Chicago, Ill.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS' annual convention June 26-28 at Atlantic City, N. J. Secretary, F. L. Hutchinson, 29 W. 39th St., New York City.

AMERICAN INSTITUTE OF MECHANICAL ENGINEERS will hold its spring meeting June 4-7, at Worcester, Mass. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

MICHIGAN-OHIO-INDIANA COAL ASSOCIATION will hold its annual convention Apr. 10 and 11, at Cincinnati, Ohio, with headquarters at the Hotel Sinton. Secretary, B. F. Nigh, Brunson Building, Columbus, Ohio.

INDIANA RETAIL COAL MERCHANTS ASSOCIATION will hold its spring meeting Apr. 10 and 11, at the Hotel Severin, Indianapolis, Ind. The meeting will be a strictly business affair, most of the time being given to discussion of retailers' problems. Secretary, R. R. Yeagley, 703 Fidelity Trust Building, Indianapolis, Ind.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The decision of the National Board of Labor as to the principles and policies which will govern its action in dealing with employers and employees for the duration of the war was announced on Mar. 29. It has an important bearing on the decision in cases like that of the Hitchman Coal and Coke Co. Under the head of right to organize, the declaration of principles says:

"1. The right of workers to organize in trade unions and to bargain collectively, through chosen representatives, is recognized and affirmed. This right shall not be denied, abridged or interfered with by the employers in any manner whatsoever. 2. The right of employers to organize in associations of groups and to bargain collectively, through chosen representatives, is recognized and affirmed. This right shall not be denied, abridged or interfered with by the workers in any manner whatsoever. 3. Employers should not discharge workers for membership in trade unions, nor for legitimate trade-union activities. 4. The workers, in the exercise of their right to organize, shall not use coercive measures of any kind to induce persons to join their organizations, nor to induce employers to bargain or deal therewith."

Open Shop Not to Be Deemed a Grievance

In reference to the present state of unionism its principles are thus defined:

"1. In establishments where the union shop exists the same shall continue and the union standards as to wages, hours of labor and other conditions of employment shall be maintained. 2. In establishments where union and non-union men and women now work together, and the employer meets only with employees or representatives engaged in said establishments, the continuance of such condition shall not be deemed a grievance. This declaration, however, is not intended in any manner to deny the right, or discourage the practice of the formation of labor unions, or the joining of the same by the workers in said establishments, as guaranteed in the last paragraph, nor to prevent the War Labor Board from urging, or any umpire from granting, under the machinery herein provided, improvement of their situation in the matter of wages, hours of labor, or other conditions, as shall be found desirable from time to time. 3. Established safe-guards and regulations for the protection of the health and safety of workers shall not be relaxed."

Women at Man's Work to Get as Much as Men

Other rulings are as follows:

"If it shall become necessary to employ women on work ordinarily performed by men, they must be allowed equal pay for equal work and must not be allotted tasks disproportionate to their strength.

"The basic eight-hour day is recognized as applying in all cases in which existing law requires it. In all other cases the question of hours of labor shall be settled with due regard to governmental necessities and the welfare, health and proper comfort of the workers.

"The maximum production of all war industries should be maintained and methods of work and operation on the part of employers or workers which operate to delay or limit production, or which have a tendency to artifically increase the cost thereof, should be discouraged.

"For the purpose of mobilizing the labor supply with a view to its rapid and effective distribution, a permanent list of the number of skilled and other workers available in different parts of the nation shall be kept on file by the Department of Labor, the information to be constantly furnished: 1. By the trade unions; 2. By state employment bureaus and federal agencies of like character; 3. By the managers and operators of industrial establishments throughout the country. These agencies should be given opportunity to aid in the distribution of labor, as necessity demands.

"In fixing wages, hours and conditions of labor regard should always be had to the labor standards, wage scales and other conditions, prevailing in the localities affected.

"1. The right of all workers, including common laborers, to a living wage is hereby declared. 2. In fixing wages, minimum rates of pay shall be established which will insure the subsistence of the worker and his family in health and reasonable comfort."

Anthracite Mine Workers Are Industrious

In the anthracite region, no developments have taken place regarding the threatened secession. The union is a badly threatened organization, but it contrives, with all its buffetings, to be reasonably seaworthy and to find place for new deckloads of passengers at nearly every port of call.

The operators and fuel administrators in the anthracite region have been desirous of keeping the mines steadily at work during the Holy Week and Easter season. The leaders of the mine workers agreed that Maundy Thursday, Good Friday and Holy Saturday should not be kept as holidays. They appear to have been entirely successful in enabling the mines to run, though some of the mines were somewhat short-handed. Good Friday has been a holiday for years hitherto, the men preferring not to work on that day.

But Easter Monday was also Apr. 1, the day set apart by the union for celebrating the inauguration of the 8-hour day in the bituminous region. Its religious and secular importance and the need the union had to present its case in favor of the increased dues made the union leaders persistent in advocating its observance. The mine workers too were somewhat tired and stale with their long grind.

The difficulty about the men imported by the Lehigh Coal and Navigation Co. into the Panther Creek district has been settled. These men were said to be evading military service and were charged with spreading pro-German sentiment. Some of them were said to be Austrians. A general tie-up of the mines of the Navigation Company was threatened, but President Kennedy, of the Seventh union district, tried hard to straighten matters out. John J. Casey, of Wilkes-Barre, a representative of the United States Department of Labor, investigated the matter and reported in favor of the employment of the men. The Navigation Company is importing men in large numbers for work at its mines.

Citizenship Is an Honor to Be Sought

The mine workers in Columbiana County, in the northeastern edge of the coal fields of Ohio, are compelling the foreign miners to become naturalized or forfeit membership in the union. One wonders what good are citizens who enter their citizenship by compulsion and not by preference. Citizenship is an honor to be sought, not a punishment to be inflicted. The Ohio mine workers in their state convention in Columbus adopted a resolution to compel all alien miners to become United States citizens just as soon as they have been here the required length of time. Those who failed compliance with this rule were to be expelled from the union.

The laws of the United States are framed on the idea that naturalization should be a free act of the individual after he has learned to desire such naturalization. The

country does not seek to put itself under obligation to defend and care for persons who are not American at heart. We have already too many citizens with varying degrees of hyphenation for us to wish to add in any way to their number. The better plan would be for the union to prohibit such men from voting at union meetings until they have taken those steps which will render them capable of voting on national affairs. In the last week of March no less than a dozen Austrian mine workers declared their intention of becoming citizens, the union at West Point having chosen May 1 as the limiting date for those seeking citizenship. Expulsion is threatened for all those who neglected to perform this duty before that date.

Subdistrict No. 5, which is the Eastern Ohio region, has a large service flag 36 ft. long and 12 ft. wide. It bears 1000 stars, the union having that number of men in the service.

The Virginias, Hitherto Quiet, Have Troubles

In some of the counties of West Virginia adjoining Kanawha County foreign propagandists have been particularly bold and active within the last few weeks. Most of the agitators are believed to be members of the Industrial Workers of the World. One of the propagandists is a Greek who has been attempting to foment trouble among Greek miners. Governor Cornwell has been investigating the activities of these trouble-makers and has made it plain that any man trying to cause industrial disturbance will be severely dealt with.

In Horse Creek, Boone County, West Virginia, a strike at the coal mines has been in progress for two weeks. It is the outgrowth of an attempt to organize the mine workers. As far as can be learned some of the men do not wish to join the union, but those that do belong are believers in "benevolent assimulation" and desire to compel them to come in.

Just over the West Virginia line in the Clinch Valley the United Mine Workers have men at work in Big Creek and Coal Creek organizing the men at the mines of the smaller corporations. In Big Creek they have been successful but in Coal Creek no organization has as yet been started.

Some Persons Truly Bode No Good to Anyone

No new developments have taken place in the Colorado split. The Seattle Union Record well compares John R. Lawson's career with that of William D. Haywood. Both were charged with murder, Haywood being alleged to have killed the former governor of Idaho. Labor spent large sums of money to free them both, the Haywood defense being paid for by the American Federation of Labor. Both men were freed and both when freed threw in their fortunes with hostile organizations. The moral is quite plain though the Union Record does not appear to draw it. The union must be careful to give its allegiance and support to men of safe and sane principles of action, men who can be depended on to be fair in their judgments in regard to all men. Often the union is not conservative enough in its choice of men and the trouble they cause to capital is but a foretaste of the trouble they will later cause to the labor organization to which they temporarily belong.

There is an agitation at Alberta, Canada, against alien enemies, just as there is in the United States. The miners feel that citizens should be granted consideration first. On Mar. 27 Premier Stewart practically assured a deputation from the United Mine Workers at Edmonton that the provincial government would take a census of the mine workers so as to determine how many of them were alien enemies.

About 60 per cent. of the mine workers are said to be of foreign birth, mostly Italians, Austrians and Russians. Not more than half of these men are of alien enemy nationality and nearly all of them are naturalized citizens. But the naturalization does not confer any miraculous regeneration of heart and will. Canada, like the United States, has too many half-baked citizens and perhaps would be less badly hampered if they could be classified unqualifiedly as alien enemies. Had naturalization been attained at greater trouble and been urged less insistently the possession of citizenship would have been a surer guarantee of that change of viewpoint which the acquisition of naturalization papers is supposed to evidence. As with the penitents at the mourner's bench, the work of regeneration is so incomplete that after a few weeks it needs to be done all over again.

In the Glace Bay district of Nova Scotia the difficulty is about the threatened introduction of Chinamen. Robert Baxter, vice president of the Amalgamated Mine Workers, and James B. McLachlan, the secretary of the same organization, held a meeting of the mine workers employed by the Dominion Coal Co. on Mar. 24, and both spoke against the immigration of coolies. Meantime, Silby Barrett, president of their organization, and George Varbin, of the Phalen local, are in Newfoundland. They expect to stay a month and to recruit 1000 men to work in the Glace Bay mines. The work is being undertaken for the government through orders issued by Fuel Controller Magrath who followed a suggestion made by the executive board of the Amalgamated Mine Workers.

Nova Scotia Steel Co. May Have Big Strike

The mine and steel workers of the Nova Scotia Steel and Coal Co. have been talking strike. They want an extra dollar per day so that their wage will be equal to that paid to the employees of the Dominion Coal Co. There are about 3000 men involved. By law they are allowed one day of idleness to consider whether they will call a strike. If they decide in favor of it they have to work 30 days before they can start their strike. Meanwhile an attempt will be made to settle the dispute by negotiation.

A meeting is to be held April 3 and then the question will be voted on by all the men. The boys in the Amalgamated Mine Workers of Nova Scotia are not allowed a vote.

The papers in Nova Scotia, as elsewhere, have been full of the repulse of the British and French armies in France. Many of the mine workers of the Nova Scotia Steel and Coal Co. believe that there has been no truth in the story. They think that the repulse has been faked by the corporation, and the story thus evolved has been spread on the pages of the local papers at the expense of the Nova Scotia Steel in order to convince the men that the cause of the Allies is desperate and strikes cannot be permitted.

Which is the greater pain—to part with a few dollars for a LIBERTY BOND, *or suffer the wounds of battle? The boys at the front are doing their share. Are you?*

Patriotism in Illinois Mines

Illinois mine workers do nothing by halves. Their loyalty seemed at a low ebb when the war started. Now it is at such a high tide that it sets the nation wondering. The other day 110 mine workers employed by the Royal Mining Co., at Belleville, St. Clair County, held an impromptu meeting at the head of the shaft and adopted a resolution that every man subscribe for at least one Liberty Bond of the third issue before going to work. The mine workers' union at Panama, Montgomery County, has voted to donate one per cent. of the wages of its members to war funds for two months. The gift will aggregate between $1400 and $1500.

But some of the patriotism is perhaps ill-advised. At the Peoria biennial convention the mine workers adopted a resolution that they would not work in any mine if the Stars and Stripes did not wave over it. Of course, the operators did not show any disinclination to unfurl the flag, even though they probably prefer not to have compliance forced on them. If an operator can be compelled by his mine workers to erect a flag under penalty of a strike, why should not a mine worker be compelled by the operator for whom he works to pin a flag on his working jacket under penalty of discharge?

It is said that this resolution of the mine workers was not so generally circulated that the operators all became cognizant of it. As a result, at several mines when the men came to work there was no flag flying. Thus it was that during the past week there were flag strikes at the Muren mine of the Southern Coal, Coke and Mining Co. and the Eldnar Mine of the Eldnar Coal Co., near Belleville. The mine workers of the Muren mine declare that they repeatedly requested the Southern Coal, Coke and Mining Co. to comply with the resolution. That corporation had made arrangements for the erection of a flag pole, but there was unavoidable delay. After a 40 ft. pole had been erected and a 4 x 6-ft. flag unfurled the men returned to work. They are subject to fines under the automatic penalty clause. The flag is also flying at the Eldnar mine and the men are back to work.

I'm buying LIBERTY BONDS *because if I did not buy them and other Americans followed suit, this country would deserve to get everything the Kaiser chose to hand it.*

Engineers Discuss Labor Problem—I

The New York section of the American Institute of Mining Engineers held a notable meeting Mar. 26 in the Engineers' Club for the discussion of labor and employment problems.

Sidney J. Jennings, vice president of the United States Smelting, Refining and Mining Co. and president of the Institute, traced the origin of his company from its inception to the present time. He said that its fundamental idea from the time when the shares were issued was one of coöperation and then analyzing the present relation of the company to industry added that if the company were not fulfilling its proper function it might have to be abolished. He found three dangers besetting the proper operation of the modern company. First, the capitalist may become divorced from a sense of personal responsibility in the operation of the business. Second, the actual manager or management may have considerable power without having any capital interest in the concern, and third, the laborer or worker may feel that he is only a cog in the big wheel.

Partnership, Profit Sharing, Intermediation

Mr. Jennings suggested the following methods for overcoming this feeling of the laborer that he is only a cog in the machine. He cited the fact that the United States Steel Corporation offers actual partnership through the purchase of shares in the corporation. Second, he thought that profit sharing above a fair return was one of the best means of making the company a truly coöperative agent. Third, he felt that the employment of a central employment manager was almost essential to the maintenance of harmonious relations between the company and the workers. He felt that a good employment manager could be responsible for either the good-will or the ill-will of employees which in turn would mean success or failure of the institution.

Walter Douglas, of the Phelps Dodge Corporation, operating copper mines in Arizona, said that it was becoming increasingly difficult to get the viewpoint of the wage earners due to the increasing numbers of men employed by individual companies. He contrasted former conditions when the employer or the manager or the shift boss had so few working under him that he knew them all personally and could get their viewpoints very readily, with present conditions where concerns have thousands and tens of thousands of men in their employ without the possibility of knowing them all personally or getting their point of view.

He thought that some substitute must be found to bring about the close personal touch which formerly existed in the small companies. He spoke of the necessity of getting specialists to analyze the labor problems for companies and thought that engineers should be the first to seek the aid of such specialists because the engineers were accustomed to employing special men for special problems. He thought that the manager of a concern is not suited to this particular kind of work and yet he is the one who most frequently tries to solve the problem.

Mr. Douglas believed that the solution will be found in some intermediary between the employer and the employee, and stated that the union has not as yet filled this function satisfactorily. He was quite certain that the big problem in the labor situation is not one of wages or hospital dues, but rather of the thousands of little things that the company knows nothing about until a crisis comes. It would be the duty of an intermediary to know what these things are and to correct evils before they develop into crises.

For Intermediation Choose Labor Leaders

The type of man best able to deal with labor would be one who has been a leader of labor himself and he cited Secretary Wilson and John Mitchell as types who would be good intermediaries for large concerns. Speaking for the Phelps Dodge Corporation, he said that they had an employment agent at the Copper Queen whose duty it was to employ, transfer and dismiss all workers. The foreman of any department could not dismiss a man but was obliged to inform the employment manager that the man was not suitable for that particular work, whereupon the employment manager would transfer him to some more suitable place.

The company has a pension system for those who have worked for the company for 15 years. The pension is 2 per cent. of the salary for each year worked, the maximum granted being $1000 per annum. The company also operates a benefit association to which 80 per cent. of the employees belong, to the funds of which the company contributes about an equal amount with the employees.

This past year an experiment was made in offering a flat service bonus of $100 to every man who had worked for the company one year. This was offered without regard to his position or salary and was a straight premium for sticking to the job.

(To be continued)



KULTUR



BY buying Liberty Bonds in large quantities, the mine workers are showing their patriotism and demonstrating that till the war is over those at home live only to support their sons and brothers in the blood-stained trenches and battlefields of France.

EDITORIALS

Why Not "Refine" Coal?

MANY materials that are used or may be used in a raw state are much more valuable and efficient if "refined" or otherwise "treated" before being finally consumed. Raw wheat, in the form of grain, is edible and life-sustaining, but it is certainly much more palatable and more efficient as a food for man if made into bread. And yet we know not for how many centuries wheat and other grains were eaten raw or at best only parched or boiled before man learned the art of making even the crudest of bread.

It took man a long time to learn how to "refine" from the crude brown, black or amber-colored earth-oil, the colorless gasoline that now drives his automobiles. From the financial standpoint crude petroleum is worth only a few cents per gallon; industrially it is worth its equivalent heat content in wood, coal or any other raw fuel, due allowance being made for ease of firing and the absence or practical absence of ash. In the refined state petroleum is worth several cents per gallon; while from the utilitarian standpoint it is worth vastly more than its equivalent heat in coal or wood. When refined, petroleum may be put to uses for which solid fuels can not be employed at all. In other words, the economic utility of petroleum has been expanded many times by the refining of the raw material, by splitting it up into many products highly useful in ministering to the convenience and the necessity of man.

The Bureau of Mines has recently published Bulletin 135, entitled "Combustion of Coal and Design of Furnaces," by Henry Kreisinger, C. E. Augustine and F. K. Ovitz. After describing what was perhaps the most thorough and elaborate series of tests on the burning of coal ever undertaken, the authors draw among others the following conclusions:

> The volatile matter of bituminous coal would have greater economic value if converted into gas or liquid fuel than if burned under steam boilers. Under present market conditions heat in the form of coal gas brings 8 to 16 times the price of an equivalent amount of heat in the form of coal. Gas is an extremely convenient fuel and can be used to advantage for many purposes such as cooking, lighting and heating buildings, municipal lighting, and in some industrial plants for obtaining a uniformly high temperature and clean products of combustion. The residue from the coking coals should find a ready market for house-heating and steaming purposes. As both the gas and coke burn without smoke, their separate use would tend to make cities cleaner. The manufacture of gas from coal has been a commercial undertaking for many years and is still rapidly developing, the liberal margin between the price of heat in the form of gas and the price of heat in the form of soft coal making the conversion profitable.
>
> The conversion of the volatile matter of bituminous coal into liquid fuel seems to be even more promising than its conversion into gas. By the application of proper processes it seems possible to reduce a large part of the volatile matter to liquid, of which an appreciable percentage can be obtained in the form of light oils suitable for motor fuel. Benzol has been obtained at byproduct plants for many years without any special effort to produce it. There is no doubt that with well-developed methods the yield of benzol and similar oils could be greatly increased.

Why is not bituminous coal capable of as thorough a refining as is petroleum? The products of coal distillation are many, embracing solids, liquids and gases. Of these the chief solid is of course coke. This can be easily, efficiently and smokelessly burned. The other chief product of coking is gas. This forms almost an ideal fuel for domestic and house-heating purposes. Between these two extremes lie a myriad of useful substances merging from explosives to fertilizers and gasoline or its equivalent.

Heretofore the great problem of byproduct coking has been the commercial utilization of the gas. So great is the volume of gas evolved in the coking process and so large a portion of the heat contained in the original coal does it carry that its utilization has so far been confined almost exclusively to large industrial plants such as the steel mills or to a few centers of dense population such as the larger cities.

The domestic uses of coal are now confined almost exclusively to cooking and house heating. For both of these coal is dirty, inconvenient, inefficient and wasteful. The quantity of heat utilized in actual cooking as compared to the heat generated by the fuel in the ordinary range is admittedly small. Furthermore, in most cases an appreciable amount of coal is lost through the grates Even if ash sifting is resorted to, a considerable amount of combustible matter finds its way into the ash can and eventually to the ash disposal dump. The heat thus lost is lost forever.

While it is quite possible to burn coal (and by this is meant bituminous coal, since it forms by far the greater portion of the domestic fuel of the land) smokelessly in the ordinary kitchen range, such smokeless consumption requires no small degree of skill and is consequently not ordinarily accomplished. There is accordingly a considerable loss in the form of unburned or only partially burned gases passing up the chimney.

Practically all that has been said regarding the kitchen range is equally true of the house-heating furnace. In such furnaces also there are incurred what are known in power plants as "standby losses"; that is, a certain amount of fuel is consumed in merely holding fire over more or less extended periods of time. Thus fires are frequently "banked" at night, or during certain hours of the day and sometimes over week ends or other holidays. Such banking avoids the inconvenience of building a new fire when normal heat is again needed.

Any comparison between the convenience and utility of gas and coal as a domestic or house-heating fuel cannot fail to reveal the advantage of the former. Delivered by pipe to the exact point of application it is merely necessary to open a cock or valve and apply a match to secure full heat. This heat, furthermore, is always under easy and perfect control. The fuel burns readily, smokelessly and may be applied comparatively

efficiently. With gas the dirt and inconvenience of coal are obviated and there is no carting of either fuel or ashes; there is neither loss of combustible through the grates nor standby losses.

It would thus appear that if heat in the form of gas could be furnished domestic consumers at a price even somewhat higher than heat in the form of coal, it would still be economical to use. The many advantages to both individual consumer and the community at large arising from a substitution of gas fuel for coal would render its use economically advantageous even though the price per unit of heat were higher. Under present methods of gas manufacture and the prices at which gas and coal are now sold there can be no such economic substitution, however convenient such a change might be.

It would almost seem that the time is at hand, if it has not indeed arrived, when the byproduct oven can solve the problem of cheap gas for the householder. Surely the coke and other byproducts besides the gas should almost if not quite pay for the original coal and the process of coking. It would be logical to believe also that heat could be delivered through gas mains quite as cheaply as by wagons and trucks over city streets choked with traffic, snow and ice or possibly all three. To burn coal raw is admittedly wasteful: to burn it in the form of gas and coke permits of high economy, the saving of many valuable substances, the enjoyment of great convenience, and might quite possibly go far toward rendering such "coal famines" as the country suffered last winter impossible.

I'm buying LIBERTY BONDS *because no decent, honorable man can afford not to buy them.*

Names of Coal Beds Are of Little Value

IN THE eastern coal fields of the United States, unless, in the description, the name of the coal bed is coupled with the name of the coal district in which it is found, the value and the character of the coal cannot be determined even approximately.

Undoubtedly there is a lower Kittanning bed somewhere in the anthracite region, but it is doubtless quite like the Freeport bed in the same region, if that could be identified. But both are quite different from the same beds in the bituminous regions, no matter where found. Location has had such an effect on all the beds in the anthracite region that even if we could give the different beds their names according to bituminous nomenclature every one would know at once without being told that the beds differ widely in the anthracite region from what they are in the bituminous region.

But this is true also in large degree in the bituminous region where the continuity of the beds is not a matter of debate, but has been traced without possibility of a peradventure. Here the characters of the beds change materially from place to place, and people having experience in only one section get into the habit of believing that the character of the seam is unchanged all over the bituminous region. As a matter of fact the seams vary so much that they also change their names from place to place.

Thus the lower Kittanning coal where the fuel is found to be of low-volatile character is known as the Miller *seam*—perhaps we should do better to term it the Miller *coal*. Where it has a large percentage of volatile material it loses that distinctive term. The term "Miller" defines an area as much as a bed. It is a regional name first and a seam name second.

For if you would match coals with the Miller, you would find that other coals from the same district, but from another bed, more closely resembled the Miller coal than coals from the same bed in another district. That is why the name does not spread. To use the name "Miller" as a general synonym for lower Kittanning would create such a misapprehension that it would be almost dishonest to attempt to give it such currency. To use it as the name of another bed in the same district would not be so injurious to the public. In some cases the purchaser of the spurious Miller—that is coal not from the lower Kittanning bed—would have a coal of equal or higher thermal value and of greater purity in the matter of ash or sulphur.

The same is true of the Moshannon coal. It is perfectly true that the Moshannon was once regarded as a lower Freeport coal found along the Moshannon creek in the first bituminous coal basin of Pennsylvania. Today it is found possible to sell as Moshannon not only the lower Freeport coal, but all the coal from all the many beds found near Osceola and Houtzdale, whereas the lower Freeport coal at Du Bois could not be regarded for one moment as Moshannon. For "Moshannon" is a local name to express a local character. The lower Kittanning along the Moshannon creek is more "Moshannony"—if the term be permitted—than the best of lower Freeport would be, say, at Reynoldsville or Punxsutawney where the coal is wonderfully clean, but has so much volatile material that it is regarded primarily as a coking coal.

The Big Seam in the Georges Creek region produces a wonderful smithing coal, not because it is the Pittsburgh seam so much as because it is located close to the great uplift and is therefore liberally mineralized. The coal of the Sewickley seam in Georges Creek—Marylanders term it the Tyson—is much more like the Pittsburgh coal in Georges Creek than it is like the Sewickley coal in Pittsburgh.

These remarks have reference mainly to the percentage of volatile matter, but they are true also as regards purity. The lower Kittanning coal in some few places has an immense amount of sulphur and many partings. In one limited section it seems fitter for a source of sulphur than a source of fuel. In some places it is mined with facility, in others a differential must be paid, for the pick seems to stick in its tenacious surface. The lower Kittanning in the section, where it is called the Miller seam, does not have any of the unfavorable characteristics mentioned.

There is perhaps in the Appalachians one name which specifies the coal fully—Pocahontas. But if the Pocahontas coal were spread over large areas, the same statement could not be made. It may sometime be correlated to some minor bed in the extreme western and northwestern Pennsylvania field, but if so the coal would be entirely different in its fuel ratio even though perhaps just as pure as far in its ash and sulphur content.

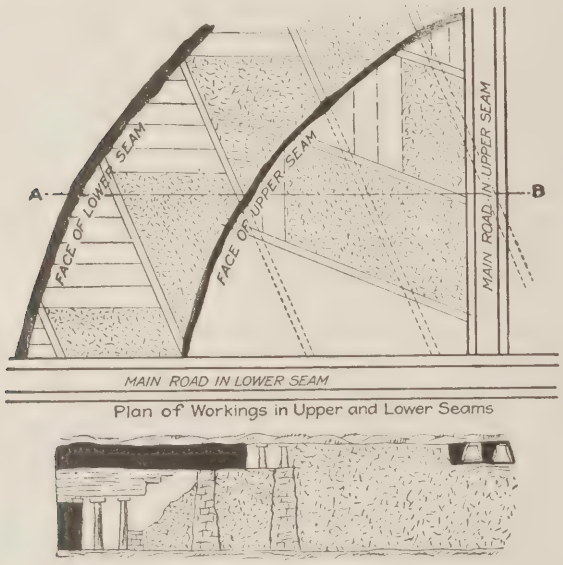
We cannot do as one authority, who should have known better, once did. He made a cross-section of the Pennsylvania coal fields and gave a common analysis for each seam as if such a generalization had any value.

DISCUSSION BY READERS

Working the "Rooster Coal"

Letter No. 4—Kindly permit me to submit my plan for working the No. 8 Pittsburgh seam, together with the overlying "rooster coal." In my experience the best method of working these two seams is to apply the longwall method of mining, carrying the working face in the lower seam about 100 yd. in advance of that in the upper seam.

In the accompanying figure I have attempted to show the general plan, including the main roads, crossroads and gateroads in the two seams. As there indicated, the diagonal or crossroads in the upper seam are driven



PROPOSED PLAN OF WORKING THE "ROOSTER COAL"

at an angle of about 45 deg. with those in the lower seam. The main roads, in the two seams, are driven in a direction practically at right angles to each other, and the gateroads are driven parallel to them, in each case.

In the lower portion of the figure is shown a cross-section on the line *AB*. This cross-section is drawn to an exaggerated vertical scale. It shows the working faces in the two seams, that in the lower seam being about 100 yd. in advance of the face in the upper seam.

Work is commenced in the lower seam by driving the main roads through the shaft pillar, at the boundary of which a longwall face is opened out. Crossroads are driven off the main road at an angle of about 70 deg. and at distances of, say 80 to 100 yd. part. The gateroads are driven parallel to the main roads at distances of about 15 yd. apart, center to center.

As shown in the sketch, the coal in the lower seam is taken out beneath the drawslate. A short distance back from the face, however, the drawslate and the mixed slate-and-coal parting separating the two seams are allowed to fall. The refuse is built up in substantial walls to support the coal in the upper seam. This refuse forms the floor on which the miners stand when working the rooster coal.

When the work in the lower seam has advanced a sufficient distance, the work of taking out the rooster coal is started by ripping the roof on the main roads in the lower seam, at a convenient point for driving an incline to the floor of the upper seam. When this is reached, the main roads are driven in the upper seam and crossroads turned at an angle of about 70 deg. off the main roads.

The work in the upper seam is identical with that just described in the lower seam. As the crossroads in the upper seam all cross those in the lower seam at an angle of about 45 deg., there is less difficulty experienced in maintaining good working conditions while taking out the rooster coal.

In this method of working, great care must be taken to build substantial packwalls and fill up between them with the slate that formed the parting of the two seams. By this means it is possible to make a good floor for working the upper coal. When proper care is taken in performing the work, I believe it is possible to take out 100 per cent. of the coal in each seam. This is the method employed for working the "Red Coal," and the "Ras Las" coal in the Rhymney Valley, South Wales.

Oak Hill, W. Va. WM. DICKINSON.

American citizens should buy LIBERTY BONDS, *because they are the means by which the United States is keeping its faith with the Allies in the war.*

Danger and Discipline

Letter No. 2—Much has been said and written about the increasing number of fatal accidents in the mines of this country. It has even been stated that the fatality rate in coal mining has exceeded the tonnage rate.

While numerous inquiries have been started to ascertain the causes of these accidents, the fact still remains that they continue to increase in frequency. John Rose, in his letter, *Coal Age*, Mar. 2, p. 431, has attributed the increase in mine accidents chiefly to the relaxation of mine discipline. He describes in an interesting manner the reasons why operators and miners alike show a less regard for safety rules than ever before.

LARGE INCREASE OF MINE FATALITIES

The report of the Bureau of Mines shows a larger number of fatalities have occurred in the mines, during the past year, than is recorded for any one of the seven previous years. A brief glance at the records of Illinois shows that we have, in this state, contributed our share toward this unnecessary slaughter.

However, while this great loss of life is naturally deplored, it is some consolation to feel that the lives thus sacrificed have blazed a way that may and I hope will lead to a more effectual means of securing greater safety in mining operations.

The high death rate shown in coal-mining reports has impressed on everyone the need of a more strict enforcement of mining laws and a higher regard for human life. In our own state, we have two shining examples of executives who have awakened to a realization of the need of a more active campaign in the interests of mine safety. I am proud to say that these are Governor Frank O. Lowden and Evan D. John, Director of the Department of Mines and Minerals.

Within the past two months these two officials have decreed that the number of fatal accidents in mines, in this state, must be diminished. As a first step, they have issued orders to the mine inspectors of the state, demanding a strict enforcement of the mining laws, in their respective districts, and the arrest and punishment of any and all parties guilty of violations of the law, in accordance with its provisions.

As an excuse for laxity in the enforcement of the mining laws during the last few years, it is said that many operators could not keep their mines in the required condition, because of the weak state of the market for coal. Some companies were even forced into bankruptcy, owing to this cause and the need of maintaining safe conditions in the mine. The coal industry is now reaping a harvest of death from the seed that was sown during this laxity of discipline.

Arrest and Prosecution for Violations of Law Has a Good Effect

A shining example of the new policy inaugurated by Governor Lowden and Director John appears in the arrest and prosecution of the superintendent, mine manager, two shotfirers and the two men who drilled the "dead holes" that were the direct cause of the explosion that occurred at the Citizens mine, in Springfield, Feb. 23, 1918, in which four men lost their lives.

At the instance of Director John, an examination was made by James Taylor, who has charge of mining investigations for Illinois, and two state mine inspectors. They reported the results of their investigation to the department, with the result that the arrest and prosecution of the guilty parties was authorized at once.

A second example of the strict manner in which violations of the mining law are to be handled is shown in the arrest and prosecution of the superintendent, mine manager, and night boss of the Virden mine, of the Royal Colliery Co. This action was authorized by Director John as the result of an investigation into an accident that occurred in this mine Feb. 22, 1918, when four men were killed by the explosion of 26 kegs of powder on the shaft bottom.

It is gratifying to know that a new era has now dawned, in Illinois, and is fraught with possibilities regarding the future safe operation of mines. This will prove a great relief to every mine worker who has, heretofore, had no assurance when he left his home in the morning for work, that he would return in safety at night.

The safety-first campaign to which I have referred will certainly save many lives and win for its projectors a place in the hearts of the 86,000 miners engaged in coal mining in the state. It is to be hoped that they will receive the hearty coöperation of every coal-mining man and operator in Illinois. With the remembrance of the 2695 men who were killed in the mines of this country in 1917, in his mind, everyone's interests in mine safety should be greatly increased.

———, Ill. State Mine Inspector.

American citizens should buy Liberty Bonds, *because the men we have sent into the perils of the trenches have a right to our support.*

First Aid to the Uninjured

Letter No. 3—When this subject was first set for discussion in *Coal Age*, Jan. 19, p. 156, I was inclined to think that there was a catch in the idea that there could be such a thing as giving first aid to the uninjured. However, a little reflection impressed me with the serious conviction that there is truly more need of giving first aid to workers who, through a lack of foresight or by the exercise of insufficient care and caution, expose themselves to danger.

The first aid necessary to be given the uninjured is of a wholly different nature from that which we have been accustomed to practice as "first aid to the injured." The old saying teaches that it is far better to "lock the stable door before the horse is stolen," and the same principle is involved in the idea of giving "first aid to the uninjured."

We cannot urge too strongly the necessity of foresight and keeping in mind the ever-present possibility of accident to the unwary mine worker. For example, the fireboss reports the mine to be safe for work when he has completed his morning examination; and, as the men follow each other into the mine, the foreman gives them the usual instructions to exercise care, telling a miner, "watch that roof in your place," and cautioning a driver to "go slow until we can get a chance to fix that track."

Disregard of Cautionary Aid by Uninjured

The answer comes naturally, "I will," but how soon is the promise forgotten, and the aid given the *uninjured* proves fruitless and must be followed by *first aid to the injured*, made necessary by an avoidable accident. The foreman's caution and instructions to his men are first aid to the uninjured. His foresight anticipates the possible accident; but, while the aid extended will prove effective in some cases, it will fail in others.

On the one hand, a naturally reckless, though experienced miner, will remember the caution given him when entering the mine in the morning and his careful inspection of the roof before proceeding to work, followed by the setting of a post under a loose piece of top, saves him from a fatal accident. On the other hand, the forgetful worker goes unmindful of the caution given him and becomes the victim of his own neglect. The reply of both of these men was the same, but the one was faithful to his promise, while the other gave it no heed.

Allow me to say, in closing, that the phases to which this injunction of "first aid to the uninjured" can be

applied are many. In the sinking of a shaft, it calls for the careful consideration of the equipment, the headgear, hoisting engine, ropes, shaft timbers, and other details respecting the safety of the work in hand. Not to consider these matters is evidence of lack of foresight.

Again, a certain place in the mine is found to be unsafe and so reported; work is stopped in the place but resumed later before the necessary timber has been set to make it safe. This likewise is an evident lack of foresight on the part of the man in charge. To my mind, the basis of the whole question is self-preservation.

R. W. LIGHTBURN.

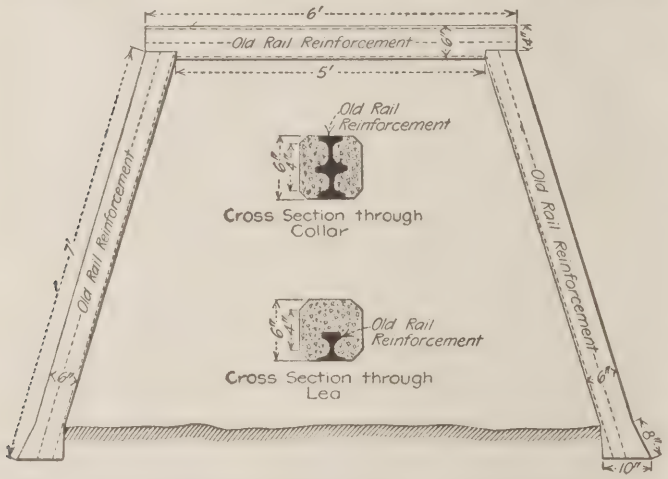
West Leisenring, Penn.

American citizens should buy LIBERTY BONDS, *because they represent today the highest form in which a citizen can perform his duty to his country.*

Reinforced Concrete Mine Timber

Letter No. 1—Reading the article entitled "Supporting the Roof in Coal Mines," by R. D. Brown, *Coal Age*, Mar. 9, p. 454, leads me to submit for discussion by readers a reinforced concrete timber frame that I devised some two years ago. Five of these frames were made and put in place in an air-course, at that time, and they have stood the test satisfactorily up to the present.

As shown in the accompanying figure, the reinforced concrete collar is supported on two reinforced concrete



REINFORCED CONCRETE-TIMBER FRAME

legs, which are inclined toward the center of the entry in the usual manner. The collar is reinforced with two iron rails arranged with their bases in contact, while the tread of the rail is exposed on the upper and lower surfaces of the collar, as shown in the detailed cross-section on the right of the figure. Each leg is reinforced with a single rail, the base of the rail being exposed on the inner surface of the leg.

The construction of these reinforced concrete timbers is simple and so well understood that a further description is unnecessary. Old discarded rails cut to the desired lengths are used. The ultimate cost of constructing the timbers is trifling, as compared with the price of steel and wood today. Similar timbers can be made to meet all conditions in mines.

The plan has the advantage that all old rails and pipe can be utilized in this way instead of sending them to the scrap heap. If desired, in order to secure greater strength, four rails can be used in the reinforcement of a collar and two rails in each leg. I gladly recommend the use of such reinforced concrete timbers in mines not subject to heavy squeeze, which might render their use doubtful.

DAVID PHILLIPS.

Coaldale, Penn.

American citizens should buy LIBERTY BONDS, *because they are for the purpose of defending his country and his home.*

Shotfiring re Explosion

Letter No. 10—Prof. C. M. Young in his letter *Coal Age*, Mar. 2, p. 430, says that he made a number of laboratory tests to establish the inflammability of powder smoke. While admitting that the results obtained were not conclusive in this respect, Mr. Young claims, that there is a possibility of combustible gases being produced when coal is blasted in a close place or heading.

Personally, I have no doubt whatever regarding the production of such gases under the conditions named, and I agree that they are inflammable under favorable conditions. However, I fail to discover any proof that the presence of what he terms "powder fumes" contributed, in his experiments, to the inflammability of the gases.

THE PRACTICAL TEST AND ITS RESULTS

In the practice of coal mining, I have made several thousand tests in blasting coal from the solid in "close places or headings." On going back to the face to fire a second or third shot, I found the place filled with hot powder smoke. The presence of a considerable amount of carbon dioxide (CO_2) was plainly indicated by the pronounced shrinking away of the flame from the wick of my lamp and by the appearance of the flame itself.

Along the floor of these places there was but little smoke and the air was fairly good. There was a perceptible movement of air along the floor toward the face, caused by the sudden rise of temperature in the place. Under such conditions, I have repeatedly lighted the gaseous mixture in the crack of a standing shot, in the presence of a thick and hot cloud of powder smoke that extended from the roof of the heading almost to the floor; but, in no instance, were the "powder fumes" inflamed by these miniature explosions.

Frequently, I have seen the gases extracted from the shattered coal ignite and burn quietly at the face, for a few seconds after the firing of a shot; but in none of the cases observed was there any indication of a continuation or extension of flame by the "powder fumes" present. On the contrary, it appeared that the presence of these fumes had a quenching effect on the flame at the face, and the evidence I saw in this respect, in my investigations of explosions, confirms this view.

Evidently, to my mind, the inflammation at the face was due to the addition of needed air to the hot gases

issuing from the interstices of the coal and extracted from the latter. This air reached the face in the manner just mentioned, which made ignition possible and overcame the quenching effect of the smoke at that point.

On the same page to which I have referred, W. H. Noone alludes to a suggestion someone has made that the circulation of air be temporarily increased in sections of the mine where shots are to be fired. It is fortunate indeed that suggestions of this kind have had but little support. They should be summarily rejected, because the act of increasing the draft in a mine, at firing time, is almost like pouring coal oil on a smoldering fire.

Although I cannot agree with the conclusions of John Moffatt, Mar. 9, p. 470, I appreciate the value of his facts. The phenomena he observed are of much assistance toward reaching a correct understanding of the process by which dust explosions are started and propagated. My views regarding this matter have been stated in *Coal Age* on several occasions, and many of its readers are probably familiar with them. I may say that these views were fully sustained by the results of the tests made at the Eskmeals Experimental Station and described by the late Samuel Dean, in *Coal Age*, Vol. 6, p. 294.

Eskmeals Tests Supported by Practice

It has been intimated that the Eskmeals tests did not warrant definite conclusions regarding the process of propagation, because they were made under artificial conditions not existing in the practical working of a mine. But the letter of Mr. Moffatt, just mentioned, proves by several tests, made under actual and generally prevailing mining conditions, that the results he obtained fully warranted the conclusions based upon the results shown in the Eskmeals tests.

Mr. Moffatt states that the mine he worked in was new and only down a short distance as mines go to day, that the ventilation was good and no gas present. The phenomena he observed occurred in a close place, that is, there were no crosscuts connecting it with the adjoining places. The coal was undercut and he observed when he fired the two rib shots together, that there were heard after reports or secondary explosions, which apparently grew louder as the place advanced, and, on the last occasion, when he fired the two shots together the sound and force of the after report was heard far out on the lower levels. When the shots were fired separately the last shot, if fired before the fumes were allowed to cool down, gave a low after report.

Mr. Moffatt expresses the opinion that these after reports or secondary explosions were caused by the absence of proper ventilation and the presence of powder fumes. But it will be readily seen that the ventilation of this place or the amount of fresh air entering it and moving rapidly along the floor toward the face was far greater immediately after the shot or shots were fired than at any other time. It is quite obvious that this air movement toward the face was stronger and faster when induced by the combined heat of the two shots fired together than when only one shot was fired and a less amount of heat produced.

The air flowing into the place may have carried with it a small amount of coal dust; but, in any event, it supplied sufficient oxygen to be mixed with the hot gases extracted from the shattered coal at the face to cause their ignition with nearly explosive effects. The noticeable interval between the firing of the shots and the after report is an important feature and the factors developed during that interim and their possible influence in determining subsequent results should have careful consideration.

JOHN VERNER.

Chariton, Iowa.

Our Allies keep on supporting their war loans; Americans will not hang back when the THIRD LIBERTY LOAN *calls. Most of the civilized world is united against Germany.*

Examination of a Mine

Letter No. 6—My previous letter, relating to the examination of a mine by a fireboss in Colorado, seems to have given the impression to a number of readers that the custom in Colorado, as described, tended to lower the efficiency of a fireboss and the standard of examinations. This is all a mistake.

It is true, as I stated, that the examination of the mine by the fireboss ends when he has returned to the shaft or slope bottom, entered his report and turned the mine over to the foreman who then takes charge and directs whatever work must be done.

The Colorado Coal Mining Laws discriminate between a mine that is generating gas and one that is free from gas. In the former case, the law requires the fireboss to enter the mine, for the purpose of making the early examination, not more than three hours before the time for the men to commence work. In the latter case, this time is extended to five hours.

After the fireboss has made his examination and reported he is allowed one hour to go home and get his breakfast and, on his return to the mine, he reports to the foreman, who naturally sends him to remove any dangers that may have been reported. It should be stated that the fireboss is ordered to do other work only when there are no dangers to be removed.

Fireboss' Work in Colorado

Always, in a gaseous mine, there is the understanding between the mine foreman and the fireboss that, on his return from breakfast, he is to devote himself wholly to the extending of brattices and other work pertaining to the ventilation of the mine and the removal of dangers discovered in the working places. Two men are generally employed on the work of building stoppings, doors, etc.

Let me say that the examination of a mine during working hours is the duty of the mine foreman, assistant foreman and safety mine inspector, alike, in all gaseous mines. In my opinion, if this system had been employed generally in coal mines, hundreds of lives would have been saved that have now been sacrificed owing to inefficient or insufficient inspection of the working places.

It is my belief that, in most instances, this great sacrifice of life can be attributed to firebosses being given too much liberty and permitted to work as they choose. Where such a custom prevails in mines, the

firebosses roam about the mine according to their own choice, and the foreman, who is responsible for the safe operation of the mine, seldom knows where the fireboss can be found.

It was this condition that caused the miners of Colorado to urge the enactment of a new law that would give the mine foreman full charge of a mine during working hours and make him responsible for the safety of life and property. We consider this law the best in the world. ROBERT A. MARSHALL.

Farr, Colo.

That man in khaki, to whom you wished "best luck," wants you to buy LIBERTY BONDS *and show that you meant what you said.*

Favoritism in Mine Management

Letter No. 5—Speaking of favoritism in bossing, I do not think that any sane manager would place a man in a responsible position because he was a favorite in some respects, or a popular fellow in the community, a "ward healer" or other influential politician, without regard to his ability to produce results in the mine.

Like Mr. Rose, whose letter appeared in *Coal Age*, Jan. 26, p. 213, I believe that men who have been employed a long time in the same position in a mine invariably fall into ruts and wasteful methods. This is strongly characteristic of men of advanced age. A younger person, no matter how much he may know in regard to mining cannot assume to tell the older man that his method is wasteful or unscientific. The result would be that the proffered advice would be ignored entirely or the man told to mind his own business.

It cannot be denied that, under such conditions, a change is desirable and will generally prove the advantage, if not the necessity, of keeping abreast of the times and using the most up-to-date methods and appliances. It goes without saying that a new superintendent will do his best to improve the operations in his charge and make a stronger showing, if possible, than the man who has preceded him and he will generally succeed for a time.

PRACTICE IN MINES IN ENGLAND

In his letter, Mar. 9, p. 471, Thomas Hogarth mentioned instances of men holding positions 20 or 30 years, in the mines of England. He does not say, however, what I believe is true, that the firebosses and other assistants have very little to say about running affairs. As a fact, the Miners' Union control everything pertaining to wages, safety of men, mine laws, etc.; and I would say the mines are far from up to date.

Why it is that there are always some of the men who do not like the coming of a new boss is because they find that he will not turn things loose and let them do as they please, or as they have been accustomed to doing under the old boss. The new boss' first efforts are, naturally, to eliminate waste and secure greater efficiency in every branch of the work.

Mr. Hogarth says that "a new man coming to take charge of a mine should study well the conditions before attempting to introduce new ideas and methods." That is all right; but, let me say, he should not study too long before he tells the men what he is there for.

Speaking from my own experience, a new foreman will not be long in his position before some fireboss or assistant foreman will tell him that his section is in bad shape explaining that the old boss would not let him do what he wanted to make it right. It will then be up to the new man to decide quickly the course he is to pursue. It may prove that what the assistant wants to do is an unnecessary expense, which the new boss must decide.

Where there are no changes made in the working force of a mine, it appears to me more like a lot of men running a race but having no definite goal, which makes the race an endless one. In that case, who cares whether he is on the head end or tagging on the tail, as in England. There, if a man starts in as fireboss, he is apt to continue in the same position. My motto is, "keep things moving and up to date."

Plainsville, Penn. RICHARD BOWEN.

I'm buying LIBERTY BONDS *because this supreme duty is paramount to all other considerations.*

Men in Blind Alleys

Letter No. 2—The argument advanced in the letter of Timothy Goldon, *Coal Age*, Dec. 22, p. 1069, is, to my mind, but another reason why young men should study to gain a knowledge of the theory and principles relating to their work. Without such a knowledge of theory, a worker is very apt to find himself, sooner or later, in one of Mr. Goldon's "blind alleys."

A young man is seldom willing to listen to the advice of an honest well wisher who has travelled the road before him and whose words should be an inspiration to him to throw off the shackles that bind him and prove that he is worth while.

The "humble pie" that our friend, Mr. Goldon, describes as the diet of the man in a blind alley is, to my mind, nothing more nor less than a potion that could properly bear the label of the skull and crossbones. The man who is satisfied to continue to eat "humble pie" when he has the ability to do otherwise has had his mind poisoned; he is morbid and of little use to himself or to anyone else.

That "blind alley" is a stumbling block to honest endeavor. It leads nowhere and the employer who is responsible for having such blind alleys in his business or organization is a traitor to the best interests of his men. While he himself resides on an avenue or street that leads somewhere, he has made it practically impossible for his employees to gain the needed exercise that is essential to successful work and service.

Where blind alleys exist in an organization one may properly look for other defects, such as side-stepping capability and the showing of favoritism, through friendship, to the incompetent. I heartily concur with Mr. Goldon's concluding remark, "never permit friendship to override justice, but give the job to the man who can get results." Results speak for themselves.

West Leisenring, Penn. LUMEN.

I'm buying LIBERTY BONDS *because I just can't help it. I'm buying* LIBERTY BONDS *because there are millions of becauses.*

INQUIRIES OF GENERAL INTEREST

What Caused the Explosion?

Kindly permit me to submit a question that has caused me to lie awake nights in a vain effort to solve the mystery. It concerns an explosion that occurred in a mine that was supposed to be free from gas. The explosion took place at a time when no one was in the mine and started, as was ascertained later, in the old workings that were wet.

The mine was ventilated wholly by natural means, there being no fan or furnace. It was a drift opening, and an air shaft 32 ft. deep was located a short distance back on the hillside. Previous to the time when the explosion occurred, the mine had been idle for two months. The question I desire to ask is: Under these conditions, what is it possible to assume was the immediate cause of this explosion, and was it a gas or a dust explosion? FIREBOSS.

Harrisburg, Ill.

There are instances of mysterious explosions taking place in mines under conditions that make it difficult to offer a reasonable explanation. In the present case, it is stated that the mine was "supposed to be free from gas." This statement, however, may be taken as only meaning that the mine did not generate sufficient gas to be detected by the ordinary means when the mine was in operation.

A period of two months' idleness, it may be said, would give an opportunity for gas to accumulate in the old workings, and a possible fall of roof may have ignited the gas and dust raised by the fall. This would seem to be the most reasonable explanation to offer, but we would be glad to hear from others who may be able to suggest other possible causes.

Money is as necessary for the success of this war as is the circulation of the blood to life. Buy a bond and help the cause.

Preparation of Coal

A short time ago I read with interest an article that appeared in *Coal Age* [Feb. 9, p. 276], treating on the preparation of coal for market.

In the course of his article, the writer described a specially arranged picking-table or screen known as the "Marcus patent picking-table screen." It was stated that the arrangement was such that the coal passed successively over circular perforations 1⅛ in., 2 in. and 4 in. in diameter, these being separated by blank picking spaces that gave ample opportunity for the thorough cleaning of the coal by picking out all foreign matter.

It has occurred to me that such a screen would be well suited to the preparation of the coal in this district, although I know of none being used here at the present time. The coal we are working is a sub-bituminous coal which makes a splendid domestic fuel when properly handled so as to prevent undue breakage of the lumps. Owing to the keen competition, in this market, it is necessary for operators here to give particular attention to the cleaning of the coal.

The seam worked, here, contains a little bone which must be picked out in preparing the coal for market. Our practice, thus far, has been to first pass the coal, as it comes from the mine, over a ¾-in. screen 9 ft. long, which delivers it directly into the weigh basket. After weighing, the lump is screened out over a 1½-in. screen, the egg over a ¾-in. screen, while the nut coal is separated by a ¾-in. screen, the remnant passing through this screen being slack. Owing to the soft nature of the coal, it is necessary that it be handled with care to prevent breakage as far as possible. The several sizes are loaded into box cars for shipment.

At the present time, I am anticipating the erection of a tipple to handle 500 tons of coal in 8 hours, and shall be thankful for any suggestions that may come from the readers of *Coal Age*. Our proposition is young, and the available means being limited, matters of economy in equipment and operation are of much importance. I shall be glad to consider an estimate of the approximate cost of erection of a tipple such as will be adapted to our conditions.

C. S. DONALDSON,
Lethbridge, Alta., Canada. Supt. Federal Coals, Ltd.

We quite agree with this correspondent in his conclusion that the Marcus patent picking-table is well adapted to the preparation of a coal such as he has described. This screen is manufactured by the Roberts & Schaefer Co., McCormick Building, Chicago, Ill., who no doubt will be glad to estimate on the cost of construction of a suitable tipple and equipment designed to handle this coal at the least expense and loss by breakage. We are confident, also, that many operators and superintendents who read this will be glad to offer practical suggestions regarding the economy of operation, through the columns of *Coal Age*.

Buy a LIBERTY BOND. *Everyone is doing it.*

Barometric Pressure re Air Column

Kindly show the method of finding the equivalent, in feet of air column, per inch of mercury or barometric reading, assuming a temperature of 60 degrees.

Springfield, Ill. STUDENT.

Since the weight of 1 cu.in. of mercury is 0.491 lb., each inch of mercury column indicates a pressure of 0.491 lb. per sq.in. or $0.491 \times 144 = 70.7$ lb. per sq.ft. But air at 60 deg. is estimated at 13 cu.ft. per lb. and an air column corresponding to a pressure of 70.7 lb. per sq.ft. is therefore $13 \times 70.7 =$ say 920 ft. in height.

EXAMINATION QUESTIONS

Illinois Mine Managers' Examination November, 1917

(Selected Questions)

Ques.—What horsepower will be required to ventilate a mine employing 410 men and 26 mules, when the water gage reads 1.6 in., assuming the efficiency of the fan engine to be 60 per cent.?

Ans.—The Coal Mining Laws of Illinois require a circulation of 100 cu.ft. of air, per man, and 500 cu.ft. per animal per minute, in a mine not generating gas. If the mine is generating gas, the law requires a circulation of 150 cu.ft. of air per minute for each man employed underground, in addition to the amount required for each animal.

Assuming, in this case, that the mine is not generating gas, the volume of air required by law will be $410 \times 100 + 26 \times 500 = 54{,}000$ cu.ft. per minute. Then, taking the efficiency of the fan and engine as 60 per cent., the horsepower required to produce a circulation of 54,000 cu.ft. under a water gage of 1.6 in. will be

$$H = \frac{54{,}000 \times 1.6 \times 5.2}{0.60 \times 33{,}000} = 22.69\ hp.$$

Ques.—If 27 hp. is producing a circulation of 70,000 cu.ft. of air per minute in a mine, what quantity of air will be produced in the same mine when the horsepower is increased to 64?

Ans.—Assuming the conditions in the mine remain constant, and ignoring the slight change in the efficiency of the ventilating fan, the quantity of air in circulation will vary as the cube root of the horsepower producing the same. In other words, for the same conditions in the mine and a constant efficiency of the fan, the quantity ratio is equal to the cube root of the power ratio, which gives, for the required quantity (x) in this case.

$$\frac{x}{70{,}000} = \sqrt[3]{\frac{64}{27}} = \frac{4}{3}$$

$$x = \frac{4}{3}(70{,}000) = 93{,}333\ cu.ft.\ per\ min.$$

Ques.—A barometer registers 30 in., at the surface, what will it register at a point 1890 ft. below the surface?

Ans.—It is customary to allow approximately 900 ft. of depth for each inch of increase in barometric reading, which gives, in this case, $1890 \div 900 = 2.1$ in. increase. The reading of the barometer will therefore be 32.1 in.

Ques.—To what use is electricity applied in the operation of a coal mine? Name the four electrical units in common use.

Ans.—Electricity is used in coal mining for the purposes of power, lighting and signalling. It is particularly useful in the transmission of power into a mine, for the operation of coal-cutting machines, drills, electric-haulage locomotives and electric fans and pumps. Many mines are now lighted throughout by electricity, incandescent lamps being used on the haulage roads and travelingways, and electric mine lamps in the working places. Most mines are equipped with some system of electric signalling, using a telephone system or signal gongs. Electric batteries are very largely employed in the blasting of coal, because of the increased safety afforded in performing the work.

The four electrical units in common use are: The ampere, volt, ohm and watt. These indicate, respectively, the strength of the current or quantity of flow; the pressure, or difference in potential between the input and the output of the electric current; the resistance of the current depending on the length, diameter and kind of material forming the conductor; the power of the current, which is expressed by the product of the amperage and voltage.

Ques.—Find the length, in feet, of an arc of 30 deg., the radius being 14 ft.

Ans.—Since there are 360 deg. in a full circle, the length of an arc of 30 deg., for a radius of 14 ft., is $30/360(2 \times 3.1416 \times 14) = 7.32$ ft.

Ques.—What precautions should be taken, in blasting, to safeguard mines that are dry and dusty and generate explosive gas.

Ans.—Under these conditions, the safest method to adopt is to employ competent and experienced shotfirers, whose duty shall be to examine, charge and fire all holes drilled by the miners, and refuse to fire any holes that, in their judgment, are unsafe. The entire mine should be divided into districts and a sufficient number of shotfirers should be employed that ample time can be given for the air current to sweep away the gases generated by the firing of the shots.

Each fireboss should examine each working place before firing a shot therein, to ascertain that it is free from gas and accumulations of fine coal and dust. As a further safeguard in blasting in a dry and dusty mine, a thorough sprinkling system should be installed that will enable the face of each room and entry where shots are to be fired to be sprinkled before firing.

Ques.—In what seasons of the year, and why, are dangers from coal dust to be expected, and to what extent would you allow coal dust to accumulate or to be deposited, before considering it dangerous?

Ans.—The cold winter months present and increased danger from coal dust in mining, because of the comparatively dry condition of the air current circulating in the mine and the larger production of coal in that season than is true in the summer season. In the winter the cold intake current, by reason of the rise in temperature, in passing through the mine, exerts a much greater drying effect on the dust. No dust accumulations should be permitted in any portion of the workings, as the danger is greatly increased thereby.

COAL AND COKE NEWS

Harrisburg, Penn.

Running all anthracite coal mines by electricity may be the Federal Government's next step. The 25 mine inspectors in the hard-coal field held a conference on Mar. 28, to consider electrification on a large scale to aid in the winning of the war. The Federal Department of Mines submitted 10 questions on which it asks information, most of them relating to electrification and to the economies now effected in mines already thus equipped. Engineers of some of the large coal companies say that it will take several months to answer the questions intelligently. Seward E. Button, the new chief of the State Department of Mines, presided.

The age question also was taken up, but no decision as to the adjustment of a conflict in laws of the Federal Government and Pennsylvania laws was reached. The 1917 Federal law prohibits the employment of boys under 16, but the older state law, while barring boys under 16 from working inside the mines, permits those between 14 and 16 to be used above ground.

Car shortage has caused a loss of 211,029 tons of coal in the central Pennsylvania bituminous fields during the week ending Mar. 23, according to a report of J. P. Cameron, district representative of the National Fuel Administration. Mines on the Pennsylvania R. R. divisions in western Pennsylvania produced but 314,613 tons during that period whereas the capacity of the mines is 525,660 tons of coal.

Mines are being operated only a little more than half their capacity, and there is no prospect of improvement under the present system of car distribution the report states. Labor shortage caused a loss of 9437 tons. The mines delivered 1097 cars to the railroads for fuel during the week and sent but 760 cars to tidewater. The blockade on the Pennsylvania R. R. is almost as serious now as it was during the severe weather of January, Mr. Cameron declares.

The H. C. Frick Coke Co., Pittsburgh, has asked the State Department of Mines whether girls can be employed at lamphouses where the mine lamps are cleaned and filled. The chief of the department—Seward E. Button—referred the matter to the attorney general, who rendered an opinion to the effect that while women may not be employed in or about the mines females over the age of 16 may be employed in lamphouses if they are some distance away from the entrance of the mines.

In another opinion to Button, C. B. Ross, Latrobe, inspector of the second bituminous district, is informed that he has the power to approve the tapping of an abandoned mine that is filling with water and endangering the workings in an adjoining mine.

The Schuylkill Navigation Co., operating the old canal from Port Clinton to Philadelphia, has given orders to its employees to get the yards and the boats in shape for early service. The company has dredges at work, and various levels have been drawn off to permit mud and culm to be removed from the channel. South of Reading the dams, channels and locks are in good shape, but the winter floods carried a great deal of mine culm to the dams. All have been drawn off and it will take many weeks to clear the channels for the boats. A dredging machine to work pneumatically is expected to go into operation on the canal in a short time. The present dredges are steam machines, not modern in size or pattern. Work on repairing the ice-broken dam at Norristown, in the Schuylkill River, is reported to be making progress. It is necessary to the operation of the canal.

The Anthracite Consumers' League issued a statement on Mar. 29, rejecting a proposed compromise with the coal companies of the Schuylkill region whereby the taxes on the coal lands in Schuylkill County were to be increased from 60 to 100 per cent. The league asserts that in order that the coal land taxes in this county shall equal those in other counties an increase of 1000 per cent. should be made in the coal assessment. The league says, "We are witnessing now the spectacle of mendacious corporations, fairly rolling in wealth, holding up the education of little children because the trust has the political power to cheat the public treasury." In order to sidetrack the raising of taxes the league says the coal companies will try to raise the rates on individuals.

One of the most serious problems confronting the anthracite operators at the present time is the difficulty in securing sufficient timber to properly insure the safety of the miners. This is especially true of the heavier timber needed for gangway purposes and at the present time operations have been temporarily halted on account of the inability of timber contractors to meet the ever-increasing demands upon them.

Birmingham, Ala.

Steel plants, foundries, railroads, machine shops and other coal and coke-using industries in the Birmingham district are operating at capacity limit, and as a result business in coal circles during the week reflected marked activity. All coal consuming industries report a congested condition as far as orders in hand are concerned and prospects are for further accumulation.

Coal mining is active and production at the mines continues to improve. There is no easing up in the supply by any means. Many persons are seeking an opportunity to begin stocking up on coal for next winter's needs, in accordance with the ideas of the Fuel Administrator, but so far there has been no coal offered on the market. Coal companies are maintaining that all attention must be given to production and delivery.

There is practically no labor dissension of any magnitude in the district. One of the larger mines of the Woodward Company lost a day's output during the week owing to a local lay-off, but the differences were quickly settled and practically every mine is working its full force.

Chairman Frank B. Fowlkes, of the Jefferson County Fuel Board, and Secretary J. H. Duncan, after an exceedingly busy week reported on Mar. 30 that practically every retail dealer in this district had been supplied with the new customers' cards. These cards are issued under the direction of the Federal Fuel Administrator, and the new regulation which became effective Monday requires that each customer fill in the card stating his needs and other information, before a delivery is made. The order applies to householders, public utilities and all industrial users of coal alike. The county board on Monday inaugurated a campaign to educate consumers up to the need of putting in their supplies as early as possible, and a house-to-house, industry-to-industry campaign is planned.

The final figures on coal production in Alabama, as well as the coke output for the past year, are now being tabulated, and there is an increase shown in the comparison with the figures of the previous year. The coal production in 1917 went to about 20,500,000 tons against 18,086,197 tons in 1916 and 14,927,937 tons in 1915. The coal production during the first three months has been sufficient to bring out an estimate that Alabama will produce this year not less than 22,500,000 tons of coal.

The coal production for the past year will be between 5,000,000 and 6,000,000 tons, while in 1918 the production should be at least 6,500,000 tons. There is a demand for every ton of coal and coke, and the labor question is the controlling issue in regulating the production.

There is need for men at many collieries in this state. The coke ovens are not here to increase the coke production very much, but all the ovens here will be kept in steady operation so that every demand may be met and the production for the year maintained.

The coke production, however, even under the most favorable conditions, could be only a trifle greater than it is now. Prices are fixed by Governmental regulation, but the margin is sufficient to allow a satisfactory profit for the producer, ample to stimulate capacity production.

Charleston, W. Va.

That car shortage is one of the biggest factors in limiting the production of coal in West Virginia is illustrated by production figures for the Pocahontas and Tug River districts for the week ending Mar. 23, the total output for that week in the districts mentioned being over 426,000. The total tons lost was 98,909, and of that tonnage 73,426 tons were lost because of car shortage and 20,760 tons were lost because of labor shortage, the ratio being 2 to 7. However, the tonnage produced and shipped from the Tug River and Pocahontas fields has exceeded the prediction made a week or so ago by the pessimistically inclined that the tonnage for the districts referred to would show a material decrease.

In the northern part of the state the car situation is so bad that there is almost open warfare between the lines in the Fairmont field and the operators there. It is claimed that the regional car supply there is almost 6000 cars short. The claim is made by the operators that the Baltimore & Ohio is discriminating against the Monongah Division which taps the Fairmont field in favor of the Pittsburgh division, where the competition is keener and where the operators charge the Baltimore & Ohio is afraid to fall behind with its car supply lest competing lines secure the business. The operators even claim that the Pittsburgh division is ahead of its quota.

Coal operators believe that the only remedy for the inability of the railroads to furnish cars is to build more cars and that the building of such cars is almost as important as building more ships, because each is dependent on the other as a means of transportation.

Governor Cornwell has signified his willingness to call a conference of representatives of the various coal associations in West Virginia to discuss plans for extending and enlarging the export coal trade with the South American countries after the war, in accordance with a suggestion made by the "West Virginia Mining News," if the various associations approve the suggestion for such a conference. The governor on Apr. 2 addressed a letter to the president and secretary of each of the coal associations, in which he expressed himself as being in hearty sympathy with the movement to enlarge the market for West Virginia coal at the end of the war.

Louisville, Ky.

The Interstate Commerce Commission at a hearing in Louisville last week took under advisement complaints of the Ohio Valley Coal Operators' Association relative to freight rates on western Kentucky coal being unfair to the operator, and asking that rates from western Kentucky to Louisville be made on a basis of $1.05, the present rate as from eastern Kentucky, instead of $1.45. In addition through rates are asked for shipments from western Kentucky mines to points in Indiana, Ohio and Michigan. The railroads directly affected are the Big Four, Illinois Central, Louisville & Nashville, Chesapeake & Ohio, and Pennsylvania principally.

The plaintiffs, represented by J. V. Norman, of Louisville, asked for rates which would enable them to go into the Covington, Ky., and Cincinnati district, and into sections north of the Ohio. It was shown that no progress has been made in western Kentucky for several years due to an unfair freight rate, which has favored shipments from eastern Kentucky, and made it impossible to compete against mines in Indiana and states north of the river.

Indiana operators were represented by attorneys who endeavored to show that reduction of rates would result in greater

competition as for the Indiana mines, and they made a strong protest against any reduction in the rate.

The hearing principally developed that present rates are unfair to western Kentucky operators, and that Indiana operators would be more than willing to see the western Kentucky mines operated at a loss rather than take a chance on the Kentucky product being given a square deal, and allowed to enter into competition.

PENNSYLVANIA

Anthracite

Locustdale—Bancroft mountain is to be stripped of its surface for a distance of two miles and the great coal veins will be exposed to the open air. It will thus be possible to undertake daylight mining on a greater scale than ever before attempted in this region. The Philadelphia & Reading Coal and Iron Co. is undertaking the work, having acquired the tract from the Bancrofts, who were a firm of independent operators who developed tracts of coal extensively near here a half century ago.

Hazleton—Coal companies of the Lehigh field are turning down new business every day. This was announced on Mar. 28, in connection with rejection of an order from a Canadian firm which wanted a half million tons of anthracite delivered before fall and offered to pay in advance. Most of the efforts to get fuel are made by the Canadian factories which are not permitted by the Government to stock up this summer and those owners are desperate in their anxiety to secure supplies. The operators here cannot take any new business, as their output is already engaged.

Glenlyon—Two miners were entombed in the mines of the Alden Coal Co. on Mar. 27, when a fall of rock occurred in one of the gangways, shutting off communication. One of the men was rescued about 20 hours later by a number of fellow workmen, who had worked all night clearing away the rock. The other man, Adam Krenzneskie, was found dead on Mar. 29 when the party of rescuers broke through the fall.

Pottsville—Announcement has been made by the Philadelphia & Reading Coal and Iron Co. that extensive tracts of land owned by the company will be placed at the disposal of its employees for "war gardening" purposes. The lands, which are fertile, are located throughout Schuylkill and Northumberland Counties, and the work will be directed by a scientific agriculturist. W. J. Richards is president.

Tower City—The United Mine Workers of America, Local No. 1261, have made announcement that $4000 will be subscribed to the Third Liberty Loan, and $1000 for War Saving Stamps.

Bituminous

Osceola Mills—The Liberty Coal Mining Co. is installing new equipment at its shaft mine near here. When the improvements are completed the mine will operate on central station power and the capacity of the mine will be materially increased. Charles M. Means, of Pittsburgh, is consulting engineer.

Pittsburgh—A new corporation organized in Pennsylvania, the Orenda Smokeless Coal Co., on Apr. 1 purchased from the Merchants Coal Corporation, of Pittsburgh, Penn., its Orenda mine, together with about 1700 acres of unmined coal, at Boswell, Somerset County, Pennsylvania, on the Baltimore & Ohio R. R. The mine has a capacity of 2000 tons per day and is operating in the C seam of coal, by means of a slope from the outcrop. The property includes several farms and a considerable acreage of the E seam of coal, together with a slope, known as Orenda No. 3, driven down about 1000 ft. several years ago but not equipped or provided with railroad facilities. The sale includes the stock of the Boswell Land and Improvement Co., the Boswell Electric Co and the Jenner Water Co., the two latter furnishing light and water to the incorporated village of Boswell. A. W. Calloway, of Baltimore, Md., president of the Davis Coal and Coke Co., is president of the new company.

Corning—A vein of soft coal 5 ft. thick has been discovered on the Davenport farm, about 35 miles north of the coal fields of Tioga County.

Washington—Fourteen hundred acres of coal land in East Finley township have been optioned by J. S. McGill, representing Pittsburgh coal operators, at a price of $182,000.

WEST VIRGINIA

Mercer—The Louisville Coal and Coke Co. and other coal companies have been sued by R. C. Reed and Dora A. Lilly, in the circuit court in Mercer County, for $10,000 damages. It is alleged that property of the plaintiffs was injured by the coal operations dumping cinders into the Bluestone River, these cinders being washed upon their land.

Wheeling—The Echo Coal Co. is opening a new mine at Edgwood, near here. The concern has taken over the Dailer tract, as well as 81 acres of the Pittsburgh seam, which was purchased from J. A. Chambers. Contracts have already been let for the concrete opening to the mine, as well as for a large concrete air shaft. It is expected that the operation will be producing 200 tons a day by June 1. E. K. Delaney, president of the Burlington Coal Co., of Martins Ferry, Ohio, is head of the Echo company.

Kingwood—The new Florence mine of the Deaker Hill Coal Co., on the West Virginia Northern R. R., was opened on Mar. 27. The tipple has been completed, and it is believed that the mine will be a big producer.

Bluefield—The Borderland Coal Co., at Borderland, Mingo County, has awarded a contract to W. B. Elswick, of Williamson, to erect 40 one-story brick cottages. The houses will have asphalt shingle roofs, hardwood floors and electric lights.

Fairmont—At an emergency meeting of the Central West Virginia Coal Operators' Association held here last week, F. J. Patton was elected secretary of the association. Mr. Patton has been acting secretary for the last month or so. The executive board pledged itself to support the Government in every way and also the railroad and fuel administrations, though lamenting the fact that under railroad administration orders fuel must be shipped west instead of east, in the markets of which most of the companies have their contracts.

Philippi—Its members handicapped by their inability to secure an adequate car supply, a special meeting of the Tygarts Valley Coal Association was held at this place last Tuesday. The wagon mines have felt the pinch particularly, according to statements made by members.

Hinton—A new tipple, with shaker screens, loading booms, etc., is being built by the Turkey Coal and Coke Co., which operates in this field.

INDIANA

Terre Haute—A series of meetings of coal miners is now being held over the state, the speakers to be sent to the state by the National Fuel Administration. The meetings are being held at Clinton, Linton, Bicknell, Terre Haute, Twelve Points, Dugger, Winslow and Boonville. The meetings were arranged by request of the Indiana Fuel Administration and are designed to bring the miners of the state into closer contact with National fuel problems.

ILLINOIS

Hillsboro—Six Italians have been arrested here on suspicion of having been implicated in an apparent attempt to blow up the Panama Coal mine. In a sack at the bottom of the shaft 25 sticks of dynamite were found, communicating with which was a fuse with a detonating cap. The fuse had been lighted but had gone out after burning several feet. Shortly before the discovery was made three men were seen running away from the air shaft. A room occupied by some of the Italians was searched and I. W. W. literature and letters were found.

O'Fallon—Two kegs of powder were exploded Saturday, Mar. 23, in the Prairie mine. The explosion occurred at a point about half a mile from the shaft and the same distance from the air shaft, in a room approached by an untracked entry. The explosion occurred just after the miners had passed on their way to work. A fuse about 20 ft. in length was found in the entry. A stone weighing about 200 lb. had been placed on the two kegs. State mining officials and the Government secret service are investigating.

Duquoin—The Harris-Dillovou-Dimond Coal Co. has been formed by the consolidation of the Crown Coal Mining Co., the West Franklin Coal Co. and the Modern Coal Co. The new company will develop Williamson County coal land and will have a capacity of 5000 tons a day. The object of the consolidation is to work out economies and to increase production. The officers are John M. Dillavou, president; Chester A. Harris, vice president; Eugene Stevens, secretary, and Jesse Dimond, treasurer.

Virden—The North Mine, which has been closed down has been reopened. A new fan has been installed which is modern in every way and exceeds the minimum requirement set by the state for mines the size of the Virden shaft.

Springfield—Damages for $12,500 have been awarded Charles J. Lemasters in a suit filed by the Springfield-Chicago Mining Co. A piece of defective track threw a car he was driving off the track, which caused it to collide with a mine support. A piece of slate was loosened in the roof which fell and struck Lemasters in the back of the neck, breaking one of the vertebrae.

Belleville—Every miner in the Belleville territory has pledged himself to buy a Liberty Bond of the third issue, the purchases being made on the installment plan. It is estimated that there will be 400 bonds purchased by miners in this territory.

OHIO

Crooksville—The New York Coal Co. has started work on its new mine opening on the Woods farm near here.

KENTUCKY

Harlan—The short supply of cars which has been received in this district for several months past is resulting in many miners deserting mines on the Louisville & Nashville and going over to the mines located on the Norfolk & Western, where a much better supply of cars is resulting in the operators being enabled to guarantee steadier work. Many miners stuck through the shortage during the winter under the impression that steady work would be afforded in the spring and summer. Without this work materializing they are being forced to make changes.

Harlan—The United States Steel Co. has been bringing men into the district in coach loads for hastening development of the new plant on the Poor Fork Branch. This plant will be completed probably within five months and will have a considerable production, which will be shipped to company steel plants.

Louisville—Apr. 15 has been set for Louisville interests to start reorganization of the old Continental Coal Co., which will become the Federal Coal Co. The old Continental Coal Co. entered bankruptcy during May, 1916, as a result of Chattanooga interests refusing to abide by a settlement agreement. The reorganization is a result of action taken by the United States Circuit Court of Appeals, Sixth District, affirming the opinion of Judge Cochran, of the United States District Court, Eastern District of Kentucky, in the case of S. Thurston Ballard against the Federal Coal Co. of Delaware and persons interested. The suit was on behalf of about 100 persons holding about $1,000,000 of stock in the old Continental company. The new company will take over 16,000 acres of coal land and operations at Pineville.

Whitesburg—The Kenmont Coal Co., at Hamden, Ky., has made several improvements in its plant and equipment, enabling the company to increase its daily output to 12 to 15 cars.

Whitesburg—The Marion Coal Co. is making an important development on Rockhouse Creek, where the new mining town of Coalvein is being established about a mile from Blakey. A number of new mines have sprung up along a new Louisville & Nashville branch being constructed into the district.

Stanford—The Boering Land and Mining Co., which has large coal and timber interests in Harland and adjoining counties, recently declared a dividend which takes $18,000 from the surplus fund. At this meeting John W. Fox, the noted Kentucky novelist, was elected a director of the company, succeeding his late brother, James W. Fox, who died last winter. Mr. Fox for many years has been close to big developments in the fields, having lived near Cumberland Gap the greater part of his life, and having based several big selling novels on Kentucky developments.

NEW MEXICO

Gallup—The old Thatcher mine east of town, which has been idle for several years, is to be worked again and will be producing coal soon. S. E. Wood and J. Stewart are to operate the mine.

Foreign News

Amsterdam, Holland—The newspaper "Handelsblad" learns from a German source that after Mar. 31, when the economic arrangements between Holland and Germany expire, the export of coal to the former will cease.

Sydney, Australia—Australia miners unions have decided to go into business as mine-owners. The Newcastle Colliery Employees' Federation will be the first in the field, having voted this week to acquire control of a large mining property.

Personals

Charles A. Braun has been appointed assistant sales manager of the Stonega Coke and Coal Co., with offices at 1727 Land Title Building, Philadelphia, Penn.

L. R. Taylor, who recently resigned as superintendent of the Virginian Ry., at Princeton, has formed a connection with the J. C. Sullivan mines in Raleigh and Wyoming Counties.

D. G. Thomas, mine superintendent of the Union Pacific Coal Co., at Rock Springs, Wyo., has resigned to accept a similar position with the Megeath Coal Co. at Winton, Sweetwater County, Wyoming.

Stanley Gleason, of Pittsburgh, Penn., has been promoted, effective Apr. 1, from the position of transitman to the division engineer of the Pittsburgh division of the United Coal Corporation to succeed W. H. Hogue, resigned.

W. E. Davis, of Hazard, Ky., has sold a controlling interest in the First Creek Coal Co. to E. L. Douglas, Jesse Morgan and some Detroit interests, and personally will give his attention to developing the property of the Midland Coal Company.

T. V. Smith has been promoted with the Solvay Collieries Co. from the position of assistant to the chief engineer with headquarters at Huntington, W. Va., to the position as assistant superintendent of the company's Coaldale colliery at Hellier, Ky.

Capt. G. W. Shaw, for five years district manager at Louisville for the Pittsburgh Coal Co., has been transferred to the Pittsburgh division. Captain Shaw, during his stay at Louisville, has looked after the river traffic work, which has lightened in this district to such an extent that he has been placed in charge of the work on the Monongahela River. E. T. Quinby, the company's local secretary, will look after the river end.

Trade Catalogs

Hughes Mechanical Gas Producer. Wellman-Seaver-Morgan Co., Cleveland, Ohio. Bulletin. Pp. 8; 8½ x 11 in.; illustrated. Describes the features that have made this gas-making machine popular with a large number of users.

The Tuerk and Hunter Electric Fans. Frank H. Seely Jr. Co., 421 Widener Building, Philadelphia, Penn. Folder. Pp. 8; 3½ x 6¼ in.; illustrated. Contains specifications and prices of oscillating, non-oscillating and ceiling types of electric fans.

Link-Belt Roller Chains. Link-Belt Co., Chicago, Ill. Booklet No. 358. Pp. 16; 6 x 9 in.; illustrated. Was issued to give preliminary information on recent roller chain developments, pending the revision of the company's No. 257 Roller Chain Data Book.

Automatic Reclosing Circuit Breakers and Relays. The Automatic Reclosing Circuit Breaker Co., Columbus, Ohio. Bulletin No. 30. Pp. 20; 8½ x 11 in.; illustrated. Gives a general description and the theory and application of this concern's automatic reclosing circuit breakers and relays for the protection of direct-current circuits.

The Pump That "Manistee" Builds. Manistee Iron Works Co., Manistee, Mich. Booklet. Pp. 20; 9 x 6 in.; illustrated. A rather unique publication descriptive of the RoTURBo pump built by the Manistee Company. On first opening the book the complete assemblage of a multi-stage pump is shown. As each page is turned the view discloses the pump with a part removed.

Industrial Storage Battery Locomotives. Jeffrey Manufacturing Co., Columbus, Ohio. Catalog No. 231. Pp. 24; 6 x 9 in.; illustrated. Contains interesting illustrations and description of various installations, information regarding details, as well as useful data for users of storage-battery locomotives, with particular emphasis on the employment of this well-known locomotive by industrial plants, lumber yards and contractors.

How to Save Coal. Bailey Meter Co., 141 Milk St., Boston, Mass. Bulletin No. 41. Pp. 20; 8 x 10½ in.; illustrated. Just at the present time, when the need for economy in the use of coal is so urgent, this bulletin, with its valuable suggestions on steam generation, should be on every power plant official's desk. The Bailey meter accurately records the steam flow on a uniformly graduated 12-in. circular chart, reading directly in per cent. boiler rating; or if desired in thousand pounds per hour or boiler horsepower.

Community Homes Built With Steel Forms. The Hydraulic Pressed Steel Co., Cleveland, Ohio. Booklet. Pp. 31; 8¾ x 11¾ in.; illustrated. The title page of this booklet, which is an excellent example of the printer's art, states that it was issued for the purpose of assisting those who are giving consideration to the much discussed question of industrial homes. Under different chapter heads is described fireproof, sanitary, industrial houses, together with first cost, permanency and low maintenance. The booklet is excellently illustrated by two-color halftones and line drawings, and reflects the experiences of the Hydraulic Pressed Steel Co. and its effort to combine profit-producing with the welfare of every employee.

Industrial News

St. Louis, Mo.—Effective April 1, the Old Ben Mining Corporation, the largest Franklin County coal operator, closed its St. Louis office. The headquarters are in Chicago.

Philadelphia, Penn.—The Pennsylvania Supply and Equipment Co., of 421 Widener Building, has been succeeded by the Frank H. Seely, Jr., Co. The change affects the firm name only and was effective as of Apr. 1.

Cleveland Ohio—The Lakewood Engineering Co. announces the opening of a district office at 448 Broadway, Milwaukee, Wis., with Frederick T. Kern and J. N. Young, both formerly of Kern, Hunter, Inc., as its representatives.

Columbus, Ohio—The combined offices of the Gem Coal Co., the Doanville Coal Co., and the Cleveland & Philadelphia Coal Co., the latter a selling agent for the other two, which produce coal, have been moved from the Huntington Bank Building to the Capitol Trust Building.

New York, N. Y.—The annual report of the Central Coal and Coke Co. for the year ended Dec. 31, 1917, shows net profits of $819,583, as compared with $334,224 for 1916. Gross profits amounted to $1 258,989, against $673,269 the year before Combined net profits of Central Coal and Coke Co. and Delta Land and Timber Co. totaled $1,302,496.

Columbus, Ohio—The new rulings of the Federal Railroad Commission regarding the use of open coal cars by small "wagon mines" will permit several hundred such mines in central Ohio to open for operations during the spring and summer months. These mines were forced to close during the winter on account of the refusal of the authorities to permit cars to be placed for them.

New York, N. Y.—Dodd-Dubosque Company, Inc., announces that it has succeeded to the investigation, sales plans and advertising business formerly conducted by the J. D. Barnhill, Inc., at 110 West 34th St New York City, with offices at the same address. The officers of the new company are as follows: Philip S. Dodd, president; Clayton Dubosque, vice president and treasurer; William T. Andrews, secretary.

New York, N. Y.—MacGovern & Co., of 114 Liberty St., well-known dealers in second-hand equipment, announce the opening of branch offices at Pittsburgh, Penn., and St. Louis, Mo. The office in Pittsburgh is located at 498 Union Arcade, and is under the direction of L. H. Tippins and W. L. Sprengle. The St. Louis office is at 315 North 12th St., and is under the direction of R. S. Fisher, district manager.

Houghton, Mich.—Calumet & Hecla subsidiaries are suffering considerable loss through continuance of the stubborn fire that for two weeks has been burning steadily in the soft coal pile at Dollar Bay. Fighting this fire has been a costly task and it is not yet under control, notwithstanding two steam shovels and a crew of 60 men have been removing the coal steadily. Gas from the burning pile reaches Houghton, Hancock and Dollar Bay communities. Over 100,000 tons were stored.

Cincinnati, Ohio—Suit has been filed in the Common Pleas Court by the Andrews Steel Co. and the Newport Rolling Mills Co., both of Newport, Ky., against Jewett, Bigelow & Brooks, alleging failure on the part of the coal concern to furnish coal to the steel companies as provided by contracts said to have been entered into, and total damages of $117,000 are asked in consequence by the plaintiffs. The contracts upon which the suits are based are alleged to have provided for the delivery of 75,000 tons of coal.

St. Louis, Mo.—Coal wagon drivers have made a demand upon the Coal Haulers' Service Exchange for an increase in wages of $3.50 a week. Officials of the service exchange say that the demands will be granted. An appeal will be made to the St. Louis fuel committee for permission to advance the price of coal sufficiently to cover the increased wages. The bureau is composed of wagon-lot dealers who do not have switches. A. W. Powers is president and William Kay secretary.

Louisville, Ky.—Inability to obtain rails, machinery and equipment of various kinds is resulting in several planned developments being held up. One eastern Kentucky mine has been ready for some time to start shipping five cars a day, but has been waiting for five months for delivery of aero baskets and ropes, the other work having been recently completed. At the present time terminal congestion at Louisville, Cincinnati and other points is resulting in equipment being held up indefinitely that should make fast time.

Columbus, Ohio—Notices have been sent out through the Ohio branch of the National Council of Defense and the Ohio Fire Marshal's office that all handlers and users of explosives will have to take out a license. Alien enemies and all persons who are subjects of nations at war with the United States will be refused licenses. Violation of the act and failure to secure a license will lay the person liable to a fine of $5000. Licensing agents are located in every county. All coal operators who use explosives will be required to secure the license.

Louisville, Ky.—H. B. Hanger, of Richmond, Ky., and H. P. Mason, of Frankfort, Ky., of the Mason & Hanger Co., contractor who built Camp Taylor, at Louisville, and who are installing switches and connections at the new Federal powder plant at Nashville, besides handling many large Government contracts, are incorporators of the new house of Mason, Hanger & Coleman Co., of Charleston, W. Va., which is incorporated with a capital of $100 000 for the purpose of constructing railroads, waterworks, locks, dams, sewers and public work generally; to acquire, manage and operate coal, iron, oil and timber properties. The other incorporators are also Kentuckians, including Frank Chinn, of Frankfort: L. B. Weisenburger, Jr., and W. O. Furr, of Frankfort.

Pittsburgh, Penn.—Effective as of Apr. 1, 1918, Colonel Henry P. Bope has resigned his position as vice president and general manager of sales with the Carnegie Steel Co. to devote his time to private interests. Colonel Bope became connected with Carnegie Brothers & Co. in November, 1879, and has remained continuously in the sales work of that company and its successors up to the present time. He has been succeeded in office with the Carnegie Steel Co. by William G. Clyde, who was assistant general manager of sales at Pittsburgh in charge of the Bureau of Bars and Hoops. Mr. Clyde by the promotion has also become a member of the board of directors of the company. Charles L. Wood long assistant to Mr. Clyde, has been promoted to be asistant general manager of sales in charge of the Bureau of Bars and Hoops.

New York, N. Y.—During 1917 the Pennsylvania Railroad Co. carried over its various lines 10,721,121 tons of anthracite, 50,205,005 tons of bituminous and 14,482,474 tons of coke, a decrease of 1,166,315 tons of anthracite, an increase of 2,551,704 tons of bituminous and a decrease of 1,877,819 tons of coke as compared with the tonnages transported in the previous year. The coal consumed by locomotives during the year amounted to 17,557,309 tons, an increase of 1,360,800 tons over the previous year. The company has on its rolls 3804 pensioners, an increase of 184 over 1916, and the pensions paid during the year amounted to $1,473,605.06, an increase of $290,905.34 over 1916. The oldest employee receiving a pension during the year attained the age of 96 years; while the average age of all pensioners, as of Dec. 31, 1917, was 72 years, 10 months.

MARKET DEPARTMENT

Weekly Review

Uncertainties Being Cleared Away—Anthracite Demand Strong with Little Likelihood That Enough Will Be Mined To Meet Requirements—Bituminous Production Still Far Below What It Should Be Due to Poor Car Supply—Active Market—Some Talk of Cancelling Contracts

THE National Fuel Administration is making rapid strides in the work of clearing away the uncertainties besetting the coal industry. A zoning policy has been announced; new price regulations have gone into effect; jobbers are practically unhampered in their methods of doing business; local fuel administrations in the different states have been organized to take charge of distribution — in short, the path is being smoothed for a quick movement of coal from the mine to the consumer's bin.

Now the cry is for production—for more and yet more coal. The demand for anthracite is insistent. Stocks are down to rock bottom, notwithstanding the fact that record tonnages are being produced at some mines. With the added demand that will surely come from household consumers during the next few months there arises the question, "Will the output equal the requirements?" It is hard to see how this can be answered in the affirmative, though it is a bit too soon to be pessimistic. Just at present, however, the number of cars handled at the loading piers shows an improvement that under ordinary conditions would be sufficient to create a surplus, but which now indicate that the demand is more than keeping pace with the supply. Dealers are accepting orders subject to Fuel Administration regulations, though no contracting is reported for the smaller coals.

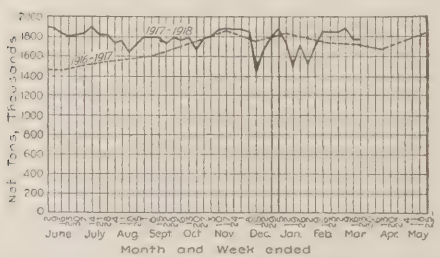
No improvement in conditions is reported from the bituminous mines. In the large district about Altoona, Penn., the car supply has been far below normal, and the motive power available is insufficient to clear the yards promptly enough to insure regular movement of cars to and from a large number of operations. Hundreds of mines in the bituminous district of Pennsylvania have been idle for days, one particular mine in this district not having received a car in over three weeks. From West Virginia, Kentucky, Illinois and Indiana come like reports. The results are a material reduction in output at a season when every condition should be favorable and an increasing disinclination on the part of operators to make commitments for months ahead. Until there is some policy with regard to assigned cars that shows some evidences of being consistently carried out, it will be impossible for many mines to work more than half time. Not much improvement can be expected under the present system of car distribution.

The market showed signs of activity during the past week, though the trade is still a little uncertain due to the fact that the making of contracts is confounded by Government commandeering and preferential shipment orders. The zone system is also adding complexities. There is some talk of the Government cancelling all contracts for coal which did not expire on April 1, the idea being that such a step would eliminate all high-price contract coal and place the entire production of the country under control of the Fuel Administration.

COAL PRODUCTION

Production of bituminous coal increased slightly during the week ended Mar. 23. The total production (including lignite and coal made into coke) is estimated at 10,972,000 net tons. The average production per working day is estimated at 1,828,000 net tons as compared with 1,729,000 net tons during March, 1917.

The total production of beehive coke is estimated at 635,000 net tons, or 106,000



tons per working day; a decline in average daily production of 1000 tons compared with week of Mar. 16. The production in the Connellsville and Lower Connellsville districts, as reported by the "Courier," increased from 335,122 tons during the week Mar. 16 to 339,580 tons.

Anthracite shipments increased from 12,265 to 42,487 cars.

The ratio of production to present capacity declined from 70.6 per cent. in the week ended Mar. 9 to 66.3 per cent. for the week of Mar. 16, due in part to transportation difficulties in the east and in part to absence of orders for coal in the far west. The lack of demand for coal in the Southwest, Rocky Mountain and Pacific Coast States was even more noticeable than during the previous week. Mines in these states reported a loss of 275,296 tons due to "no market," compared with 201,006 for week ended Mar. 9.

The reports of conditions in the Connellsville and adjacent coke regions for the week ended Mar. 23 show continued improvement. Fifty-seven of the principal operators in the Connellsville, Greenburg and Latrobe districts reported a production of 273,420 net tons or 65.6 per cent. of their full time capacity as compared with 64.1 per cent. during the preceding week. Losses due to shortage of cars and labor slightly declined. The same operators produced 152,400 net tons of coal.

The ratio of production to capacity of byproduct coke plants during the week ended Mar. 23 (87.8 per cent.) was the same as in the previous week. The losses on account of lack of coal represented 6.4 per cent. of capacity, the same as the previous week. Kentucky, Maryland, Tennessee and Washington increased their production to maximum capacity. The lowest ratio reported—in New Jersey—was 79.6 per cent., an improvement over 76.5 per cent. in the previous week. Indiana was the only state reporting decrease in production during the week ended Mar. 23 due to lack of coal.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended:			
	Mar. 2	Mar. 9	Mar. 16	Mar. 23
Bituminous shipments, 123 roads..	197,415	200,239	190,298*	191,525†
Anthracite shipments, 9 roads...	39,875	41,807	42,265*	42,487†
Beehive coke shipments, 4 roads...	12,911	13,032	13,218*	13,040†

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods is well in advance of the corresponding period of a year ago. Road sales for both immediate and future deliveries show good increase over the same period in 1917. Merchants have been into market in slightly smaller numbers. The market on domestic cotton goods continues strong. Collections are good.

Bradstreet's—Trade expands as the season advances, and optimism grows, though many chafe under price regulations imposed by the Government. Lack of labor, dearth of materials and paucity of cars prevent even heavier movements. An early Easter, accompanied by favorable weather, has brought retail trade to the forefront, buying from wholesale dealers for fall shipment is active, industry is brisk, collections are more favorable than otherwise, crop news, except for absence of rain in the southwest, is excellent, and widespread preparations are being made for increased planting this spring.

Dry Goods Economist—Due partly to the financial outlook and partly to shortage of labor and of raw materials, there is nothing surprising in the predictions heard on all sides that still higher prices for textiles will prevail. There has been no recession in the prices of raw cotton, silk or wool. Instead, the markets are firm and some advances have been noted. Raw cotton, for example, reached 34.40c. this week, the advance being based on reports of continued drought in the Southwest.

American Wool and Cotton Reporter—The wool supply is becoming scarcer and the market becoming stronger. One feature of the week under review has been the cleaning up of practically all the 4s and 5s B. A. wool in the market. The woolen goods market remains steady—with produc-

tion up to the highest possible point under existing conditions. Manufacturers expect that there will be sufficient shortage of goods to make possible at least reasonable profit margins.

Iron Age—A remarkable recovery in pig-iron production is shown by the statistics for March gathered by wire from 344 blast furnaces. The total was 3,213,091 tons, or 103,648 tons a day, as against 2,319,399 tons in the 28 days of February, or 82,835 tons a day. As coke supply has increased, more furnaces have wheeled into line, the net gain in the month being 24. The 344 coke iron furnaces in blast Apr. 1 were producing at the rate of about 106,500 tons a day, as compared with an actual average production of coke iron in the year 1917 of 105,000 tons a day.

Atlantic Seaboard

BOSTON

Jobbers file application for licenses. No clear program, and apparently no action on assigned cars. Buyers in quandary. No improvement in Tidewater receipts. Rail shipments fair. Bottoms extremely hard to get. Hampton Roads dispatch good. Distribution the coming year a serious problem. On present consumption industry will keep running, but where will be the reserves? Pennsylvania operators largely unresponsive. Selling connections of many years standing given up, apparently for good. Anthracite program now quite definite. Retail regulations issued. Wide opening for much confusion. Plans not flexible enough to meet situations that will arise.

Bituminous—New England factors have applied for licenses and have been assured that unless they hear otherwise from Washington they may continue in business as if licenses had already been issued. Representative houses are besieged by manufacturers and other buyers wishing to contract, but they are powerless to act. Firms that have certain contracts for a score of years have been obliged to notify customers that the latter must look elsewhere. In many cases a Philadelphia house or one nearer the mines has a sales contract for the output of a mine for a number of years, and where in other seasons the selling compensation has been shared with New England agencies the prospect is such that each concern in position to do so wants to collect the whole 15c. The New England connection is therefore left in the cold. While the "jobber" has been allowed to stay in business his livelihood, so far as bituminous is concerned all-rail, seems likely to be taken from him. Even the distributor of Pocahontas and New River finds himself in a dilemma with regard to selling commission. And this is only one of the anomalies created by present regulations.

Bituminous all-rail is coming through in fairly good volume, as compared with two months ago. Barely enough is received to keep plants running even on a hand-to-mouth basis. There are considerable areas in New England heretofore relying exclusively upon all-rail shipments where only the emergency supply drawn from tidewater allows the industries to run. The price on water shipments via Hampton Roads is now about $9.50 per gross ton f.o.b. Boston or Providence. In some cases rehandlers are asking as high as $11.20, but this latter is the exception. When this basis is compared with $3.05½ per net ton f.o.b. mines for all-rail shipment plus $3 or so freight, the inequality is striking. Neighboring factories may face that inequality, but apparently there is no remedy. One month a consumer may get his coal all-rail, the next from tidewater. And there is no way of being sure of either!

The shortage of high volatile grades, particularly for illuminating and for by-product use, is causing real alarm. Blast furnaces are using an enormously increased tonnage and attention is being called to quantities of low sulphur coal used for fast train service. One New England railroad alone uses 150,000 tons and at a time when gas utilities are not able to get more than a percentage from their usual sources. The fact that anthracite also is going to be hard to get has a bearing on the probable scarcity of gas coal. Lime burners are also in straits for these grades, and unless long flame coal is forthcoming it will go hard with a lot of industries that are dependent upon them. It will be increasingly difficult this year to distinguish between "essential" industries.

Boats are still extremely scarce and are likely to continue so. The allotment of ships to the various interests will have to be most carefully administered, and at best there will be much dissatisfaction. It is beginning to be realized that the same authority that has the distribution of coal should also have the disposition of steamers and barges. The Shipping Board authorized rate to Boston is still $3.25 from Hampton Roads, the demurrage rate varying according to tonnage. Dispatch at the Virginia terminals has been good through March and the flow of coal certainly has been sufficient for the boats arriving. There is talk of equipping one of the old Norfolk piers for bunkering purposes exclusively. That should help, together with the thawing facilities that are being installed against next winter.

Anthracite—At this writing "spring prices" have not yet been given out, although there is little interest here in a possible reduction. Freight increases will absorb some, both rail and water, and the great anxiety of buyers will continue to be "to get coal." Receipts increase not at all, arrivals being contingent so largely on the tugs available. One day last week there were 20 barges loaded and loading in the Delaware, and only two tugs due. Unless some power is furnished New England is sure to be bitterly disappointed in any distribution that is now aimed on the 1916 basis.

NEW YORK

Demand for anthracite domestic sizes continues to be heavy, and dealers accept orders subject to new prices. The smaller coals easier, with prices slightly reduced. Production is heavy but insufficient to create a surplus. Bituminous conditions not satisfactory. Railroads favor certain mines, while others have to get along with curtailed car requirements.

Anthracite—The demand continues unprecedented for this time of the year. Stocks are down to rock bottom notwithstanding the efforts of the producers to create a surplus and even with the heavy production reported from the mining fields retail dealers have comparatively little coal in their yards.

Production is steadily improving and now that the Federal authorities and labor representatives have come to an agreement regarding strikes during the continuation of the war it is not expected there will be many interruptions of work in the mining fields. Records are being reported at some of the mines, while reports show that shipments are steadily increasing. Not many complaints are being received regarding unclean coal.

The number of cars handled daily at the loading piers shows a big improvement, which under ordinary conditions would be sufficient to create a surplus, but which now indicate that the demand is more than keeping pace with the supply.

There is an active demand for buckwheat, with a good supply of rice, barley and screenings on hand. Offers of part cargoes of the domestic coals with an equal amount of the smaller sizes are said to have been refused by some dealers who said they had not place to store the steam coals. Some dealers are willing to take anything in order to obtain domestic coals. No contracts are being made for the smaller coals for next winter.

Although no further official notice had been received from Washington regarding the discount of 30c. per ton in the mine prices for the domestic sizes of anthracite coal, Reeve Schley, New York County fuel administrator, announced on Tuesday a 35c. reduction in the retail prices. This includes the 30c. reduction from the mine prices and a 25c. cut from $2.50 to $2.25 per ton in the gross margin of profit allowed the retail dealer. This total reduction of 55c. is cut to 35c. because of the increase in freight rates of 15c. per ton and 5c. for handling expenses due to the recent strike among bargemen. On the small anthracite sizes the gross margin has been reduced from $1.90 to $1.75 per ton, but for pea coal and bituminous the gross margin fixed several months ago of $2.10 per ton has been allowed to remain. These discounts are to remain in effect until Sept. 1 when the full winter price becomes effective again. It is understood that most of the companies are taking orders for coal with the understanding that the reduced prices will prevail.

Current quotations, per gross tons, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6 15	$6 90
Egg	6 05	6 80
Stove	6 30	7 05
Chestnut	6 40	7 15
Pea	4 90	5 65
Buckwheat	4 45@5 15	5 10@5 85
Rice	3 90@4 10	4 10@4 85
Barley	3 40@3 65	3 10@4 10
Boiler	3 65@3 90	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Note—Foregoing prices are based on summer discount of 30c. per ton for the domestic sizes and the increase in freight rates of 15c. per ton on all anthracite coal.

Bituminous—Conditions are anything but satisfactory to most operators. There is a feeling among many of them that they are being discriminated against by the railroads, in that while their coals are not being taken for railroad consumption other operators are enabled to work their mines with a 100 per cent. car service. When coal was short last winter these same railroads were only too glad to get part of their supply from these same mines which are now idle a great part of the time because of the lack of cars.

In some instances offers by certain operators to continue furnishing coal to the railroads under the same arrangements as had existed have been turned down.

The order granting operators 20c. in addition to the Government prices for clean coal was welcome news to some local operators.

The license system is looked upon more favorably than it was at first. All jobbers have filed their applications at Washington for licenses to continue business and pending their issuance are being permitted to sell coal.

No improvement in conditions is reported from the mines. Production figures indicate a slight betterment but is due to heavier output at some mines, while other openings of a smaller nature have been unable to work more than half time. Car supply along the Pennsylvania continues bad, but along the New York Central is much better. Not much improvement is looked for under the present system of distribution.

Bituminous is in good demand for mixing with the small anthracite coals, and its scarcity accounts for the easier conditions for these sizes.

BITUMINOUS PRICES

	F.o.b. New York Gross	Mine Price Net	Gross
Central Pennsylvania	$5.06	$3.05	$3.41
Maryland:			
Mine-run	4 84	2 85	3 19
Prepared	5.06	3.05	3.41
Screenings	4.50	2.55	2.85

An advance of $1.35 per net ton over operators' prices is authorized on coal for export and on bunker coal supplied to steamers engaged in foreign trade.

PHILADELPHIA

New distribution plan will soon be effective. Zoning also likely. Retailers busy filing storing orders. Jobbers temporarily licensed. Large companies now selling culm. Bituminous contracts create interest. Many expired agreements not renewed. Zoning plan also affects contracts. Coal continues short, car supply being the principal factor. Premium on clean coal.

Anthracite—The distribution plan on the basis of the coal year Apr. 1, 1916, to Mar. 31, 1917, has been about worked out, and many shippers have notified their customers that they intend to ship on this basis from now on. This has caused many strange alliances. For instance, it is known that since Mar. 31, 1917, the individual shippers have deserted much of their small trade, those dealers to whom they shipped just a car or two, and in their place have been nursing some of the larger trade in the hope of serving them permanently when normal conditions once more prevailed. Under the present plan the independents must now go back to their old customers.

Another complication caused by the absence of the new Government prices is that due to the expiration of practically all steam-coal contracts these consumers are now without protection. For the past several weeks the buyers of steam coals have been on the anxious seat and have kept the shippers constantly stirred up to find out just where they stand. It is known that almost all the producing companies are willing to renew contracts on practically the same basis as last year, and with this idea in view they made up all contracts a month ago and sent them to Washington for approval. Now it is learned that the Fuel Administration has rejected these agreements on account of wage clauses and other restrictions which it has always been the custom to place in them.

The business with the retailers for filling-in orders after Apr. 1 has been quite heavy. However there are some dealers, in fact the majority, who are not making any particular effort to load themselves up with orders of this kind until they have some as-

surance of receiving the needed coal. Other dealers are taking the stand that they will go after all the business possible and then if they do not have the coal will present their orders to the fuel authorities with the hope that they will see that they are provided with the fuel to cover the orders in hand. The dealers are rigidly enforcing the filling out of the coal cards as required. In doing this there is an immense amount of work involved, but the dealers are complying, with little complaint. Receipts locally are comparatively light, as many of the larger shippers continue to ship heavily into other markets. Nevertheless a change in this respect is expected as soon as the companies begin working on the new distribution schedule.

A matter that has lately caused a good deal of comment among shippers, not to mention annoyance to them, is the new rule of the railroads not to make transfers of shipments either en route or after the cars reach destination. This action falls with particularly severe effect on the concerns who are shipping culm, as often concerns who have ordered a trial car of this material reject it after it arrives at destination, as much of it falls far below the purchaser's ideas of what it should be. In order to protect themselves it is likely the shippers will require from purchasers a signed order before shipment is made, which makes the transaction a contract and binding upon the purchaser to receive it.

The Washington authorities state that the mass of work incident to issuing the licenses to jobbers has been so heavy that it will be impossible to act on the applications for several weeks. In the meantime jobbers who have made application will be allowed to continue business as usual. There seems to be no doubt that practically all jobbers will be permitted to continue and that the issuing of the license will be merely a formality.

An interesting development of the week has been the entrance of the larger companies into the field created by the demand for culm. Heretofore the independent shippers had this trade practically to themselves, the larger operators taking the stand that it did not pay to take the cars from other sizes. The price usually asked by the companies for culm is $1, while the individuals get from $1.25 to $2 for theirs.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$5.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.80	6.00	Rice	2.65	3.65
Stove	5.05	6.35	Boiler	2.45	3.55
Nut	5.15	6.40	Barley	2.15	2.40
Pea	3.75	4.65			

Bituminous—The contract situation is much to the fore at this time. With the first of the month there was a heavy expiration of agreements of this kind, and while the consumers have been anxious to renew them there seems to be much hesitancy on the part of the fuel authorities to allow renewals. Of course, with a fixed price in effect there is nothing to be gained in this way, except that the consumer on his part feels that he has a certain protection as to being supplied.

Supplies continue to be short in this territory, and the lack of improvement in the car supply is a cause of great disappointment. As has been the case for some weeks now, the greatest difficulty is on Pennsylvania shipments west of Altoona, as the movement eastward of that point is reported quite good. With the limited number of cars at their disposal the miners are making the greatest use of them by loading to the fullest possible capacity, and the cars are reaching here "topped" two feet or more.

The operators were informed this week that the Federal Fuel Administration had made a ruling that where coal was prepared by the use of special mechanical appliances they would be allowed to add 20c. to the fixed Government price.

This week State Administrator Potter suggested to the national authorities the minimizing of priority orders, if not their entire elimination; the creation of a pool from which to draw coal for emergency use, and the organization of a Federal inspection system in the bituminous region.

BALTIMORE

Everybody busy signing up new contract relations and at the same time wondering how they are to be filled. Bituminous supply easier. New schedule for anthracite out.

Bituminous—The industrial world has descended on the coal men here in an effort to create new relationships under Government regulations and at the same time assure themselves of coal supply over the coming year. Many changes of form are taking place and the trade is still a little uncertain where it stands. A number of mines are probably hooking up direct with some larger consumers, but the uncertainties existing under Government commandeering and preferential shipment orders is such that much of the business is still at sea.

Jobbers too are uneasy. Many find numerous contracts with business concerns as purchasing agents easy to get, but are wondering how they are to assure themselves of the coal to supply the firms in question. Few of the mines are willing to promise the jobbers a sure supply. Even some jobbers selected to act as purchasing agents for public utilities are in the same boat. It may be that the state fuel administrator will be forced to secure the coal for a large part of the supply through jobbers, should many mines continue in their present frame of mind of refusing to make contractural relations. The immediate supply of soft coal here is a little easier, following clearing of much railroad congestion.

Anthracite—The new spring price list was announced here this week, after conferences between the city coal committee of the Maryland fuel administrator's office and a committee representing the retail coal association. The prices are 35c. off the winter schedule here, and are as follows:

Broken white ash	$10.10
Egg	10.00
Stove	10.25
Nut	10.35
Pea	8.95
Egg, Sunbury	10.25
Stove	10.50
Egg, Lykens Valley	10.70
Stove	11.10

The prices are for chute delivery, extra to be added for cost of bagging, carrying, etc. Twenty-five cents is allowed off the above schedule for cash. Under the plan consumers must fill out application cards and will be allowed two-thirds of their estimated requirements up to Mar. 31, 1919.

Lake Markets

PITTSBURGH

Coal output no better than stationary. Greater use of rivers contemplated. Premiums and penalties as to preparation of coal.

Coal output has not improved appreciably in the past week, if indeed it has not decreased slightly, as car supplies have been anything but satisfactory, eight weeks after winter weather practically disappeared. The transportation situation is not to be dismissed lightly in expectation that normal weather is to restore full movement. The situation is to be met by energetic action on the part of those in western Pennsylvania who can use the rivers. Several tipples are being built in the 14th and 15th pools of the Monongahela, which have hitherto shipped little river coal to Pittsburgh, the 15th pool being 130 miles above Pittsburgh, and there will be large shipments to Pittsburgh at least if not to Cincinnati. As is well known, the mines in the lower pools that used to furnish such a large Monongahela River coal traffic are largely worked out. Something is being done also in the direction of increased use of the Allegheny River.

There is still considerable contracting for coal being done for the twelvemonth beginning Apr. 1, but the major part of the business, or at least a very large part, had been done before the recent reaffirmation of prices, subject to Government price ruling at time of delivery. The Fuel Administration is urging that all essential wants be fully covered by contract, and that shipments be taken as fast as possible, even to the extent of buyers borrowing money to carry the coal.

There is a moderate amount of free coal in the market, but not equal to the demand in all cases. Demand from large consumers is relatively light, shipments as a rule being equal to requirements. All the intricacies of the zoning system have not been ironed out yet, as applied to Pittsburgh coal, which is under less restriction than the coal in most zones. The market remains quotable at $2.20 for slack, $2.45 for mine-run and $2.70 for screened, per net ton, f.o.b. mine, Pittsburgh district. Jobbers can charge customers a brokerage in addition, up to 15c., when regularly authorized. There is a new regulation permitting operators when licensed to do so to charge 20c. extra for coal especially prepared to eliminate foreign matter, but the regulations and standards are altogether in doubt. Considerable confusion is expected to result, at least for a time, from this new proviso, when already there is a penalty of 50c. on coal that does not pass the inspectors.

D. W. Kuhn, local fuel administrator, has fixed $5.50 per net ton for domestic coal, delivered within a reasonable distance from yards on a level haul, price at yard being $4.50. Later prices will be fixed for the hilly districts. All prices are to run to Sept. 1, when there will be an advance of 25c.

TORONTO

Coal supply still inadequate for heavy demand. Local deliveries much delayed. Consumption restricted by government order. Wood will be largely used for fuel.

Coal is being received in considerable quantities, but the supply is still insufficient to enable dealers to fill orders in arrear and meet current demands, which continue heavy. There is consequently much delay in local deliveries. A government order in council restricts consumers to 70 per cent of their normal requirements, except in cases where these do not exceed six tons per year. Dealers consider that it will be a matter of some difficulty to enforce this order. The civic authorities are considering an increase of the police force to keep up with the inspection work involved by the fuel regulations. The demand for fuel will largely be met by an increased consumption of wood, as many municipalities are preparing to take advantage of the offer of the Provincial Government to allow the cutting of cordwood in Algonquin Park.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove, nut and grate $10; pea, $9; bituminous steam, $9; slack, $8 to $8.50; domestic lump, $10; cannel, $11; wholesale f.o.b. cars at destination, three-quarter lump, $7 to $7.50, slack $6.50 to $7.

BUFFALO

Jobbers still wondering how they are coming out. Coal is freer, except that anthracite is not sized well. No lake coal. Car shortage the chief difficulty.

Bituminous—If the car supply was what it ought to be the difficulties in the coal trade would mostly disappear. A few days ago the cars became somewhat more plentiful, and at once coal began to accumulate, with reports that certain mines which were not favorably situated were shutting down. Then there would come counter reports, of mines in certain districts that could get scarcely any cars and were losing their miners to go into other business or other mines that did get cars.

Anthracite—The situation turns on sizes and the April market. As is the case at this time of the year there is an excess of chestnut, for the big stockers of coal are asking for larger sizes, as they cannot use chestnut in their furnaces. The city distributors are taking the reports of consumers, who are to be given a percentage of what they used last year. Much difficulty is experienced by those who are expecting to move or make other changes in their needs of coal.

The city shipping agents have a sort of semi-official price to work from, though it did not come in till April and seems to be subject to unexpected changes, as is the case with bituminous. The consumer will get coal at only 15c. reduction, as the decline of 30c. is halved by a 15c advance in freight. After the price seemed to be a certainty an order arrived that all coal mined in March must be sold at March prices.

The prospect of shipments by lake are not good and they will not be till there is a surplus of coal. Shippers do not seem to be making any preparation for loading vessels, though in former seasons they sometimes had hundreds of thousands of tons loaded before the lakes opened. Buffalo harbor has long been open this season and there is scarcely any ice in the lake at this point, though it will probably be some weeks before the upper lakes are open.

DETROIT

Bituminous coal is coming to the local market in fair volume. Anthracite is scarce. Lake shippers prepare for start.

Bituminous—Shipments of bituminous coal are being maintained in sufficient quantity to offset in fair degree the current requirements of consumers. The supply arriving is not so great, however, that

any accumulation occurs on tracks, and not much progress appears to have been made by many of the steam coal users in obtaining a reserve for future needs. Demand from steam plants is maintained in substantial volume, while there is a moderate amount of buying also by household consumers, who find it necessary to continue operation of heating plants and are unable to obtain hard coal or coke.

Comment is made by some of the jobbers that slack is less plentiful than would be desirable to meet needs of their customers. Incoming shipments also include little of the prepared sizes such as ¾ lump, 4-in. lump and egg, this being due, the jobbers say, to a disposition on the part of the operators to do away with what is regarded as unnecessary work in the preparation of stock. The opinion is expressed by some of the jobbers that the reduction in number of sizes is a movement in the right direction. In the retail trade interest is at present centered on the attitude of the Michigan fuel administrator in insisting that a margin of not to exceed $2.25 a ton is adequate for dealers handling domestic stock, after Apr. 1. Among some of the retailers there is an inclination to fall back on the earlier ruling by the Federal Administration permitting a margin of not to exceed 30 per cent. over the average of the gross margin in 1915. This, it has been calculated, would permit the retailers a margin of $3.21 this year.

Anthracite—With only a small amount of anthracite coming into Detroit, the retailers are in most instances unable to fill orders for stove or egg sizes. Household consumers who desire to put in stocks for next winter's needs are unable to do so. Uncertainty as to whether Detroit is to receive anthracite in anything like normal quantity this season is a feature of the situation, disturbing both consumers and dealers. Attempts to get definite information have elicited only more or less conflicting reports.

Lake Trade—Preparations for reopening the movement of coal up the lakes are well under way. Some railroads are already offering to move coal to loading docks. The movement is expected to start in large volume.

COLUMBUS

A slight weakness in both domestic and steam grades has developed in Ohio during the past week This is the usual lull before the lake season opens and is expected to pass away as soon as lake tonnage is required.

The usual between seasons lull has taken possession of the coal trade in Ohio territory. Both domestic and steam grades are showing slight softness, but not sufficient to cause any uneasiness in any quarter. The market is taking about all the tonnage now produced and storage is the order of the day. With the opening of the lake season in several weeks this condition is expected to pass away rapidly.

Steam business is now the best feature of the trade, according to both producers and distributors. Many steam plants are stocking up a large tonnage in order to be on the safe side in case of emergency. This is especially true of public service and large steam plants. General manufacturing concerns are also stocking up to a certain extent. Many steam users ordered coal from various sources during the time of stress and in larger quantities than was then needed. This coal is now coming in and only a few cancellations have been reported. Railroads are still taking a large tonnage for the movement of freight. Some contracting for steam tonnage is reported, but many sellers as well as buyers are waiting until the expected price readjustment is finished.

The domestic trade is also rather active, although some lull is reported in certain quarters. Dealers are stocking up to a certain extent, but there is a disposition on the part of some retailers to wait and see if it is possible to get Pocahontas and West Virginia splints. As a result stocking is not as active as might be expected under different circumstances. Hocking and Pomeroy lump is now the principal coals in the local market. The zoning plan is not expected to affect the local situation to any extent.

Prices of short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.80	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

Both contract and spot demand heavy. Operators chiefly concerned with maintaining production. Traffic congestion furnishes the principal difficulty.

The beginning of the contracting season finds operators and their agents with the situation entirely in their hands, as it requires no effort this year to induce large consumers to make contracts for their fuel requirements. The difficulty is going to be in keeping up with contracts, as it was last fall and winter, as it seems certain that the transportation situation is going to continue to be the chief problem of coal operators as well as of manufacturers and other business men. Reports indicate some improvement in the matter of car supply, but the movement of freight is extremely slow and unsatisfactory, on account of the great and constantly increasing volume of traffic which has to be cared for. There are plenty of indications that large coal consumers, here and elsewhere, taking the lesson of last winter to heart, are going to do everything possible to provide storage facilities at their plants and put in some coal during the spring and summer as this seems to be the only expedient which will go far toward preventing another winter shortage. Domestic consumers are being urged to secure their next winter's fuel early, and dealers report that orders are being placed in unprecedented volume accordingly. Prices are on the Government scale, including those of dealers, which are based on a two-dollar margin.

LOUISVILLE

Good demand for steam and domestic coal, with supplies light and little stocking underway at present due to inability to obtain cars at mines. Production at present time light in all Kentucky mining districts.

Kentucky mine operators are rather discouraged with present conditions and the outlook. The trade had been given to understand and had fully expected a good supply of cars at this season, but the car supply is about as bad as if not worse than at any previous time in months. In the eastern Kentucky districts supplied by the Louisville & Nashville R. R., only about a 48 per cent. supply is being furnished. The situation is probably still worse in the western Kentucky district, where the Illinois Central has been furnishing practically no cars, some mines having gone six and seven days without a car; while on the western Kentucky Louisville & Nashville lines only about a 40 per cent. supply is being furnished.

There is an active demand for both steam and domestic coal, with domestic consumers anxious to place orders for season needs, most orders being for 15- to 25-ton lots. At the present time there appears to be no certainty that summer prices will be made effective, as the Kentucky board is going ahead on the supposition that present prices will stand. Any change will probably come direct from Washington. The domestic demand has been so good, with supplies so light, that no large stocks are accumulating, and local yards have a barren appearance, such as is shown in December.

BIRMINGHAM

Steam market active and spot demand good. No contracting being reported. Domestic inquiry improves as April is ushered in. Surplus coal hard to find. Production on about same basis as last period.

As yet no changes either in prices or classification affecting the coal industry in Alabama have been announced by the fuel administration, and it is hardly probable that there will be any revision of the mine schedules at this time except such as is necessitated by altered classifications, which are undertood to have been agreed upon.

In the meantime there is an active demand for every ton of steam coal that can be produced in the district and any surplus product is hard to locate—in fact anticipated production over contract bookings at the mines is sold in advance, as has been the case for many months.

Domestic inquiry has stiffened some during the past week and a strong buying movement is expected to develop during the first part of April, as soon as it is definitely known whether or not there will be any price revisions.

The zone restrictions for this producing district contain practically the identical territory supplied normally, some little domestic coal having been shipped into the Carolinas in past years when dull trade conditions demanded expansion of territory, but this situation does not prevail at this time and domestic mines will have to maintain steady and heavy production to supply the officially allotted territory.

Brokers and other coal men affected by the new regulations are preparing to adjust themselves promptly to the new rulings effective Apr. 1, and under the present economic conditions in the coal industry the broker will merely become a purchasing agent for the consumer, which, in fact, has been his position for quite a while, instead of a selling agent of the mines.

Coke

CONNELLSVILLE

Car supplies poorer again, especially Pennsylvania cars. Market offerings light and confined chiefly to foundry.

Conditions as to car supply, after having been relatively good for three weeks, have grown particularly bad again. Last week's car supplies averaged only between 35 and 40 per cent and supplies this week have been relatively poor thus far. It is estimated roughly that last week's coke shipments were not over approximately 250,000 tons, against about 334,000 tons shipped in each of the three preceding weeks. The main difficulty is as usual with the Pennsylvania system, whose car supplies have been especially light, and on some days its contribution to the Monongahela R.R. have been almost negligible, the Pittsburgh & Lake Erie furnishing nearly all the cars that road secured. The Pennsylvania is now restricting certain types of cars from going off its tracks, especially affecting consumers reached by the Philadelphia & Reading.

Furnace coke is only occasionally offered in the open market. Operations have been so irregular that operators if they have any coke to offer can usually offer it as 72-hour, and therefore at the $7 price, so that the limited tonnages available in the market are almost altogether classed as foundry, and this coke must be sold to foundries, which as a rule is not difficult. Even with the "restricted" Pittsburgh & Lake Erie cars a buyer can usually be found. The market remains quotable at $6 for furnace, $7 for foundry and $7.30 for crushed, over 1-in. Sellers of coke screenings, obtained from old dumps, have raised their price from $5.50 to $6, having found a good sale for this new-found material.

The "Courier" reports production in the week ended Mar. 23 at 339,580 tons, an increase of 4458 tons, and shipments at 333,537 tons, a decrease of 416 tons.

Buffalo—The situation does not change materially. A moderate and constant supply comes in and the furnaces are able to get along with it. The ore supply at the furnaces is large, so that only a few small ore charters have been made, all at $1.50 per ton from Lake Superior. Furnaces have been handicapped somewhat by shortage of men and cars, but have as a rule done well. A charter meeting is to be held this week, when rates will no doubt be fixed. A good lake season in ore is looked for.

Birmingham—Coke producers report strong inquiry for this product in the local market, but there has been no improvement in the supply of either furnace or foundry coke, and only a limited tonnage is available to the spot trade. There has been some betterment in the car supply recently and producers have been able to make some progress in catching up on delayed deliveries. The Sheffield Iron Corporation will, in the course of a week or so, have 300 beehive ovens near Jasper in shape for operation. These ovens have been idle for many years and the output from them will be used in the furnaces of this corporation at Sheffield, which will be started up in the near future.

Middle Western

GENERAL REVIEW

The desire to clean up out-of-zone orders prior to Apr. 1 made the market active during the past week.

Producers with their own sales organizations and jobbers alike have had an unusual active week, confining their main efforts to clearing their books of orders that were outside the zone limit, which became effective Apr. 1.

When the zone plan was announced by the Fuel Administration almost every sales company had at least a few orders for domestic coal booked for movement to distant points, and beyond the zoning line. This was true on the higher grade and better prepared coals of southern Illinois and Indiana. Dealers in Lincoln and Omaha, Neb., and Council Bluffs, Iowa, who have for years handled southern Illinois coal, have taken advantage of the situation and urged the filling of orders

They also placed additional orders where they thought it possible to get them filled, the result being the neglect of tonnage movement for several days to within new zone districts to the advantage of out-zoning points.

This movement no doubt would have been far greater had there been a better supply of equipment. This movement has also reflected its benefits on the producers of inferior grades of coal, because of needs close to Illinois, Indiana and Missouri points.

The question of equipment has been quite a factor in helping to steady the market. Indiana has had only a 50 per cent car supply for the past week, Illinois about 65 per cent and in a number of instances embargoes have so reflected on the shippers that it had the effect of causing operators to find a new market for their coal. The taking away from Illinois and Indiana operators of markets that had been established for years, because of rail connections, has caused considerable confusion, which will take some time to overcome. This applied in particular to the Danville field, which depends to a great extent on the Wabash and Big Four railroads for its car supply. Danville is near the state line and had for years shipped a considerable tonnage into Indiana, east of the east zone for Illinois coal. Some of the operators from this field have asked Dr. Garfield to allow them to continue temporarily their movement into Indiana until they might establish connections elsewhere in the zone in which their coal is permitted to move.

CHICAGO

Market firm on better grades, buying heavy.

The Chicago market continues to be firm on high grades of Illinois and Indiana coal, and the trade is quickly taking up all free offerings. Williamson, Franklin and Saline County operators are not finding it difficult to get all the orders they need. During the week past several important factors entered the game, including some of the large railroad companies in the North and Northwest. Every possible pressure is being brought to bear on the consumer to show him that it is necessary to buy coal now if a coal famine is to be avoided next winter.

Quite a few contracts were closed during the past week, all at the Government price and subject to the approval of the Federal Fuel Administrator. The form of contract generally used was the one adopted by the National Coal Association and approved by Dr. Garfield.

Quotations in the Chicago market are as follows, per net ton f.o.b. car at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Egg or furnace	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Small egg or nut	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Stove	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Chestnut	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	3.35@3.50
Pea	2.65@2.80	2.65@2.80	3.05@3.20	2.65@2.80	2.65@2.80	.....
Washed egg	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed stove	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Washed nut	2.65@2.80	.....	.....	.....	2.65@2.80	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings	2.15@2.30	2.15@2.30	2.45@2.60	2.50@2.65	2.15@2.30	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Hocking	West Va. Splint
Dom. lump.	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Coal men scraping the bins and yards in order to make the fuel supply last until first lake cargoes arrive. Fine weather helps the situation.

A survey of the coal district in Milwaukee harbor reveals the fact that the big coal handlers are "scraping the dish," so to speak and that Milwaukee's fuel supply is almost exhausted. Fortunately the weather continues so warm that the consumption for heating purposes has been reduced to a minimum, while rail supplies keep the busy industries moving. Prices are the same as they were in February and will no doubt be held steady until the Federal Fuel Administrator orders a change.

It is believed that after the houseowners in the cities have been supplied with their quotas of fuel it will not be a difficult matter to estimate the needs of the floating population in small flats and rented dwellings. In the rural districts the task of estimating transient needs will be an easier problem. It is becoming more apparent every day that there will be a great hegira to the wood piles the coming winter and that coal will be abandoned in the average country home from now on and until the coal situation betters.

The fuel administrator will review the mass of applications carefully, and in case it is thought more coal is asked for than is really needed an explanation will be requested.

ST. LOUIS

An unusually quiet market, with plenty of coal. Car shortage acute on Mobile & Ohio. Prevailing also on other lines. Steam demand easy, with no domestic business. A good tonnage of anthracite moving in and some Arkansas.

The local condition is extremely easy. There is practically no steam call at all, and all steam sizes are heavy. This does not apply on the coal from any one particular field, but is prevalent on all steam sizes from all fields. Coals that were difficult to get and have been in demand for many months, such as Nos. 1, 2, 3, 4 and 5, are a drug on the market. This is caused largely on account of the embargoes against Chicago on shipments via the Chicago & Alton and Wabash.

The domestic demand is light, both in the city and country, caused by an expectation on the part of the public that prices would go down on Apr. 1. Shortly after the first of April new prices are to be set in St. Louis for the domestic trade, and this will stimulate business. Everything looks extremely good for an unusual domestic tonnage.

The past week in the Carterville field has been unusually quiet. There has been a shortage of cars and in some places a shortage of water for washers and boilers. At a few mines there has been a little unbilled coal caused by being loaded in foreign equipment.

The Mt. Olive field has been a trifle heavy the past week in some sections. A few mines have had coal left over, but this was practically nothing in comparison with the tonnage produced. In a general way this tonnage has moved north and west up to the first of April in extremely heavy volume on account of the zone restrictions which went into effect on Apr. 1, which prevented Illinois coal from going out on the Omaha, St. Joseph or Kansas City market. This coal was largely domestic sizes, and at no period in the history of this field has such a tonnage moved in such a short space of time to the western markets.

The same conditions prevailed largely throughout the Standard field up to the first of the month. Nearly all the available well prepared lump and nut coal moved to the western market.

The car shortage is severe on the Mobile & Ohio and also on the Illinois Central and Iron Mountain lines. This has kept the tonnage down somewhat, but there has been no shortage of coal. As a matter of fact if car supply improves there is apt to be an over-production in the Standard field on account of the restricted areas into which the coal can now move.

During the past week a heavy volume of anthracite has been coming in and a few cars of West Virginia smokeless. There has been a fairly good tonnage of semi-anthracite and smokeless from Arkansas.

New prices for this territory are practically the same as they were previous to the first of April, with the exception that mine-run is 5c. higher.

The prevailing prices are, per net ton f.o.b. mine:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@2.80	2.65@2.80	2.65@2.80
No. 2 nut	2.65@2.80	.....	.....
No. 3 nut	2.65@2.80	.....	.....
No. 4 nut	2.65@2.80	.....	.....
No. 5 nut	2.15@2.30	.....	.....
2-in. scrgs	2.15@2.30	2.15@2.30	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	$2.65@2.80	$2.65@2.80	.....
No. 2	2.65@2.80	2.65@2.80	.....
No. 3	2.65@2.80	2.65@2.80	.....
No. 4	2.65@2.80	2.65@2.80	.....
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin Co. rate is 87½c. Other fields 72½c.

SEATTLE

Outlook poor for West this winter.

The asumption made by the F deral Fuel Administrator that the coal-producing fields of Washington, Montana, Wyoming, Utah, Colorado and New Mexico can supply the bituminous coal needs not only of these six states but also of California, Oregon, Idaho, Nevada and Arizona, and must do so after Apr. 1 when shipments into these states from other fields must stop, is not founded on fact. It means that the coal fields of Wyoming, Utah, Colorado and New Mexico will have to supply not only their needs but practically the entire needs of California, Idaho, Oregon, Nevada and Arizona, as well as over 1,000,000 tons to Montana and over 250,000 tons to Washington, for these two latter states are not now nor did they last year produce anywhere near what they consumed.

Washington last year produced 4,002,749 tons of coal while Montana produced 4,406,155 tons, a total of 8,408,903 tons. Washington consumed 4,161,400 tons while Montana consumed 5,370,202 tons, a total for the two states of 9,531,602 tons, a difference of 1,122,699 tons consumption over production. Montana last year imported 1,158,612 tons of coal and exported 186,565 tons. Washington imported 539,263 tons and exported 380,610 tons. Under the new arrangements it would not be expected that Montana would export any coal, which would still leave her an excess consumption of 972,047 tons over production. Of Washington's imports 50 000 tons were from Montana and 12,000 tons from eastern states, which she could not expect this year. About 356,000 tons were imported from British Columbia and 121,897 from Utah and Wyoming.

If Washington did not export any coal this year she would have to import 150,000 tons of coal from Utah and Wyoming which, combined with her production, would just equal her consumption; and her 380,000 tons of exports to California, Oregon, Idaho and Montana would have to be borne by Utah and Wyoming. It is not expected that British Columbia will be able to export to either Washington or Montana the amount of coal it did last year, which will also increase the amount of coal Utah and Wyoming mines will be expected to furnish these two states. For this reason it is safe to say that Utah and Wyoming will have to supply a deficiency of more than 1,250,000 tons of coal to Washington and Montana this year, for whatever increased production may be made in the latter two states this year will be absorbed by increased consumption.

The figures upon which the report is based are from the offices of W. J. Swindlehurst, of Montana, and David Whitcomb, of Washington.

General Statistics

PRICES OF COAL TAR PRODUCTS

(Crude)

Benzol, pure, water white, gal	.30	..	35
Benzol, 90 per cent., gal	.....	..	.....
Xylol, pure, water white, gal	.35	..	.50
Solvent naphtha, water white, gal	.17	..	.22
Solvent naphtha, crude, heavy, gal	.13	..	.16
Creosote oil, 25 per cent., gal	.33	..	.35
Dip oil, 20 per cent., gal	.29	..	.30
Pitch, various grades, ton	8.00	..	20.00
Carbolic acid, crude, 95-97 per cent., lb	1.05	..	1.10
Carbolic acid, crude, 50 per cent., lb	.60	..	.65
Carbolic acid, crude, 25 per cent., lb	.35	..	.38
Cresol, U. S. P., lb	.18	..	.20

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

CINCINNATI	Apr. 1, 1918	One Month Ago	One Year Ago
No. 2 Southern foundry....	$35.90	$33.00	$18.90
No. 2 Northern foundry....	35.90	35.95	21.76
NEW YORK			
No. 2X Northern foundry..	34.25	34.25	22.00
No. 2 plain Northern foundry	33.75	33.75	21.00
No. 2 Southern foundry....	37.25	37.25	22.00
BIRMINGHAM			
No. 2 Southern foundry....	33.00	33.00	16.00
CHICAGO			
No. 2 Northern foundry....	33.00	33.00	22.00
No. 2 Southern foundry....	37.00	37.00	....
PITTSBURGH			
Bessemer iron*	37.25	37.25	24.95
Basic iron*	33.95	33.95	20.95

*These prices include the freight charge from the valley to the Pittsburgh district. †Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York Apr. 1, 1918	New York 1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.....	$3.00	$4.195	$3.25	$4.27	$4.20
Channels, 3 to 15 in.....	3.00	4.195	3.25	4.27	4.20
Angles, 3 to 6 in., ¼ in. thick	3.00	4.195	3.25	4.27	4.20
Tees, 3 in. and larger.....	3.05	4.245	3.40	4.27	4.25
Plates	3.225	4.45	5.15	4.52	4.45

BAR IRON—Prices in cents per pound at cities named are as follows:

	Pittsburgh	St. Louis	Denver	Birmingham
Apr. 1, 1918.....	3.50	4.17	4.05	4.38

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$2.70	$4.30	$4.85	$4.25	$4.25	$4.60	$4.50
Cut	2.70	5.25	....	4.40	....	6.15	....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh Apr. 1, 1918	Pittsburgh One Year Ago	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$2.65	$6.00	$5.00	$5.00	$6.25	$5.30	$5.00
Track bolts	4.90	3.25	8.90	6.25	6.00	7.45	6.75	6.00
Standard section angle bars	3.25	2.00	....	4.50	6.00	4.90	....	4.30

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½ %	List	+10%	List	+35%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight ..	$5.25	$6.50	$6.50	$6.25	$7.50	$6.25
Assorted ..	5.40	6.50	6.50–7.00	6.40	7.75	6.50

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Apr. 1, 1918	New York 1-Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in. $58.35	$58.35	$44.50	$57.55	$57.00	$70.00	$61.00
6 in. and over	55.35	55.35	41.50	54.55	54.00	67.00	58.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Apr. 1, 1918	Pittsburgh One Year Ago	Chicago Apr. 1, 1918	Chicago One Year Ago
Standard bessemer rails....	$65.00	$38.00	$65.00	$38.00
Standard openhearth rails..	67.00	40.00	67.00	40.00
Light rails, 8 to 10 lb....*3.135 (100 lb.)	58.00	*3.135 (100 lb.)	53.00
Light rails, 12 to 14 lb....*3.09 (100 lb.)	57.00	*3.09 (100 lb.)	54.00
Light rails, 25 to 45 lb... *3.00 (100 lb.)	53.00	*3.00 (100 lb.)	52.00

OLD MATERIAL—Prices per net ton in Chicago and St. Louis (including delivery to buyer's works and freight transfer charges):

	New York Apr. 1, 1918	Chicago Apr. 1, 1918	St. Louis* Apr. 1, 1918
No. 1 railroad wrought.....	$32.75	$35.00	$35.00
Stove plate	22.00	23.50	20.00
No. 1 machinery cast.....	35.00	27.50	22.00
Machine shop turnings.....	16.50	17.50–19	20.00
Cast borings	17.80	17.50	19.00
Railroad malleable cast.....	31.75	29.00	25.50–26

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.16	$0.16	$0.17

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	15c.	14c.	15c.
Hollow	24c.	25c.	....

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh: basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜..	44%	17%	¾ to 1½.....	33%	17%
½	48%	33½ %			
¾ to 3.....	51%	37½ %			

LAP WELD

2	44%	31½ %	2	26%	12%
2½ to 6.....	47%	34½ %	2½ to 4.....	28%	15%
			4½ to 6.....	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜..	40%	22½ %	¾ to 1½.....	33%	18%
½	45%	36½ %			
¾ to 1½.....	49%	36½ %			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½ %	2	27%	14%
2½ to 4.....	45%	33½ %	2¼ to 4.....	29%	17%
4½ to 6.....	44%	22½ %	4½ to 6.....	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black New York	Black Chicago	Black St. Louis
¾ to 3 in. butt welded.....	38%	42.8%	40.1%
3½ to 6 in. lap welded.....	18%	38.8%	36.1%

	Galvanized New York	Galvanized Chicago	Galvanized St. Louis
¾ to 3 in. butt welded.....	22%	27.8%	25.1%
3½ to 6 in. butt welded.....	List	24.8%	22.1%

Malleable fittings, Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 15 and 5%.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair-sized orders, the following amount is deducted from list:

	New York Apr. 1, 1918	New York One Year Ago	Cleveland Apr. 1, 1918	Cleveland One Year Ago	Chicago Apr. 1, 1918	Chicago One Year Ago
Hot pressed square...	$1.00	$0.50	$1.40	$2.60	$1.05	$3.00
Hot pressed hexagon .	1.00	.50	1.20	2.60	.85	3.00
Cold punched square.	1.00	.50	.75	3.00	1.00	2.50
Cold punched hexagon	1.00	.50	.75	3.00	1.00	3.00

Semifinished nuts sell at the following discounts from list price:

	Apr. 1, 1918	One Year Ago
New York	40%	50— 6%
Cleveland	60%	50—10%
Chicago	50%	50—10%
St. Louis	50—10%	.....

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St. Louis
⅝ by 4 in. and smaller	30%	45%	40—2½	40%
larger and longer up to 1 in. by 30 in.	15%	33⅓ %	30—5%	35—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..$1.00 Cleveland..$2.00 Chicago..$3.00 St. Louis..$3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York..$5.00 Cleveland..$4.50 Chicago..$3.50 St. Louis..$2.75

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller.....	30%	35%	40%*
Tinned	30%	35%	40%*

*For less than keg lots the discount is 35%.

Button heads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in., sell as follows per 100 lb.:

New York ..... $7.00 Cleveland ..... $5.85 Chicago $5.50

Coneheads, same sizes:

New York ..... $7.10 Cleveland ..... $4.50 Chicago $5.60

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	Chicago	St. Louis	Birmingham	Denver	Pittsburgh
Cup	7	5¼	6.1	7½	10	7½
Fiber or sponge..	8	6	6.4	7½	15	7½
Transmission	7	6	6.4	7½	15	8½
Axle	4½	4	3.6	3	5	5¼
Gear	4½	4½	6.5	7½	6	3½
Car journal .....22 (gal)	3½	4.6	3	6		7½

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Apr. 1, 1918	One Year Ago	Apr. 1, 1918	One Year Ago	Apr. 1, 1918	One Year Ago
Best grade...	90.00	60.00	93.00	53.75	90.00	55.00
Commercial ..	50.00	35.00	22.00	17.75	30.00	28.00

HOSE—Following are prices of various classes of hose:

	Fire
	50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	40%

	Air		
	First Grade	Second Grade	Third Grade
¾-in. per ft.	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade... 30% Second grade... 30-5% Third grade... 40-10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	40+5%	35%
Denver	35%	30%
Birmingham	35%	40%
Chicago	30—10%	40—5%
Cincinnati	40—10%	40%

RAWHIDE LACING—40% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.65
Duck and rubber for piston packing	1.00
Flax, regular	.90
Flax, waterproofed	1.10
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.90
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.10
Asbestos wick, ½- and 1-lb. balls	.65 to .70

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+ 20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.34½	Atlanta	$0.33¾
New York	.33¼	Denver	.30½
Cincinnati	.33⅓	Kansas City	.33½
Chicago	.32½	New Orleans	.33
St. Paul	.34	Seattle	.33½
San Francisco	.31	St. Louis	.33
Pittsburgh	.36	Los Angeles	.32

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard List Per Lin.Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1 -in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2 -in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05

85% magnesia high pressure ..... 15% off

For low-pressure heating and return lines ..... 4-ply.... 58% off; 3-ply.... 60% off; 2-ply.... 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Apr. 1, 1918	One Year Ago	Apr. 1, 1918	One Year Ago	Apr. 1, 1918	One Year Ago
Raw per barrel..	$1.55*	$0.99	$1.65	$1.05	$1.65	$0.98
5-gal. cans	1.65*	1.09	1.80	1.15	1.75	1.08

*Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White	
	Apr. 1, 1918 Dry	1 Yr. Ago In Oil	Apr. 1, 1918 Dry	1 Yr. Ago In Oil	Apr. 1, 1918 Dry and In Oil	1 Yr. Ago Dry and In Oil
25- and 50-lb. kegs	11.50	11.00	10.50	11.00	10.50	10.50
12½-lb. keg	11.75	11.25	10.75	11.25	10.75	10.75
100-lb. keg	11.25	11.50	11.00	11.50	11.00	11.00
1- to 5-lb. cans....	13.25	13.00	12.50	12.50	13.00	12.50

CALCIUM CARBIDE—Price f.o.b. cars at warehouse points in Eastern States is $102.50 per ton for Union miners' lamp carbide, and $97.50 per ton for Cameo miners' lamp carbide. Union sells in 25-lb. cans for $1.46 per can.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$12.00	Birmingham	$15.00
St. Louis, salmon	9.00	Denver	8.50

FUEL OIL—Price variable, depending upon stock. New York quotations not available owing to this fact. In Chicago and St. Louis the following prices are quoted:

	Chicago	St. Louis
Domestic light, 22-26 Baumé	5c.	none
Mexican heavy, 12-14 Baumé	7c.	7⅛c.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with mails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	c.l.	l.cl.	c.l.	l.cl.	c.l.	l.cl.
No. 1 grade.....	$1.30	$1.55	$1.60	$1.75	$1.90	$2.05
No. 2 grade.....	1.15	1.30	1.45	1.60	1.75	1.90

Asbestos asphalt saturated felt (14 lb. per square) costs $..... per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.95 per roll in carload lots and $2.20 for smaller quantities.

Shingles, red and green slate finish, cost $5.25 per square in carloads, $5.50 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less Than Carload Lots
Tar felt (14 lb. per square of 100 sq.ft.....	61	62
Tar pitch (in 400-lb. bbl.)	20	21
Asphalt pitch (in barrels)	30	35
Asphalt felt	70	75

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b Pittsburgh, with a comparison of a month and a year ago:

Apr. 1, 1918	One Month Ago	One Year Ago
$3.10	$3.10	$3.10

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$80.00	$130.00
Chicago	79.00	137.00
Denver, per ton	11.00	200.00
Kansas City	58.00	128.56
St. Paul	56.00	110.00
Boston	80.00	150.00
Birmingham	61.20	114.80
Cincinnati	68.80	129.00
Pittsburgh	86.50	147.10

LUMBER—Price of yellow pine per M in carload lots:

	1-In. Rough, 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$36.00	$31.00	$35 00
Birmingham	27.00	30.00	28.00
Pittsburgh	38.50–49	33.50–49	42–54

	8 x 8-In. x 20 Ft. and Under			12 x 12-In., 20 Ft. and Under	
	Y.P.	Fir	Hemlock	Spruce	Y.P.	Fir
Boston	$52.50	$52.50	.....	$40.00	$60.00	$60.00
Cincinnati	36.00	.....	35.00	.....	**40.00**	**39.00**
Kansas City	**37.25**	**38.00**	.....	.....	**40.75**	**40.00**
Seattle	**24.50**	**24.50**	**24.50**	**24.50**	**24.50**	**24.50**
New Orleans	**30.00**	.....	.....	.....	.....	**45.00**
St. Paul	.....	**55.00**	**43.00**	**43.00**	.....	59.00
Denver	.....	**38.00**	.....	**34.00**	.....	**41.00**
Atlanta	25.00	.....	.....	.....	30.00	.....
San Francisco	.....	26.00	26.00	26.00	.....	26.00

	1-In. Rough, 10 In. x 16 Ft. and Under			2-In. T. and G. 10 In. x 16 Ft.	
	Y.P.	Fir	Hemlock	Y.P.	Fir
Boston	$45.00	.....	.....	$50.00	$50.00
Cincinnati	**42.00**	.....	**38.00**	**41.00**	**37.00**
Kansas City	**46.75**	**53.00**	**53.00**	**54.50**	**58.00**
Seattle	**24.50**	**24.50**	**24.50**	**24.50**	**24.50**
New Orleans	**38.00**	.....	.....	*34.00*	.....
St Paul	.....	**46.00**	39.00	61.00	**44.00**
Denver	35.00	32.00	32.00	.....	32.00
Atlanta	**36.00**	.....	.....	**40.00**	.....
San Francisco	26.00	26.00	26.00	.....	26.00

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$13.00	$15.00	$26.00	$13.50	$16.25	$31.25	$13.00	$16.80	$35.02
10	23.30	26.50	52.55	25.00	28.50	56.40	28.50	32.40	67.10
8	33.10	36.70	73.20	34.85	38.85	74.70	40.10	45.10	.....
6	.....	56.20	.....	59.75	64.25	.....	58.60	63.10	.....
4	.....	80.55	.....	84.40	84.90	.....	97.40	102.40	.....
2	.....	120.30	.....	125.50	132.00	.....	142.15	147.15	.....
1	.....	156.25	.....	163.00	171.15	.....	196.50	201.50	.....
0	.....	187.05	.....	216.00	225.00	.....	261.00	261.00	.....
00	.....	252.65	.....	263.00	273.50	.....	301.10	301.10	.....
000	.....	309.35	.....	320.00	331.50	.....	402.60	402.60	.....
0000	.....	376.75	.....	388.50	400.50	.....	497.00	497.00	.....

EXPLOSIVES—Price per pound in small lots at cities named:

	Low Freezing	Gelatin			†Black Powder
	20%	40%	60%	80%	
New York	.....	$0.27½	$0.34½	.....	**$2.40**
Boston	.....	.....	.36¾	$0.43¾	....
Cincinnati	*$0.18¾*	.22¾	.27¾	.....	2.35
Kansas City	.20	.26¼	.33¼	.43¼	....
New Orleans	.....	.25¼	.30¼	.....	....
Seattle	.17½	.24¾	.31¾	.41¾	....
Chicago	.18¾	.23¾	.33	.43	....
St Paul	.20	.26¼	.33¼	.....	**2.45**
St. Louis	.20	.24	.29	.43¼	2.45
Denver	.18	.25¼	.32¼	**.24¼**	....
Dallas	.24	*.30¼*	.38	.48	....
Los Angeles	.22	.28	.36	.....	....
San Francisco	.17¼*	.23½*	.30½*	.40½*	....

†Per keg. *Carload price.

FREIGHT RATES—On finished steel products in the Pittsburgh district, including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates are effective in cents per 100 lb.:

Boston	21.5	Minneapolis	35.5
Buffalo	11.6	New Orleans	30.7
Chicago	21.5	New York	19.5
Cincinnati	18.5	Philadelphia	18.5
Cleveland	13.5	St. Louis	27.0
Denver	79.0	St. Paul	35.5
Kansas City	47.0	Pacific Coast (all rail)	90.0

COAL AGE

Volume 13 NEW YORK, APRIL 13, 1918 Number 15

The Organization of Time

By Floyd W. Parsons

OF ALL things leading to individual success none is so important as the systematic and effective use of all the hours in each day. The only kind of man who can step out from the crowd and become a leader is the fellow who has so organized his time that no minutes are squandered.

Time never works, but it does eat, rust and destroy. It gives us, however, the opportunity for accomplishment. We may regain wealth by economy, knowledge by study, and health by temperance, but lost time is gone forever.

The man who is choice of his time is always choice of his company and his actions. Often it is only for a moment that the favorable instant is presented. Miss it, and months and years are lost. A stray five minutes may easily contain the event of a life. Successful men have ever been misers of moments.

All systematizing of human effort, of course, shall be based on Nature's laws. There must be hours for rest and play, so as to invigorate brain and body and give them a renewed appetite for labor. People who work best should play best—leisure is just as needful as is activity. However,



THE MAN WHO LACKS CONTROL OF HIS TIME WILL NEVER CLIMB HIGH



A PROPER MARSHALING OF THE HOURS REMOVES ALL OBSTACLES ON THE ROAD TO SUCCESS

recreation must be rational; it must have its limits and its place on each man's self-arranged daily schedule.

Success does not depend on the amount of work done, or on the number of things accomplished, but on the importance of what we do. Many men who fail do enough, but they labor at haphazard. A few jobs finished is far better than many jobs not completed. We must select the right things to do and do them when the results count for most.

Discipline in the administration of time is vital. Precepts are but theory. It is discipline that cultivates self-respect and obedience, and the best discipline is always combined with freedom, mildness and sympathy. The man who lacks self-discipline certainly cannot command others.

To get the most out of each hour requires concentration. The man who defers concentration, waiting for something important to turn up, will be unable to master the situation when the big moment arrives. Only by practice can one prepare. Not until we can shut out from our minds all ideas irrelevant to the problem immediately before us are we prepared to play a major role in life. Divided attention means broken force. No man can organize his time before he is able to focus all his energies on one point.

IDEAS AND SUGGESTIONS

Check on Explosives for Miners' Use

By R. W. Mayer
Connellsville, Penn.

The distributing powder houses are situated near the mine entrance at the mines of the United States Coal Co., of Gary, West Virginia.

The miners pass these houses on their way to work, before entering the mine. Each mine has a distributing house, which is in charge of a man licensed to handle explosives, and also a clerk. The licensed man issues the explosives and detonators to the miners in the quantity called for, and the clerk takes the miner's name and payroll number, together with the number of detonators and sticks of explosives issued to him. The miner buys stamped brass checks at the store, or commissary, which he gives in exchange for the explosives issued to him. Each check calls for a certain number of detonators or sticks of explosive.

Each mine is divided into from six to ten districts, according to the size of the mine. An assistant mine foreman has charge of each of these districts or sections. He is in his section before any miner is allowed to enter it. He meets the men at the entrance to his section of the mine, and enters on a report sheet the amount of explosives each miner carries into the mine for that day. The distributing powder house is closed before the starting time of the mine.

The time of closing varies with the extent of the workings of the different mines. It is regulated so that a miner, after receiving his explosives, will have time enough to get to his working place before starting time, so that the amount of his powder may be checked up by the assistant foreman. The assistant foreman fires all the shots. The miner drills the holes, prepares the clay tamping and charges of powder, but does not load the holes. He also stretches out the shooting cable. Each miner has his own shooting cable. He has everything in readiness for loading the holes and firing the shots. The shots are all fired by detonators and batteries. The tamping material is a dry clay. This clay is poured into paper cylinders, tubes or cartridges which are a little smaller in diameter than the drill hole. These paper cylinders are made by rolling a piece of newspaper around a cylinder-shaped stick of the proper diameter, one end of the stick being slightly smaller than the other end so the paper cylinder will slide off the stick easily. About 2 in. of the paper is allowed to extend beyond the small end of the stick. This extending end of paper is folded against the end of the stick, when the paper for the cartridge is rolled on the stick, closing one end of the cartridge. The larger end of the cartridge stick should extend beyond the paper to furnish a hand-hold for slipping the paper cartridge off the stick. The coal is undercut by electric chain cutters during the night. The miner, while waiting for the assistant foreman to come and fire his shots, cleans the "bug dust" out of his cut and loads it into cars, sets timber close up to the coal face and lays track up against the face of coal. When the assistant foreman shoots each miner's shots he enters on his report sheet the number of detonators and sticks of explosives used by the miner, and the amount of each he has remaining on hand. Sections are of such a size that he makes his round through the section a number of times and shoots the miners' shots on any of his visits during the day. The ventilation is such that the smoke from the shots doesn't annoy the miners. When the assistant foreman makes his last visit for the day and examines the miner's working place, he questions the miner as to how much explosives he'll require for the next day. If the estimate is reasonable, he enters it on his report sheet without correction. Otherwise he corrects the miner's estimate, although this rarely happens.

This estimate is turned over to the clerk at the powder distributing house, to guide him in issuing explosives to the miners the next morning. No miner is allowed to have issued to him more explosives or detonators than called for by the assistant foreman's estimate. This supervision of the amount of explosives issued, and when and where used, apparently works a hardship on no one, unless it would possibly be the one miner out of a hundred who would use the explosive for an illegal purpose.

GETTING AHEAD

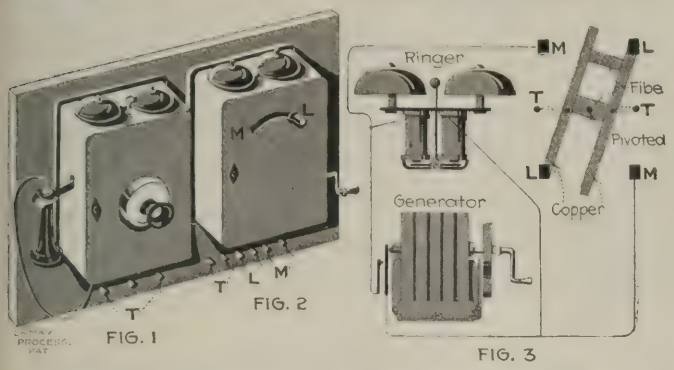
By WILLIAM GRIFFITH
SCRANTON, PENN.

THERE'S an ancient adage, time-worn and riven,
"Unto him who hath it shall be given";
But in modern days we say instead
"It's the man with a pull who gets ahead."
Now, if this is so, it is true, perforce,
That the needful thing is the pull, of course.
But when to secure it in vain you try
You'll find that the adage is all awry;
It must be reversed, like an "Irish Bull"—
It's the man with a *head* who gets the pull.

Combination Telephone System

By Frank Huskinson
Lafayette, Colo.

A telephone was needed in the superintendent's house that would communicate with various parts of the works. This residence already was provided with a local long-distance telephone, but no connection had been made with the mines and shops. The interior of the dwelling was finished and furnished in an artistic man-



FIGS. 1 TO 3. DETAILS OF TELEPHONE SYSTEM

mer, and not wishing to install another telephone I made up the combination telephone system here described and illustrated.

In the accompanying diagrams, Fig. 1 shows the local long-distance telephone already installed, also the lines *LL*. I made up the neat box shown in Fig. 2 to match the one in Fig. 1, and had this just large enough to hold a magneto-generator and ringer coils, of the same capacity as those in use on the mine telephone system. I also made up and arranged a special switch and connections, see Fig. 3. This switch was mounted on the inside of the door of the box in Fig. 2. The details of this switch are as follows: *MM* are two switch contacts to which the mine telephone lines are connected; *LL* are two switch contacts to which the local telephone lines are connected; *TT* are the two terminals connected to the terminals *TT* in Fig. 1. These two lines are connected by a flexible connection to the two copper switch blades, which are held in position by the two fiber pieces. On one of these fiber pieces the switch blades are pivoted. On the other piece is the handle for changing the position of the switch from *L* to *M*, or from the local system to the mine system.

In Fig. 2 the switch handle is on the front of the box and the handle for the operation of the magneto-generator on the side. The telephone in Fig. 1 has no generator for signaling, as this type of telephone signals central when the receiver is removed from the switch hook.

In the working of this combination system the switch is always left in the position *L*, see Figs. 2 and 3. This leaves the telephone connected to the local long-distance lines *LL* and is always ready for use on this line. The ringer and the generator shown in Fig. 3 are connected to the mine telephone lines *MM*. This allows the signals from the mine telephone system to come in on the ringer (see Figs. 2 and 3); also, the mine telephone system can receive signals from the generator, Figs. 2 and 3. Any time that the signal is for the superintendent's residence, an answering ring is given, and the switch lever is moved from the *L* position to the *M* position, thereby disconnecting the telephone from the local lines *LL* and connecting it to the mine lines *MM*. As soon as the conversation is finished the switch is moved back to the *L* position, thereby disconnecting the mine lines and connecting the local lines.

The telephone, Fig. 1, and the combination box, Fig. 2, are mounted close together. This is a type of installation that can be used to advantage in many places. It is considerably cheaper than two separate telephones, takes up little room, is not conspicuous, and is just as reliable and satisfactory as two instruments would be.

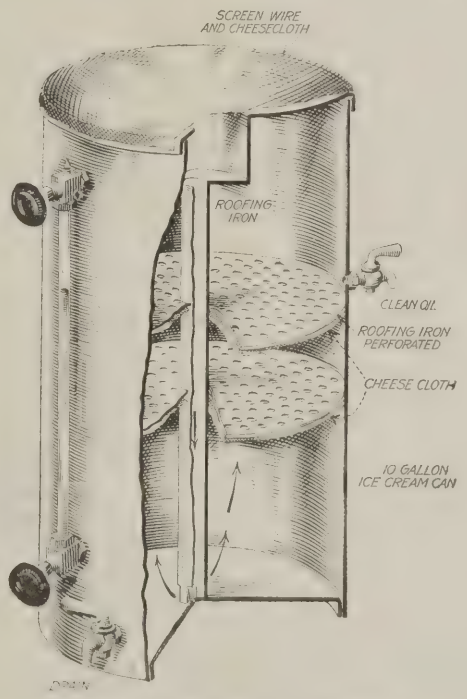
Homemade Oil Filter

By Jack L. Ball
Amsterdam, Ohio

Feeling the need of an oil filter for a fan engine which is situated quite a distance from the main engine room, but the prevailing high prices preventing the purchase of a new one, I made a filter myself. This was constructed as follows:

The materials used were an old 10-gal. ice cream can, scrap roofing iron, screen door wire and cheese cloth; the gage glass connections were fittings from an old lubricator; the only new parts purchased were two cocks, one gage glass and two yards of cheese cloth.

The filter, which is illustrated herewith, was made during spare time while on shift and the cost for ma-



EASILY MADE OIL FILTER

terials was about $1. All joints were soldered, and the filter cloths and the like arranged so that when it is necessary to clean the filter all that one has to do is simply lift out the parts shown and clean them with steam. This device saves carrying considerable oil. Furthermore it cleans the used oil nicely. During cold weather it is placed on top of the steam chest, which assures warm oil.

Excuses are a sort of mental roller skate that hurries a man backward in his business career.



Successful Steel Breakers of the Lehigh Valley Coal Company

BY GEORGE W. HARRIS
Editorial Staff of "Coal Age"

SIGNAL success in industrial lines is often decided by the substitution of modern for antiquated ideas. To the anthracite operator a breaker is a mill in which four to five million dollars worth of coal may be prepared annually for a period of 25 years or so. Why should it be built of wood anymore than mills of similar importance in other industries? The progressives among the anthracite men are building steel breakers and washeries. The Lehigh Valley Coal Co. has been a pioneer in the present movement, and its practice and that of the leading designer, fabricator and builder of such structures is given in the accompanying discussion. Conditions warranting the use of steel are noted—it is decided on a cost-per-ton basis—a matter of capitalization. Various considerations affecting the design of steel breakers are mentioned—shapes successfully used are noted. Preliminaries settled, the course pursued in the design of a breaker is given. The matter is viewed broadly. The occurrence of the coal in the mine is graphically shown by the sections of basins—supplementary notes cover details. All this information is important in the successful preparation of anthracite. Lehigh Valley practice at its various steel plants is given—in detail at the Franklin Colliery. Structural steel is an ideal material for the framework of a building. The number of successful steel breakers and washeries in existence and building indicate the way the wind is blowing in the anthracite coal region.

WHILE coming over the summit of the mountains above Wilkes-Barre, Penn., winding in and out among the ravines and low hills forming the topography of the top of the ridge, an unusual opportunity to view the country spread out before him is given to the traveler on the Lehigh Valley R.R. Should it happens to be one of those rare calm mornings of that peculiar state of the atmosphere when exhaust steam rises in a perpendicular column to a considerable height —what a sight is presented over the length and breadth of the Wyoming Valley.

To the mining man, these steam columns are most interesting. They mark the location of hoisting, breaker and fan engines, so necessary to the mining and preparation of the anthracite coal of the region of which Wilkes-Barre is the principal city. The coal operator realizes better than the layman the full significance of this expenditure of power. During a recent year the Wilkes-Barre district produced 5,533,967 tons of coal, of which 563,902 tons were used for steam and heat. This means that for every 100 tons of anthracite sent out from the breakers 12 tons are charged up to running expenses. No mean item of operation at the ruling price of coal. Each year anthracite requires more careful mining and preparation, the two going hand in hand when best results are attained. With the depletion of the better seams and the thicker ones, the thin beds and those containing a larger percentage of bony and slate partings are mined. This means an overhauling of out-of-date breakers, discarding of antiquated machinery, the installing of modern types and frequently the rebuilding of the whole plant. Breaker practice has undergone many changes to suit the requirements of mine and market. Possibly as striking a change as any is the substitution of more permanent building materials for the wood almost universally used in breaker construction not many years ago.

It was in the '90s that Coxe Bros. & Co. built its iron breakers at Drifton and Oneida collieries. This company was the pioneer in this respect, and the breakers attracted much attention. Built to minimize fire risk and cost of insurance, it was not long before the Oneida breaker was destroyed by fire. At that time the difference in the cost of iron and wood was a serious item and the new method of breaker construction received a decided setback.

To-day conditions are much changed, both as to the

relative cost of steel and wood and the sentiment about steel as a building material. At present there are 18 steel breakers or washeries in the Pennsylvania anthracite field, either constructed, building or being designed, distributed as follows: The Lehigh Valley Coal Co. leads with 5; the Delaware, Lackawanna & Western has 4; the Lehigh Coal & Navigation Co. has 2; the Pennsylvania Coal Co. has 2; the Lehigh & Wilkes-Barre has 1. The independent companies have 4, of which the G. B. Markle Co. has 2. Of these 18 structures 12 were either built or the material of which they were constructed was fabricated by the Guerber Engineering Co., of Bethlehem, Pennsylvania.



FIG. 1. FRANKLIN COLLIERY—CAPACITY 1500 TO 1800 TONS

It was not a complicated line of reasoning which influenced the coal operators —both bituminous and anthracite—to adopt steel as a material with which to construct their plants for the preparation of coal. It was the natural outcome of such conditions as the increasing scarcity and cost of timber, the decreasing cost of steel, its comparative permanency, inflammability and general adaptability for structural purposes. Structural steel lends itself particularly to conditions imposed on breakers and tipples. Such buildings are subjected to severe stresses which are satisfactorily met by steel structures; on the other hand rigid construction might be seriously weakened under similar conditions of service. Steel tends to spring back after a stress—unless the safe limit has been exceeded. If wooden structures are not made rigid, the joints rapidly deteriorate under racking stresses. If water works into the joints of timber framing, decay may proceed so rapidly as to necessitate replacement in a comparatively short time. This is true of many of the sticks in a breaker. The designing of steel breakers is a new field—there is little precedent to go by. A well designed wooden breaker might serve as a guide in proportioning various members of a steel structure. But new wooden breakers often have large excess of strength in some pieces of framing—especially in the case of sticks which it would be difficult to replace. In many cases a much larger piece of timber is used than necessary to carry any possible load to which they are subjected, largely to allow for probable decay in a few years. In this weakened condition the piece of timber is still supposed to have sufficient strength.

The Guerber Engineering Co. designs a breaker so that not more than 16,000 lb. fiber stress shall develop in any member. This gives a factor of safety of 4. In connection with factors of safety, a story is told about Prof. Mansfield Merriman, the well known authority on roofs, bridges and structural work in general. He was presiding over a meeting where a certain bridge was under discussion. Being asked what the factor of safety of the structure was, he replied "the grace of God." It so happened it was a notably weak bridge.

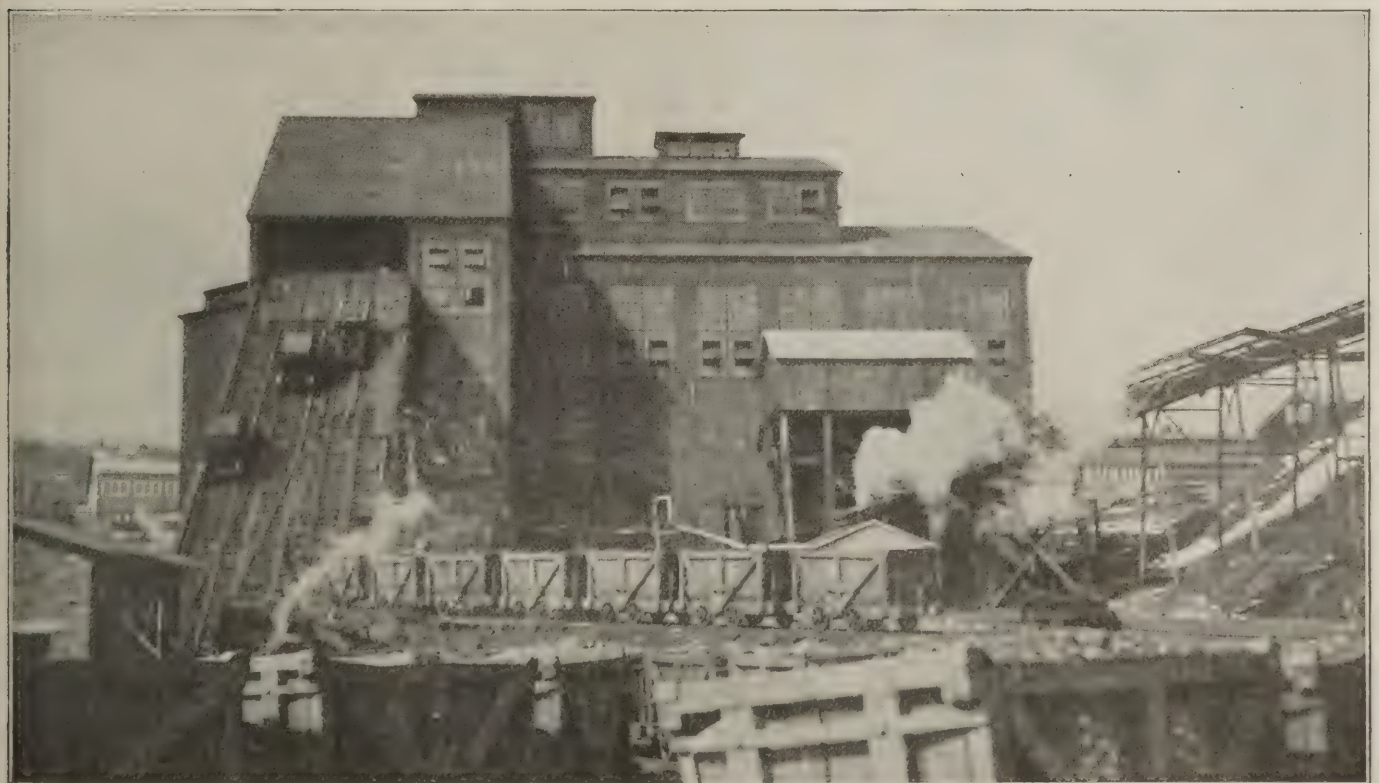


FIG. 2. DRIFTON BREAKER—ORIGINAL IRON BREAKER IS LEFT PORTION OF STRUCTURE

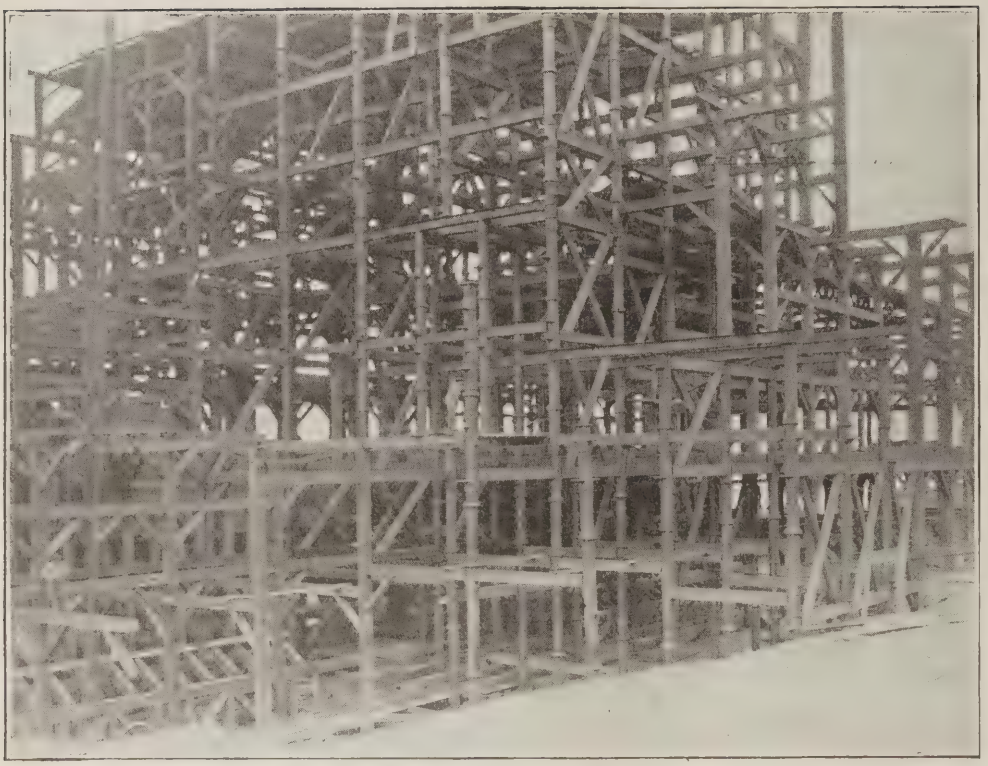


FIG. 3. FRAMEWORK DETAILS OF A WOODEN BREAKER

Figuring the loads in breaker design is a complicated problem. There are vibratory loads to consider, also variable ones. A floor may be calculated for specific load and later it will develop that the space may be used for machinery, bins of coal, etc. Machinery greatly complicates the load problem.

There should always be an economical flow of material through the breaker, yet keeping it confined to as small space as possible.

In ordinary steel buildings the floors are settled first and are continuous through one level. Not so in a breaker. Here the machinery is located and then the floors are placed to suit its requirements, being careful to have steel members not foul belts and shafts. The continuity of floors is much broken up and numerous platforms are required around machinery, etc., for the use of workmen. There is little opportunity for repeated work. The floors are at many and varied levels with no regularity.

It is customary to design a breaker from the roof down, the posts at the bottom being the last consideration. Also it is good practice to avoid complicated built-up work as offering possible crevices and cracks where moisture may sometimes enter and cause rust. Riveted work furthermore brings in the human element and an additional possibility of trouble from rust. The H column is the salvation of the breaker business. Other good sections used are beams where possible. In other words use a wide flange girder rather than a built-up section.

Breaker bracing is important and it may consist of either angles or rods. The latter type offers the advantage of adjustment at any time and rods do not take up as much room as angles. Bracing complicates connections, necessitating special design—standard connections cannot be used. Also machinery weighs and connections must be heavier than usual. This is important.

As in the case of any steel structure, breaker frames can be protected to advantage by some good paint. One or two good coats of a suitable protective paint will last for a long time. A good tar paint may be as desirable as anything—especially where wet conditions may exist. There are comparatively few breakers nowadays where coal is prepared dry. At the pockets steel should be well protected. The coal entering them is usually wet. Also it tends to wear off ordinary protection to columns and other steel members. The bottoms and sides of pockets are generally combinations of steel, cement and boards. The posts passing through pockets are often protected by cement with boards which were used as forms outside.

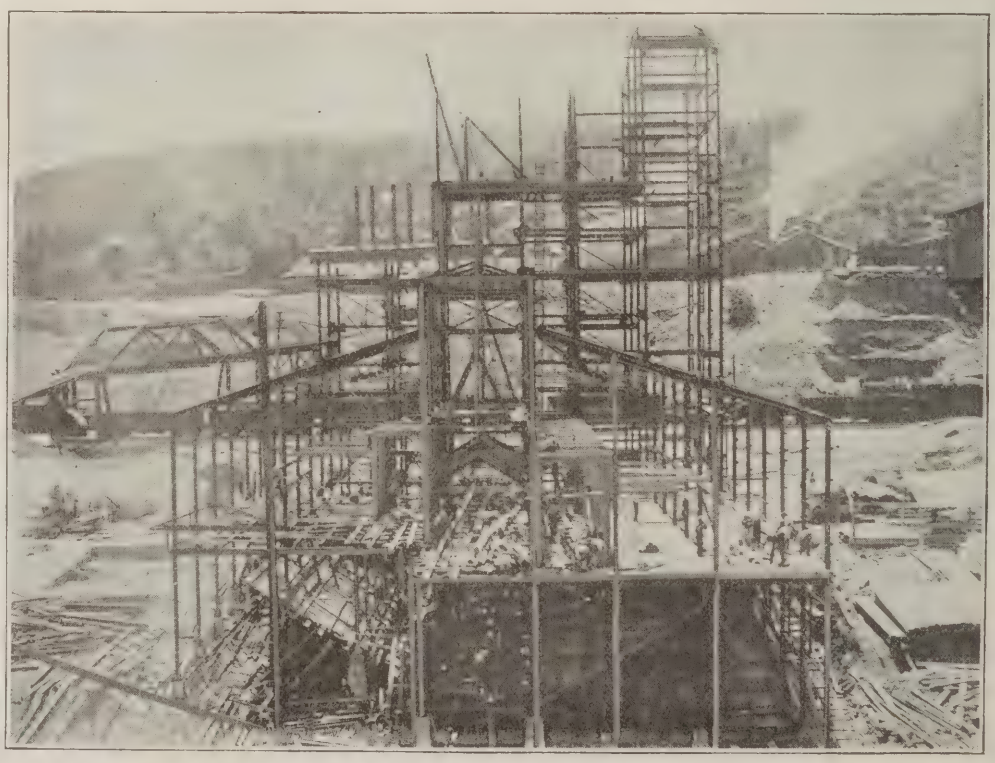


FIG. 4. PACKER NO. 5 STEEL BREAKER DURING CONSTRUCTION



FIG. 5. VIEW OF PACKER NO. 5 PLANT—2500-TON BREAKER IN CENTER

As to the actual process of erection of steel breakers conditions are generally none of the best. In many instances it is a case of building a new breaker on or near an old site. Space for storing material is usually limited, as are also accommodations for labor. Some fine records have been made in steel breaker construction from design to erection.

At the best, the life of a wooden breaker is placed at 20 years—in many cases less. The annual depreciation in certain parts is extremely heavy—in the pockets and some heavy timbers it will amount to 25 per cent. And it is very difficult to replace some of these timbers. At present the tendency is to concentrate tonnage from various mine openings for preparation in a large breaker. In most cases this arrangement fixes the life of a plant at more than 20 years. There are some instances where limited, isolated workings have been cleaned up by a small plant. In this case a wooden breaker might fill the bill.

As to whether a breaker should be built of steel or wood is tersely expressed by the Lehigh Valley Coal Co. as a case of capitalization. Thus there is a certain acreage to be developed. The coal tonnage in the ground is estimated and the annual production at the proposed plant decided upon. Then the cost for both a wood and steel breaker is computed on a cost-per-ton basis. Add annual interest charges, sinking fund and maintenance cost. The cheaper is the one to build.

Repairs and replacements in wooden breakers can be very heavy. For example, a replacement of 60,000 ft. B.M. in one breaker was at the rate of $80 per M. In another case a 26,000 ft. B.M. replacement was at the rate of $117 per M. One breaker was remodeled at a cost of $119 per M for 331,000 ft. B.M. In another case $107 per M was paid for 447,000 ft. B.M. In still another breaker $178 was paid per M for 144,000 ft. B.M. In this last case there was considerable machinery to reset, but there was still a charge of $139 per M on woodwork alone. In all of the foregoing cases of remodeling there was included taking out old work, replacement with new and resetting machinery.

The Lehigh Valley breaker foundations are designed for one ton per square foot bearing on soil. The columns are spaced so that each will not exert more than 30 tons pressure on the foundations. The breakers of this company are generally riveted structures, but some of their washeries may have bolted connections on occasion. This latter matter introduces some nice questions of judgment into the discussion. Small structures when bolted can readily be taken down and moved from place to place—profitably in the case of washeries on a 10-mile limit. It is said to cost in the neighborhood of $30,000 to move an average washery, and that amount of cash will move a lot of coal.

Should a steel breaker be decided upon several methods are followed as to designing the structure. Sometimes the coal company furnishes a structural steel concern with plans giving location of machinery, chutes, pockets and other main features of the breaker or washery. In that case the steel company may design the structural

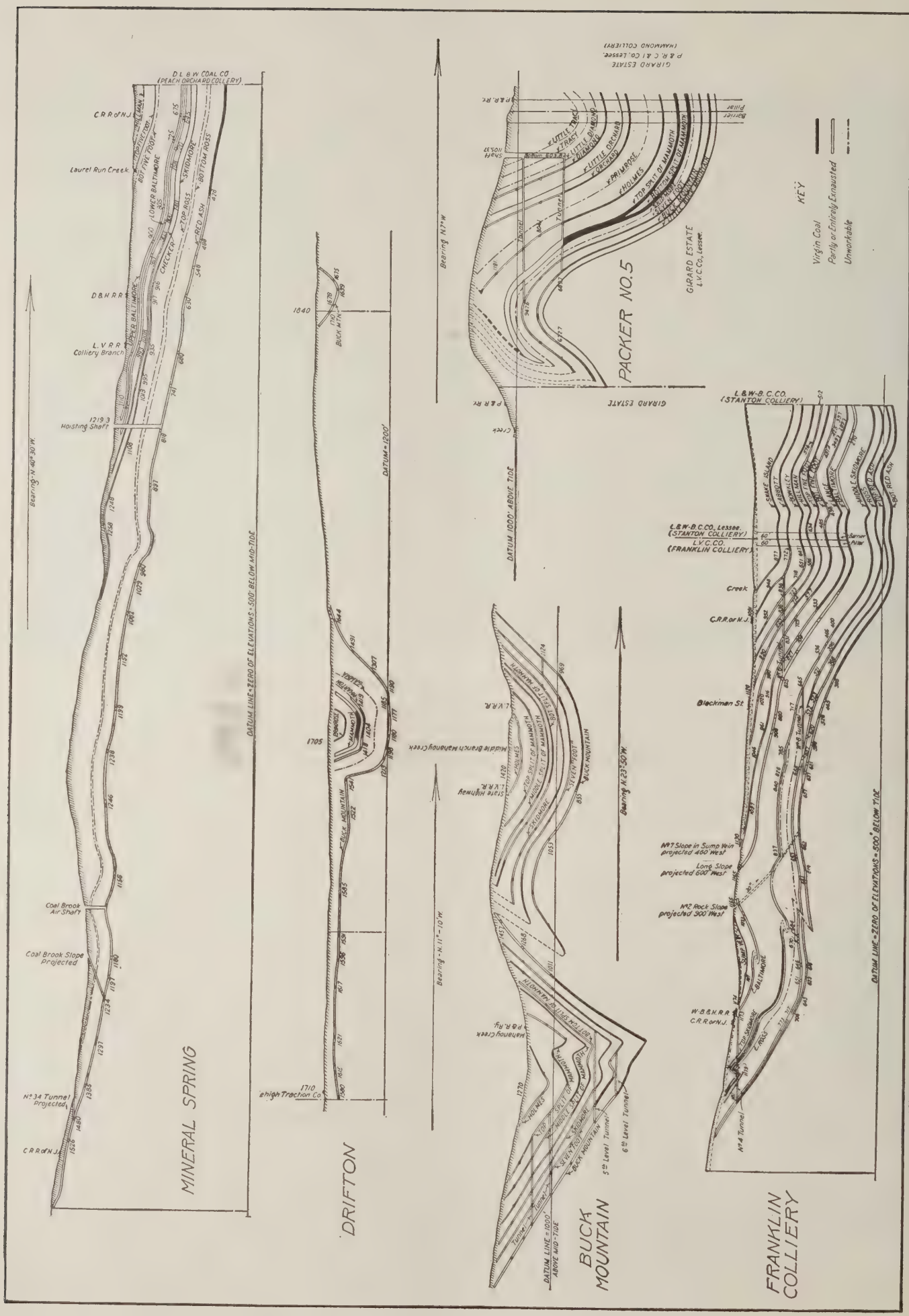


FIG. 6. CROSS-SECTIONS OF COAL BASINS AT THE FIVE STEEL BREAKERS OF THE LEHIGH VALLEY COAL COMPANY

frame, calculating stresses and working out details. From these plans the material can be fabricated. At other times, especially when the mechanical engineering department of the coal company is not swamped with other work, then they may prefer to work up complete plans themselves. A saving is effected by this method on the cost of structural material to the operator, but not necessarily on the total cost of the breaker. If the same concern designs, fabricates and erects the building, certain advantages attend. Coöperation benefits

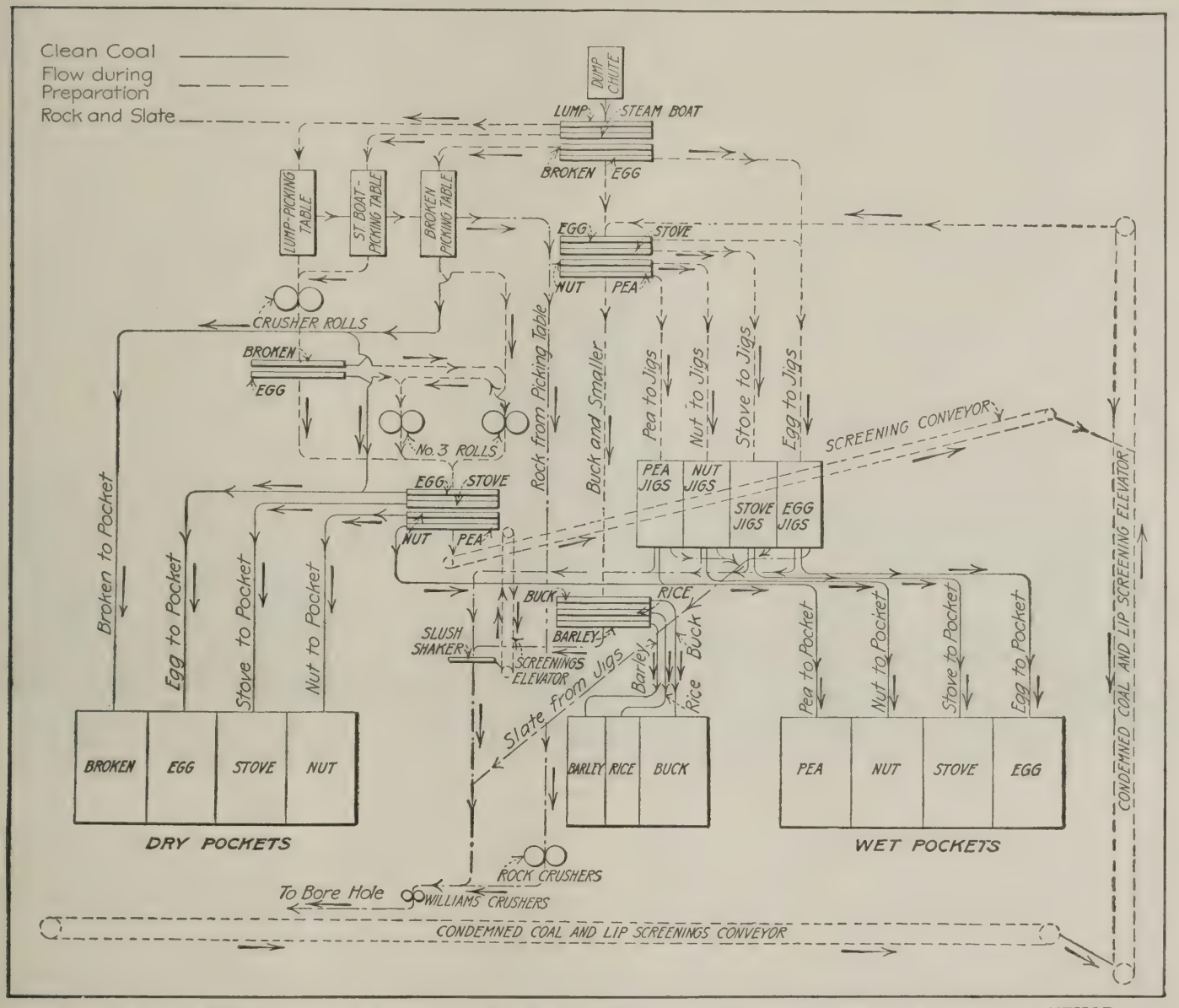


FIG. 7. FLOW SHEET OF THE FRANKLIN STEEL BREAKER, SHOWING TYPICAL WET AND DRY METHOD

may accrue in the design of practical shapes which are most economically fabricated in the shop and quickly erected in the field.

To a man who becomes completely absorbed in working out the many problems connected with the preparation of anthracite coal, the design of a breaker may be as interesting as reading a novel. As a preliminary in such an undertaking, Paul Sterling, mechanical engineer of the Lehigh Valley Coal Co., states that having a certain tract of coal on which to locate a plant, estimate the total tonnage which will likely be prepared over the proposed breaker; judge as to the probable character of the run-of-mine; sketch out the probable flow sheet and settle on the daily output. The cost of the breaker should be reduced to a cost-per-ton basis, which is obtained by dividing the cost of the structure by the total estimated tonnage in the property.

Next the probable make-up of the shipments should be determined. Also the probable per cent. of each size. Suppose the following eight sizes are to be made: Broken, egg, stove, nut, pea, buckwheat, rice and barley. Should it be decided not to make broken coal, then add a percentage of each size to the next lower. Likewise in the event that no broken or egg are to be made. When the sizes of coal to be made have been determined and the percentages fixed, then the machinery for preparation can be designed. Breaker capacity for a maximum of each size should be secured. Determine the area or size of shakers; number and size of rolls; number of jigs or mechanical cleaners and sizes of all elevators and conveyors. With this information, the horsepower required to run the breaker can be determined.

Finally a plan is necessary to show the arrangement and location of the various parts of the outside plant, including the breaker, shafts or other near-by mine openings. Also empty and loaded railroad tracks with

their "light" and "loaded" scales and any other accessory plant such as boiler houses, shops, etc. The method of putting the run-of-mine coal into the breaker will depend on a number of local circumstances. A tower-hoist, barney plane or conveyor line may be used, keeping in mind that every time coal is dumped, breakage of coal occurs. If the plant is steam operated, boiler fuel must be arranged for. An adequate and suitable water supply for boilers and for coal preparation is also an important consideration.

The disposition of refuse, whether it is to be pulverized and silted into underground workings or stocked on the surface, is an important matter. Large rock and slate banks nearly always are an accompaniment of anthracite mining and preparation. They frequently occcupy valuable surface and may contribute considerable additional weight to that bearing on mine pillars. In the past, slate, rock and culm have often been placed over coal which was near enough the surface to strip.

tions. They also emphasize the necessity of putting in bracing where it belongs. Where a steel beam connects to a column—that is, a riveted field connection—then a chair or support for the beam should be built up in the shop on the post. Rolled steel shapes are used rather than built-up sections in wet breakers. The following table shows the distribution of steel in two breakers among the various members according to the position in the building:

Breaker A:	Tons
Posts or columns	125
Beams	186
Bracing	39
Roof	22
Girts	41
Stringers—Pocket	36
Rivets—Field, and rods	9
Total	458

The volume of the breaker is 640,000 cu.ft.

Breaker B	Tons
Columns	115
Beams, including pockets	183
Stairs	10
Bracing	55
Roof	28
Girts	25
Rivets and rods	11
Cast-iron chairs	3
Total	430

The volume of the breaker is 860,000 cu.ft.

Conditions under which a bed of coal exists affect mining and preparation to a large extent. If the pitch



FIG. 8. BUCK MOUNTAIN BREAKER, THE FIRST STEEL PLANT OF THE LEHIGH VALLEY COAL COMPANY

The removal of refuse as a preliminary to stripping is now generally avoided. Each one of the many points thus briefly noted is worthy of a separate paper, but space limits their discussion here to little more than topical mention.

In connection with a more detailed discussion of the five steel breakers of the Lehigh Valley Coal Co., it might be interesting to note their location in the anthracite region and refer to the section of the basin at each plant. (See Fig. 6.) Of the five plants in question, Buck Mountain and Packer No. 5 are in the western middle field; Mineral Spring and Franklin are in the northern field and Drifton is in the eastern middle field of the anthracite region. In these breakers the preparation is wet in all except the Franklin, where both the wet and dry methods are used.

The Lehigh Valley people find many commendable features in steel breakers. Everything is open, there is good light and air and nothing hidden away in dark corners. The basis of the design of their first steel breaker was to secure steel posts which should be equivalent to a 12 x 12-in. wood post under similar condi-

is light so that the miners can take mine cars to the face and load them, then slate and rock can largely be gobbed in the chamber and comparatively clean coal be sent to the breaker. Even if there are partings in the bed and bad top overhead, quite a bit of coal can be cleaned inside. Contrast the foregoing conditions with mining on the heavy pitches, where practically everything is loaded out—partings, falls of roof and coal all go to the chute and into the mine car. In extreme cases a mine car may contain 40 and even 50 per cent. of refuse.

Coal is often dirty. It is frequently wet, in addition, on account of water finding free entry to the workings through crop falls and cracks in the strata. Such adverse conditions greatly handicap both mining and preparation—especially the latter. Fig. 6 shows at a glance what the various collieries in question likely have to contend with. The breaker proposition may vary greatly with differences in pitch, purity of the seam and condition of top.

Before referring to the individual steel plants, it should be stated that all the breakers contain more or

less wood in their construction. Chutes, some machinery foundations and pocket linings (bottoms and sides) are of wood. In the case of pockets, the stringers are I-beams; lengthwise on these beams are 3 x 8-in. sticks; across these are other 3 x 8-in. timbers on 14-in. centers; and on top of all are 2-in. plank running with the pitch. On top of the plank is two-ply roofing paper, then ⅞-in. T. & G. boards, and finally 1-in. hardwood boards.

The Buck Mountain breaker, Fig. 8, was described fully in articles appearing in the May 18 and 25, 1912, issues of *Coal Age*. It has a daily capacity of 1800 tons. The breaker contains 477 tons of steel and 386,000 ft. B.M. of timber. Below the jig floor concrete was used in its construction. By reference to the section of the basin at this colliery, Fig. 6, it is seen that the pitches of the seams are heavy, notably so on the south dips. The seven seams mined are in good condition and the top is generally good.

Packer No. 5 breaker is shown under construction in Fig. 4 and completed in Fig. 5. It is the largest steel breaker of the Lehigh Valley Coal Co., having a capacity of 2500 tons. In addition to the steel, there is 690,000 ft. B. M. of timber in the building. In Fig. 3 is illustrated the framework of a wooden breaker. Note the mass of timbers extending in almost every direction and then contrast this construction with the apparently slender structural steel frame of Packer No. 5, shown in Fig. 4. Some of the many advantages of steel over wood for breaker building have been brought out previously. In the wooden frame, Fig. 3, it is interesting to note early tendencies to substitute metal for timber. Here some of the columns are of cast iron and there are a few iron or steel beams in the breaker.

Returning to Packer No. 5, the following seven seams are mined: The Diamond, Little Orchard, Orchard, Holmes, Mammoth, Seven Foot and Buck Mountain. The first three beds have bony and slate partings and a soft slate top. The remaining four seams generally occur in good condition, which is a fortunate circumstance for the pitches are very heavy. The seams at Packer No. 5 are thicker than those at Buck Mountain colliery.

Site of Pioneer Iron Breaker

The Drifton colliery of the Lehigh Valley has always been a most interesting plant. From the earliest years in its history until the death of Eckley B. Coxe, it was his special pride and many of his experiments in mining and preparation of coal were carried out here. The extensive shops of Coxe Bros. & Co. were at this place. Here Mr. Coxe built the pioneer iron breaker which the Lehigh Valley Co. added to recently. It was described by E. P. Humphrey in a paper read before the American Institute of Mining Engineers. This paper was published in the Mar. 30, 1918, issue of *Coal Age*. The original iron breaker is shown in Fig. 2 as the narrow portion and three track plane at the left of the structure. The addition is at the right, and it occupies the site of the old lump coal chute, discarded at the time the breaker was remodeled.

The seams mined at Drifton are the Mammoth, Wharton, Buck Mountain and to a limited extent the Gamma. There have been extensive strippings at this plant on the Mammoth seam. The gunboats which are to be seen on the breaker plane indicate steep pitches in the mines, and the Drifton section bears out this idea. It is expected that this breaker will develop a capacity of 2500 tons daily.

The Mineral Spring breaker is shown in the headpiece. This plant was described in an article published in the Mar. 16, 1918, issue of *Coal Age*. Some of its special features relating to safety precautions were described in an article in the Dec. 8, 1917, issue of *Coal Age*. The capacity of this breaker is about 1600 tons daily. In constructing the breaker 553 tons of steel were used and 302,000 ft. B.M. of timber. The principal seam mined here is the Red Ash, which is thick and comparatively hard, but it carries bony coal, is dirty, and there is generally a heavy clod over the bed. In general the seams at this plant are thin and dirty.

Typical Wet and Dry Plant

The Franklin colliery of the Lehigh Valley company, Fig. 1, is a particularly interesting plant. The breaker is one of the newest of the steel type of this company and has a capacity of 1500 to 1800 tons. It is the only plant of the five in question which prepares coal by both the wet and the dry methods—it is typical of this process. There is a tendency to do away with the dry way as the wet is cheaper. Twelve different seams are mined at the Franklin plant. The best seam, the Baltimore, is practically exhausted. Among the others, the Hillman and the Red Ash occur in good condition. At times many of the seams are dirty and carry slate and bone partings, also poor roof. The section of the basin at the Franklin, shown in Fig. 6, gives a good idea of the general mining conditions as affected by pitch of seam, etc.

The early history of this plant is an interesting one. In 1868 a wooden breaker was built which replaced previous ones. At that time the company operating expected to have coal only for about 20 years. In '89 the Lehigh Valley replaced that breaker by a modern one with the expectation of its life being limited again by only 20 years available coal. In 1913 a steel breaker was built with the prospect of coal for the next 30 years. This illustrates the changes which have been brought about in anthracite mining as this coal becomes scarcer and thinner and poorer seams are considered profitable for mining.

The Franklin steel breaker was necessary to handle and prepare the coal now being mined—it is different from that previously worked. Also an up-to-date breaker was necessary on account of the development of beds which could not be prepared satisfactorily in the old structure. It would have been too expensive to rebuild the old breaker, and then the annual maintenance cost on the wooden structure would have been so heavy that steel was waranted. The new breaker has a ground area of 88½ x 96 ft. and a total height of 125 ft. The total weight of steel in the structure is 488 tons. The volume of the building is 640,000 cu.ft.; it is covered with galvanized, corrugated steel and has steel sash containing 8000 panes of 12 x 18-in. glass.

This breaker was built over old workings a portion of which it was necessary to silt to avoid settlement in the mines which would damage the breaker. The first car of steel arrived on the ground on Apr. 3, 1913, and the first car of coal was dumped on Oct. 3, 1913. Coal is

supplied from three openings and concentrated at the foot of a tower hoist. Coal is hoisted to the top of the breaker in self-dumping cages to a height of 115 ft. at the rate of 150 cars per hour. Broken, egg, stove and nut are prepared dry, and egg, stove, nut, pea and smaller sizes are prepared wet at the Franklin. The flow sheet (see Fig. 7) gives the details of how coal is handled in this breaker.

The system of loading coal here, by belt converyor, was introduced in the region by the Lehigh Valley. The coal pockets are at right angles to the loading track. A 36-in. belt is used which is run at a speed of from 300 to 500 ft. per minute, the rate of speed being in inverse ratio to the size of the coal. Belt loading uses less men than by the old method, cutting the labor item in half. Loading by belt costs 1c. per ton, while chute loading costs 1.6c. per ton. The cost of the belt itself amounts to 2 mills per ton on a tonnage of 350,000 loaded. A belt has loaded 5000 tons of coal in 10 hours. The loading is managed by one man, who operates levers controlling gates at the pockets. Another man places cars for loading. Where large tonnage is handled more men are needed to see that car movement—empty and loaded—is expedited.

Considerable thought was given the subject of breakage of coal in the design of the Franklin breaker. Small lowering conveyors are used for moving lump coal from shakers to lump coal picking tables. At the discharge end of each picking table is a shifting apron which prevents excessive breakage at that point. This latter device, as well as numerous other ingenious contrivances about this plant for saving labor and doing work better and safer, is the invention of James Piatt, the outside foreman at the Franklin colliery. All chutes have rounded corners and the movement of coal is largely regulated by automatic controls, developed at the Maltby colliery by the outside foreman, Nelson White.

All breaker refuse at this plant, after being collected, passes through a No. 6 Gates gyratory crusher which reduces it to about stove coal size. This product is then passed to a pulverizer which grinds it to ¼- to ½-in. size, when it is silted into the mines. The breaker is driven by a pair of 18 x 30-in. Corliss engines belt-connected to a main line shaft. The breaker is divided into two units—pure and impure sides—independently driven, a considerable advantage when handling condemned coal. The Franklin was designed for 1800 tons, but the best dump for 9 hours has been 674 mine cars. However, the best hour hoist has been about 120 cars, which indicates that over 2000 tons might be prepared over this breaker. The best record for coal yield is 2.2 tons of prepared coal per mine car.

A paper on the preparation of anthracite coal by Paul Sterling was published in Vol. 42 of the *Proceedings* of the American Institute of Mining Engineers. This paper gives anthracite practice of 1912 with special reference to the Mineral Spring plant—all wet breakers are a modification of the methods treated in this article. Much of further interest was noted in connection with Lehigh Valley practice both in the mining and preparation of coal, but space forbids more than general comment. It is quite noteworthy that as preparation requirements become more and more exacting and as poorer and dirtier seams are mined, that less labor is employed in and about breakers. Mechanical devices are supplanting the human element. However, it cannot yet be said of coal preparation as in the manufacture of food—"it is not touched by the hand of man."

For much of the information in this article and for many of the illustrations accompanying it, *Coal Age* is greatly indebted to the various departments of the Lehigh Valley Coal Co., at Wilkes-Barre, Penn. The unfailing courtesy of busy officials should receive grateful acknowledgment. In this same connection, the Guerber Engineering Co., of Bethlehem, Penn., should have special mention.

If a man spends his time in pleasure or in just getting by, he mustn't expect more than he purchases. If he uses the same time to make himself more efficient and to win friends and gain knowledge, he again will get what he pays for. Remember, however, that time can only be spent once. You pay your time and you take your choice.

An Expeditious Car Unloader

A continuously operating car-unloading apparatus, for handling sized coal, sand, crushed rock, etc., has been invented by James B. Seaverns, a Chicago engineer. An endless belt carrying scoops is mounted on a vertical frame the lower end of which rests in the material in the car. By this means the material is scooped up and elevated to a hopper well above the car, whence it is delivered to a horizontal conveyor belt. The latter



THE UNLOADER IS READY FOR OPERATION

dumps the material into a wagon or truck, for delivery. The endless bucket elevator, provided with a concrete weight at its lower end, is supported in a traveling bridge, or crane. The elevator may thus be traversed from side to side of the car, allowing the buckets to pick up practically all the material.

A mechanical feed device advances the machine against the material in the car as fast as it is scooped up by the elevating apparatus. The machine may be provided with a two-way spout and valve in the delivery hopper, to allow the material to be spouted either to trucks on one side of the track or to a storage pile on the opposite side. The machine materially reduces the present loading time and thus tends to relieve the difficulty the railroads are experiencing in getting cars unloaded promptly so that they may be put back in service again. The machine can be operated by either electric motor or gasoline engine.

From Telegrapher to Large Mine Owner

Biographical Sketch of P. A. Coen, President of the Buckeye Coal and Railway Company

HARD WORK, coupled with the desire to succeed and make a mark for himself in the world, have been the two cardinal principles underlying the success of P. A. Coen. He is president of the Buckeye Coal and Railway Co., which controls a large area of coal in the Hocking Valley district of Ohio. Mr. Coen also conducts an important jobbing business. He is a man who has made a wonderful success in all branches of the coal business by perseverance and the capacity to master all details. Mr. Coen is now 40 years of age and has been more or less intimately connected with the coal business for approximately 17 years.



P. A. COEN
Hard work, coupled with a desire to succeed, helped him to get on top

Mr. Coen is a product of the farm, having first seen the light of day on a farm near Cambridge, Ohio. Part of his early schooling was obtained at the local railroad station, where the young boys of the neighborhood congregated, many of them learning telegraphy at their leisure moments. In fact it is said that a number of men, now prominent in the coal industry, started their business life by learning to telegraph at the little railroad office.

After mastering telegraphy Mr. Coen was offered the position of station agent, which included the duties of telegraph operator, freight and express agent, at a station on the Wheeling & Lake Erie R.R. at Beach City, Ohio. This is the junction point of the Baltimore & Ohio and the Wheeling & Lake Erie. When Mr. Coen took this position it was found that the competing railroad had all the best of the grain and live stock shipments out of that section. When the general superintendent assigned him to the position, he said, "I want you to get all of that freight business back."

Investigation showed that the reason for the success of the competing road was the better service given, especially to live stock shippers. Mr. Coen sent word to the shippers that the pens and yards would be improved and that water would be brought to the pens in order to give the animals drinking water and to cool them off in hot days. As a result business came back rapidly.

His work at Beach City attracted the attention of railroad officials and his next step was to go to a railroad and coal property in Pennsylvania, where he worked hard to master the details of the business. In 1904 he was in charge of a coal exhibit at the St. Louis Exposition. While there he familiarized himself with all phases of the coal business, but more especially the gas coal industry, by arising at 5 a. m. and spending his time going through the other coal exhibits and the testing plant operated at that point.

After the exposition he drifted back into the coal business as a salesman. He took several positions and finally landed in Oklahoma as the general manager of an operating company. When he took charge of the property, at the age of 30 years, he found that recent discoveries of oil in that territory caused practically all railroads and many manufacturing plants to use fuel oil as a substitute for coal. The market was a decreasing quantity and he undertook to see what could be done to revive it. In that work he traveled through northern Mexico and all of the southwestern states as far as the Rocky Mountains.

He studied freight rates and mastered all of the details of the business in an astonishingly short time. A law had been enacted recently making five traffic zones. The mines over which he was general manager were thus handicapped by a freight differential of 40c. He secured an attorney to appear before the Oklahoma railroad commission to have the law changed or the rulings suspended. The day of the hearing arrived and the attorney failed to appear because he missed his connections. Since Mr. Coen had spent a month in going over the case with the attorney he was familiar with all of the details and he submitted the case himself, and won his contentions as well as the admiration of the railroad commission and other operators in the state.

Mr. Coen held that position for a year and then came East to sell coal for various concerns. He finally made a connection with the Rail and River Coal Co. and had his headquarters in Toledo. In that capacity he did considerable jobbing of coal and attracted the attention of J. S. Jones, of the Jones & Adams Coal Co., of Chicago. To learn jobbing he took a former jobber into his office, learning that branch of the business through him. How well he succeeded is shown by the results obtained, as the Toledo office of the Rail and River Coal Co. is known throughout the middle west.

Mr. Coen always kept in close touch with market conditions and when there was an advance coming on through a cold spell or railroad congestion he bought heavily of coal, making a good profit. When J. S. Jones purchased the control of the old Sunday Creek Coal Co.—which was shortly after the Grand Trunk R.R. took over the mines of the Rail and River Coal Co.—Mr. Coen came to Columbus as general sales manager of the Sunday Creek. Litigation ensued and the Buckeye Coal and Railway Co. was revived. Mr. Coen was given the presidency. In that capacity he not only mastered the selling but also the operating end of the business.

Successful Shoveling Machine

SYNOPSIS — *Machinery is constantly supplanting hand labor in all phases of coal mining. Shoveling has been one of the latest operations to be successfully performed by machine. Coal mines have been somewhat slow in taking up this method of car loading, but are now adopting it more rapidly than in the past.*

MODERN mines are making increasing use of mechanical devices to secure the output demanded and to maintain reasonable cost of production in the face of constantly advancing expense for labor and material. All departments of coal mining now generally employ machinery. The electric or gasoline locomotive has supplanted the "hay burner." The undercutting machine now does the most arduous work of the miner. Boring machines are now being used to supplement the cutting machines.

Practically the only field of mining which is not well supplied with mechanical means to supplement manpower is the actual loading of the coal into the mine cars. The thinking men of the industry have long recognized the need for machinery to do this shoveling, and the principal reason why this machinery is not as prevalent as, say, the cutting machine, lies in the lack, at least until recently, of such a machine.

For over ten years designers, engineers and inventors have been paying considerable attention to this problem, and at the present time the only excuse that up-to-date mines have for not employing loading machinery is the fact that they may not be able to secure as prompt delivery of such appliances as they might desire.

The machine built by the Myers-Whaley Co. was first developed some ten years ago, and has long since passed the experimental stages through which all new machinery must go. For some years past machines of this manufacture have been in constant successful use under the most severe physical conditions. The first machines were built for loading coal, and the first one, which is shown in Fig. 1, loaded several thousand tons of coal in several experimental trials.

Some Improvement Was Needed

This machine was the basis upon which the later ones were designed. Being a radically new invention, it is natural that it should have incorporated in its make-up some features which would need improvement. As a whole, however, the original machine was highly successful and clearly pointed the way along which improvement should proceed.

Later on it was found that the rock and ore mining people had an even more pressing need for this machine than the coal mines, and were in a more receptive mood, willing to pay for machines and eager to obtain them. Following the line of least resistance activities were soon exclusively occupied in developing and furnishing machines for loading rock and ore, and have been so occupied for approximately the past five years.

As an illustration of how well the builders have succeeded in this particular field, one of the machines which was built six years ago and which was used for a number of years for loading rock is now in use by the Darby Coal Mining Co., at St. Charles, Va., in driving entries, and is giving successful and satisfactory service. In this work at St. Charles the entries are driven about 6 ft. high, and as the bed of coal is only 36 in. thick, it is necessary to lift a considerable amount of bottom. It was found difficult to keep men steadily at work taking up this bottom and the manager of the mine, C. H. Thompson, decided to use the shoveling machine for this purpose. He states that it has solved his problem and that he drives all entry work required with this one shoveling machine.

Another one of the older machines has been in continuous service for the past five years, loading rock salt, underground. The company has since ordered six additional machines, which indicates with what success this machine has done its work. The average loading under these conditions is from 200 to 250 tons per 9-hour shift.

Many Installations Have Been Made

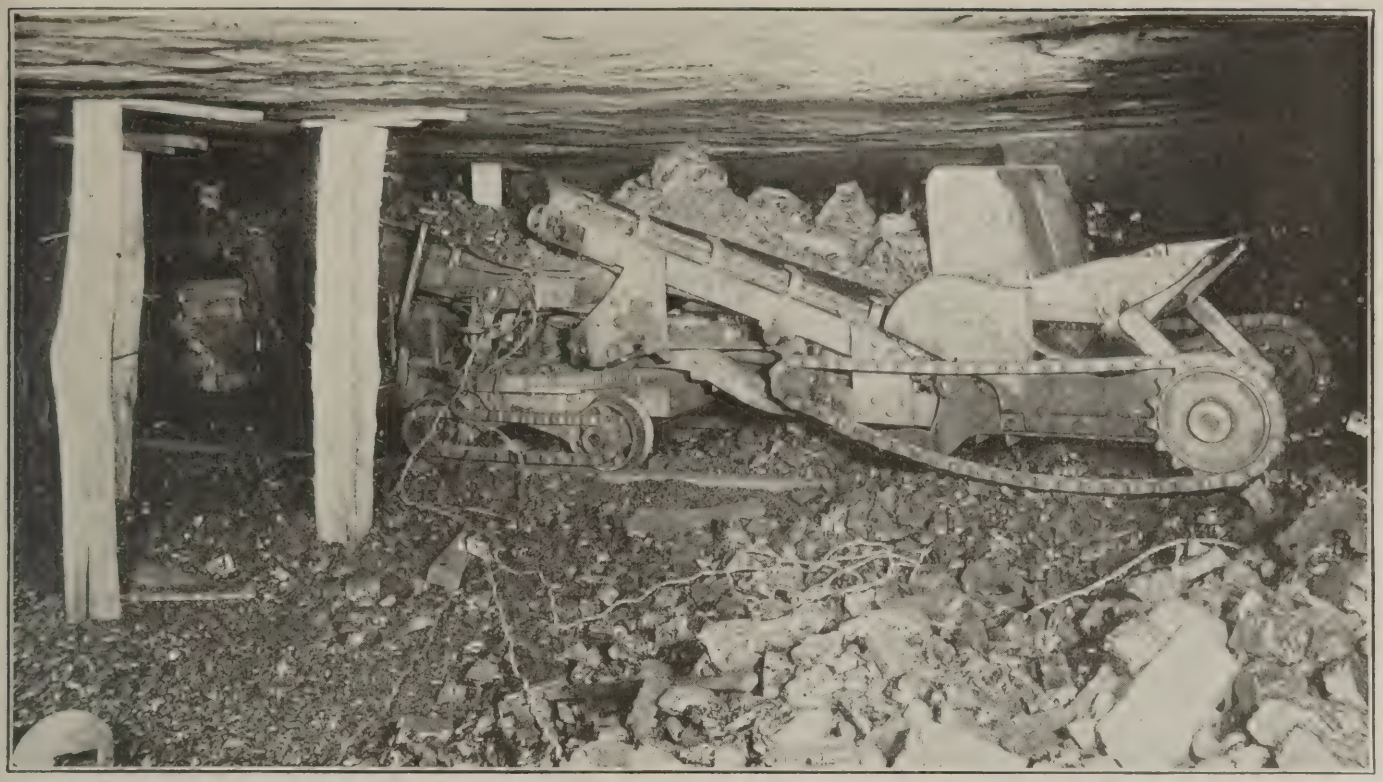
A number of other interesting installations might be mentioned, but it is feared that this would take up more space than is available. It might be stated, however, that coal mines are now recognizing the usefulness of this device and that machines are now being supplied for loading coal. Such machines have recently been furnished to two of the largest concerns in Utah.

By the use of shoveling machines a considerable reduction in cost of loading is possible, even with the general advance in other costs. In addition to this the machine does the work of 15 or 20 men, and at operations not having plenty of help the men thus displaced can be put on other work. If men are not available the output can be secured without putting them on the payroll.

To those not familiar with this machine, a brief description of its operation may be of interest. Referring to the photograph, it will be seen that the machine consists of an automatic shovel mounted upon the forward end of a jib upon which jib is carried a reinforced belt conveyor which receives the coal from the shovel and transfers it to a second conveyor mounted upon a supplemental rear frame which is pivoted at the center of the machine and extends over the mine car.

The main frame which carries both the jib and the rear conveyor also supports the motor and propelling mechanism. The jib can be swung by power 45 deg. to either side, so that the shovel can reach a distance of 10 ft. to each side or clean up a space 20 ft. wide from one track. The rear conveyor can also be swung laterally so as to load either upon the machine track or upon one paralleling it.

The entire machine is moved forward and backward under the control of its operator, who is stationed upon a platform on the jib frame. From here he can clearly see the shovel and direct it. The controller for starting and stopping the motor is also mounted upon this platform directly in front of the operator. He can



THE ORIGINAL SHOVELING MACHINE AT WORK IN A COAL MINE

therefore start and stop his machine, swing the shovel laterally, and move the machine forward and backward without leaving his seat.

The shovel is entirely automatic in its action and is a unique piece of mechanism consisting of a shovel member, 34 in. wide, having an auxiliary or rear section fitted into it. The shovel is actuated and supported by a crank which rotates continuously, and which is driven by heavy roller chains on each side of the machine. The rear end of the shovel is carried by a cross shaft having rollers on its ends which run in cam grooves. This gives the mouth of the shovel a motion quite similar to that of a shovel actuated by hand.

The front part of the shovel discharges into the rear section, which has auxiliary cam rollers engaging another cam groove and which turn the rear section partly over during each stroke. In this way the material is picked up and transferred to the belt conveyor at the rate of one shovelful for each rotation of the crank. This crank rotates at a speed of 12 to 13 r.p.m.

In making use of the shoveling machine, it is necessary to attend to some details more carefully and in slightly different manner than is done for hand loading. These embrace the following particulars:

1. The machine should have good solid tracks upon which to work, as no jacks or fastenings of any kind may be employed. The machine relies upon its weight and friction on the track to maintain its stability and to give the necessary force to shovel.

2. The coal should be shot down in such a way as to enable the shoveling machine to clean up the room without waiting for men to pick down standing coal. This is quite important as the machine will clean up a 40-ton room in about 1½ hours if it is not delayed by having to wait for coal to be broken down.

3. It is essential to arrange side tracks and trips with an ample supply of cars, so that a minimum of time will be consumed in moving out the loads and placing empties back of the machine. Under ordinarily good conditions this can be done readily in less than one minute per car. It should be realized that any more time spent in shifting cars is wasted and will reduce the output from the machine.

4. The machine is equipped with a 20-hp. motor and the power lines and supply should be amply large to furnish current power to this motor.

5. The machine is easily operated. An intelligent man can readily learn to run it in a few hours. The mechanism, however, should be inspected regularly, and although the machine is capable of operation by medium grade men, a competent mechanic should have charge of it and see that it is properly oiled and handled and that irregularities are promptly attended to. This, of course, is true of all mechanical devices and is not peculiar to the shoveling machine.

How Oil Saving May Be Achieved

These methods of saving lubricating oils are posted in the machine shops of Germany:

Use only closed oil cans, with spouts tha will deliver drops, or at most only a thin stream.

Use all lubricating apparatus strictly according to instructions and put the oil only where it will actually lubricate. If a machine has automatic droppers, shut off the supply while machine is standing.

Do not use cylinder oil on shafting or elsewhere when cheaper oil will answer.

Keep all rubbing surfaces in good condition. Rough surfaces and too tight boxes consume more oil. Worn and leaky bearings waste oil.

Always use drip pans, and arrange to filter and cleanse the oil so caught. It is as good as new.

Collect all greasy waste and wiping cloths, so that the oil may be recovered. Never burn them.

Be careful about using lubricating oil for cooling a bearing. Water will often do as well.

Be careful about using oil for cleaning and polishing. Never clean the hands with oil. A greasy cloth will do as well.



Electric Hoist at Alaska Colliery

DURING 1917 the Philadelphia & Reading Coal and Iron Co. installed at its Alaska Colliery, No. 10 Plane, located at Mt. Carmel, Penn., a two-speed electric hoist, manufactured by the S. Flory Manufacturing Co., of Bangor, Penn. This hoist was designed to operate on a power plane in the Mammoth Vein. The illustration at the head of this article shows the hoist building and mouth of the plane. The cars, however, are not hoisted to the surface. Figs. 1 and 2 show the hoist in operation. Fig. 3 shows a general plan of the plane and lifts.

This two-speed hoist was designed so that the power factor would be practically the same for hoisting the loaded cars from the lifts and pulling the empties up the plane. This means efficient hoisting.

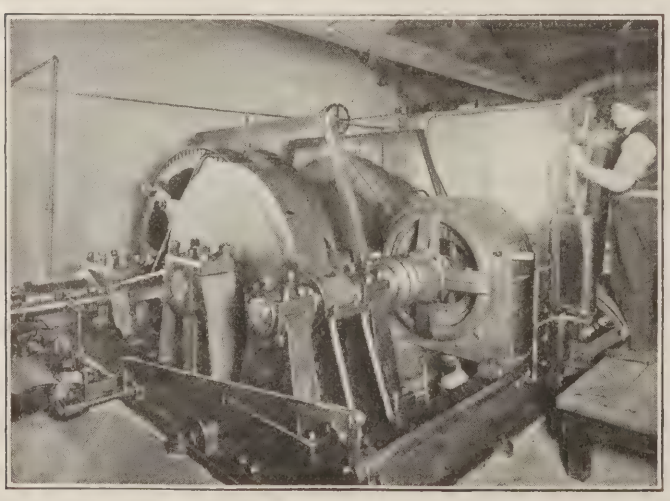
The length of the plane (five levels) is 1400 ft., while the pitch of the plane is 26 deg. The load on the hoist is as follows: Cars per trip, 2; weight of loaded trip, 20,000 lb.; weight of empty trip, 7000 lb.; size of rope, 1⅛ in. (The weight of rope is not included in the foregoing figures.) The rope speed in hoisting the empty trip is 500 ft. per minute, while in hoisting the loaded trip it is 250 ft. per minute.

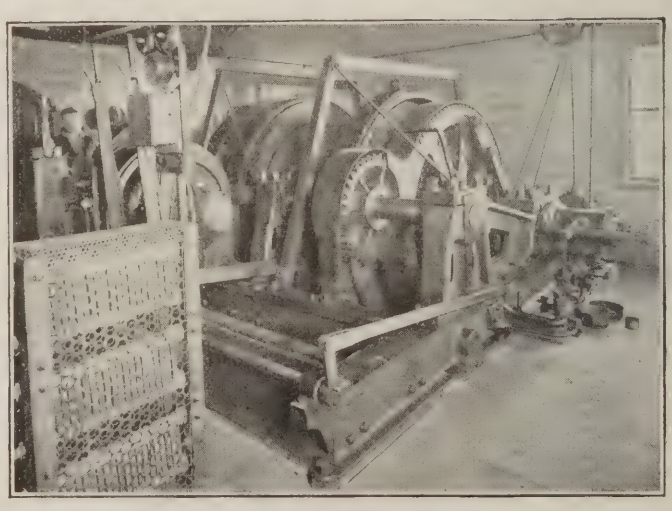
The cycle of operation is as follows: Accelerate empty cars at bottom, 5 sec.; hoisting empty cars on slope, 131 sec.; stop-accelerate to lower in lift, 5 sec.; lower empty trip in lift, 18 sec.; decelerate empty trip, 5 sec.; changing ropes, 30 sec.; accelerate loaded trip, 10 sec.; hoist loaded trip out of lift, 18 sec.; stop-accelerate loaded trip, 10 sec.; lowering loaded trip on slope, 163.7 sec.; decelerate loaded trip, 15 sec.; changing ropes, 30 sec.; making a total for an average trip of 440.7 seconds.

In order to perform the cycle given and the duty imposed, the hoist was designed with all cut-steel gearing, the gear ratios giving 500-ft. and 250-ft. rope speeds. The primary gear reduction, or that between the motor and countershaft, is accomplished through cut herringbone gears; the secondary reduction, or that between counter- and drumshafts, is through spur gears. The drum is cast iron, 60 in. in diameter and 36 in. long between the flanges. Each gear is provided with a Werner patented band friction, well known in the coal industry. The frictions are operated by patented air-thrust cylinders, giving the operator sensitive control. The drum has two brakes, each 8 in. wide, equipped with "vita-bestos" brake lagging. The machine is sectionalized throughout so that it can be taken into the mine in the future if desired. The hoist is driven by a 100-hp. continuous-duty rated motor with master control. This type of hoist is in use by a number of mine operators and in other lines of industry with universal satisfaction. Another hoist is under construction by the same manufacturer for the Philadephia & Reading Coal and Iron Co. for similar operation.

We are indebted to J. T. Jennings, electrical engineer of the Philadelphia & Reading Coal and Iron Co., for the data and drawing of the plane.

The machine here described and illustrated has been





FIGS 1 AND 2. INTERIOR OF HOIST HOUSE SHOWING BOTH SIDES OF THE HOIST ENGINE

in operation for some time and is giving excellent satisfaction. The impression created by the operation of this machine was well expressed by the man who runs it,

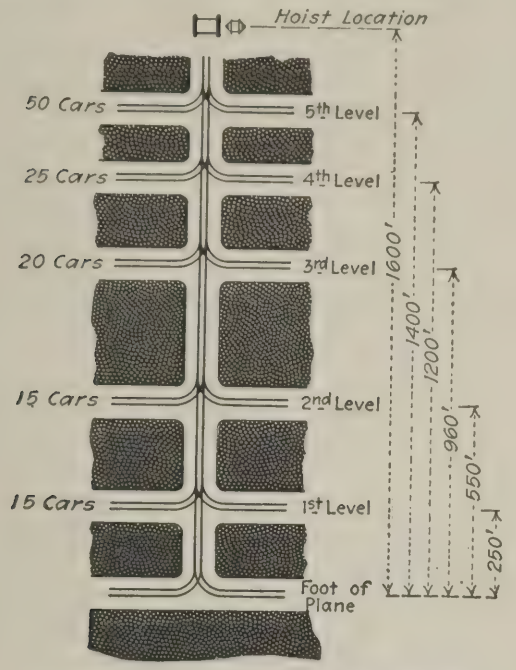


FIG. 3. GENERAL PLAN OF SLOPE

when he said in reply to the question of what he thought of its operation, "I think she works like a top!"

Many a man is wondering what hinders his success in life when it is all as easy as falling off a log. He is governing himself according to guesswork. Don't guess; know facts. Facts count and guesswork is no account!

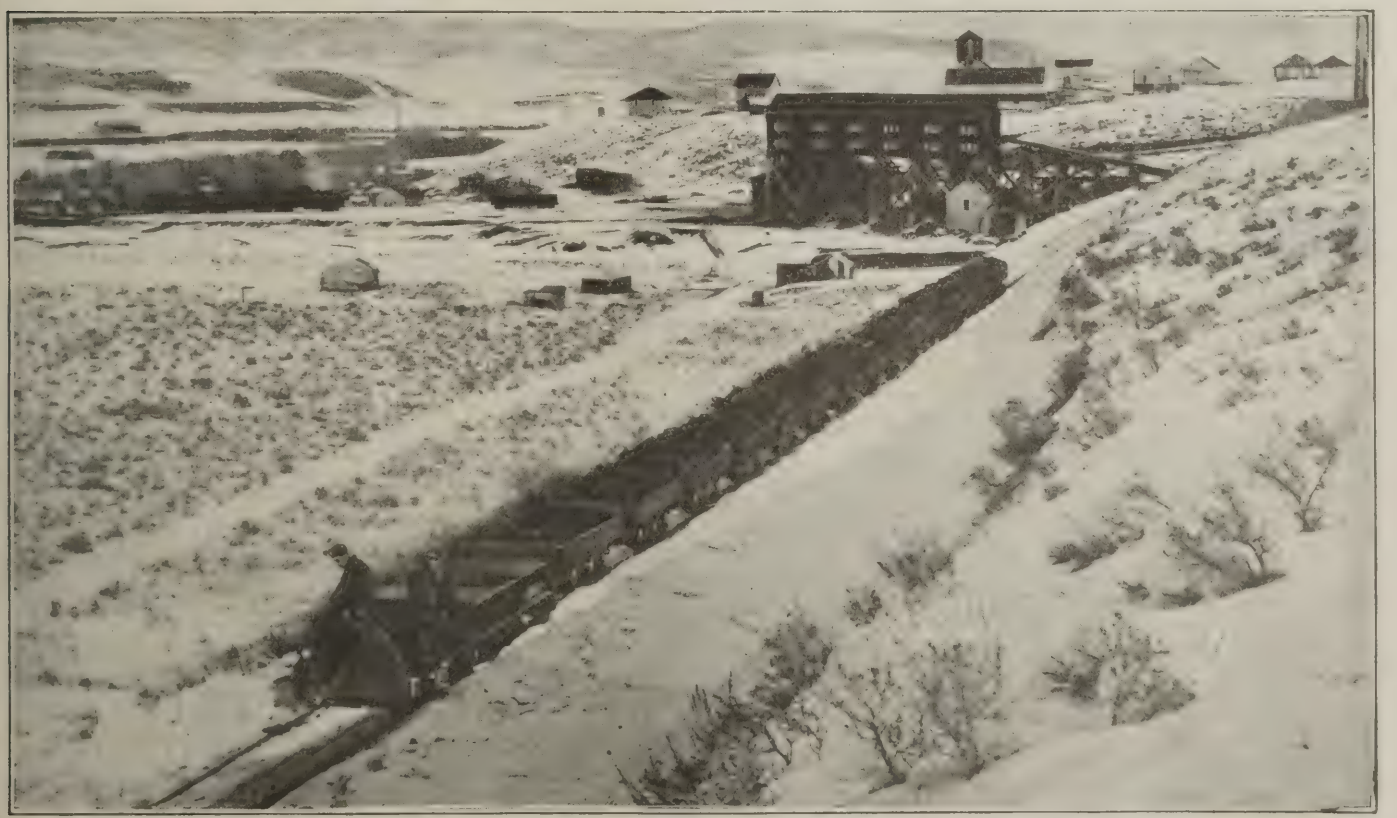
Every man who works uses his employment as either a meal ticket or an opportunity. If he looks upon it as a meal ticket to tide him over from day to day, he must never expect to travel very far or climb very high. If he looks upon it as an opportunity to open the door to something bigger and better, through expert service and the complete mastering of his task, there is no limit to the distance he may go.

Storage-Battery Locomotives Enter Colorado Coal Mines

The McNeil Coal Co. is, apparently, the first to introduce the storage-battery locomotive into coal mines in the State of Colorado. The illustration shown below is of an Ironton locomotive of this type in operation between the company's newly opened mine No. 2 and the tipple, at its property at MacGregor, Routt County. In opening this mine the company considered the various available methods of transportation over a line approximately 4000 ft. in length and having a grade averaging 1½ per cent. in favor of the load. Its decision, therefore, to apply the storage-battery locomotive is of unusual interest, although it is in line with well-established practice in the Eastern coal fields.

The locomotive is a 5½-ton low type, equipped with 48 cells of battery and a single heavy duty motor. It has single end-drum control, and in tests has demonstrated a satisfactory drawbar pull. The results thus far have been both encouraging and gratifying.

The Grand Junction Mining and Fuel Co., whose ownership is vested largely in the McNeil Co., has placed a 4½-ton Ironton in its mine at Cameo, Colo., for gathering purposes. Other Colorado operating companies have placed orders for similar storage-battery equipment.

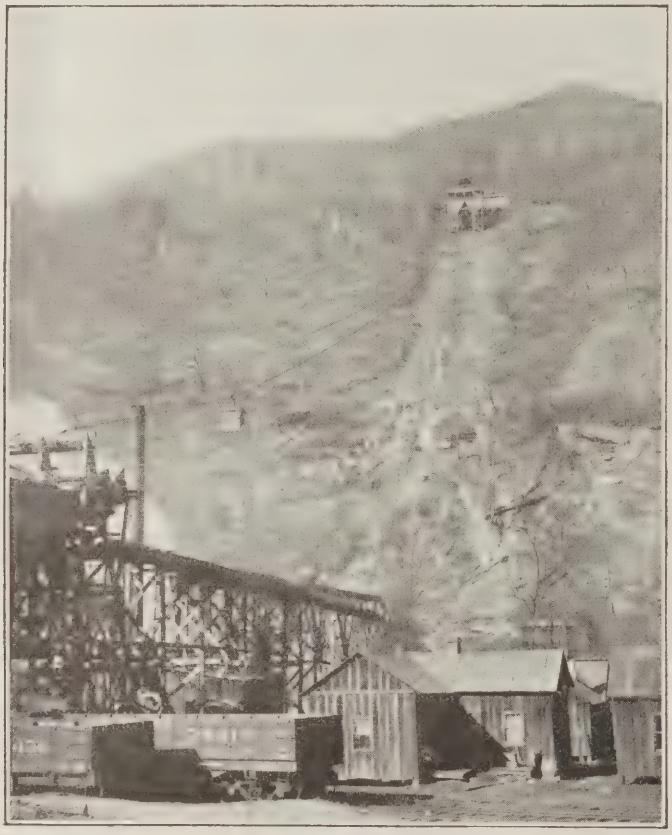


IRONTON STORAGE-BATTERY LOCOMOTIVE IN OPERATION AT A COLORADO MINE

Aerial Tramway at a Coal Mine

The accompanying photographs show a Broderick & Bascom Co. aërial tramway recently installed by the Rex Coal Co. at Kitts, Ky. This tramway is approximately 850 ft. in length with a fall of about 300 ft. in this distance. A capacity of 60 to 75 tons of coal per hour can be handled by this equipment from the loading station to the tipple at the railroad tracks.

The buckets, of 3000-lb. capacity, are of the automatic bottom-dump type. The trolley sheaves are fitted with



LOADING STATION AND TRAMWAY

Hyatt roller bearings. Only one attendant is required for the operation of this tramway. This man is located at the loading station and controls the filling of buckets as well as the brakes regulating the speed of the line. At the discharge station the buckets are dumped automatically.

The control sheave is of the three-groove type, 6 ft. in diameter, and equipped with two 4-ft. diameter brake rings. The brake bands are lined with asbestos. The track cables are $1\frac{3}{4}$ and the traction rope $\frac{9}{16}$ in. in diameter. The coal is brought out of the mine on mine cars, which are dumped into a 50-ton bin at the loading station of the tramway. The top of this bin is on a level with the mine tracks. The coal is then drawn into the tramway buckets through steel chutes, the flow being controlled by the operator by undercut gates.

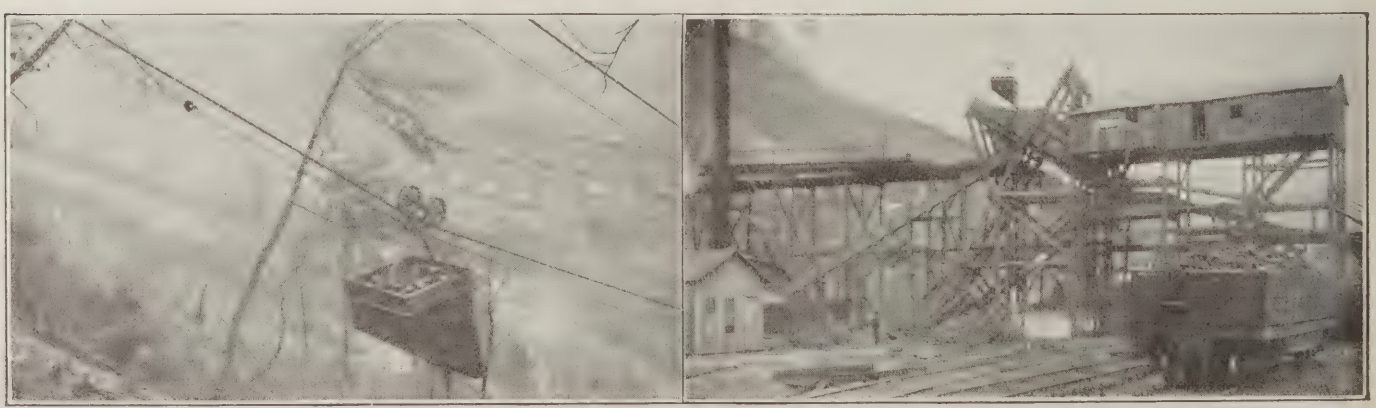
The Rex Coal Co. reports that this tramway is in satisfactory operation, and from all indications it is capable of handling from 25 to 50 per cent. above the rating guaranteed by the builders.

How the Lehigh Coal and Navigation Co. Boosts the Liberty Loan

By W. G. Whildin
General Superintendent, Lansford, Penn.

The basis of our scheme for securing subscription for a Liberty Loan Bond is personal solicitation. We have a general committee, consisting of the heads of all departments, and officers and executive committee members of the mine worker's organizations, with the writer as chairman. Each of these heads of departments then acts as chairman of his district committee, which consists of all inside and outside foremen. At each mine the soliciting committee consists of the foremen, assistant foremen, loader bosses, night patrolmen, grievance committee men, safety committee men, and first aid and rescue men. Each of these members takes his own small district and personally talks over the question with his men. If a workman refuses to buy a bond, or gives some reason for not doing so which is not believed, his case is at once reported to other members of the committee, who take steps to bring the man into line—and they always succeed. It requires a strong valid excuse for exemption.

For the third Loan, we will follow out our policy of the two former loans, of having payments made in twenty installments deducted from each semi-monthly pay. The committee at each mine is being furnished with a complete list of subscribers, the amount of bonds subscribed for under the first loan, and also the amount subscribed under the second loan, and in addition information as to whether the subscriptions were completed before the final installment date, or whether cancellation of either or both subscriptions was made. In this manner each committee will have the facts before it, and it will be difficult for anyone to shirk.



VIEW OF THE 3000-IB. CAPACITY BUCKETS IN OPERATION AND THE MINE TIPPLE

Southwest Believes Its Fuel Difficulties Are Solved

Harry N. Taylor, one of the live wires of the Southwest and general manager of the Central Coal and Coke Co., writes us as follows:

In the Southwest the past winter's coal production and distribution went forward without the harrowing conditions experienced in the Eastern States. At no time during the entire winter was there any actual



HARRY N. TAYLOR

suffering and on no occasion was a general closing of industries necessary in any of the Southwestern or far Western states.

There were two reasons for this: (1) Because there are no congested manufacturing centers in that territory to make extraordinary demands on the railroads. For this reason the gateways to our manufacturing communities never became cluttered with an accumulation of materials gathered for the manufacture of war munitions. (2) Because as early as last May, through the Peabody committee, the closest working relations were established between the railroads and the operating interests and these relations were maintained even after the passing of the Peabody committee. As there was thus secured a close coöperation between the producing and the transporting interests the situation was greatly relieved.

There was, of course, a shortage of coal, and the movement at times was slow; but there was no more severe stress than has often occurred in past years during extraordinarily cold weather, such as we experienced the past winter. There were no heatless days, and early closing orders were more calls to do our bit than an actual necessity.

The zoning system as it is now established by the Fuel Administration will benefit both the operator and consumer in the Southwestern States. It will prevent coal from coming into that territory from far distant sources of supply, and render cars available for short hauls between the coal fields and the nearby consuming centers. This will greatly facilitate the movement of coal for the car supply will thus be made more adequate. As almost the entire shortage last year was due to lack of transportation, this will be largely eliminated by the zone system.

The labor situation in Iowa, Missouri, Arkansas, Oklahoma, Wyoming and Texas is entirely satisfactory. There is little or no friction between the operators and the men. In Kansas, there has been much idle time, caused by the unfortunate leadership of the miners in that district. It is hoped that the new penalty clause imposed by Dr. Garfield will eliminate local strikes in Kansas, and make available a large tonnage which has been lost during the year through labor troubles.

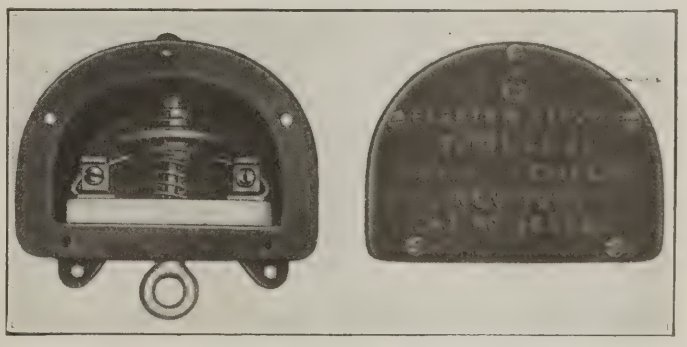
On the whole, the outlook for the Southwest and far West is brighter than it was at any time during the past year. There are three governing factors: the operators, the railroads, and the consumers. The first two are already thoroughly lined up. If the consumers will do their share by buying for early storage, so as to keep the mines in continuous operation, the problem of preventing a recurrence of last winter's shortage will be successfully solved.

Mine Signal Pull Switches

The Electric Service Supplies Co., of Philadelphia, Penn., has recently placed on the market improved types of mine signal pull switches for high- and low-voltage circuits. These are intended particularly for use on mine-signal systems operated by storage-battery or high-voltage circuits. They are designed for easy and quick operation, being fitted with plungers to which may be attached a cord, wire or chain to bring them into easy reach. They close the circuit only as long as the plunger is pulled down and held, and open the circuit on release.

Both types are inclosed in weather-proof iron boxes with covers fitted with rubber gaskets. The switch proper is mounted on a porcelain insulating base.

The battery-circuit type, illustrated, includes a circuit-closing mechanism which is simple and rugged



BATTERY-CIRCUIT TYPE PULL SWITCH

in construction and which produces a double break and rubbing contact. The circular contact disk is free to revolve, thus continually offering a new contact surface. These switches are 5 in. wide, 4 in. high and 3 in. deep over all. They weigh 4½ lb. each.

The high-voltage type is similar to the battery-circuit type except that the former is larger and fitted with a quick-break mechanism to take care of the higher voltage. The circuit-closing mechanism is insulated from the iron box and produces a quick-acting double break and rubbing contact. This type measures 6¼ in. in height, 5 in. in width and 3¼ in. in depth over all. The switches weigh 8 lb. each.

Annual Convention of Michigan-Ohio-Indiana Coal Association

THE most important feature of the annual convention of the Michigan-Ohio-Indiana Coal Association, held at the Hotel Sinton, Cincinnati, Ohio, on Apr. 9 and 10, was an address by J. D. A. Morrow, General Director of Distribution of the United States Fuel Administration.

Speaking before over 400 members, Mr. Morrow, introduced by R. A. Colter, president of the Cincinnati Coal Exchange, explained frankly the purposes of the Fuel Administration, stating that the distribution of coal under present conditions is essentially a matter of organization. He pointed to the vast industrial organization of Germany, perfected for 50 years for war purposes, in proof of this, and declared that this country must perfect as good an industrial organization behind its armies in order to win the war. Coal organization in Germany before the war was in the hands of three great syndicates, he said, and when war began the government forced all operators into these syndicates in order to have all distribution centralized in its own grasp.

What Fuel Administration Hopes to Do

Contrasting this compact government-controlled organization with the disorganized state of coal and other industry in the United States, Mr. Morrow declared that the Fuel Administration now aims to bring about organization in the coal trade with the aid of trade, and pointed out that in a real sense this country is at war not only with the German government but with the close-knit organization of the entire German industry as well. As to details, it is doubtful, he said, if the railroads of the United States, burdened with war freight, will be able to transport all the coal that the industries may ask for during the coming year. "It therefore becomes the duty of all of us," he said, "to see to it that coal goes first to those absolutely necessary uses on which the prosecution of the war primarily depends. That means in plain English that some of the less important consumers will be asked to go short, if anybody is to go short. The entire Fuel Administration must see that important consumers get their coal supplies."

Talking of essential and other industries, he referred to a conference with the War Board at which a list of important consumers was completed and stated that those consumers will get coal. Generally speaking, a decision has to be made between essential and non-essential industries by the War Board, in case of a shortage, referring to a case where a railroad recently confiscated coal consigned to a ship plate plant, thereby delaying ship construction. Domestic consumers were placed on the preferred list, he stated, subject to the arrangements of the zone system, and public utilities were similarly placed; but as to the latter, he emphasized the fact that storage facilities must be provided so that coal can be stored this summer, otherwise such utilities will be heard to complain next winter that they can get no coal. Also, should construction of such facilities involve heavy cost, he suggested that such cost should be considered by rating commissions as ground for increased rates, if necessary.

Mr. Morrow expressed appreciation of the work of the coal trade as a whole, especially in enabling the Fuel Administration to operate through trade associations to get to individual members in a mass. He gave an instance of a dealer who misrepresented facts to get coal and sold it to local industries, thereby depriving essential industries of fuel, and declared, "You are going to help me put that kind of dealer out of business until the war is over." The present policy of the Fuel Administration is to utilize the experience and ability of the coal men in handling problems confronting it, both by permitting business to remain in its usual channels and by direct aid of coal men in Washington.

The zone system, the speaker explained, was devised to meet the fact that the bulk of essential war industries is located on the Atlantic Coast, and that West Virginia and Pennsylvania coal must all go there, thus leaving Ohio, Michigan and the Middle West to be served by other fields. Similarly, Oklahoma, Arkansas, Kansas, Missouri, Wyoming and Colorado must use coal from their own or near-by fields and, moreover, must store it, if possible, during the summer, in order to enable those fields to operate to capacity, instead of on part time, as at present. This shifting of coal transportation threw new demands on the railroads in the sections indicated, and it was only after full consultation with them that the Fuel Administration announced its zone system, which in some respects must still remain tentative, awaiting developments, and subject to change accordingly.

Believes Production Will Fall Off

"It is not only possible, but quite probable, that the production of coal will fall off," declared the speaker, pointing to the increasing demands of the army and manufacturers, "and it is up to the domestic consumer to get his coal while he can." Mr. Morrow closed by emphasizing the seriousness of the situation, pointing to a partial failure of the United States to keep the industrial program to the mark in aiding the Allies, and asking the full coöperation of the coal trade in enabling the Fuel Administration to handle its vital problems, expressing complete confidence in obtaining it.

Noah Swayne, Commissioner of the National Coal Jobbers Association, now an assistant in the Fuel Administration, addressed the meeting of the jobbers in the morning on trade conditions and work at Washington, and spoke before the convention following a brief report by Secretary Nigh. Mr. Swayne declared that the legitimacy of the jobber's functions has been recognized, and that new regulations of the Fuel Administration are satisfactory to that branch of the trade. He said that Dr. Garfield is a big man, and that it was as well that a coal man was not made Fuel Admin-

istrator, as the appointment of a layman had disarmed suspicion and secured public confidence.

The speaker pointed out that Garfield's appointment occurred on Aug. 20, and that the coal year was far advanced then, so that the developments of the past winter could hardly be charged to the Fuel Administration. "Dr. Garfield has two sons in uniform in France," he said, "and a man cannot give his sons to a cause and then fail to give his best efforts to his own work in that cause."

In reply to a question, Mr. Morrow stated that the distribution of anthracite would be announced May 1 on the basis of 1916 and 1917, and that it would be limited only by the prior needs of near-by Eastern consumers. On another inquiry as to confiscation by municipal authorities, he said emphatically that such confiscation tends to disarrange distribution plans and stops one gap to make another more serious. "Such wholesale confiscation as occurred last winter will not be permitted," he said. The convention was entertained Tuesday evening at a theater party.

Wednesday's session was brief, and the convention was concluded before noon with all business transacted. Moving pictures giving the members an idea of the tremendous ice gorges which recently blocked river traffic were shown, following which Samuel B. Crowell, of the National Retail Coal Merchants Association, addressed the convention.

Mr. Crowell said that Dr. Garfield, however inexperienced in the coal trade, is fair and honest, with no intention but to give the public and coal men alike a square deal, which has been apparently accomplished as to coal retailers, he said. That the national organization has been largely responsible for the satisfactory adjustment of the coal situation as between retailers and the Government was the opinion expressed by Mr. Crowell, advantages in having a representative in Washington being emphasized. He expressed hope that a representative of the retailers will shortly be placed on the Fuel Administration to give the Government the advantage of his practical experience, pointing out incidentally that the Administration is now following certain advice embodied in resolutions adopted at the coal meeting in Baltimore some time ago.

The essential need now is for more motive power, Mr. Crowell declared, stating that not more cars but more engines are needed to enable coal to be moved. Much therefore depends on Mr. McAdoo as director of railroads, rather than on the Fuel Administration, he said. The work of the Fuel Administration in investigating the cost of doing business was commended by the speaker, who declared that now is the opportunity of trade to get on a proper merchandising basis. He expressed the belief that the Fuel Administration will probably be a permanent, successful organization.

Nominations were presented and unanimously indorsed. Homer C. Gill was elected president, H. A. Bauknecht, vice president, and W. A. Gipson, treasurer. Resolutions adopted included assurance to the Fuel Administration of full support and coöperation. C. M. Moderwell, of Chicago, prominent in the work of the Peabody-Lane commission, outlined the history of the Government's handling of the coal trade, including the agreement of the operators to reduce their prices and the refusal of the authorities to accept the agreement then made, with the subsequent shortage, resulting from the drop after production had been raised to two million tons daily.

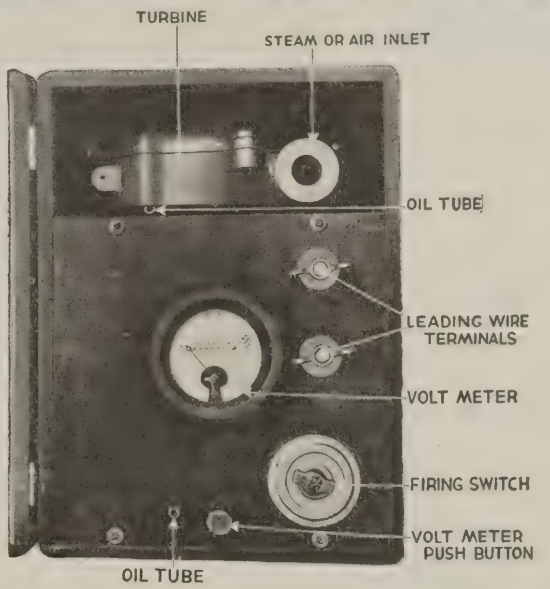
The subsequent price regulation by the Administration, the readjustment of the original basis adopted and the final adoption of substantially the same basis offered voluntarily by the operators, was recounted by Mr. Moderwell. He concluded with a warmly patriotic utterance, urging coal men to do their part as American citizens and declaring that business as usual is impossible, sacrifice being necessary to win the war.

Mason Turbine Blasting Machine

Something new in electric generating devices for firing explosives by electricity is found in the Mason turbine blasting machine. This was designed to fill a long-felt want in large blasting operations where steam or air is available.

The machine consists of an electric generator direct-connected to a turbine motor, which depends for its motive power on steam or compressed air. When operated at full speed the generator will produce a current of 10 amp. at 300 volts.

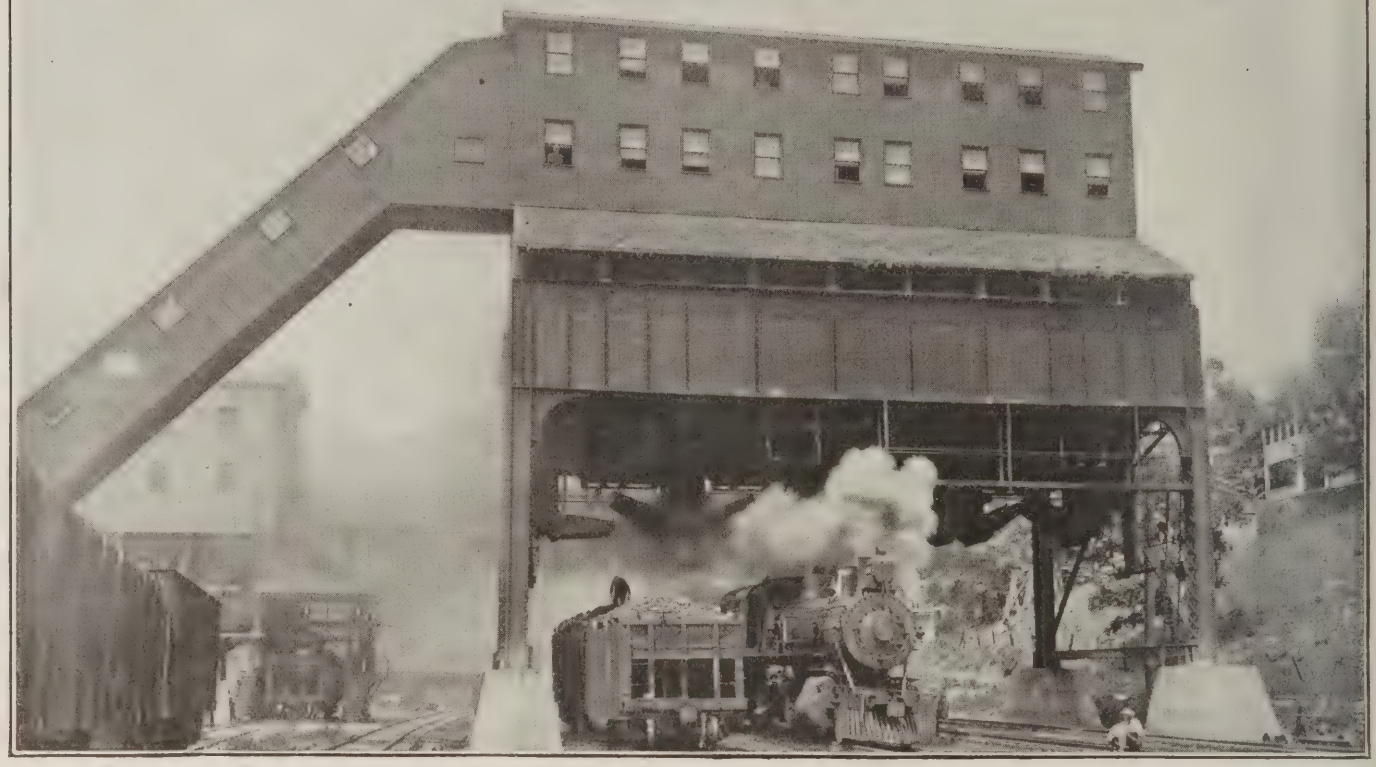
The machine is incased in a substantial hardwood case, the control board being located on the top of the



DETAILS OF TURBINE BLASTING MACHINE

case and protected by a hinged cover. The operation is decidedly simple. The wires are attached to the terminals or binding posts and the air or the steam turned on. As the speed of the turbine increases the generator gradually picks up the voltage. The voltmeter push button is held down and when the voltmeter indicator moves to the firing point the firing switch is pressed and the connected charge is detonated. A spiral spring which the voltmeter push button compresses forces the push button back to its original position and thus keeps the circuit open. The machine is lubricated through oil tubes leading to the top of the case. On the lower side of the case is a corrugated-iron pipe outlet (not shown in the illustration) through which the exhaust steam or air passes. The size of the case is 14½ x 13 x 10¾ in. and the machine weighs 42 pounds.

Coaling Locomotives on the Norfolk & Western

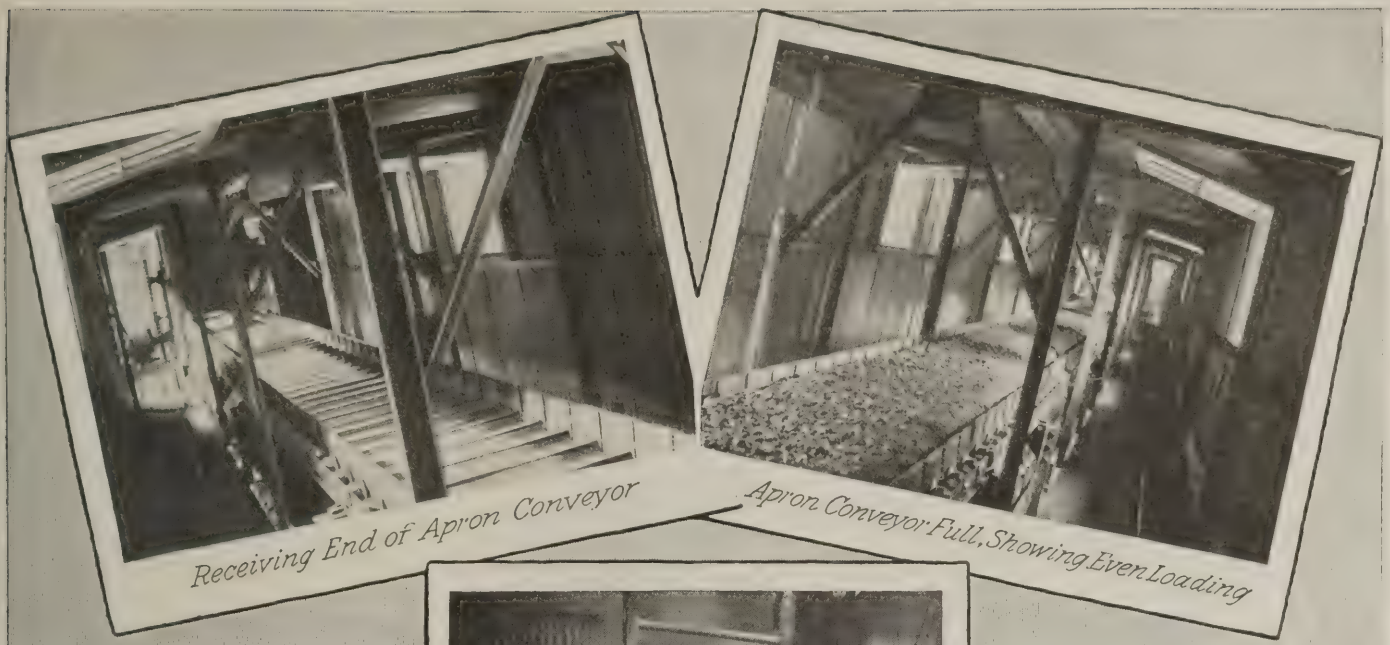


SYNOPSIS—*For quick dispatch in coaling locomotives it is necessary to have the proper kind of coal stored ready to be immediately spouted into the locomotive tender. A coaling station is here described where the fuel passes directly by conveyor from the mine to the station bin. Transportation expense is thus avoided and locomotive fuel is always available.*

PROBABLY no two industries are so closely associated as coal mining and railroading. The mines depend on the railroads to distribute their output, while the railroads have to buy fuel before the distribution can take place. It still takes coal to haul coal, even though oil-burning engines and electric locomotives are increasing in number each year. The relationship between railroad and mine is so close and so important as to form the subject of much legislation, both state and national.

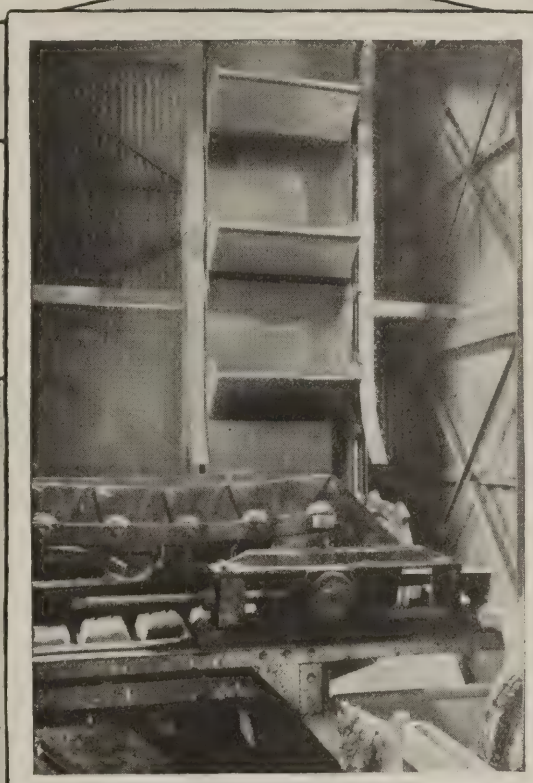
There are some roads whose chief business is that of handling coal. One of these is the Norfolk & Western, which gathers trainload after trainload from the mines in West Virginia and Virginia, carrying the loaded cars eastward to ships at Norfolk, Va., or north and west to Columbus, Ohio, where other roads take them over for delivery to the factories, mills and yards of our Central States. But the locomotives which draw the coal trains need fuel and accordingly each division of the run is provided with facilities for filling the locomotive tender with as little delay as possible. The newest coaling station is at Vulcan, W. Va., and is one which has received the approval of all those who have seen it as being one of the most convenient and efficient stations on the line. It has one marked advantage in that the coal here stored is taken directly from the mine tipple, which can be seen behind the inclined gallery at the left of the view reproduced in the headpiece.

The coaling station spans four tracks and has a storage capacity of 750 tons, although it is seldom called upon to deliver more than 200 tons in any one day. As stated above, the coal comes direct from the stationary screens in the tipple, passing into a bin from which it is drawn by a short double-beaded apron feeder and delivered to a 32-in. apron conveyor which transports it 116 ft., to a V-bucket carrier. The two upper views on the facing page show the apron conveyor empty and full, the right-hand illustration showing the even distribution of coal provided by the feeder. The center view shows the point at which the coal is delivered by the apron to the V-bucket conveyor. The buckets of the latter are 24 x 36 in., made of $\frac{3}{16}$-in. steel and mounted between two strands of 18-in. pitch steel-bushed roller chain. Their path is first vertical for 13 ft., then on an incline for 57 ft. (see headpiece), finally straightening out into a 60 ft. run over the bunkers (shown in the two illustrations at the bottom of the facing page.) There are two discharge gates which allow the coal to drop onto bar screens where it is divided into two sizes which are separately stored as run-of-mine and stoker coal. Each gate serves one screen and each screen supplies two pockets, one for each kind of coal. This division allows locomotives to receive either size of coal, on any track. All the equipment from the tipple to the bunkers, including the housing, was built and installed by the Webster Manufacturing Co., of Tiffin, Ohio.

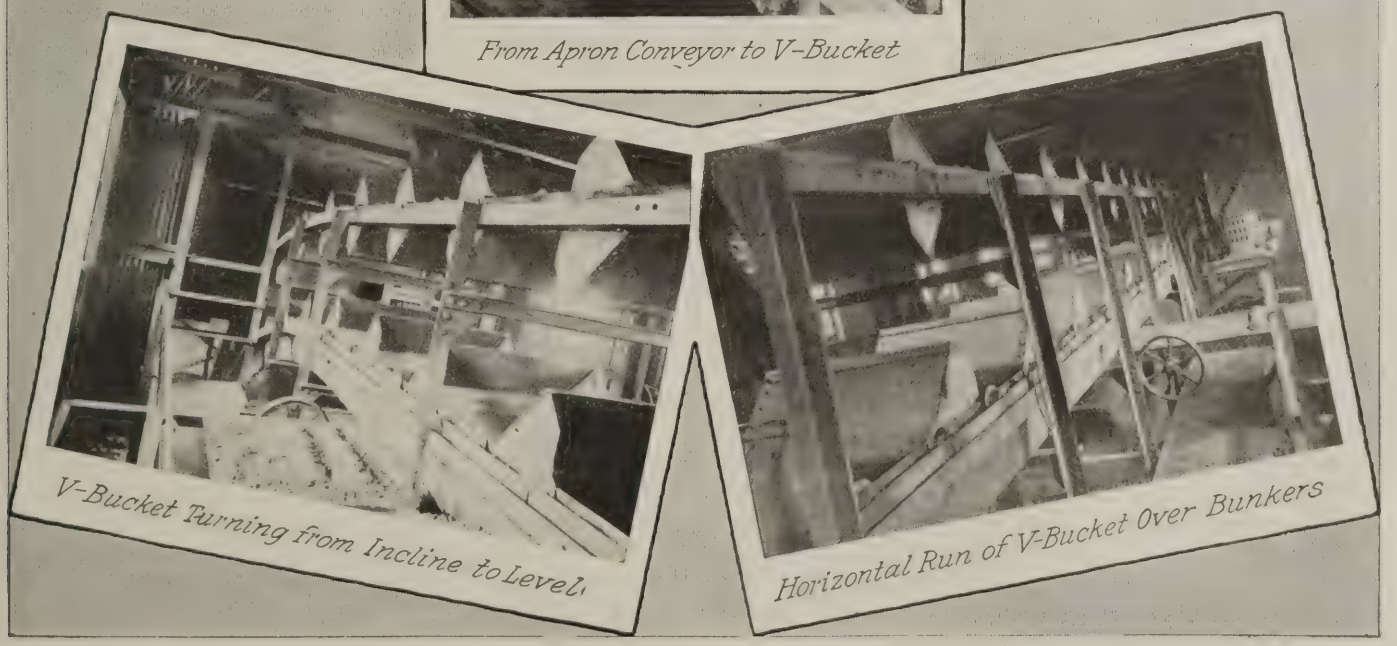


Receiving End of Apron Conveyor

Apron Conveyor Full, Showing Even Loading



From Apron Conveyor to V-Bucket



V-Bucket Turning from Incline to Level

Horizontal Run of V-Bucket Over Bunkers

Inherent Ability and Success

Brief Biography of Robert E. Hobart, Mechanical Superintendent Lehigh Coal and Navigation Company

WHEN a man receives a good round of applause after a service of many years with one concern—steady promotion from one of the lowest to one of the responsible positions in the active management of a big coal company—then it is not mere curiosity which makes men reflect on the reasons for this reward. It should not be difficult to read between the lines of this brief sketch of a life crowded full of endeavor and achievement—a struggle for place and position.



ROBERT E. HOBART
Started down at the foot of the ladder and climbed high by application and hard work

Robert E. Hobart was born in June, 1874. He comes of one of the old families of eastern Pennsylvania and lived in Tamaqua when a boy. His father was a Lehigh Coal and Navigation Co. man, and it is not surprising that the son should start his business career with the same company.

At fifteen years of age he became an apprentice in the Lehigh Coal and Navigation machine shops, and at the end of four years developed into a full-fledged machinist. He worked a number of years in this capacity and as a handy man at the shops. Rounding out his early training by a course in mechanics and as a draftsman, in a short time Mr. Hobart was made assistant general foreman at the Lansford shops. Later he became assistant mechanical superintendent, rising to master mechanic, and now holds the position of mechanical superintendent. He has jurisdiction over all the mechanical operations of the mining department of the Lehigh Coal and Navigation Co., including the Cranberry Creek Coal Co. and the Harwood Coal Co. The latter affiliated collieries are near Hazleton, Penn. All mechanical matters, steam, electrical and compressed air, and the extensive Lansford shops receive his attention.

It is most noteworthy that Mr. Hobart has come so rapidly to the front in the electrical end—in the development of electrical machinery as applied to mining. Further, that through it all his ideas in new applications of electrical machinery have proved in every case to be entirely practical and extremely successful. While he does not hold an engineering degree from a university, he intuitively grasps technical matters and goes through with them. The Lehigh Coal and Navigation Co. is one of the leaders in the electrical development in the anthracite field, which is largely due to the efforts and foresight of its organization, of which Mr. Hobart is an important part.

Big developments in the way of improved hoisting machinery, car-handling devices at shafts—also mine-car and headframe construction—in all these matters he has taken a prominent part. In the pump end he has labored to eliminate old, wasteful steam pumps of antiquated type, substituting modern, electrical centrifugal machines. All these efforts have tended to result in greater efficiency in the production of coal, decrease in costs—especially in the item of maintenance. Mr. Hobart is amply justified in priding himself particularly that serious breakdowns in machinery on the operating end are almost an unknown quantity.

His practical knowledge of the mechanical end of the coal-mining proposition is such that he can always find his way out of difficulties. He knows where a thing is, what it is for and how it can be applied. He thoroughly believes in "yardmaster talk" and yardmaster action—going out on the work and getting things done. Mr. Hobart has an unusually strong personality and the saving grace of a sense of humor. This is attested by his popularity with his men and in the town in which he lives.

He is sometimes addressed as Captain Hobart, for he had a long connection with the National Guard of Pennsylvania. His military experience dated from 1896 until 1911, when he retired with the title of captain. At present he is treasurer of the armory board at Tamaqua. His contributions to engineering societies and technical periodicals in the way of papers and articles are valuable additions to mining and mechanical literature.

Mr. Hobart's extreme reticence to talk about matters connected with himself leaves many blanks—including his home life and many interesting personal reminiscences. His modesty is strikingly exemplified in the type of picture which we are obliged to publish of him—it is taken from a group—the only one obtainable and that without his knowledge or consent. Also were it not for the friendly enthusiasm of his associates, this sketch would be brief indeed. Of his 43 years of life, 28 were given to the company he now serves. His experience should be a wholesome inspiration to those who question whether conscientious, persistent well-directed effort brings success.

There is no fuel that will burn almost completely without any combustion space. No matter how much the volatile content of the coal is decreased, the combustion space cannot be decreased beyond certain limits except at the expense of completeness of combustion.—*Bureau of Mines Bulletin No. 135.*

Balloon Framing with Concrete

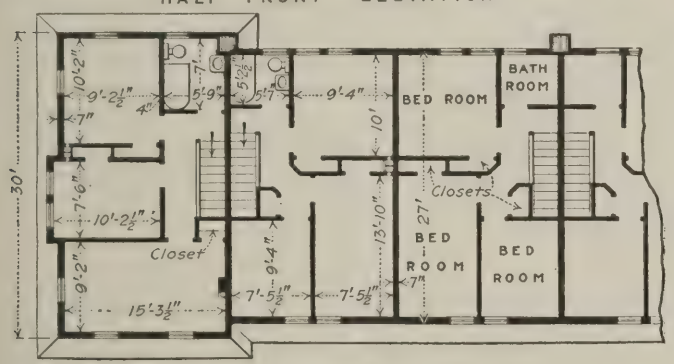
SYNOPSIS — *Concreting has been successfully applied to balloon-frame construction. All the wood used in the forms is left in the building, but little of such wood is needed. The building when completed is a shell of gunite or cement stucco supported on a concrete framework, the whole forming a monolithic unit. For the inside of the outer walls, the party walls and partitions either gunite, cement stucco or plaster may be used.*

THE value of concrete for resisting fire and keeping down vermin gives it a peculiar value as a building material. But there are difficulties in the casting of solid walls, and these difficulties make the building of all-concrete houses trying and expensive. Moreover, walls which are not double are apt to be wet. So some have sought an intermediate plan in which the framework is of wood and the outer and inner coating cement stucco with wire reinforcement.

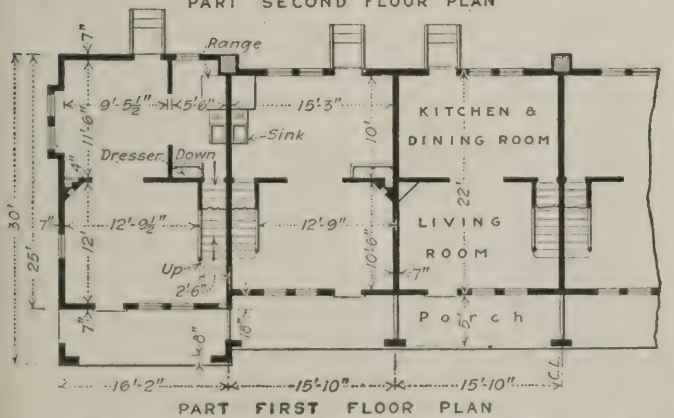
Emile G. Perrot, of Ballinger and Perrot, architects and engineers of Philadelphia, Penn., has successfully schemed out a house with concrete studs, floor plates and caps as well as a wall surfacing of cement stucco. This sounds complicated, but the matter is comparatively easy. You have walls that do not shrink and are reasonably fireproof and you have floors which, though not fireproof, have the merits of springiness and comfort, qualities which are not afforded by the unyielding concrete floor, which is better suited to a factory than a dwelling. The plan and construction methods are under consideration for use in the large-scale housing work about to be started by the government.



HALF FRONT ELEVATION

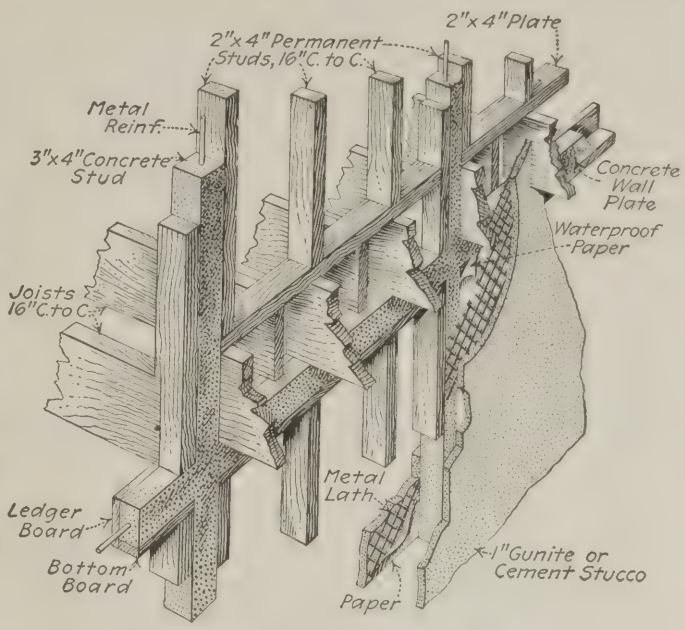


PART SECOND FLOOR PLAN



PART FIRST FLOOR PLAN

PART FRONT ELEVATION AND FLOOR PLANS OF TEN-UNIT HOUSE WITH CONCRETE STUDS



PERSPECTIVE SHOWING PARTY WALL

The bids which have been received show that houses, at present prices for labor and material, can be built in ten-unit rows, as sketched herewith, for $2500 per house of six rooms. This figure includes the cost of the hot-air furnace and of the piping for heating purposes. The price is as low as was bid for the construction of a precisely similar house of wood-frame construction and shingle covering and $100 lower per house than was asked for the construction of the houses when 8-in. brick walls were specified for exterior and party walls.

After the cellar is excavated a stone or concrete foundation wall is built in the ordinary way. The first-floor wood joists are then set in place on the foundation walls. On these joists a wood frame consisting of studs, joists and rafters is erected much in the manner customary when building the skeleton of a frame house.

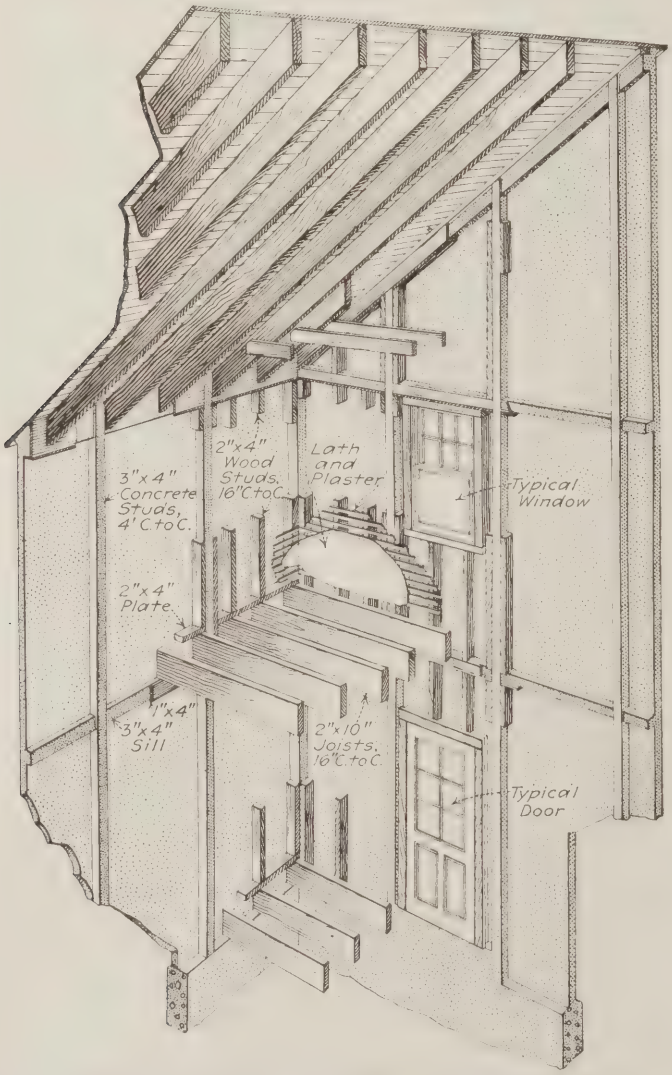
Every fourth stud is doubled, a 3 x 4-in. space being left between the two parts. This space is to be filled with concrete to form a concrete stud, as soon as the roof of the building is in place. At the level of the second floor a ledger board (or board set on edge) is placed over the tops, of the wood studs, its outer edge flush with one side of the studs; either side will do, if a party wall is being constructed, but the inside must be chosen, if an outside wall is being built. A bottom board is also laid flat on these wood studs, its edge butting against the ledger board. When the concreting

reaches this point, the cement gun is directed at the angle between the ledger board and the bottom board and the beam is easily built up by the gun in the shape shown in the perspective view of the party walls.

Before concreting commences heavy waterproof paper is stretched all over the studs on the outside of the exterior wall which is then covered by metal lath. The gunite coating is built up on this metal lath and is made from 1½ to 2 in. thick. At the same time the studs and wall plates are concreted. If, for any reason, the cement gun is not available, the continuous vertical studs and wall plates can be poured with concrete and the exterior metal lath coated by hand with 1:2 cement mortar.

However, the work is not so good as if done by the cement gun for gunite concrete is 33 per cent. denser than ordinary poured concrete and about twice as strong. Color effects may be obtained by adding mortar stain to the concrete while it is being mixed. No further treatment of the exterior wall surface is needed.

In the illustration showing the details of the party wall gunite or cement stucco is shown as the material used. Where cement stucco is adopted the waterproof paper can be dispensed with, the cement stucco being readily built up on the metal lath. The architect will possibly prefer to use neither gunite nor cement stucco but plaster for the inside, party and partition walls.



CORNER OF THE LAST HOUSE IN BLOCK OF TEN

Because only a few wood studs and all the concrete studs are shown it is not to be assumed that the wood studs are removed before the lath and plaster or cement stucco surface is placed.

Plaster is not so hard as cement stucco and in consequence interior wood finish, picture moulds, etc., can be more easily nailed in place than they can be with cement surfaces. The plaster can be put on wood, instead of metal, lath if desired. Of course, with such plastered surfaces on the inside walls the dwelling is only semi-fireproof because a fire on the inside of the dwelling is not protected from spreading. The outside wall being protected by gunite or cement stucco is, of course, fireproof, and there is thus protection against exterior fire hazards, but not against those from within. Wherever, as in a factory, no wood trim is desired the cemented surface may well be found preferable.

In order to reduce the fire hazard the interval between the joists on the foundation wall and on the wall plate of the second-story floor may be filled with concrete up to the underside of the flooring, the thickness of the fire stop being the same as that of the studs, namely 4 in.

The rapidity with which this type of house may be erected is dependent only upon the number of cement guns put into simultaneous operation or, if the work is done by hand, upon the number of workmen employed at any one time. After the framework of any number of houses is erected the cement can be applied without any interruption. It is not necessary as in the concrete construction to shift the men and their materials forward and back till the work is completed.

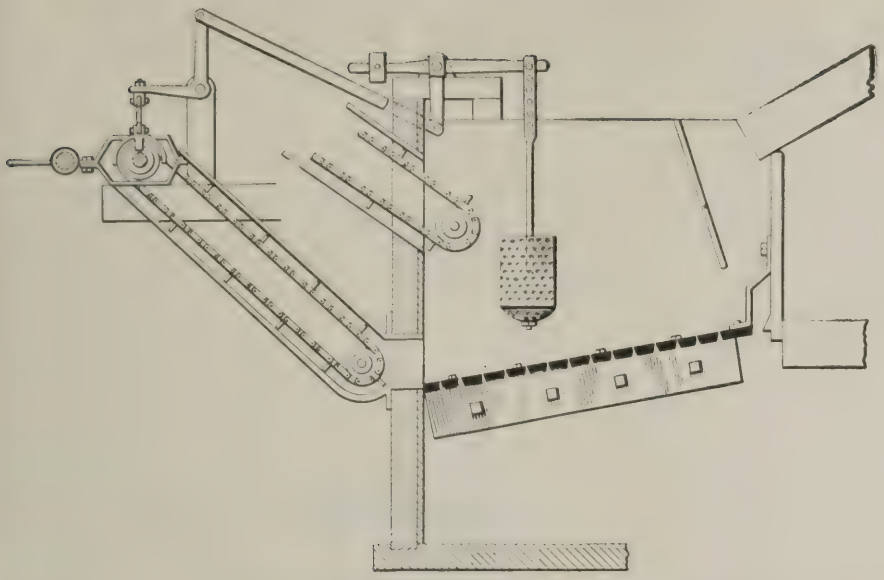
Furthermore, the many cracks so common to all other forms of concrete construction are entirely eliminated because the vertical concrete studs carry all the load and consequently there is no shrinkage or settlement to contend with, the structure being monolithic.

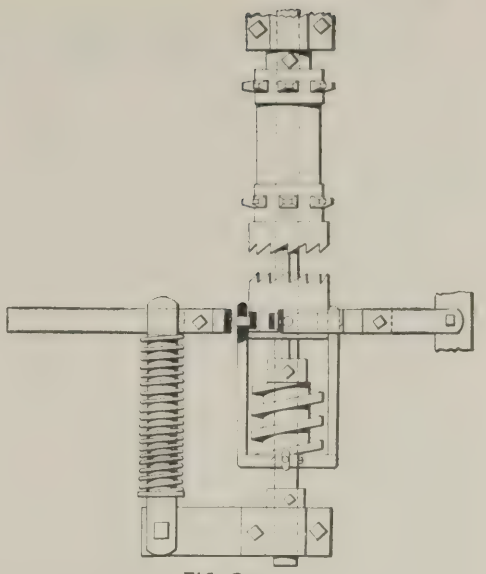
Where the party walls are of stucco or gunite a skim coat of plaster is applied to the cement as a finish. This method of surfacing the walls of a room saves about 8c. per square foot over the usual plastered surface. Whether the interior is gunited, hand-coated with cement stucco or plastered in the ordinary way the methods of construction compete quite successfully with those used in building a frame dwelling, especially now when wood is expensive and difficult to obtain.

Automatic Anthracite Coal Jig Control

The accompanying illustration shows an automatic control for slate and refuse elevators as attached to the common types of anthracite coal jigs. As may be seen in Fig. 1, the device embodies a perforated cylinder or float, which in operation rides on the surface of the slate or refuse while in process of jigging, the object being that after the slate rises to any predetermined height in the jig chamber or compartment. this float rises with the slate and automatically releases a spring (Fig. 2), thereby engaging a clutch. This starts the slate elevator and so removes the slate in the jig chamber, allowing the float to settle again. This settlement causes a nut to come in contact with a worm gear, disengaging the clutch, and so stopping the slate elevator.

It will be readily perceived that the elevator will remain idle until enough slate or refuse has again accu-


FIG. 1


FIG. 2

FIGS. 1 AND 2. AUTOMATIC JIG CONTROL FOR SLATE AND REFUSE ELEVATORS

mulated to cause the float to rise, and thereafter automatically repeat the operation. An important economic feature of this device is that one operator is enabled to care for a battery of 15 jigs where in ordinary operation not employing a control of this character one man is required to attend each 2 or 3 jigs. Once installed and operative, the jigs become entirely automatic, and the device here shown is so simple and "foolproof" as to insure continuous operation at very low cost for upkeep.

This controlling device was invented and patented by Reynolds and Brown, of Forty Fort, Penn. Practical installations have been in operation at several collieries of the Temple Coal Co. for about one year, where they have proved entirely satisfactory. The results have shown an increase over the normal capacity of the jigs, and a greater general efficiency as compared to the operation of standard jigs not equipped with controlling devices. The Cross Engineering Co., of Carbondale, Penn., manufactures this control.

W. M. Chase

NO ONE has reason to expect success who does not connect himself from the first with concerns having a modern way of doing business. A broad view of any industry can never be formed by association with companies that hesitate to travel on a new high road and which begrudge the expenditure necessary to bring their properties up to date. Some persons start life in the deep rut of niggardly and narrow-minded methods, and from these methods and the habits of mind that go with them escape is usually impossible.

W. M. Chase, who was born at Lynchburg, Va., in 1881, was fortunate in having modern operations and competent leadership from the start of his career. In 1898 he started work with the Berwind-White Coal Mining Co. He stayed with them 14 years and then affiliated himself with the Lackawanna Steel Co.'s mining interests at Ellsworth and Wehrum. In the service of both these companies he had an opportunity to see coal-mining practice in the making. Not that progress in the coal industry is all the impatient would have it, but because the Berwind-White and Lackawanna were in many, many ways among the leaders in that progress in both mechanical and sociological lines.

From the Lackawanna interests he went to the Cambria Steel Co.'s mining department at Johnstown, Penn., another progressive organization. When Harry T. Meehan became managing partner of the firm of Cosgrove & Co., Mr. Chase was selected as general manager of the Union Coal and Coke Co., to succeed Mr. Meehan. In doing this Mr. Chase goes back to a neighborhood


W. M. CHASE

with which he is quite familiar. The Union Coal and Coke Co. owns the Marianna and Acme mines, the properties of which abut on either side the properties of the Ellsworth Collieries Co., with which Mr. Chase was for some years identified. The Hazel Kirk mines 1 and 2 are on the same line of road, somewhat nearer to Monongahela. At the latter town is another of the Union Coal and Coke Co.'s mines, the Schoenberger. The other two mines, Penn Manor No. 1 and 5, are in Westmoreland County at Manor and Claridge, Pennsylvania

Mechanical Mining Without Explosives

By N. D. LEVIN
Columbus, Ohio

SYNOPSIS—*A machine that cuts, breaks down and loads coal has been tried out in several fields and several coal beds. The use of this machine decreases the cost of entry driving, makes mining safer and secures a normal output in a short time after opening the mine.*

AT THIS time, when there is a larger demand for coal than ever before in the history of the world, a study of the performance of an entry-driving machine will be of interest. Since 1910 systematic research work has been carried on; experimental machines have been built and tested in several coal beds in various states. This work has resulted in the development of a machine that performs all the operations required in mining coal and loading it into the pit cars without the use of explosives or hand labor.

One machine has been in practically daily operation for two years, and additional ones are now being installed in the same mine. The coal in this mine is overlaid by a heavy layer of drawslate that comes down as soon as the coal is removed. The handling of this slate takes a large percentage of the time, and therefore the production is limited. Careful time studies have been made of the operation of this machine. Table I is an example of one of the daily reports made by an engineer whose duty it was to keep track of the time.

A short description of the machine will assist in understanding this report. Fig. 1 shows a front view of the machine. It operates on the same principle as a breast machine; the first or sumping cut being made at either rib, usually the left. It is fed forward in a stationary pan, making a cut 5 ft. wide, 7 ft. deep and of a height to suit the coal bed. The coal in the above-mentioned mine is 5 ft. 8 in. high. The machine has an undercutting chain with cutter head similar to that of a breast machine, and two shearing chains, one on each side. The frames carrying these shearing chains can be varied for different heights of coal. Between the shears is mounted a frame carrying a number of heavy punching picks. This frame is readily raised and lowered by the operator, who can cause the picks to strike at any height he desires. The coal falls onto a conveyor which is made thin enough to go into the kerf cut by the undercutting chain. This conveyor carries the coal to the rear end of the machine and dumps it into a second conveyor, which is mounted so that it can swing at any desired angle to the machine.

After a cut is made, the machine is moved sideways by means of a rope hitched to a jack at the opposite rib and then another cut is made. When slate is to be piled up at the side of the room the rear conveyor is swung sideways, the slate rolled onto the front of the machine and gobbed by the two conveyors.

If we analyze the daily report we find that on this particular day it took an average of 13½ minutes to make a cut, and about 3 minutes to move the machine to the next cut, or about 16 to 17 minutes time for each cut. There were 45 cars of coal loaded and 13 cuts made, therefore each cut gives about 3½ cars. The cars hold nearly two tons of coal, which means at least six tons per cut and 21 tons per hour. This rate of mining and loading can readily be maintained if conditions in the mine are such that the machine



FIG. 1. FRONT VIEW OF THE MACHINE

can be kept in steady operation, which is not possible with heavy drawslate. Where the roof conditions were good the machine has loaded 30 tons an hour in this mine.

Fig. 2 shows the machine ready to start a cut. The jack and rope for pulling the machine over for the next cut are plainly seen. This photograph shows the pipe posts that are used with the machine. These posts can be set in a small fraction of the time that would be required for setting wooden posts. As the machine advances, wooden posts are put in to take the place of the pipe posts.

Fig. 3 shows the coal being delivered to the swinging conveyor. Figs. 4 and 5 show the swinging conveyor delivering coal to a storage hopper. This hopper holds about three tons, and is provided with a conveyor that will empty it in about a minute. There is a separate motor on this hopper for operating the conveyor. A starting box for the motor is at the rear end of the conveyor, conveniently located for the driver who stops and starts the hopper conveyor as required in loading the car. There is also mechanism on the hopper for moving the car its own length so that the driver can load the car without assistance. The machine crew pay no attention whatever to this part of

the work. The storage in the hopper gives the driver sufficient time to change cars and keep the coal away from the machine. This hopper conveyor is of more importance than one would think.

TABLE I. DAILY REPORT

7:00 a.m. to	7:50 a.m.	Clearing slate and bottom coal
7:50 a.m. to	8:05 a.m.	Cutting and loading coal
8:05 a.m. to	8:17 a.m.	Move machine and set posts
8:17 a.m. to	8:30 a.m.	Cut and load coal
8:30 a.m. to	9:02 a.m.	Move and set machine for sumping cut; set bits; clear slate; dig up bottom coal and replace bent jack pipe
9:02 a.m. to	9:25 a.m.	Cut and load coal and pick out slate that fell on top of the machine
9:25 a.m. to	9:28 a.m.	Move machine
9:28 a.m. to	9:41 a.m.	Cut and load coal
9:41 a.m. to	9:51 a.m.	Cleaning slack out of teeth of crank gear*
9:51 a.m. to	9:56 a.m.	Move machine
9:56 a.m. to	10:07 a.m.	Cut and load coal
10:07 a.m. to	10:09 a.m.	Clean slack conveyor
10:09 a.m. to	10:16 a.m.	Move machine and set roof posts
10:16 a.m. to	10:27 a.m.	Cut and load coal
10:27 a.m. to	10:32 a.m.	Tighten brake band an pick drum
10:32 a.m. to	10:52 a.m.	Clearing slate and bottom coal
10:52 a.m. to	12:07 p.m.	Cut and load coal
12:07 p.m. to	12:37 p.m.	Dinner time
12:37 p.m. to	12:55 p.m.	Move machine and shovel loose coal and post room
12:55 p.m. to	1:06 p.m.	Cut and load coal
1:06 p.m. to	1:20 p.m.	Move machine and shovel loose coal
1:20 p.m. to	1:35 p.m.	Cut and load coal
1:35 p.m. to	2:00 p.m.	Move and set machine for sumping cut, clear slate and dig up bottom coal and reset roof posts
2:00 p.m. to	2:17 p.m.	Cut and load coal
2:17 p.m. to	2:20 p.m.	Move machine
2:20 p.m. to	2:33 p.m.	Cut and load coal
2:33 p.m. to	2:37 p.m.	Move machine
2:37 p.m. to	2:51 p.m.	Cut and load coal
2:51 a.m. to	2:56 p.m.	Move machine and oil crank gear gearing
2:56 p.m. to	3:10 p.m.	Cut and load coal
3:10 p.m. to	3:30 p.m.	Shovel loose coal and take down slate and post up room safe for night

*A guard has been provided to keep the slack away from the gear.

From July to October, 1913, the first machine of this type was operated in another district, driving an entry where the roof conditions were all that could be desired, but all that time there was no hopper conveyor used. It was found that regardless of every effort on the part of the machine runners and the mine foremen, there was an average of 5 minutes wasted each time a car was changed. Nevertheless an output of as much as 120 tons per shift of 9 hours was obtained with an average of 60 tons per shift for the three months that the machine was operated. Since that time many improvements have been made in the machine, and the hopper conveyor added, therefore a much larger output should be expected.

The use of mining and loading machines will materially change the coal-mining industry. A property that, with the present system, takes years to develop, can be opened up in a short time by the use of mining and loading machines. As soon as the overhead equipment, shaft or slope is ready, it is simply a question of putting in a sufficient number of machines to obtain the desired output. The work can be concentrated and the output obtained from a small territory.

Opening a New Mine

If we assume that a coal property of about 5000 acres averaging 6 ft. of coal located in the lower Monongahela River section of the Pittsburgh district is to be opened, the panel system of room-and-pillar mining would probably be decided upon as being the best adapted to the conditions to meet maximum recovery and safety in operation. It would probably be desirable to obtain an output of 3000 tons per day, which would exhaust the property in somewhat over 20 years.

To provide for the enormous volume of air that would be required as the mine advances it would probably be necessary to drive six face entries in the center of the property. If the entry work is pushed hard, and all entries worked double shift, it would probably take three years to develop the mine sufficiently to obtain an output of 3000 tons a day. On the other hand, if the same property were to be opened with a view of using mining and loading machines, it would probably not be necessary to plan for more than two or possibly three face entries. Two butt entries could be started immediately and worked to the end of the property, one machine to each entry.

The machine when driving an 11-ft. entry has averaged 20 ft. advance per shift of 8 hours under rather unfavorable conditions. There was a considerable



FIG. 2. THE MINING MACHINE READY TO START A CUT



FIG. 3. REAR VIEW OF MACHINE, SHOWING COAL ENTERING SWINGING CONVEYOR

amount of sulphur in the coal, and the machine was handled by a crew unskilled in the work of pushing the work; also, the personnel of the crew was frequently changed. It is safe to assume that if the machines are worked double shift, they will advance 40 ft. each 24 hours. This being the case it would be desirable to drive to the end of the property and work back. As soon as a pair of entries are given, as many rooms as desired can be turned off. In the meantime another pair of entries can be started. It is desirable to cut very few breakthroughs in the entries in order to save expense of building fireproof stoppings. The breakthroughs may be driven on 250-ft. centers. In this case air is supplied to the machines by canvas tubes and a small electrically driven fan placed in the nearest breakthrough. A tube of this kind is shown in two of the accompanying illustrations. These machines should be worked double shift. Between shifts they

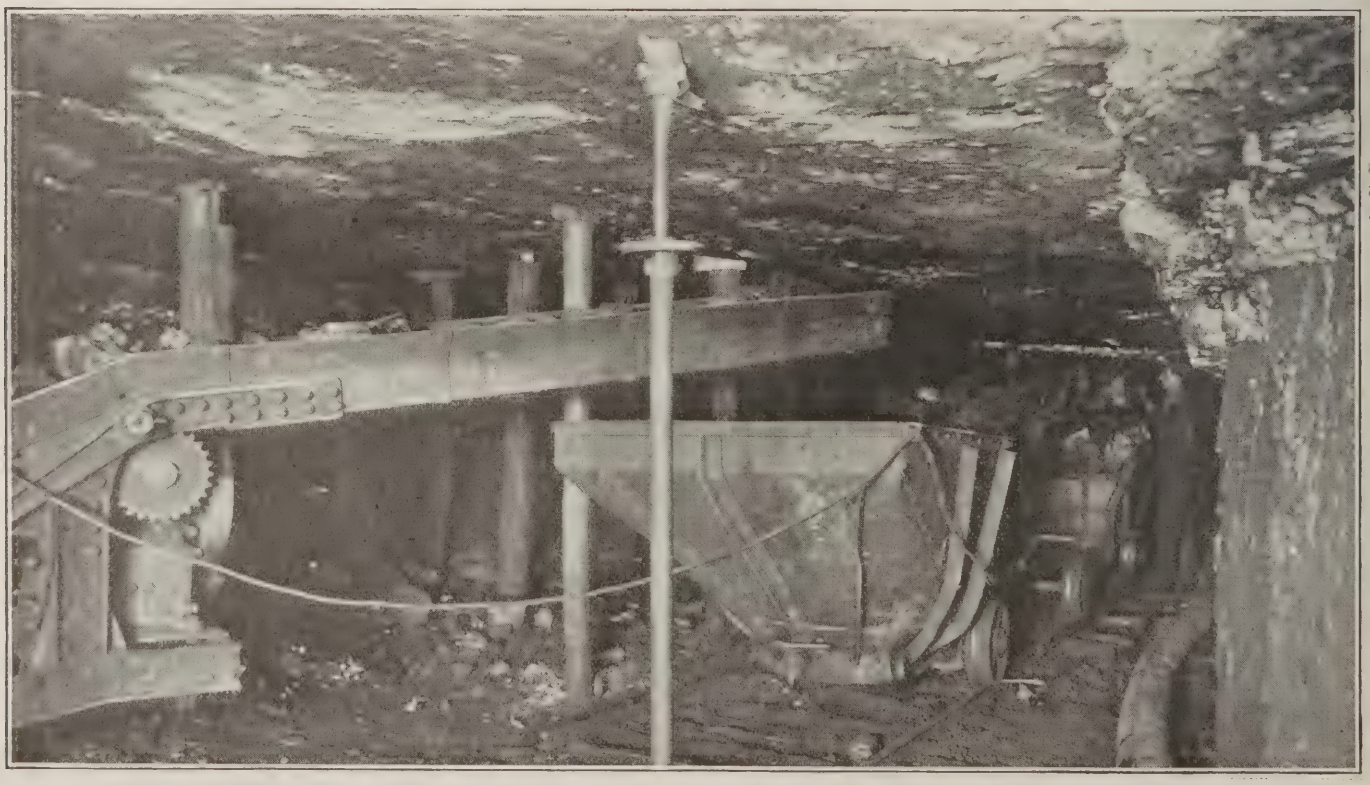


FIG. 4. REAR OF CONVEYOR, STORAGE HOPPER AND CAR

should be oiled, looked over in a general way and the bits reset.

If we assume that each machine working in a room produces 60 tons per shift, or 120 tons each 24 hours, and each machine on entry work produces 40 tons per shift, or 80 tons every 24 hours, there would be 22 machines required for room work and four machines for entry work for the mine in question. Consequently, to obtain 3000 tons per day would require only 22 rooms and four entries at one time. If the mine is laid out along the line of present practice about 350 rooms and 30 to 40 entries would be required to maintain an output of 3000 tons per day.

It can readily be seen that an enormous saving can be made in track and trolley material, overcasts, fireproof stoppings, turning room necks, timbering, drainage, ventilating equipment, locomotives, mine cars, mules, etc.

The crew for each machine consists of a machine runner, a helper and a driver. If the slate is heavy, it may require an extra man for handling this material. The same class of men that make good shortwall machine runners make good men for the mining and loading machine.

There is less danger of roof falling where the mining and loading machines are used. The machine stays in the room until it is worked out, which is a comparatively short time, probably three to four weeks. On account of this condition the expense of timbering should also be decreased to a marked degree.

In a mine of the kind outlined there would be few entries that they could be inspected frequently and kept in a safe condition. No explosives would be used in a mine equipped with mining and loading machines, and there would thus be no danger of blownout shots which often cause dust explosions. All accidents due to careless handling of powder and carelessness in shooting would be entirely eliminated.

When a section is worked out, it could be closed up permanently. Thus only a small section of the property would be worked at a time, making it easy to ventilate and keep down the dust.

To analyze the cost two mine maps were laid out, one for the mine using entry driving machines and the other the present system of room-and-pillar work. On these maps were marked the advance of working faces for each month until 3000 tons per day could be obtained. Equipment, track material, etc., were tabulated for each case and probable pay rolls were made up.

It was found that the outlay for equipment and the expense of opening a mine with mining and loading machines was about the same as with the present system, if it was assumed that the machines loaded only 60 tons per shift, in the rooms. Conditions must be unfavorable if the machines do not load more. If an output of 100 to 150 tons per machine is obtained, which is quite probable, then the saving in the first cost will be much in favor of the mining and loading machine. The figures show a saving of 32c. per ton by using the machine in entry driving.

In obtaining these figures it was assumed that conditions were unfavorable and that the machines produced only 40 tons per shift in rooms and 30 tons per shift on the entries. The machines have averaged much better than that where the slate handled was 2 to 4 ft. thick.

In a mine equipped with mining and loading machines the cost will not increase from year to year as the mine is being worked out, as is the case with the present system. The workings will always be concentrated. Only main haulage will become longer, and this will not materially affect the cost.



FIG. 5. COAL BEING DELIVERED TO THE STORAGE HOPPER

From Switchman to Coal Operator

Biographical Sketch of Frederick W. Lukins, President of the Southwestern Interstate Coal Operators' Association

GRAY matter, energy, a level head and a sense of proportion that provides an appreciation of the other fellow's point of view—these are the chief qualities that have characterized the progress of Frederick W. Lukins, from switchman on the Chicago, Burlington & Quincy, at Streator, Ill., in 1881, to coal operator and president of the Southwestern Interstate Coal Operators' Association.

Fred Lukins, with the commonest of common school educations, was a husky lad and naturally drifted into a switchman's job at home; but he had ambition. He edged his way into the freight office of the railroad; next he was made secretary of the Riverbank Coal Co., a producing concern. He joined forces with Jim Cavanaugh, who was also energetic and ambitious. They formed the coal-producing firm of Lukins & Cavanaugh and bought a drift mine on time. Cavanaugh looked after the operating end, hauling coal from the drift to the dump, from which it was hauled by wagon to the cars. Lukins looked after the business end of the company. After two years Lukins gave up his regular job with the Riverbank company. He and Cavanaugh bought another mine where they raised coal with a gin; they dumped it into a tram car in which they hauled it to the railroad.



F. W. LUKINS

Has gray matter, energy, level head—and appreciates the other fellow's point of view

In 1887, after three or four years of the hardest kind of work, they reached the climax of their efforts, opened another shaft, equipped it with a steam hoist and loaded coal into the cars direct. Meanwhile, however, they added other strings to their bow. They had a brick manufacturing plant and they also formed a partnership with Mulford, a contractor, whom they bought out.

In 1893 Mr. Lukins sold his interest to Mr. Cavanaugh, and with T. C. Loucks, of Chicago, organized the Chicago-Virden Coal Co. They bought a coal mine at Virden, equipped it with modern machinery, and went to work in earnest. The first year they would have made the record for the biggest output of the state, except for a railroad rate war in which their railroad did not participate. The second year they produced the highest annual tonnage in the state at that time, 350,000 tons. Then they bought out the Sugar Creek Coal Co. at Auburn and also a mine at Chatham. This gave them a total production of 5000 tons a day. They ran these properties until 1905, when they consolidated with the Pittsburgh Coal Co., whose properties were at Springfield, Virden, Litchfield and Sorento. Mr. Lukins had been vice president and general manager of the Chicago-Virden company; he was made general manager of the new combination, the Illinois Collieries Company.

On the first of April, 1907, Mr. Lukins resigned his position with the Illinois Collieries Co. to become the general manager of the O'Gara properties. These included the O'Gara Coal Co.'s thirteen properties in Saline County, Illinois, also the mines of the Vivian Collieries Co., the Imperial Mining Co. and the O'Gara Coal Mining Co., the latter companies having ten mines in Illinois, Indiana, Ohio and West Virginia. The O'Gara companies soon developed the largest output of any concern in the central west at that time. There were more than twenty mines scattered over four states. Production was greatly increased under Mr. Lukins' management. The Saline County property, for instance, rose in five years from 4000 to 15,000 tons daily. In another of the properties Mr. Lukins increased the production from 800 tons a day to 1200 within a month's time, without any increase in the day labor cost.

When the five-year contract was up, Apr. 1, 1912, Mr. Lukins was ready to take a rest. He had been thirty years in harness and he wished to give up the coal business, moving to one of his ranches in Colorado. He was there only a year when pressure was exerted to get him back into coal again. He finally took the general managership of the Waverly Coal Co., which has extensive interests at Waverly, Mo. These mines had been idle for some time and finally had been purchased by an English syndicate.

When Mr. Lukins had been back in Streator, Ill., as a young man, he had come in contact with the high grade coal from the east and with cheap coal from the south. He then resolved that eventually he would handle either the highest grade coal or the cheapest. Later, in the Virden company he had had a chance to mine cheap coal successfully. But out on the ranch he decided that what he really wanted to do was to handle a high-grade product. When he came to Kansas City in 1913, as manager of the Waverly company, he bought the properties of the Farmers' Fuel Co. at Higginsville, Mo., and reorganized it. This company had been selling Red Label coal for more than 30 years in its territory. Mr. Lukins, in 1916, bought another mine in the same field, which gave him control of that field and of the type of coal which had been sold as Red Label for so many years.

Coal men will remember the Virden riots of Oct. 12, 1898. These were the culmination of a strike on the Chicago-Virden properties which had lasted through that summer. That trying experience matured Mr. Lukins' sympathy as well as his judgment with refer-

ence to the unions and the general purposes of organized labor. This sympathy was not purely theoretical, but has been practically applied to dealings with unions over many years.

Mr. Lukins was one of the first members of the Illinois Coal Operators' Association, organized in 1898, and was on the scale committee from the beginning. He served two terms as vice president of that association and was continously on its executive committee. After coming to Kansas City he was continued on the scale committee because of his knowledge of practical mining matters and his faculty for getting along with the men. In 1917 he was vice president of the Southwestern Interstate Coal Operators' Association for Missouri, and this year is its president.

Mr. Lukins does not confine his sympathy for organized effort and for conservatism to miners' organizations. He believes that operators should consider the square deal. He is consistent. When the Chicago Virden company was organized, he had that same idea which he now represents as president of the Southwestern Coal Operators' Association. The Chicago Virden company raised the day wages from $1.50 to $2 and the miners' scale from 50c. to 55c. in the face of opposition of operators who did not believe in paying any more than they had to.

The question was asked Mr. Lukins, "What is the secret of success?"

"It's hard to say," he said, "why one man fails and another gets ahead. Two essentials to success are gray matter and energy. But there are plenty of smart fellows who work hard enough and yet do not seem to gain a permanent advantage. Perhaps it is because they lack balance."

Anyone knowing Mr. Lukins could hardly avoid observing that he never is apparently in a hurry; he always has time for anything that needs to be done; he goes straight at the task, and every move he makes and every word he says carry him closer to the accomplishment of the result aimed at. If one remembers the big things Mr. Lukins has done, the many phases of complicated industrial problems that he has so ably kept in hand, his competent grappling, not only with financial and operative, but with the human element of coal and mining and marketing, one can hardly fail to recognize him as a man of genius.

Success of the Coal Mining Engineer

By E. I. ROBERTS
Alberta, Canada

THERE is great diversity of opinion as to just what constitutes a mining engineer. If the question were asked, "What is a coal mining engineer, as commonly understood around a coal mine?" various answers will be received. The majority will probably say, "Why, he is the man who does the surveying." From others, "Well, he is usually around when there is some concrete work to be done." Still another explanation will be given by others.

As a general rule, however, the definition of "coal mining engineer," as it is usually given and understood around the various coal mining fields, does not give as complete or as full a credit to the name as it deserves. Wherein lies the reason for this? Is it with the coal companies, or with the mining engineer? The writer ventures the opinion that it rests with the engineers, as professional men, to change this general understanding. It is of course realized that mining engineering comprises a little of all branches of engineering; in some cases a lot of some particular profession. It is probably due to this diversity of engineering requirements around coal mines that the general engineer has confined his efforts to surveying. The primary requisite, then, is adaptability on the part of the engineer.

There is a decided trait among certain young college graduates to still cling to the college fraternities—too much Alpha Beta. This trait tends to injure their own future and also the future of coal mining as an engineering profession. This all tends to a waiting for opportunity—to a craving for the unearned respect of those who have never had the chance to be an Alpha Beta. Coal mining is too hard a game and contains too many strong, able men to give respect to a name alone. This brings us to the second requisite for success—push and initiative. The graduate, on first leaving college, encounters a cold, and sometimes unsympathetic world, particularly when he enters the coal mine. The guiding hand of his professor is withdrawn, and sometimes it almost seems to him as though the source of all his knowledge has been cut off. He may temporarily forget that his professors strove to impress on him the necessity to think for himself. College aims to make men think—textbooks are mainly for reference, after their contents have been mastered. This all tends to call attention to the third requisite, that of confidence in himself.

Many times training is not considered at all—it may be presupposed that this quality has been given to the young engineer during his college days. Further, it has been said that engineering is one part mathematics and nine parts common sense. In the mind of the writer, the training for any particular application of engineering can be acquired at the time necessary for the training to be applied. Provided, of course, that the foundation is there. It is rarely the case that a university gives any man more than a foundation, the rest comes from the continued application, built up on this foundation.

In the past the duties of a mining engineer too often have been largely confined to one or two small branches of the profession—that is, surveying and platting. Occasionally he may have been used to look after the construction of a concrete wall. Or, if he was out of work, he may have been instructed to help in the office or in any department where a little clerical work was needed. Finally, when the company retrenched, the mining engineering department was the one largely dispensed with.

A person realizes that to survey properly is a worthy attainment—to be able to make an accurate map, an actual necessity. But it seems ridiculous that it should require four years' technical training and subsequent practical knowledge to run accurately and plat neatly a simple traverse in a coal mine. Yet this is what is expected of the engineer by the majority of coal operators and officials. It would be quite as reasonable to expect an electrical engineer to devote his entire time to the splicing of cables, or a mechanical engineer to the firing of a boiler. Each of these duties is a necessity in the respective lines, but they do not constitute the professions of electrical or mechanical engineering. Still, a similar necessity in the mining engineering field is expected to constitute the whole. It is up to the mining engineer to change this view. And may it not be a lack of one or more of the requisites for success above mentioned which is responsible for this understanding of the profession?

Of all modern industrial organizations, coal mining is occasionally the least efficient. A coal mine power plant may still use fire-tube boilers, and most boilers are hand fired. Such devices as carbon dioxide recorders are the great exception, similarly with draft gages. The average coal company considers that the fuel used about the plant costs little. Again it is up to the mining engineer to present such matters to the company—show them the practicability of the devices in question—also that coal used at the plant should be an item on the cost sheet. All this before the company, waking up to the situation, sends for a mechanical expert to report to them on conditions which their own engineer might have pointed out.

Mine Engineer Should Investigate First

Before an electrical expert is demanded, let the mine engineer investigate how much leakage there is on the underground cables; whether the return is sufficient for the intake cables; is the bonding up to the mark. These are all matters that a bright, capable mining engineer can at least report upon up to a certain point—his investigations will be of value to his company. Again, a haulage accident occurs. What is the reason? Here is a chance for the mining engineer to make suggestions as to a remedy to prevent a recurrence.

In regard to the preparation of coal: Possibly matters are not progressing smoothly at the tipple. Slack may be going into the lump coal chute. There is too great a proportion of nut in the egg coal. Will the engineer measure up to this problem or shall the company send for an expert on such matters? Take the question of costs: If they are running high, is there a system in use which will spot the item causing leakage? If not, the engineer has an opportunity to show that a system of proper distribution of all expenses and revenues may change matters. He can anticipate the sending for accountants.

Is there labor trouble? What are the difficulties? Did the engineer make it his business to be on hand as a company representative? Efficiency engineers are being called from manufacturing fields to investigate, report and suggest methods that the mining engineer long ago should have investigated and at least partly remedied. Let us suppose that an engineer had installed definite time motion studies on the different operations of coal mining two or three years ago. This might have been of considerable value today.

It might be that the whole question could be summed up in the word "anticipate." Anticipate your own needs and sometimes the needs of the company will also be anticipated. All of this discussion points to the three qualities for success previously noted. Adaptability to the present needs, push and initiative to anticipate these needs and confidence to present the facts authoritatively.

To make a mistake once is pardonable; to repeat it, unfortunate; to let it happen the third or fourth time is to establish a habit. Bad habits are the stock in trade of weak-willed, self-indulgent, spineless individuals.

High Efficiency at Small Cost

By G. E. Alloway
Ironton, Ohio.

About one year ago C. O. Messenger took charge of the mine of the Eagle Gas Coal Co., at Vaughan, W. Va. At that time this operation had an output of about 50 tons per day. Mining was done by hand and hauling by mules, five of these animals being used to handle the output. A furnace was used to ventilate the mine—burning from four to five tons of coal per day.

As Mr. Messenger's capital for improvement was limited, he decided on the following equipment: One 25-hp. firebox boiler; one 22½-hp. engine; one 7½-kw. generator; one 6-ft. Stine disk fan; one 5½-ton Ironton storage-battery locomotive; one 3-in. suction 2-in. discharge electric-drive pump. His method of obtaining 100 per cent. efficiency from this small plant is as follows:

By using a pulley at each end of his engine shaft, he can drive the fan from one pulley and the generator from the other. He thus furnishes power for his pump during the day, and at night this machine is shut down and current is used to charge the storage-battery locomotive.

This equipment has eliminated all mules and has increased the output to 150 tons per day. The fuel consumed is really less than that formerly burned in the furnace. Besides these savings Mr. Messenger has been able to dispense with the services of a furnaceman, one man employed in bailing water and two drivers.

The 5½-ton locomotive is able to handle a train of 14 loaded cars (total weight of cars and load 27 net tons) over a grade 1500 ft. long and averaging 2 per cent. against the load. At some points for a distance of 25 to 50 ft. the grade is as high as 4 per cent. against the load. One man runs the engine and looks after the rest of the machinery during the day, while another during half a shift at night charges the locomotive and gets it ready for the next day's run. One motorman and a helper complete the force needed to operate this highly efficient little plant. Cars are of the plain bearing type, and 20 lb. rail is used on the main haulage.

I believe this is the most efficient plant in the coal fields of West Virginia, considering the small size of the initial investment.

Revolving Dumps at Docena and Edgewater

DURING the summer of 1906 it was decided to open a new mine in the Pratt seam lying due north from mines then in operation. The coal lay at a depth of 250 ft. from the surface, the average thickness being approximately 36 in. The operation is known as Pratt No. 12, or Docena Mine.

The standard Pratt car being too high for this thickness of coal, a new car was designed with an over-all height of 26 in. above the rail and a capacity of 2 tons; the usual swing door at the front end of the car was replaced by a solid end to prevent spilling of fine coal along the haulageways. This type of construction necessitated the use of a revolving dump.

The average output desired from the mine was 2500 tons in 10 hours. After due consideration it was decided to sink a two-compartment shaft, equipped with 6-ton capacity skips running in balance, and to install suitable dumping and loading arrangements at the bottom of the shaft.

After the plant had been in operation for some time, a test was made of the capacity of the revolving dumps, with the following results:

	Dumping Time	Tons per Hour
First trip—16 cars	5 min., 30 sec.	200
Second trip—18 cars	8 min.	165
Third trip—10 cars	2 min., 30 sec.	276
Fourth trip—22 cars	4 min., 45 sec.	318
ifth trip—36 cars	6 min., 45 sec.	368

The whole arrangement worked out satisfactorily, and when it became necessary to sink and equip Pratt No. 13, or Edgewater Mine, it was decided to use a similar arrangement. The following brief description refers to the Edgewater installation:

Referring to Fig. 2, the plan of the bottom shows the relative location of the car haul, car scales, revolving dump and hoisting shaft.

Electric locomotives deliver trips on the loaded sidetrack. After being uncoupled and passed over the scale by car haul, the cars acquire sufficient momentum by gravity to run into the revolving dump, displacing the empties therein. The car stop used is of the revolving type and is automatically operated by a reach rod from the incoming end by the loaded cars.



FIG. 1. THE THREE-COMPARTMENT DUMP IN OPERATION

As shown at *A*, the revolving dump has three compartments, each holding two cars, one-third of a revolution being required for each dumping operation. As it operates wholly by gravity, the cost of operation and upkeep is low.

The operation of the dump is controlled by a band brake on one of the spiders. Originally a positive stop was used to bring the dump to rest in the loading position, but it did not prove successful and was abandoned, the stop being now made wholly by careful operation of the brakes.

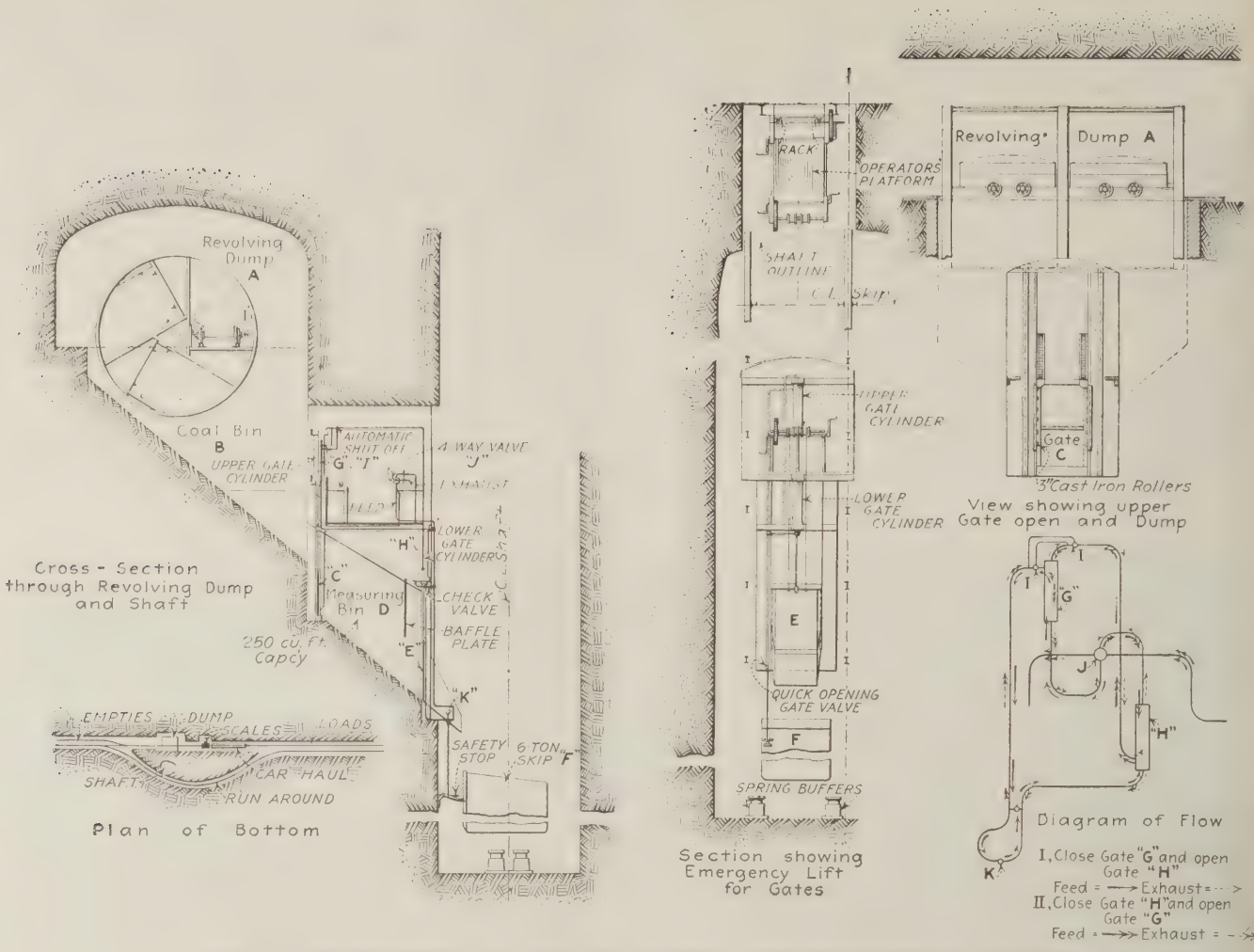


FIG. 2. ARRANGEMENT OF DUMP AND CONTROL DEVICES AT SHAFT BOTTOM

Fig. 1 shows clearly the construction of the dump and method of operation. The operator is shown on the right, his right hand on the lever controlling the operation of the dump, and his left hand on the controller of the car haul motor. Another lever is shown, which is used to operate the car stop for the removal of empty cars when no loads are available. The mechanism for automatically operating the reach rod to the car stop is also clearly shown.

The bin *B*, directly under the revolving dump, has a capacity of approximately 40 tons. To prevent overloading of the skip (6-ton capacity) and spilling of coal around the bottom of the shaft, a measuring bin *D* with a capacity of a skip load (6 tons), is built between the bin *B* and the side of the shaft. This is operated as follows: The skip being loaded and the bin *D* empty, the gate *E* is lowered and the opening closed. The gate *C* is then opened and coal flows into the bin *D*. When the bin is full, the gate *C* is raised to the closed position.

The arrangement of valves and cylinders is such that the undercut gate *C* cannot be operated while the dump gate *E* is open, neither can both gates be open at the same time; further, by means of the control valve at *K*, operated by the skip, the gate *E* cannot be opened until the skip is in position to receive the load. This eliminates any possible error by the operator.

The whole cycle of operation is controlled by four-way valves (marked *J* on the drawing); the operator at this point also controls the movement of skips in the shaft by signals to the hoisting engineer. The diagram of flow shows the course of the water through the cylinders and valves during the operation of opening and closing the gate. Hand-operated emergency lifts are provided in case of temporary failure of the hydraulic mechanism.

Efficient Pipe Covering

Coal means money. This applies just as forcibly to the operator as to the consumer. The old days of extravagance in fuel consumption around the mine are as out of date as the mine mule and the old horse-propelled hoist.

Small isolated steam plants—at the tipples, the hoist, the pumps and other outlying points—are among the most extravagant of fuel wasters. That they can be abolished with satisfactory results is shown by the experience of the Harleigh-Brookwood Coal Co. at Frackville, Pennsylvania.

Here 10 isolated steam installations, each with its own boiler house, involving all the heavy costs of fuel, labor, maintenance and overhead, have all disappeared. In their place one central boiler house supplies all the various operations both above and below ground.

Steam is generated at 175 lb. pressure and transmitted with but small loss from condensation, through a pipe line, extending in all for over 6700 ft., of which 4300 ft. is 10-in. pipe, 800 ft. of 8-in. and the remainder of 6-in. pipe. The greater part of this length is out-

doors, but some 900 ft. is carried underground, to supply triple expansion steam pumps.

The pipe line carries an ample supply of steam for two 20 x 30-in. double cylinder engines, the breaker machinery and all other outlying operations, in addition to the pumps mentioned. A detailed description of this plant was printed in *Coal Age* for Dec. 20, 1913, page 939. (See illustration below, which gives an excellent view of the pipe line at the Harleigh-Brookwood plant.)

All of these pipes are protected by a covering of 85 per cent. magnesia 1½ in. thick, suitably covered and protected from the weather. Over hill and dale, in all sorts of weather, they deliver an ample supply of steam, defying blizzards, storms and zero temperatures, of all of which there are plenty in this section of Penn-

It is of course the heat insulating powers of the covering that make such extreme lengths of pipe line possible. This is by no means an isolated instance. At the Kingston colliery, a few miles away, is a 2700-ft. line, and it is not at all uncommon for much shorter lengths than these to be used.

Thanks to the protection afforded by adequate pipe covering it is no longer necessary to figure on a separate boiler house for each extension of the plant. The first cost of a transmission pipe line, properly insulated, is far below that of even a cheap boiler. The reduction in overhead costs for one year often more than pays for the entire outlay.

There are many instances on record where magnesia coverings have been in service for 25 years and upward without showing the least sign of alteration, either in their structure or in their insulating value. On a cost per year basis it is the insulation that maintains its efficiency over the longest period, that is the cheapest, irrespective of its first cost. The coal saving is the measure of its efficiency. Multiplied by its years of life, this saving often far outweighs all other considerations.

Italy's Coal Mines Are Expanding

In 1917 the coal production of Italy was probably 15,000 to 20,000 tons of coal and 2,000,000 tons of lignite. In 1914 there were 46 active coal mines. This number increased to 59 in 1915 and to 137 in 1916. Evidently the new mines were smaller than the old ones, for in 1914 there were 4000 men employed, in 1915 5461 and in 1916 about 6000 men. Some of the lignite is of the pitch type and may be used as a gas coal, its quality being similar to that of Scotch "splint." This particular lignite comes from Ribolla in the Comune of Roccastrada in the Province of Grosseto, Tuscany. The mines generate gas.



GENERAL VIEW OF PIPE LINE AT HARLEIGH-BROOKWOOD PLANT, FRACKVILLE

Handling Coal and Ashes in the Boiler House

BY HENRY J. EDSALL
Philadelphia, Penn.

SYNOPSIS — *The plant here described, although not built at a coal mine, might well serve as a model for such installations. Both coal and ashes are handled by a single conveyor so designed that the chief wear comes upon hardened steel bushings and pins that can be cheaply and quickly renewed when appreciable wear has developed.*

IN THE last three years there have been a great many boiler houses built, and the majority of them have been of moderate capacity varying from 2000 to 10,000 hp. normal rating. As the boiler-room equipment has become pretty well standardized, it has been possible in numerous cases to follow a more or less standard design for the building and the arrangement of the boilers and other equipment.

Since I have been in touch with the design of quite a number of these boiler houses, starting with the first sketches of the plant, I have had a chance to follow the general tendencies in present-day design and to note the attitude of many engineers toward the various types of coal- and ash-handling equipment. There are, of course, certain individuals who are likely to be affected by prejudice or by lack of a sufficiently broad experience; but by considering the attitude of quite a number of engineers, most of whom base their conclusions on actual experience with certain types of equipment, it is possible to judge quite accurately of the general tendencies at the present time.

While the selection of a satisfactory coal-handling equipment is a comparatively simple matter, the handling of the ashes undoubtedly complicates the problem on account of their abrasive nature and their corrosive proclivities when wet. As a matter of fact, however, the difficulties encountered in handling ashes have been largely overcome in the best modern practice, though this fact is overlooked by many engineers and there is still a tendency among some of them to separate the coal- and ash-handling equipment so that the coal can be handled in one system and the ashes in another. This means several machines with several motors and driving arrangements to operate and maintain, and, unless the cost is excessive, these machines will be inferior in design and lasting qualities to a first-class combined system.

At the present time the general tendency is strongly in favor of putting in a single, first-class, pivoted bucket carrier to handle both the coal and ashes. By so doing the simplest possible equipment is obtained along with the least amount of driving machinery and other complications. The best of these carriers have been so carefully perfected and improved, and have given such excellent service with low operating and maintenance costs, that it is fast becoming standard practice to use one of these machines for handling both the coal and ashes in all except the large central stations, where the coal-handling requirements are so great that it is practically a necessity to have separate coal-handling equipment because it is imperative to operate it the greater part of the working day.

The handling of ashes in the same machine as the coal does, of course, somewhat increase the wear. The best modern carriers, however, are built so that this wear is confined to small parts, which are of the best possible wear-resisting materials and which are renewable at small expense. Thus the increase in maintenance cost due to handling the ashes is comparatively small, much less than the increase in the cost of maintenance incurred by adding a separate ash-handling equipment. Furthermore, the use of a first-class carrier reduces the operating costs and the delays to a minimum.





A CAR BEING UNLOADED AND A VIEW OF THE TRACK HOPPER OUTSIDE THE BUILDING

An excellent typical example of a carrier-equipped boiler room, designed according to best modern practice, is the one built a little over a year ago by the John A. Roebling's Sons Co., at Trenton, N. J. This plant, although not built at a coal mine, might well serve as a model for such plants, since the chief difference in design would be in the method of receiving the fuel. This boiler room is designed for six 600-hp., Babcock & Wilcox boilers set in batteries of two and equipped with Wetzel stokers, with short extended furnaces. Each battery of boilers takes up a length of 31 ft. 6 in., and there is a 6-ft. space between each two batteries. The building is about 135 ft. long, and the front part is high enough to accommodate a 1300-ton overhead steel bin of the suspension type, with spouts from its bottom direct to the stoker magazines. At one end of the bin, and also inside the building, there is a 100-ton overhead ash bin with spouts leading out to railroad cars on the siding.

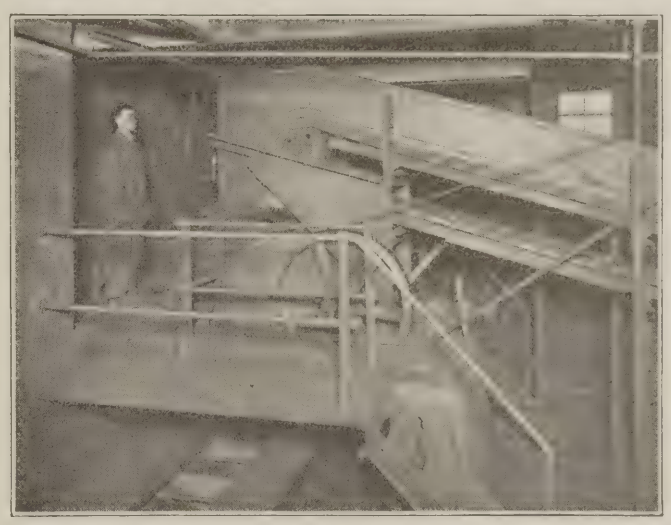
The rear of the boiler room is built with a sloping roof—that is, one of the lean-to type—and is considerably lower than the front of the building. The bin is supported on steel columns set 28 ft. center to center sideways and 19 ft. center to center longitudinally. The bottom of the bin is 22 ft. above the floor; the bin is 18 ft. deep to the top of the girders, and the cross beams which support the conveyor are 12 ft. above this point. Light roof trusses span the columns at a height of 6 ft. 6 in. above the cross beams. This makes the eaves about 68 ft. above the floor level, whereas the eaves at the rear wall of the lean-to are only 31 ft. above the floor level. The total width of the building, center to center of columns, is 50 ft. The walls are brick and the roofs are covered with corrugated iron supported on steel purlins. An ample light supply is obtained by windows at the front and back, also opposite the conveyor on the upper run. There is a ventilator at the upper part of the lean-to roof close to where it joins the higher part of the building.

The railroad track comes in at ground level, which is nearly the same as the boiler-room floor level. This track runs at an angle of about 20 deg. with the side of the building and comes quite close to one corner. The track hopper is located at this corner and, since the siding is a dead-end one with little room for shifting cars, it was especially desirable that the track hopper should be made large enough to make it possible to unload the largest cars without moving them. Since, therefore, the overall dimension from outside to outside of doors for the 140,000-lb. coal cars is about 22 ft., it was decided to make the track hopper 22 ft. long by 12 ft. wide.

The coal- and ash-handling equipment consists of a double reciprocating feeder underneath the track hopper, an apron conveyor extending to the crusher, which is located directly over the carrier. A standard two-roll crusher is employed, and a 24 x 24-in. Peck pivoted bucket carrier, following a rectangular path, having a horizontal center of 131 ft. and a vertical center of 61 ft. This carrier encircles the overhead bin and has the lower run in a tunnel, or basement, below the boiler-room floor so that the ashes can be handled entirely in the basement and raked out directly into the buckets of the carrier. This equipment has a capacity of 60 tons of coal per hour, or an equivalent volume of ashes with the carrier running at the speed of only 45 ft. per minute. There are three electric motors for driving the machinery, a 5-hp. motor for the double reciprocating feeder, a 15-hp. motor for the apron conveyor and crusher, and a 10-hp. motor for the Peck carrier.

The coal is dropped through the bottom doors of the railroad cars into the track hopper, from which it is fed to the apron conveyor by the double reciprocating feeder. The apron conveyor then delivers it to the crusher. After it passes through the crusher, it goes directly into the carrier buckets, which elevate it and distribute it by means of a tripper which tilts the buckets at any desired point along the horizontal run, thereby discharging the contents into the bin. From the bin the coal feeds by gravity through the spouts to the stoker magazines. The ashes are raked out of the ash pits underneath the furnaces and directly into the buckets of the carrier on the lower run. They are elevated and discharged into the ash bin from which they can be delivered to railroad cars by means of gates and spouts.

The equipment in detail is as follows: Each rail of the railroad track is supported across the track hopper pit by means of a 15-in. 73-lb. Bethlehem girder beam. These girder beams are supported on the pit walls at

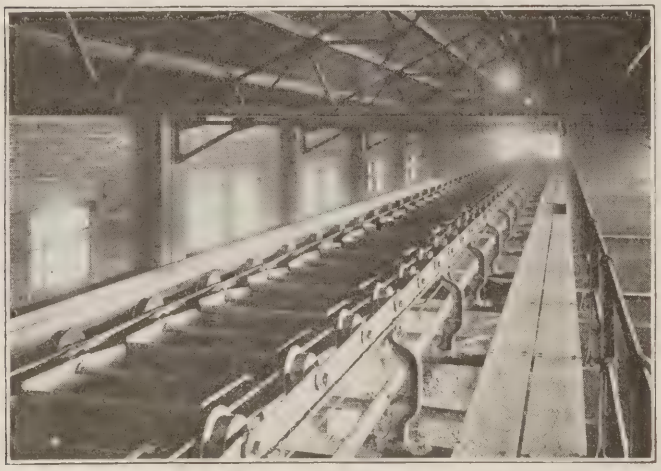


APRON FEEDER, CRUSHER AND LOWER RUN OF CARRIER

the ends and on a 20-in. 120-lb. Bethlehem girder beam at the center, this cross beam being supported on the pit wall at one end and by means of an 8-in. 32-lb. Bethlehem column at the other end. The double track hopper is made up of $\frac{1}{4}$-in. steel plate, properly braced and stiffened. It has two openings at the bottom. Underneath these openings are the reciprocating feeder plates of $\frac{3}{8}$-in. steel, about 34 in. wide by 6 ft. long each. These plates are connected together and stiffened by means of 4 x 3 x $\frac{5}{16}$ in. angles. They are supported on rollers attached to the feeder sides underneath the hopper openings, these feeder sides being really a part of the track hopper. The reciprocating motion is obtained by means of an eccentric driven by a countershaft running at 25 r.p.m. which is connected to the motor by means of spur gears through an intermediate countershaft. The length of throw of the eccentric is adjustable from 4$\frac{1}{2}$ to 6 inches.

The apron conveyor is about 30 ft. long center to center of head and foot wheels, with a short horizontal run at the foot and the balance at a slight incline to a

point over the crusher. This apron conveyor is made up of a double strand of 9-in. pitch, steel bushed, steel strap chain with 3½-in. single flanged rollers at the joints. The corrugated steel pans are attached between the chains so as to form a continuous apron 30 in. wide. The chains pass around 18-in. sprocket wheels at the head and foot shafts. The speed of the apron is 54 ft. per minute. The rollers travel on steel angle tracks



UPPER RUN OF CARRIER OVER COAL BUNKERS

on the carrying and return runs. These tracks are supported on angle frames resting on the concrete foundations. The head shaft is driven by means of a chain from one of the roll shafts of the crusher.

The crusher rolls are 28 in. in diameter by 24 in. long and revolve at a speed of 56 r.p.m. The shafts are carried in babbitted cast-iron bearings resting on a cast-iron frame. One pair of the bearings has relief springs, which allow one roll to move back and avoid a breakdown if a foreign substance gets between the rolls. The coal is crushed to a size of about 2 in. and under. The crusher is set on steel beams resting on concrete piers and is driven by means of a belt from the motor to a countershaft, which in turn is geared to one of the roll shafts. The roll shafts are geared together by means of spur gears with special long teeth, to allow for the possible backward and forward movement of one of the rolls. The rubber driving belt is 6 in. wide and runs upon a 44-in. flywheel pulley on the crusher countershaft This belt drive is an additional safeguard to the crusher in case something other than coal enters the machine.

The Peck carrier has two strands of heavy malleable-iron chain of a pitch of 24 in. Between the chains are suspended the 24 x 24-in. malleable-iron buckets cast in one piece with a thickness of metal of about $\frac{3}{16}$ in. and with overlapping lips to prevent the coal and ashes from spilling between them. The buckets are pivoted on cross rods carried by extensions of the inside links and, on account of the pivot points sweeping around the turns in a larger circle than the path of the chain joints, the buckets lap and unlap properly at the turns without the aid of any auxiliary device.

At each chain joint there is a high-carbon steel pin fitted into one pair of links and a case-hardened steel bushing fitted into the other pair of links. Both pin and bushing are keyed into the links, so that the only movement, when the chain bends around the wheels, is between the hard steel surfaces of the pins and bushings. This gives large bearing surfaces of the most excellent materials for resisting wear at the joints. The links are thus relieved of all wear, and the pins and bushings are easily renewable at small expense when they finally become worn.

On the outside of each bushing there is a 6-in. single flanged roller with a hard chilled tread. This is cast with an oil chamber holding, under ordinary operating conditions, about a three weeks' supply of oil. The oil is injected into the roller through a Bennett oiler and filters slowly through a felt washer to the bushing and on through a slot in the bushing to the pin. This arrangement insures a well oiled joint and reduces the friction and wear to a minimum. Also the oil coming from the inside and working out tends to force the dirt out of the joint rather than into it.

The carrier is driven by means of sprocket wheels at the driving turn, the driving shaft being geared by means of equalizing gears to the first countershaft, thus effectually eliminating the irregular motion usually accompanying long pitch chains and securing a uniform motion to the carrier. This countershaft is geared by means of spur gears to a second countershaft, which in turn is driven from the motor by means of a silent chain drive.

On the horizontal runs the chain rollers travel on regular T-rails supported by cast-iron rail chairs, at-



GENERAL VIEW OF BOILER ROOM

tached to the steel supporting framework on the upper run and to the concrete floor of the tunnel on the lower run. On the ascending and descending runs the chain rollers travel between double T-rails, supported by cast-iron rail chairs, these chairs being attached to the steel casings which inclose both vertical runs.

On the upper run the cast-iron chairs also support the rails on which the discharger travels. This movable discharger is arranged so that it can be moved by the buckets themselves in the direction in which they travel and can be pulled back with a cable which winds upon a drum operated by a hand crank.



LOWER RUN OF CARRIER WHERE ASHES ARE RECEIVED

The carrier chains travel around sprocket wheels at all four corners. The lower turn shafts are supported on cast-iron stands resting directly on the concrete foundations. The upper shafts are supported on the steelwork over the bin and the driving shaft, countershaft and motor are all supported on unit-cast iron stands which keep the shafts in proper alignment and the gears in proper mesh. Where the ashes are fed to the carrier buckets on the lower run there are continuous curved steel guard plates which effectively protect the chains from ashes and deliver them to the center part of the buckets, thereby avoiding spillage.

It can readily be appreciated from the foregoing description that the construction of this type of coal- and ash-handling equipment has been carried to a high degree of efficiency, so that it stands up wonderfully well under the service for which it is designed. With proper oiling and a little general care these machines operate with but few delays and require few repairs, so that the maintenance cost is low and the coal and ashes are handled at a minimum labor expense. Aside from getting the coal out of the cars into the track hopper and feeding the ashes out of the ash pits, the operation is entirely automatic. The feeding of the ashes to a carrier is also a much easier and more rapid operation than it is with various other systems. This part of the work is thus less laborious.

Cause of "High Mica"

By F. W. Blackwell

Most people seem to think that high mica is due to the mica insulation getting loose and working out between the commutator bars. This may be true in some cases, but in most instances high mica is caused by the soft copper commutator bars being worn down, allowing the mica to extend up beyond them. The obvious correction for high mica is a returning of the commutator. "Undercutting" will prevent the frequent occurrence of high mica troubles.

New Electric Air Heaters

The recent coal shortage caused industrial men not only to use their available supplies of coal primarily for power production, but to look at the same time for supplements for use in heating.

The Cutler-Hammer Manufacturing Co., of Milwaukee, Wis., foreseeing this tendency, developed and is now marketing a new and improved line of electric air heaters designed to supplement the furnace or steam-heating system in the home, office, store, factory, shop or industrial plant.

Electric air heaters are found useful in heating crane cabs, outhouses, valve, pump and meter houses, exposed remote corners or rooms, watch or signal towers, theater ticket booths as well as for many miscellaneous applications. In such uses they effect a distinct saving in coal. Flexible electrical conductors will carry heat cheaply and efficiently to remote points.

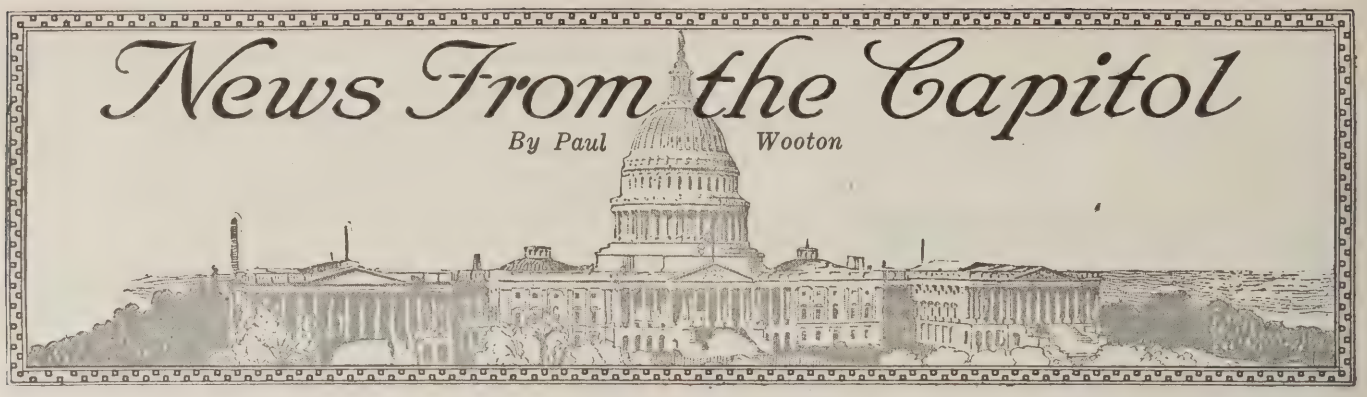
The new electric air heaters are self-contained, easily moved from one point to another and possess the inherent advantages of all electrical heating devices: namely, heat under perfect control and absolute freedom from dust, ashes, soot, unpleasant odors and vitiation of the air. The perfect control possible allows efficient use of the heat; as soon as a location is warmed, a turn of the switch cuts off the current and the heater can be moved to warm another part.

Users find the new electric air heaters convenient supplements to their existing heating systems. In some central stations and other great industrial establishments maintaining large generating plants and deliver-



HOW ELECTRIC AIR HEATER IS INSTALLED

ing current at a cost not exceeding 1 or 2c. per kw.-hr., it has been found economical and convenient to use electric heaters entirely. These new heaters are made in various shapes, sizes and capacities and a heater to fit almost any space or condition of mounting may be selected.



New Price Regulations

New prices, effective Apr. 5, have been fixed by the Fuel Administration as follows:

Kentucky—Harlan, Perry and Letcher Counties and operations in Pike County on the Levisa Fork of the Big Sandy River: Run-of-mine, $2.20; prepared sizes, $2.45; slack or screenings, $1.95. East of the 85th degree of longitude, except Harlan, Perry and Letcher Counties and operations in Pike County on the Levisa Fork of the Big Sandy River: Run-of-mine, $2.65; prepared sizes, $2.90; slack or screenings, $2.40.

Tennessee—All except Overton and Fentress Counties: Run-of-mine, $2.20; prepared sizes, $2.45; slack or screenings, $1.95.

Virginia—Lee, Wise and Dickinson Counties; Russell County west of Finney on the Norfolk & Western Ry.: Run-of-mine, $2.20; prepared sizes, $2.45; slack or screenings, $1.95.

Iowa—Marion County: Run-of-mine, $2.70; prepared sizes, $2.95; slack or screenings, $2.45.

Georgia—Run-of-mine, $3.25; prepared sizes, $3.50; slack or screenings, $3.20. The Georgia field covers a limited area and was not included in former prices regulating the coal industry.

Wyoming—(Sub-bituminous.): Egg run, $2.15; nut run, $2.

Weekly Coal Production

For the week ended Mar. 30 bituminous coal production was 10,832,000 tons. Anthracite forwardings were 43,642 cars. Beehive coke production totaled 622,000 tons. Byproduct coke production amounted to 474,610 tons. The figures used are those compiled by C. E. Lesher, of the United States Geological Survey.

A decline in the production during the week ended Mar. 30, along with the knowledge that a still further decrease took place during the week ended Apr. 6, is regarded seriously by authorities on coal in Washington. Those factors which have been limiting production during the winter now are much less potent. The new factor entering into the situation is the uncertainty as to the price the Government is going to pay for fuel for its railroads and ships. With the taking over of the railroads, the Government takes a large percentage of the entire coal production of the country.

With the uncertainty as to the price which the Government will pay, each mining district in the country has properties which have suspended operation pending an adjustment. The situation, however, is much more serious in the West, where "no market" is a serious limiting factor. During the latter half of March, the Western mines lost one-fourth of their working time due to this fact. The railroads are not making purchases and it seems to be difficult to get the public started in the purchase of its next winter's supply.

To Conserve Domestic Sizes of Anthracite

Domestic sizes of anthracite coal are not to be used for industrial purposes where it is to replace bituminous coal. An order to this effect has been sent by the Fuel Administration to the state administrators. The order follows the discovery that domestic sizes of anthracite are being used at times for steaming purposes. Such procedure the Fuel Administration defines as absolutely unfair to the domestic consumers. Each community will receive only its allotted tonnage. Use of anthracite by factories simply will make it impossible for the domestic demand to be met. Five per cent. has been added to the basic price of coke manufactured east of the Mississippi River and sold west of the Rocky Mountains. The order reads as follows:

"That in all cases of sale of coke, manufactured east of the 94th meridian, to consumers located west of the 115th meridian, where the seller assumes the responsibility for the quality and delivery of such coke, and extends credit to and carries the account of the purchaser in accordance with the usual trade practices, there may be added 5 per cent. to the established price of coke f.o.b. cars at the point of manufacture."

More District Representatives Appointed

D. F. Hurd has been appointed district representative of the Fuel Administration at Cleveland. He succeeds J. B. Zerbe, who resigned because of ill health. The district, which will be under Mr. Hurd's direction, embraces the coal fields of eastern and central Ohio and the Panhandle counties of West Virginia.

Julian B. Huff has been appointed a district representative with headquarters at Greensburg, Penn. With the exception of those on the Sewickley branch, he will have charge of the mines of the Pennsylvania R.R. north of Ruffsdale in Westmoreland County.

W. L. Byers, with headquarters at Uniontown, Penn., has been named district representative in charge of the mines in Westmoreland County on the Pennsylvania south of Ruffsdale, and of the operations on the Sewick-

ley branch of that road. In addition, he will have jurisdiction over operations in Fayette County south and west of a line from Banning through Whitsett junction to Brownsville, with the exception of the mines on the Baltimore & Ohio at and east of and connecting at Indian Creek. His jurisdiction will extend along the Baltimore & Ohio in Westmoreland County and on the Mount Pleasant branch of that road. His district, however, does not include the mines on the Baltimore & Ohio along the Youghiogheny River or river mines on the Youghiogheny River.

Charles M. Means Heads Inspection Division of Fuel Administration

To enforce its clean coal order and other regulations, a large number of inspectors soon are to be appointed by the Fuel Administration. Charles M. Means, a mining engineer of Pittsburgh, who is known nationally, has been made manager of the inspection division of the Fuel Administration. To start with, one inspector is to be named in each district representative's territory. As the work becomes more thoroughly organized other inspectors will be appointed as may be found necessary.

Railroad Fuel Question May Disrupt Fuel Administration's Plans

Overtopping interest in any other coal matter last week was the railroad fuel question. Loath to give up their former practice, the railroads are insisting on obtaining their fuel at much lower prices than those specified in the official schedule. While the Fuel Administration is insisting that coal should be furnished all consumers, whether large or small, at the same price, railroad officials do not accept this view and apparently have won over Director General McAdoo to their way of thinking.

At the Fuel Administration, the generally held opinion is that domestic and industrial consumers have paid a portion of the railroads' fuel bill long enough. While in the past, conditions may have been such that it would be difficult to prevent the railroads from securing coal at cost or below, now that the United States Government is running the railroads it is contended that no such advantage should be taken of a considerable portion of the public. This policy, however, is not being followed by the railroads, who, in numerous instances, have refused to supply cars to mines until prices satisfactory to them have been quoted for railroad fuel. That the United States should be a party to any such questionable methods is a cause of great surprise. If it is persisted in, the demoralization of the whole coal scheme—the consummation of the whole effort of the Fuel Administration—is threatened. The condition precipitated by the railroad fuel matter will have the same effect on the situation this year as did Secretary Baker's letter last year. The effects, however, will be more immediate, since the railroad fuel matter has such a direct bearing on the labor situation.

Social life is one thing; business is another. True friendships may count in business, but it is a mistake to think that cheap, social popularity is a business asset. Sterling integrity, progressiveness, reliability, service and quality goods all count as nothing else can.

Brief Washington Notes

Coal lands in the Nenana field of Alaska and in the Fort Peck Indian reservation in Montana have been reserved by Presidential order.

Five per cent. more coal was mined in February, 1918, than in the corresponding month of 1917. The poor showing in January, however, still holds the production for the first two months of 1918 a full 3,000,000 tons under the production the first two months of 1917. The calculation on which the figures are based was made by C. E. Lesher of the Geological Survey.

All operators in central Pennsylvania who have collected five mills per ton for the proposed fund to meet the expense of a pooling arrangement have been instructed to refund such collections. A plan which was under consideration for the facilitation of distribution has been rejected by the Fuel Administration.

A suit to test the constitutionality of a raid by the Department of Justice at the request of the Fuel Administration has been instituted in the Supreme Court of the District of Columbia by the Cambria and Eastern Coal Co. The offices of the coal company in Washington were raided Mar. 1 by agents of the Department of Justice who seized papers and other matter in the offices in an attempt to secure evidence to prove that the coal company had violated the Fuel Administration's price rulings.



EDITORIALS

Nearing a Crisis

JOHN SKELTON WILLIAMS, financial man for Mr. McAdoo, and at present in charge of fuel purchases for the railroads, has flatly refused the right of the Fuel Administration to fix prices and establish conditions under which railroad coal shall be bought. Mr. Williams maintains that the railroads are privileged to purchase coal where they please and at the best price they can force the operators to accept. In making such contracts for fuel, the railroads propose to continue to use their control of car supply as an effective weapon to force price concessions.

Fuel Administrator Garfield is determined that the railroads shall not be exempted from the operation of fuel regulations. He points out that to permit such a practice would be to sanction the establishment of a Government policy of great injustice. A few mines and a few miners will prosper at the expense of the remaining two-thirds of the industry. Mines producing commercial coal and working only a part of the time will necessarily have to shut down, or get more money for their product. Therefore, in the final outcome the public is obliged to pay all that the railroads save.

It is wholly unlikely that the President will sanction a plan that is sure to stir up serious labor unrest through its inequitable operation. He cannot indorse action that permits one Government department to deliberately violate the rulings of another Government administration. He cannot fail to see that if nearly one-third of the total bituminous production is exempted from Government restrictions, outlined by the Fuel Administrator, the remaining tonnage cannot be distributed in an efficient and satisfactory manner.

The railroads are a vital link in our industrial life; they must have a full supply of coal, of the quality best suited for their purposes. This can all be accomplished in an orderly manner and in strict conformity with carefully established plans of procedure. It is far more necessary that the Nation as a whole shall be provided with an adequate supply of coal in the present world crisis than that John Skelton Williams, or any other Government official, shall gain a reputation for efficient railroad management through increasing the net revenue of our transportation systems, and thus proving the benefits of Government ownership.

Steel Breakers and Washeries

THE late Eckley B. Coxe in the '90's attracted the attention of mining men—particularly anthracite coal operators—to his experimental iron breaker at Drifton, Penn. During the next few years Coxe Bros. & Co. built another iron breaker at its Oneida colliery. Unfortunately this latter breaker was soon destroyed by fire. As one of the strong arguments for iron construction was immunity from fire with consequent decrease in insurance rates, the new policy was viewed as an experiment requiring further demonstration as to its practicability.

However, the new scheme remained latent only awaiting favorable circumstances to spring into life. Such conditions came about gradually. There was a growing tendency to introduce cast-iron columns and iron beams in breaker frames. Finally the Lehigh Valley Coal Co. built its Buck Mountain breaker in 1911 almost entirely of structural steel. During the succeeding years this type of construction received such an impetus that at present there are 18 steel breakers and washeries in the anthracite coal region—built, under construction or being designed. The leading article in this issue of *Coal Age* is a discussion of this whole matter.

The design, fabrication and erection of steel breakers require special knowledge and experience. The multiplicity of sheaves, belts, shakers, jigs, chutes and conveyors tends to make the designer's task a most complicated one. The stresses are so involved and difficult to determine, that to secure a well-balanced structure requires the judgment attained from experience to a greater extent than in practically any other type of structural steel work—provided economy in metal is a consideration. From a coöperation standpoint, it is especially important to have the design, fabrication and erection handled by one organization, thus tending to obviate the mass of misunderstandings and contentions, with their unavoidable delays, which frequently attend operations where different branches are handled separately.

The advantages which steel possesses for breaker construction are pronounced and definite. From the operator's point of view, perhaps speed of construction stands out preëminent, neglecting advantages accruing to the use of a modern building material. A steel breaker can be tapped out in less than one-half the time it would take to build a wooden structure. Again, slow depreciation, smallness of members, progress of construction in rough and freezing weather all speak volumes in favor of steel.

Citing a few instances of rapid construction we turn to the Markle breaker. This structure was completely designed, fabricated and erected in 88 days, including an unavoidable delay of 20 days in the erection work. This was in response to a hurry call on the part of the coal operator to replace a wooden breaker suddenly wiped out by fire. The Buck Run breaker at Minersville, Penn., was designed, fabricated and erected in 68 days. But a record of special significance is that of the recent Alliance breaker of the Lehigh Coal and Navigation Co. Throughout a period unprecedented in the history of the steel business, the work on this breaker has gone ahead notwithstanding workless days, railroad embargoes, government restrictions including changes in rollings, shortage of labor, etc. Further, at the site of the Alliance building during erection there was experi-

enced the most severe winter "within the memory of the oldest inhabitant." In addition there was inaccessible location, treacherous ground on which to operate locomotive cranes, also a number of minor occurrences—all of which delayed erection at least four weeks. The contractors expect to complete this job in 103 or 104 days. Their contract time was 100 days. Formerly a wooden breaker of any size was a six-month proposition.

A unique feature which has been taken advantage of by several operators in the case of working over old culm piles is that of the bolted washery. Structures of this kind set up with all field connections bolted can be operated for a time at one bank and then be taken down and reset on another site. This scheme is being used in erecting the Markle No. 4 washery, at Jeddo, Penn., at the present time. The Thorne-Neale washery near Ashland, Penn., was similarly handled last year, being set up complete in eight working days.



The question of moving a washery to another bank or of transporting a bank to the washery, is a problem involving a nice balancing of factors affecting its solution. It suggests the case of Mohammed and the mountain. Will it be a better policy to move the bank to the washery with the necessity of a steam shovel to load the bank into cars which have to be hauled to the washery—coal freezing en route possibly on the long hauls in severe winter weather? Or will a saving be effected by moving the washery to a new bank with attendant expenses of railroad tracks for shipping the washery product, a water supply for cleaning and sizing the coal, and power to run the plant?

A final word as to speed construction. Commenting on this feature, a successful steel breaker builder notes, "Service of this kind more than offsets the increased cost of steel construction."

Peace Without Victory

SOME time in the clash of 1914 when the Teutonic troops had not committed all their many crimes and when the truth about those they had committed could still be questioned because the crimes had not been investigated or when we could still explain them away as the outcome of a drunken orgy, some time when we did not know all that we know now, if the Germans had been willing, they could have had peace without victory.

Today there could not be peace without victory without an indictment of the peacemakers. When a city has a terrible crime committed in its midst and fails to punish the perpetrators that city is shamed. The world is but a big city. Over a million murders of Armenian, Belgian, British, French, Arab, Serb, Russian and American civilians have been committed, not in the prosecution of war but out of a sheer lust for slaughter. Cathedrals and property of all kinds have been destroyed in the hope that the burden of the war might perdure till long after the war was ended.

Unless we, the citizens of the world, punish these acts we discredit the government under which we live. We proclaim that we give way to force and violence and are not determined on justice and right. Let us proclaim peace without victory when we have government without jails. The crimes of the Germans and their allied nations must be expiated by defeat. They may not like the sound of the word, but nations and parts of nations just as sensitive and far, far more honorable have had to suffer it. Into the valley of humiliation the destroyers of civilization must pass, or civilization will itself be destroyed.

Let us not be squeamish. There are people in America who say it would be wicked to shut out, or put a heavy duty on German goods, yet we have for years been trying to arrange special concessions to those nations which shut out our goods, making no concessions at all to those who gave us free entry into their ports. The sin we are urged to avoid is only the crime of treating Germany as we would have treated Great Britain before the war could we have arranged reciprocity with the other European powers. Perhaps we shall do unrestricted business with Germany after the war, but if we decided not to do it no one could utter any complaint. The fear is not that we will be too severe in our actions to Germany, but that we shall be guilty of coddling the unrighteous, of compounding with Germany's villainy, of acting as "accessory after the act" by protecting Germany from the majesty of offended law. Violence, murder, theft and war must be proved unprofitable. The business of the soldier must be proved to be disgraceful to all those who do not use it in the interests of peace and justice. The profession of arms for glory, aggrandizement and pelf must be made as dishonorable as the business of burglary. This can only be attained by a peace with victory. Till it arrives let us go on buying Liberty Bonds as fast as they are offered.

Two Culm-Bank "Iniquities"

A FEW years ago the public when visiting the anthracite region very piously regretted the large piles of waste coal known as culm banks and urged that something be done—just what, the public did not say—to recover the values in those mountains of fuel.

Just of late the operators have been preparing fuel from culm banks and the public is beginning to suggest that there is something morally wrong in making use of the rejects of past operations and of obtaining, as it were, something for nothing. The public is in a querulous mood. It has discovered two iniquities, to store culm and to use it.

Because a piece of coal has lain for years by a piece of slate is no reason why the two should not be separated

and the coal placed on the market no matter what bad company the coal kept for many years it should not be spurned, so long as it appears alone at the consumer's cellar. It is no more to be condemned than meat which has grown near the bone if the bone is cut out before delivery at the consumer's larder.

The trouble is, however, that the public has grown leary because too often the culm of past days has been shipped indiscriminately or only partly cleaned. A sample which has recently come into our hands is apparently the culm from a most efficiently conducted modern washery. The slate above the Pittsburgh or Freeport coal would, from a cursory inspection of the culm, seem to promise a higher thermal value. This "fuel" was sold as "culm," it is true, but it was a scandal to waste even the time of the shoveler over the handling of such rubbish.

Happy Mean in Cleaning Coal

IT IS a bad time to decry the consumer for being over particular about clean coal, for he is sore about the treatment he has recently received and with good reason. In too many cases the operator has taken advantage of the coal shortage and shipped him coal far below the standards of former years.

But the consumer, so recently beridden by certain unscrupulous operators, has been in his time the beggar on horseback, and he has ridden the coal operator to death. Edwin Ludlow, vice president of the Lehigh Coal and Navigation Co., told the American Institute of Mining Engineers about a firm that demanded coal having 14,600 B.t.u. per pound. Yet that firm was only evaporating 9 lb. of water per pound of fuel whereas about 11 lb. should have been secured.

Consumers have caused many a ton of passable fuel to be thrown away in order to get an excessively high fuel value. Some mining concerns, it is true, could fill the bill without loss, but others only met it by a waste of fuel. When the war is over we shall probably drop back into the old ways of coal testing, and the operator with coal of lower thermal power will continue as in the past by a finical preparation to make up for defects in the coal he is mining. If he crushes and burns under his boiler the material thus thrown out no loss will result, but if the fuel rejected is used for railroad ballast and highroad surfacing the loss will be considerable.

Team-Track Mines Less Numerous

REDUCTIONS in the price of coal have caused a high mortality rate among such wagon mines as supply coal for rail haulage—"team-track mines" as they are termed. The ending of contracts by regular expiry, by zoning restrictions, and possibly also later by a general order is the last blow. Is it unfair to say that the industry hopes it will prove sufficient to end the existence of these team-track mines?

They destroy the efficient operation of both railroads and collieries. The railroads find their side tracks cumbered by cars placed for the team-track loaders. They find the time of loading is much greater and more uncertain than when the coal is loaded direct from a railroad tipple.

The team-track mine takes men who otherwise would work more productively in large and more efficient operations, which are now short of men. But the chief count against the team-track mine after all, is that it does not take all its men from the big mines. Some it takes from farming work, which is far more grievously undermanned than mining. The closing of the team-track mines will release a number of farmers for their proper work.

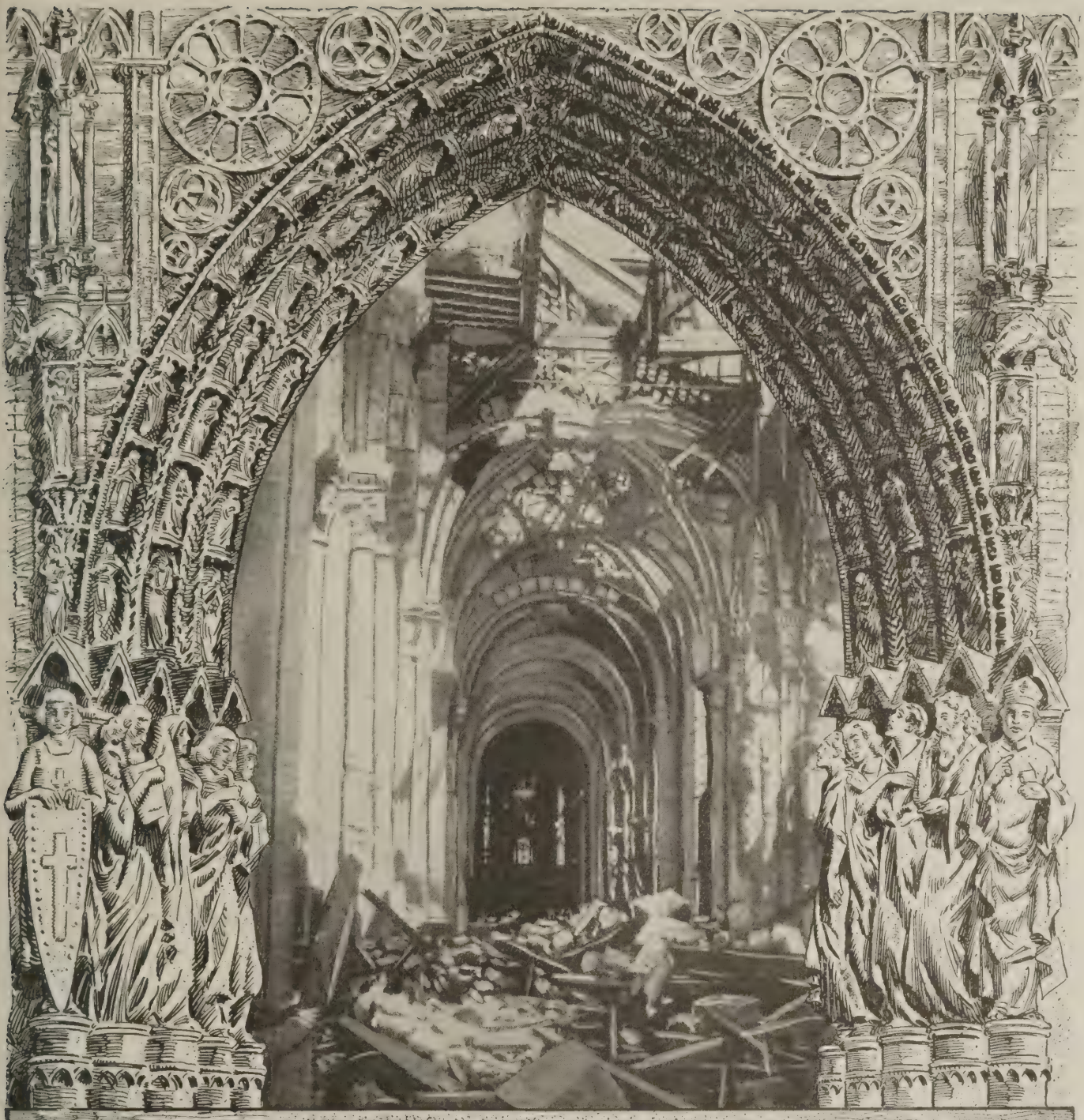
Today, or till recently, many farmers and farm laborers were digging coal and hauling it. When conditions are readjusted they and their teams will be employed in raising food. When winter comes they may, to advantage, go back to mining and hauling coal, not, however, for rail transportation, but to supply local needs. Such wagon mines have existed for years. They work mainly when no farm work is possible and they deliver coal when it can be sledded and when, in consequence, the expense of delivery is at a minimum. They give the farm hand an extra two or three months of congenial work.

These winter mines are always welcome. Under the Fuel Administration's regulations there is no likelihood that it will be found impossible to operate them. They will continue to supply the farmers with fuel for domestic consumption and for lime burning and help to save the wood lots on which the future operation of coal mines so much depends.

They will, by supplying winter work to the farmers help to lower the overhead cost of the production of farm products. Moreover, the lessening in number of the inefficient team-track mines will assure to the larger coal operator a supply of props in the winter without which his mines cannot be safely conducted, for the farmer who cannot haul coal will make and haul props.

The team-track mine decays! May its activities draw rapidly to an end! The farmers should not go to the mines. The tide of labor should rather flow the other way. Idle miners should be encouraged to plant gardens and work on the farms whenever nothing else can be done. Many of the best men around the mines were farmers in earlier days, here or in some foreign land. They are more adaptable to the needs of the farm than are professional men, boy scouts, and city school children, who have been suggested as possible agricultural laborers, but who at best could do little but hoe and who could not hope to be strong and skillful enough to do a man's work at that.

Concentration, mixing, temperature and time of contact are interrelated and each of these factors is essential for good combustion. Consideration of these four factors indicates the conditions necessary to obtain good results. These conditions are: (1) Enough air; (2) air and the combustible gases thoroughly mixed; (3) a furnace temperature above the ignition point of the gases; (4) enough time for combustion to be complete. In practice an excess of air is required, but the amount of excess air can be small if the mixing is thorough. Mixing is probably the most important single factor and the one most frequently responsible for poor combustion. A large excess of air and high temperature will do no good unless the air is mixed with the furnace gases and the oxygen and combustible gas brought into contact.—*Bureau of Mines Bulletin No. 135.*



Shall the Civilization of the Ages vanish before the Devilization of the Hun?

One hundred million freemen answer

NO—

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The best news of the week is that the Central Pennsylvania mine workers decided on Apr. 5 to leave the wage question with the Fuel Administration, asking that body to investigate wage conditions and appoint mine workers on the investigating committee. The Fuel Administration declared that it had already made a most careful investigation and had satisfied itself that the price of coal set by the Administration was such as the wage justified and indeed made necessary. The matter is therefore settled.

John P. White on Saturday, Apr. 6, declared that the mine workers were satisfied. They had a stormy meeting, it is true, and condemned their leaders liberally, but after their steam was all blown off they realized that the price fixing was in competent hands and was based on the wages paid and on the other expenses incurred by the operators. Some time ago the operators in Central Pennsylvania, in common with other operators, had two decreases in price, one at the suggestion of Francis S. Peabody and the other on the demand of the Fuel Administration.

The mine workers did not suffer by these price revisions even though they were downward. The operators, however, suffered severely from the last cut. By increasing the price of the coal produced in central Pennsylvania the Fuel Administration now proposes to do justice and nothing more, but the mine workers do not see it that way. They declare that the advances in wage for which they are asking can be paid by the operator. If that could be proved Dr. Garfield, we may feel sure, would not raise wages but restore the old price or one somewhat lower than the one he has just set.

CENTRAL PENNSYLVANIA SPECIALLY FAVORED

There is no call for a revision of wage in central Pennsylvania. The mine workers have fared a trifle better than other regions as to wage increases and as to wage rates and they have gained also the abolition of pushing. What, after the war, will happen to the miners in the areas containing only thin beds is a matter of grave question. These areas of thin coal are in overwhelming majority. Perhaps such beds can be worked after the war despite the handicap of the pushing provision, and all the brushing it entails. But it is certain that they could not be worked if a wage differential against the district, such as the mine workers are asking, were added to the difficulties created by the necessity for brushing.

Let it here be said that to the higher officials of the union belongs all the credit for the patriotic resolution of the delegates. These officials threw all expediency to the winds and jeopardized their standing with their followers by a patriotism so sincere that it did not permit them to seek their private advantage. There are few men in public or journalistic life who could not take a lesson from these fearless fellows who were minded to tell the truth no matter what it cost. Accustomed to seek the suffrages of the men it required no small exhibit of backbone to get up and set themselves directly athwart the current of the convention.

Leading credit must be given John P. White, who though a member of the Fuel Administration, is in the pay of the miners and is so poor that he needs their financial support. He would probably have to resign his position were the support withdrawn. It was he that reminded them that the Illinois operators were getting a 45c. decrease and that on Apr. 1 the Montana and Wyoming operators got a decrease of 70c. per ton. If the price of coal were to determine wages, the mine workers in those states would get decreased pay, but no such reduction is proposed.

He told the men that when the miners make $5 a day and cannot pay house rent it is not because the wages are inadequate, but because the running time of the mines is too slow. He said that in some districts the men get only 6 and 8 days work a month.

But even after Mr. White's speech the convention voted 138 to 15 in favor of the policy of the special committee, which committee urged that the 60c. increase in price be shared or rather all given to the mine worker and that the mine workers be given place on the Federal wage investigation committee by which some such recommendation was to be made. U. E. Swartzentruver, the secretary of the policy committee, however, declared against a strike. Charles T. O'Neill, the district vice-president, also said he was an American first and therefore opposed to any



SUPPORT HIM BY BUYING LIBERTY BONDS

cessation of coal production. George Bassett added "There is not a man in this house who would not lay track or drive mule for six months and live on bread and water, if doing so will whip the Kaiser."

One delegate named Brown struck a discordant note. He called on the delegates to fight as hard and as long for $1.20 a ton coal "as the men in the trenches are doing."

Another recent event of interest was the lynching of a baker whose only proved offense was that he desired to continue work in an Illinois coal mine. The detais are given in another article in this department. There seems to have been inadequate evidence against the man, so that there was not even evident guilt to excuse the action.

But it is easy to criticise the action of the miners unjustly. It must be understood that there has been a panic fear that a mine explosion, or mine explosions, would be successfully started by some miscreant, and this fear was not without ample excuse.

At the Shoal Creek mine near Panama, Ill., 25 sticks of dynamite were found in an airshaft, and it is believed that only the failure of a percussion cap prevented an explosion. Then again in the Prairie mine two kegs of powder were exploded about half a mile from the bottom of the shaft. A fuse about 20 ft. long was found in the entry and a stone had been placed on the kegs. There was clearly a

conspiracy. Fortunately the coal dust of the mine did not aid the explosion, and the results were far feebler than its perpetrators expected. But it is quite possible that at some time just what the miners fear may happen.

Lynching is wrong and must be ended. It frequently is directed against innocent men. It is peculiarly American. Perhaps we have reason to be proud of the fact even though lynchings are far too numerous, are participated in by people who should know better and are rarely punished. Where other countries have a massacre, a pogrom, a vespers or mob violence on a large scale, we usually specialize on one man who really may be guilty. We in general require a certain semblance of guilt. We almost never destroy all those who happen to part their hair, grow their beards, or write their names in the same way as the real criminal. We never destroy a race for the shortcomings of some one of its members.

But the mine workers must never forget that action like that at Collinsville, Ill., is quite likely to result in reprisals in Germany. As that country has no citizens of America who are above all suspicion of virulent pro-Germanism it is quite possible that reprisals would be taken on our soldiers.

The growth of patriotism in the main leaders in the union has been so marked that it is surprising to find that "Mother Jones" has not come under the influence. On Labor Day that agitator with Congressman M. M. Neely spoke at Moundsville, W. Va. The Congressman advised the miners to load every empty as soon as it arrived and argued against any dissatisfaction here till after the war, contending that any trouble which arose "over here" was infinitesimal as compared with what would result if the United States were not on the winning side "over there." But Mother Jones, after making a strong plea for patriotism, contended that all the fighting should not be done "over there." She announced that she was going to Charleston and would in the immediate future make her headquarters in the unorganized fields of West Virginia.

A strike at the mines of the Pittsburg Coal Mining Co., of Pittsburg, Okla., which commenced September, 1916, has not yet been settled and it is announced that all negotiations are ended and the strike will continue indefinitely. The miners demand more pay for the removal of rock.

Lynching of a Miner by Miners

A man, R. P. Prager, who according to his own account had worked in the mine for four years mostly as a timberman, but who had been more usually employed as baker, was lynched by a mob of 350 miners at Collinsville, Ill., in the early hours of April 5. He appears to have been innocent, but the rumors of the corner saloon loafers about him may be repeated to explain the cruelty with which he was treated.

It was said that when he was working at the Donk Brothers Coal and Coke Co. mines at Maryville quantities of powder were stolen during a period of weeks. The miners accused Prager of stealing this powder and alleged that his purpose was to blow up the Maryville mine. Prager endeavored to join Local Union No. 1802 at Maryville, but the president of the local, by name J. Fornaro, apparently opposed his admission. It was said that he was a Socialist and had made disloyal remarks at a meeting, but the evidence is that the only thing wrong with Prager was that he was a German and the feeling against him appears to have been spread by some of the leaders of the local union for their private purposes. His letter to his parents shows he spoke in broken English with German idiom, and in this way exposed himself to suspicion.

On Apr. 3 he was paraded through the Maryville streets as a German spy. He vehemently denied, however, that there was any element of disloyalty in his behavior. Escaping, he remained in hiding until he came to Collinsville on the night of Apr. 4. Arriving at Collinsville, he went to his room. The men in a nearby saloon saw him and, gathering a mob, went to his quarters and ordered him out.

The police rescued Prager and took him to jail, but the mob broke in and found him hidden under some material in the basement. They led him through the town, barefoot, and made him sing patriotic songs. He requested to write a letter to his parents and by the glare of an auto lamp and with a mud guard of another auto as a desk he wrote a short note beginning, "I must on this the 4th day of April, 1918, die." His tormentors finally hung him to a tree.

Prager was registered in St. Louis as an enemy alien. It is said that he tried last summer to enlist in the United States Navy. According to his statement he had declared his intention to become a citizen and was expecting to apply for full citizenship. Walter Clark, the superintendent of the Maryville mine, declares that he believes Prager was "all right" and says he is convinced that Prager did not steal powder. Local authorities have started an investigation and it is to be hoped that inquiry will result in conviction. The whole section needs cleaning up. Maryville is not far from East St. Louis, a town where local ruffians and some miners recently killed several negroes.

Would Import Mexicans Into Texas

The coal operators in the Eagle Pass, Tex., section desire the Federal Fuel Administration to give them permission to import coal miners from Mexico on the same basis and under the same conditions as agricultural workers are now being admitted. The lack of Mexican labor to operate the coal mines has caused many operators to shut down their mines, and the output of coal is now very limited.

L. M. Lamar, vice president and general manager of the Olmos Coal Co., has been delegated to take the matter up with the Federal Fuel Administration in an effort to get a modification of its rulings as to the admission of Mexican coal miners. In his letter to the Fuel Administration Mr. Lamar says:

"It may be true that there are idle mines and coal miners in certain parts of the United States at this time, due to the severe weather, crippled transportation service, etc., but there are few, if any, coal operators or other well-informed persons who will state that we have a surplus of coal miners anywhere in the country. Quite the contrary is the case. Even so, the idle miners of the North will not come to and work in this section, as the climate and other conditions are not attractive to them.

"We are absolutely and exclusively dependent on the Mexican miner, and the same state of affairs applies to all other lines of industry based on manual labor, such as farming, construction, etc. There is practically no other labor here in the unskilled line. The industries must either utilize Mexicans, and get more of them, or the work will be left undone. Unless we are permitted to secure Mexican coal miners at Eagle Pass our output cannot be increased. This will mean that coal must be hauled, in some cases (for the San Antonio cantonments, for instance) from other points of production, involving sometimes about five times the amount of transportation service and loss of time to equipments."

The scarcity of Mexican labor in the United States is due to the fact that when conscription was established the Mexicans in Texas got the idea that they were to be drafted into the military service. They thought, or were told by evil influences, they were to be given preference as to conscription—that is, taken first, and placed in the front of all battle lines. "This absurd idea is amusing to all who know better," says Mr. Lamar, "but the ignorant took it in earnest, and thousands, including our coal diggers, stampeded back to Mexico."

Now, these Mexicans want to come back to the United States. They are starving over in Mexico, but are unable to return because of the strict immigration laws, which require a head tax of $8 and bar all illiterate ones. It is to enable farm laborers to come to the United States that the immigration laws were modified, but this does not apply to coal miners. These Mexicans left the United States last summer and fall with all their belongings, flattering promises being held out to them. Since then, it has been learned, most of their cattle starved to death. It is estimated that at least 10,000 Mexicans have left Texas.

Engineers Discuss Labor Problem—II

The closing remarks of Walter Douglas of the Phelps-Dodge Corporation before the New York Section of the American Institute of Mining Engineers had reference to the company store and hospital, on the defects or alleged defects of which the labor agitators had laid much stress. He showed that the company's store reduces the cost of living and that only recently 90 per cent. of the employees at Ray, Miami and Globe had petitioned the company to establish company stores at those places.

He felt that the hospital is a different problem and that if the company does not run it, it will not be run right, and the men will not receive adequate attention. The charge for this service is nominal and yet the agitators always find much fault with both the company's store and the hospital in spite of the fact that both institutions are for the good of the employees.

Socialistic Trend of British Thought

J. Parke Channing, consulting mining engineer, said that while the United States had been efficient as far as methods are concerned it had not been efficient in the utilization of its man power. He cited the change which has taken place in England since the beginning of the war, and showed that it had become a socialistic community which was highly efficient with the government doing almost everything. He said that the English laborers were not going to be content to return to the old order of things.

He admitted that the problem in Great Britain was simpler than in the United States on account of the fact that practically all of England's laborers are English, while the United States has a mixture of unassimilated foreigners. He felt that if we are to carry the war to a successful conclusion and increase our efficiency after the war we must Americanize our foreigners and give them our own point of view.

He outlined the proposed program of the British labor party which has four principles, namely, 1. The universal enforcement of the national mimimum. 2. The democratic control of industry. 3. The revolution in national finance. 4. The use of surplus wealth for the common good.

If these four demands are carried out, England will be a socialistic state, and Mr. Channing did not presume to say how much this program could or should be carried out, but cited it as showing the trend of thought in England. He said that the British workman has seen his wages increase and that he was more than ever convinced that in the past he had not been getting his fair share of the products of his toil. He also believed that the workman was realizing that he had not done his proper share toward increasing the wealth of the country.

State Socialism Successful in Britain

Generally speaking, Mr. Channing thought that the workman had seen such good results obtain in the democratic control of industry that there was no reason why this control should not be just as efficient after the war. Mr. Channing distinguished between the English labor party and the Bolsheviki of Russia, saying that the former did not believe that the working class should manage the country. The English laborer realized the importance of brains and education and the necessity of these things in bringing the country to the highest state of development.

He felt that a similar program was likely to come up in the United States and that we should be on our guard lest the pendulum swing too far if the employing class does not give more attention to the laborer and see that his condition is improved. He felt that engineers were the best instruments for carrying out the necessary work. He spoke of the growing tendency to give engineering students some training in human engineering and cited such courses at Columbia University.

In discussing trade unionism he said that Professor Hoxie's work on trade unionism in the United States would clarify anyone's ideas of that subject and he advised all engineers to study the book carefully. He urged that laborers be educated to a proper point of view rather than coerced into any line of action. He spoke favorably of the human engineering work of the industrial department of the Young Men's Christian Association.

Edwin Ludlow, vice president of the Lehigh Coal and Navigation Co., agreed with Mr. Schwab that "labor is now in the saddle." He said that the time had come when we must have captains of labor as well as captains of industry, and that both these factors must get together if industry is to be developed to its utmost possibilities.

He reviewed conditions in the anthracite fields of Pennsylvania, beginning with the strikes some years ago which were settled by Mr. Roosevelt, and he said that the most important feature of the method of settling disputes was the establishment of a board of conciliation, the final arbiter in all disagreements. He added that pending the adjudication of disagreements, there should be no suspension of work, either by lockout or strike, and the agreement between the mine workers and operators called for this provision. Mr. Ludlow thought that we made a mistake if we did not encourage the better class of men into the union so that those organizations would be directed by the best thought among the laborers.

Psycopathy to Cure Disease of Discontent

A physician who is one of the directors of the Psychopathic Hospital of Boston spoke of the possible use of the psychologist in handling labor for large organizations. He felt that there was a good field already developed for this type of scientist. Such men could assist large concerns to get the right men for the right jobs and could analyze many conditions which were purely psychological in their character.

R. J. Young, of the Illinois Steel Co., explained the elaborate care the organization has taken toward the establishment of harmonious relations between the workers and the company. He laid much stress on the value of an employment manager whose function it was to secure a desirable labor supply. He advocated the ownership of industrial stock by employees and suggested that when a certain percentage of the stock was so owned these stockholders should have representation on the board of directors of the company.

Pensions Based on Employee's Ethical Value

With regard to pensions he raised the question as to whether the amount paid should be based on the wages of the man or on his ethical value to the company. He thought that basing a pension solely on the wages previously earned was not a fair basis for pension. Mr. Young then outlined very briefly the numerous activities engaged in by the steel corporation in an effort to create good working conditions and establish harmonious relations between the company and the men.

Among these efforts were medical supervision, dental clinics, shop sanitation, industrial canteen, domestic science instruction for the laborers' wives, proper illumination of shops and homes, fire prevention, proper ventilation, recreation for the workmen and their families, education for the children, housing and insurance. He laid considerable stress on the value of picking proper individuals for foremen because he said that they represent the management to the men and hold very important positions in the organization.

He felt that they were the closest point of contact and as an organization increased in size it grew more and more important to pick the right sort of foremen. After a man is placed in a foreman's position he should be constantly educated and trained in the duties of the place and in the importance of his job, and Mr. Young felt that the necessity of this training would come to be realized to such an extent that there would be established in this country an institute of human engineering to which these foremen could go from time to time.

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DISCUSSION BY READERS

Success in Mine Management

Letter No. 1—Since the recent discussion of the efficiency of mine foremen and firebosses, in *Coal Age*, I have been asked repeatedly to express an opinion in regard to what constitutes a thoroughly reliable and successful mine manager. I am not referring, now, to the use of that term made in Illinois to indicate the foreman of a mine, but am considering the man who fills the office of manager for the company.

In my opinion, the manager of a mine must have a clear and exact understanding and knowledge of what work can be done and how it can be executed most economically, and the time required for its performance. To secure this knowledge, I do not believe that it is necessary for a manager to have dug coal, driven a mule, set timber, or performed other work required in a mine. He should, however, have so closely observed the performance of this work by others as to be able to discriminate between men who are efficient workers and those who employ unpractical and costly methods.

An important feature or characteristic of a successful manager is the ability to provide the men and material that are most useful for his purposes, with the ultimate aim of reducing the cost of production. This will require, on his part, a broad knowledge of the industry in all its branches, from the digging of coal to its transportation, loading and shipment to market where it must meet the competition of other coals.

In addition to his practical knowledge of mining operations, the success of a manager depends just as largely on his consideration of the welfare of all the men employed by the company. He must consider these men and their families as having human necessities and provide for them suitable houses surrounded by all that makes life useful and enjoyable, such as schools, churches and means of recreation and entertainment.

Ultimate Test of a Man's Ability

The ability of a manager is often severely tested when an accident occurs in a mine and the lives of the men underground are endangered by reason of an explosion or fire in the mine, or an inrush of gas or water into the workings. His ability to quickly grasp the situation and provide the necessary means of rescue and other needed help is an unquestioned indication that he possess important elements of a successful manager. Indeed, the ability of a man to organize and direct the work of rescue when the emergency suddenly arises is a true index of equal ability to successfully manage the daily affairs of the company who employes him.

In my talk with young men, I have always tried to impress on them the importance of combining a knowledge of theory with the practical experience they are gaining, from day to day, by the work they perform in the mine. I have urged that such a knowledge will some day gain for them a higher position in the company and, perhaps, will find them seated, eventually, behind the manager's desk, occupying his chair and performing the important duties of that office.

Young men are much harder to train than young animals. A little dog can be taught to perform certain tricks, because he is willing to obey and recognizes his master; but this is not the case with the average young man. The giving of instructions successfully, involves the willingness and desire to learn on the part of the one taught. I believe this is the common experience of many of our older mine officials who have endeavored to teach the young men growing up around them and must, in time, assume their duties and perform their work.

R. W. LIGHTBURN.

West Leisenring, Penn.

American citizens should buy LIBERTY BONDS *because they will give the Government the means to bring the war to an early close, and to put an end to suffering and slaughter.*

Success in Superintending

Letter No. 1—Not everyone engaged in the coal-mining industry will agree with me that the position of mine superintendent is the most important position in the company. It is my belief, however, that such is the case. It is a position that requires a man of ability, tact and diplomacy, and one who is capable of dealing fairly and squarely with everyone and showing no favoritism or preference.

The superintendent of a large mine, like the foreman of a smaller operation, is the real link between the men and the corporation who employs them. He stands before the men as the representative of the company, and his actions, unconsciously it may be, are responsible for the likes and dislikes that form and grow in their minds.

In previous discussions, it has been argued that the official who is able to gain the confidence of his men is fostering in them a spirit of loyalty to the company and their interests. In doing this, he is gradually but successfully paving the way for the earnest and hearty coöperation of every worker in and about the mines. This, in my opinion, is one of the chief characteristics of a successful superintendent, but it is a feature that requires large self-control and a thorough knowledge of human nature, together with a careful study of every individual workman in his employ.

The successful superintendent who has gained his position through hard work and continuous application is in a position to appreciate the viewpoint of his men. He understands their way of thinking and is able to form a good judgment of their opinion regarding the various questions that are constantly arising in the daily operation of the mine.

Such a man's previous experience in the ranks enables him, now, to understand better the difficulties that con-

front him in his official capacity. The same experience will dictate to him tactful methods of dealing with his men; and, as a result, he is generally able to effect a just compromise. To the company, the services of such a man are invaluable.

Contrast, for a moment, the man I have just described with one whose rise from the ranks has given him an exaggerated idea of his own importance and a desire to use his authority in ways that are overbearing and unfair. The company that employs him comes to realize when it is too late the untold and almost irreparable damage such a one has been able to do by virtue of his position.

Not only should the superintendent be willing to listen to both sides of a controversy and decide impartially, but having reached a decision, he should be capable of impressing his view of the situation on others in a manner that is just and fair to both parties. His knowledge and insight into human nature should make him willing to allow for human weaknesses to a certain extent, and to exercise patience and forbearance while, at the same time, enforcing obedience.

The successful operation of a mine is dependent on the amount of work done by the men employed, and no one will deny that a satisfied worker will do more and better work than one who is dissatisfied. For this reason, a superintendent who commands the respect and confidence of his men will be able to show more material progress than one who deals unfairly and rules by reason of the authority of his position.

Golden, Colo. FRED L. SERVISS.

I'm buying LIBERTY BONDS *because buying them is the first, last and only duty of every American at this time.*

Climbing

Letter No. 2—Reading a letter on this subject by "Kappa," *Coal Age*, Jan. 26, p. 209, followed by the brief note on "Getting Ahead," Mar. 9, p. 459, set some thoughts running in my head to the effect that the principal reason why men fail to *get ahead* is their habit of *holding back*.

The man who begins to think that he is giving more work than the worth of his daily wage is at the point of proving that he is drawing more money than he is worth. No one ever heaped the measure of his performance while his eye was constantly on the clock. Truculent self-interest invariably defeats itself.

The surest way to advancement is the promotion of the boss' welfare. Minute-counting employees create penny-weighing employers. Where there is a stingy worker there will soon be a stingier boss. A man's mind cannot brood and breed at the same time. Where there is discontent there is little action, and a worker that is not satisfied with his lot will not be satisfying to his employer. No! *One never gets ahead by holding back.*

Granted, for sake of argument, that there are merchants and manufacturers whose dollar-vision is obstructed by their dime-voracity; and many concerns that fail to see per cent. in profits, because they look too close and too long at cents in expenditures. Such institutions are failures in the making. Large purposes and great undertakings are not evolved from contracted policies. A mean man performs no courageous acts, and, as must be expected, falls short of his possibilities. In trade and industry, risks and gains are inseparable bedfellows.

The man who wears the thorny crown of success has come into its possession because of his persistent courage. Finding one's self in the wrong sort of organization calls for increased effort to secure recognition by the exercise of greater willingness and efficiency. In serving a responsibility one but serves himself. A half-hearted service not only reduces an employer's profits, but likewise the future prospects of the delinquent worker.

PERSISTENT EFFORT WINS RECOGNITION

Self-deception is folly, and stifled faculties eventually become dwarfed and unresponsive. Keep in trim; strive for *the man within* and your record will attract *the man without*, because competence in a worker does not pass unnoticed. Competitors in the world's trade know everyone who is contributing to a rival's strength. Practice to be steady, willing, earnest and eager to serve, in the little corner where you are, and some keen judge of human values will before long pay market price for your merits.

The man who limits his endeavors to the things he is specifically appointed to do; displays no interest in matters outside his immediate duties; arrives on the hour and quits on the stroke of the gong; figures the minimum equivalent for present salary, caring nought for what happens about the mine as long as it does not bear directly on his own activities—that man is stunting his own growth. He hurts no one so much as he injures himself. But the one who delivers the goods, raises his average, while he who insists on sticking close to his own base, merely caring for what comes his way, will end the race where he began. It is the willing spirit and the active mind that climb. G. W. CARLSON.

Logansport, Penn.

I'm buying LIBERTY BONDS *because a Liberty Loan button with a gray head above it is a full service uniform.*

The Key to Success

Letter No. 1—One seldom reads the story of the promotion of a friend, or the rise of one who has attained success by extraordinary efforts, without being strongly impressed with a desire to unravel the mystery and discover, if possible, what was the key to the man's success. Many such instances were brought out in the discussion that occurred some time since in *Coal Age*, entitled "Merit vs. Favoritism."

It is not my intention to discuss that particular phase of the subject but only to add a few words that will suggest to the thoughtful man what is the true key that will unlock the door of fortune.

Speaking of the promotion of men to the position of mine foremen, I believe that it is true that favoritism is often shown in making the promotion. However, it is my belief that few men who have been thus favored continue to hold their positions for any length

of time, unless their promotion has stimulated them to unusual activity.

It is only natural that those who invest their capital in an undertaking should demand results, and *results* can only be secured through the efficiency of the workmen employed. These are true business principles and require that the man who is to succeed in the end must be one who is willing to make the necessary effort for his own advancement. The man who is looking for promotion must be willing to forego the pleasures that would otherwise absorb his time and consume his idle moments, and devote himself to study and improvement. Looking at successful men, one realizes that they are what their efforts have made them, and this conclusion develops in a man a determination to set himself to the task of securing like success.

In our state of West Virginia, candidates for the position of mine foreman must hold a certificate of competency granted them by an examining board, after they have successfully passed the required examination. While most men appear anxious to obtain a position as mine foreman, few are willing to devote themselves to the task of preparing to take the examination. When told that they must spend some of their evenings and idle hours in study, they appear to lose their interest. For such there is little hope of advancement.

A Lost Opportunity

One instance that I recall is that of a mine foreman who held only a second-class certificate. His superintendent, anticipating his own promotion, urged the foreman to prepare himself and take the examination for a first-class certificate, which would put him in line for promotion to a superintendency. Although he promised to help the foreman in the work of preparation, the latter gave no heed to the suggestion. As a result, a new man was brought in and appointed superintendent to fill the vacancy.

Had the foreman, in this case, tried and failed he would be worthy of our sympathy and future success would still be within his grasp, but the failure of the man to try excites only one's contempt. I am convinced if there were more men who were willing to try for higher positions, there would be more promotions from the rank and file of the laboring classes.

Let me not be understood as saying that passing the examination gives assurance that a man is competent to take the position of mine foreman. He must have experience to go with his technical knowledge. Neither is the man who has spent several years digging coal at the face fitted for the position of mine foreman. He must have experience in the working, drainage and ventilation of mines, and possess the ability to handle men and economize in all matters of time and material.

This does not mean that a man, to make a good foreman, must be a technical graduate who has acquired most of his knowledge from textbooks; but the successful mine foreman must possess a knowledge of the theory and principles of mining, in addition to his practical experience in the operation of mines.

In closing, let me say again that the true key to success is the willingness of men to prepare themselves for advancement. Let us put aside all ideas of "favoritism" and base our hopes of success on the efficiency of our own efforts, and, above all, let us remember that he who builds his own fortune on the wreck of another's prospects will not long survive.

Bluefield, W. Va. D. H. Perdue.

I'm buying Liberty Bonds *because I don't want to hang my head in shame every time I meet a man in his country's uniform.*

The Handling of Men

Letter No. 7—I have been particularly interested in the several letters regarding the successful handling of men, and would like to add a word on this topic myself. To be able to deal successfully with a body of men and secure results that are at once satisfactory to them and to their employers is, in my opinion, one of the most important requisites of a mine foreman. I would add, though he possess all the other qualifications required to fit one for that office and lack the patience, tact and initiative necessary to secure the desired results, he would prove a failure in the end.

A foreman in charge of men must be able to judge correctly in regard to their individual qualities. Otherwise, he will make many mistakes by placing men in positions that they are not fitted to fill, or giving them work that they are ill-adapted to perform. By way of explanation, let me say a man who is a model miner may be wholly incapable of driving a mule or running a locomotive. A good mule driver may make a poor man to operate a machine for cutting coal.

Something more than willingness in the worker is necessary for the proper performance of different kinds of work. Some men are natural miners; others natural mechanics; while still others have skill in the handling of a horse or mule. It is these characteristics in men that adapt them to different classes of work, and the mine foreman must be able to determine by his observation and by questioning to what class a man belongs.

Need to Study Human Nature

Besides these physical qualities possessed by men, there are the human elements that go to give individuals different dispositions, and it is important for the mine foreman to discover the nature of each man he employs. Some men will respond with their best efforts to a kind word; others are won by flattery or praise; many require to be encouraged; while still others must be compelled by the use of rough language or severe measures. The foreman must be all things to all men. He must, of course, provide the proper material and tools for doing the work, or he cannot expect the best results.

When instructing a new man how the work must be performed, a foreman's patience is frequently severely tried. A workman will often do the opposite from what he has been told, not because he means to be contrary but through his lack of understanding the instructions given him. It is up to the foreman, then, to explain himself, so that the man will understand fully what is expected of him.

As an arbitrator, the foreman is often obliged to settle differences between his men, and sometimes even family troubles are brought to him to be adjusted. It

is in the settlement of such disputes that the foreman often shows his greatest tact.

The successful handling of men requires, moreover, initiative on the part of the man in charge. He must be able to do the right thing at the right time, and not be under the necessity of consulting the man above him. He is the one in charge of the work and should be capable of its proper performance. He should be held responsible for the results, and if these are not forthcoming, he must expect to give place to another man who is better fitted for the position

Pride in Performance of Work

An important element in any operation is that the man in charge and the men under him must have a love for the work, and display an interest in its performance. Not only must the foreman take pride in the manner in which the work is performed, but he must have the ability to make every man feel the same pride. In this way only can the men be brought to feel that they are a real part of the business. Every worker should feel it his duty to do his part to establish a reputation for the place. The reputation of the company is as much to every worker as the wages he receives, since these will ultimately depend on the success of the business.

Finally, in addition to his other requisites, the foreman must have the welfare of his men at heart. His treatment of them must be such as to make all feel that their efforts are appreciated. At the same time, his discipline must be such that every worker will know what is expected of him. Disobedience of orders or violation of mining laws, mine rules and regulations cannot be tolerated. In this way only will the men come to have respect for the foreman, which is essential in securing the highest efficiency in the work. A lax discipline is sure to breed trouble. In the handling of men, the old adage is true "Take care of the little things and the larger things will take care of themselves."

J. H. Tipton.

Hooversville, Penn.

I'm buying Liberty Bonds *because my negro elevator boy has bought one out of his $10 weekly wages and I don't want to feel ashamed in his presence.*

Mining Equipment

Letter No. 2—I have been a much interested reader of the letter signed "Progressive," which appeared in *Coal Age*, Mar. 9, p. 468, regarding the securing of accurate information in respect to the performance of mining equipment in actual use.

The writer has drawn attention to conditions that would cause many operators to hesitate in regard to giving publicity to the results they had obtained in the use of different types of equipment. Most of us will agree with "Progressive," however, that the coal mine operator who has used certain equipment in the operation of his mine is the one who could, if he would, give the most valuable information in respect to its performance.

Assuming, for example, a certain type of coal-cutting machine or haulage locomotive has been in use for three or four years in a mine, working under certain conditions, with the result that the records show a considerable saving since the installation was made, there can be little doubt that to spread that information broadcast would be of great assistance to the coal-mining industry and would be welcomed by all coal operators. The suggestion is made that such publicity might "take an unfair advantage of advertisers, by making comparisons of similar equipment under widely varying conditions," which might not appear or be comprehended by the writers.

It would seem, however, that the real difficulty in the way of disclosing information in regard to the performance of certain equipment, by operators using the same, is the fear of giving valuable information to competitors. At the present time, I fear that comparatively few operators will be found willing to voice their opinions relative to the results obtained in the use of various equipment installed by them at considerable expense. It is therefore necessary for the manufacturers to advertise the performance of their own equipment, which is done through the advertising columns of journals or by mailing descriptive catalogs and circulars direct to consumers. It is true, as "Progressive" has intimated, that mine operators often feel they are "fed up" with such information coming from the man who has the equipment to sell and they would welcome information from users of the same.

In closing, let me express the hope that a new era is already dawning and that mine operators will soon take a broader view of the situation and recognize the value of the information they can give in respect to the actual practical performance of mining equipment to the coal industry at large of which they are a part. The general adoption of this policy will in the end bring its reward to every operator.

——, Ala. "Checker."

Letter No. 3—Speaking of mining equipment and the results obtained in its use, there is one feature regarding the treatment of the steel used in construction that cannot fail to be of far-reaching importance and interest to all coal operators. I refer to the heat treatment of steel, particularly the steel used in mine-car axles and haulage locomotives.

Some eight or ten years ago a few railroads in this country began experimenting with heat-treated axles of various kinds, and they also had some of their engine truck frames undergo the same treatment, as well as the crosshead guides of their locomotives. The result was that when the material so treated had been in service for a considerable time, it proved so far superior to the steel formerly used, that few of the roads now, I understand, would permit any vital part of their locomotives to escape this treatment. I believe that the success achieved in the use of heat-treated steel, in railroad practice, can be largely attributed to the hearty coöperation of many members of the Master Car Builders Association.

In this connection, let me suggest that there are a number of associations connected with the coal-mining industry; but, to my knowledge, none of them have given any serious consideration to the necessity of the heat treatment of mine-car and locomotive axles. This is a matter that does not as vitally concern the mine-car builders as it does the users of such equip-

ment. If my information is correct, however, there are a large number of heat-treated axles now in use in the anthracite region and the same can be said with regard to alloy steels of various kinds, such as chrome steel, vanadium steel and many others.

It is important to say, here, what many already know, that the tensile strength of a heat-treated axle, or even an axle of alloy steel, is seldom, if ever, less than 1½ times the tensile strength of the ordinary hot-rolled steel so largely used in the manufacture of much mining equipment. Indeed, the tensile strength of the former will often reach three and four tims that of the latter.

I understand, further, that a low-carbon steel is quite generally used in the manufacture of mine-car axles, the carbon in the steel often being as low as 0.1 per cent., the steel being hot-rolled. This quality of steel was used by a large coal company during a long period, until they were advised of a better axle steel, which they have since used with increased satisfaction.

Quality of Steel in Mine-Car Axles

To my mind there is nothing more important in connection with a mine car than the quality of the steel in its axles. An inferior quality of steel will cause the axle to bend easily, and the metal will often crystallize under the repeated vibrations incident to its use. The crystallizing of the steel will cause an axle to break suddenly and, perhaps, cause a serious wreck on the haulage road and tie up the mine until it can be cleared. The result, in such a case, is not only the damage done to the cars and the expense of clearing away the wreck and making the necessary repairs, but of even greater importance is the loss occasioned by the temporary shutting down of the mine.

Since *Coal Age* is regarded as the national organ of the coal-mining industry, at the present time, the discussion of this subject in its columns will prove of untold interest to coal operators, especially those who are thinking of bettering their equipment. I, with others, will welcome a recital of the experiences of operators in respect to the quality of steel they are using in their mine-car and locomotive axles. It may be possible, also, to show specimens of microphotographs of the right kind of heat-treated axles, together with microphotographs of inferior axles, as this would enable many to understand the technical use of these terms in a more thorough manner. P. K. Howard.

New York City.

Each of us should buy Liberty Bonds *to assume at least part of the individual responsibility which the war imposes on the nation as a whole.*

The Mine Gatehouse

Letter No. 3—In reading the letter of W. H. Noone, *Coal Age*, Feb. 2, p. 256, explaining the advantages of the mine gatehouse, I was reminded of the time when I started the same system in an Alberta mine of which I had charge as superintendent and mine manager. The system worked well and is still in use, after 14 years, having undergone little change.

A large board was prepared, about 30 in. wide and 5 or 6 ft. long. The board was ruled with lines and holes ¾ in. in diameter were drilled at regular distances apart on these lines. Each hole was numbered, besides being marked with the name of the miner and his working place. If the man had no contract number, his name and place only appeared on the board. These names were put in a separate section by themselves. Drivers, motormen, timbermen, etc., were kept in their respective divisions underneath the others.

Operation of Checking System

The practical operation of the system was quite simple. A man called the "checker" was in charge of the board and placed a small wooden peg in the proper hole as each man, on passing the window of the checking office, called out his number or name. The checker became so expert in putting the pegs in the holes that the men were able to pass the window in a steady stream and be registered correctly. At times, the checker would use both hands and place the pegs in their proper holes with almost the same dexterity as a typewriter would handle the keys of her machine. When the men returned from the mine they would again pass the window and check out, the checker removing the pegs from the board as the numbers were called.

In the use of this system we scarcely ever had any trouble at the end of a period. Each man's time was made up from the board. The checker was stationed in the office, or "gatehouse" as it has been called, and if a man quit early the time when he came out of the mine was marked on the timebook correctly. Not only did the adoption of this system save much expense in keeping the time of the men working in the mine, but it enabled the mine manager to see at a glance what men were at work in the morning and to fill the places of those who had not come to work.

Plan to Insure Uiform Output of Coal

It was our custom, in that mine, to keep 10 or 12 men who were called "open-link miners." These men had no regular working places, but were sent to rooms where a man's buddy had failed to come to work. The rule at this mine was that no man was permitted to work alone, an extra man being sent to his place when his partner was not on hand. This plan had a good effect in maintaining the output of the mine more uniformly than would otherwise be possible.

Comparing this system with those I have observed in mines in Washington, Montana, Colorado and Kentucky, where brass checks were used and these were put on the board when the miners went into the mine and taken off again at night, I am convinced that it is of great advantage to have a competent man in charge of the checking board, whose duty it will be to mark the time that each man works, correctly.

This also serves to keep men in their places for the entire day, unless they have a good excuse for quitting, as the checker is obliged to note the cause of each man who comes out of the mine early. When the men realize that there is a close watch kept on their coming and going, it has a marked effect on keeping them in their working places until the end of the shift.

Moreover, as has been pointed out, a good checking board when properly kept is of great value in showing who is in the mine, in case an accident should occur that would make this information of importance.

Cassidy, B. C., Canada. Agar.

INQUIRIES OF GENERAL INTEREST

Sinking Shaft Through Quicksand

I have been much interested, recently, in the study of the problem of sinking a shaft through quicksand: and am anxious to secure what information I can in regard to methods that have been used successfully in sinking shafts through such strata. I have heard of some shafts being given up, because of the inability of the sinkers to control the inflow of water and sand struck at varying depths below the surface.

In one instance, a shaft had reached a depth of 80 ft. when it penetrated a 4-ft. bed of quicksand. Continued bailing and pumping produced no effect and the shaft was finally abandoned, because of the sinking of the surface over a considerable area surrounding the excavation. I would like to ask whether it would have been possible to save this shaft by any practicable means.

Although I have had little practical experience in sinking through quicksand, my study of the problem has suggested a method that appeals to me as bidding fair to be successful. It has the advantage of being more simple than any arrangement of steel shoes and tubbing, which are generally recommended when sinking through such measures.

Without attempting to give my own ideas, I would like to ask one or two questions: Does quicksand rise above its own level in a shaft? Is it possible to control the inflow of quicksand into a shaft excavation by the use of cement grouting, and how should this be accomplished?

JOHN A. RURY.

ercy, Ill.

Some sections of the Illinois coal field are famous for the extensive beds of quicksand, representing old river bottoms and lying anywhere from 25 to 50 yd. below the present surface. Much difficulty was experienced, a few years ago, in sinking the Ladd shaft, in Illinois. At that time, the writer devised a plan that proved successful in penetrating a thick bed of quicksand lying at a depth of 150 ft. below the surface.

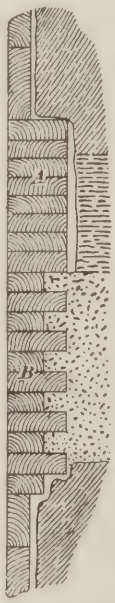
As shown in the accompanying figure, which is a cross-section through the curbing, the shaft was timbered with alternate 10- and 12-in. planks laid flatwise, which presented a corrugated surface at the back, the effect of which was to choke the drainage behind the shaft timbers, as the excavation proceeded downward. By the use of cross-buntons, the curbing was tied to heavy truss-beams at the surface, by means of steel rods inserted in 10-ft. sections.

When the excavation had reached a sufficient depth below the surface to permit of hanging the uppermost section of the curbing the first set of four steel rods, 1½ in. in diameter, were suspended from two heavily trussed beams, so as to hang in the four corners of the shaft, respectively. The four rods passed through and supported two cross-buntons on which the curbing rested. By means of screw couplings other sections were added as the depth increased.

In this manner, and by the use of a steel shoe at the bottom of the shaft, it was possible to pass through the quicksand, after having experienced the loss of five shafts sunk successively in the same locality. In that instance, the surface had sunk 4 or 5 ft. over a large area surrounding the shaft when the coal was finally reached in the sixth shaft.

The pressure on a bed of quicksand will depend much on the nature of the overlying strata. When the quicksand is finally reached, in sinking a shaft, there frequently occurs an outburst of sand and water, which comes without warning, and rises in the shaft to a point equal or corresponding to the head or water level in the strata.

The character of the quicksand bed is quite variable. At times, it may consist almost wholly of fine sand, and, again, the sand may be mixed with boulders or lumps of mud or clay. The water permeating this bed may have its source in a watery stratum lying some distance above the quicksand, and this will explain how it is that the water and sand frequently rise to a great height in the shaft.



SECTION THROUGH SHAFT CURBING

While the use of cement grouting has proved of great value, in many instances, it is often the case that quicksand flows so freely that it is impossible to control or even reduce the inflow into a shaft excavation, after this has once started. In every case, where there is reason to expect an inflow of water or quicksand, test borings should be made at the proposed location of the shaft, and this should be done before the sinking is commenced. The results of these borings will determine both the head and the quantity of water to be encountered in sinking. The borings will also show if quicksands are present and give the depth and thickness of the bed besides showing the character of the strata.

Where a freely flowing quicksand is to be encountered in the sinking of a shaft, it is advisable to resort to what is known as the "freezing process." This consists in sinking a series of boreholes around the proposed excavation and freezing the strata by forcing a freezing mixture through pipes into these holes, till the ground is frozen.

Another method that has been successfully applied is to force a good grouting of hydraulic cement into the holes, until it has permeated and largely solidified the bed of quicksand for a few feet surrounding the shaft. When this method is used, the work must be done before the excavation is started and the quicksand is dormant, as it will not be easy to solidify the quicksand when a flow has once started.

EXAMINATION QUESTIONS

Illinois Mine Managers' Examination, November, 1917

Ques.—The main entry in a mine is driven due east from the bottom of the shaft. There are three pairs of entries turned south off the main east, known as the 1-, 2-, 3-, 4-, 5- and 6-S entries. Fifteen men are at work in the 1-S, 15 men in the 2-S, 15 in the 3-S, 15 in the 4-S, 22 in the 5-S and 15 in the 6-S. Two men are at work in the main east entry and one in the main return entry. How much air should be required to pass through the last open crosscut in each pair of entries?

Ans.—Assuming a nongaseous mine and not estimating on the number of animals required in these entries since no mention is made of them, it will be sufficient to allow 100 cu.ft. of air per minute, for each man employed in each pair of entries. In estimating the quantity of air flowing through the last crosscut, however, it is necessary to consider whether this mine is ventilated by a continuous current or whether the split system of ventilation is employed.

Assuming, then, that each of the three pair of south entries are ventilated by a separate air split that is conducted at once into the main return airway, the quantity of air passing through the crosscut at the face of the 1- and 2-S will be $100(15 + 15) = 3000$ cu.ft. per minute. The same quantity will be required in the 3- and 4-S entries. The quantity required in the 5- and 6-S entries is $100(22 + 15) = 3700$ cu.ft. per minute.

The air passing the face of the main east and return airways, in order to comply with the law, need be only $100(2 + 1) = 300$ cu.ft. per minute. This quantity of air, however, would give a velocity of but 5 or 6 ft. per minute, which would not be sufficient for the ventilation of these places. It is, therefore, better to assume that the air split ventilating the 5- and 6-S entries is conducted to the face of the main east entries, instead of passing directly into the return airway. In that case, however, the quantity of air passing through the crosscut on the 5- and 6-S and the crosscut at the face of the main east entries would be $100(22 + 15 + 2 + 1) = 4000$ cu.ft. per minute.

In case this mine is generating gas, the Illinois coal mining laws require 150 cu.ft. per minute for each man working in the mine. This would increase the quantity of air passing through the several crosscuts mentioned, and make the quantity half again as great.

Ques.—What advantages and disadvantages would you expect by connecting the underground workings of two or more mines, and what dangers are likely to arise therefrom?

Ans.—The advantage of connecting the underground workings of two adjoining mines is that such a connection will afford means for the escape of the men from the workings, in case of emergency arising from a sudden outburst of gas or an explosion occurring in one of the mines. The disadvantage of having such a connection is that, should an explosion occur in one mine and the division doors are blown down, the effect would be felt and the explosion possibly transmitted to the workings of the adjoining mine. Another disadvantage may be experienced in the possible disarrangement of the ventilating current, owing to the setting open of the division doors or the difficulty of preventing the leakage of air from one mine into the other, especially if one is ventilated under the blowing and the other under the exhaust system of ventilation. Unless the doors between the two mines are kept locked, some trouble might arise from the men employed in one mine, paying their visits to the workings of the other mine, which would afford an opportunity for shifting the blame of accidents and making it impossible to determine the responsibility for the same.

The dangers of connecting adjoining mines are those mentioned relating to the possibility of explosion in one mine or the flooding of one mine affecting both mines alike.

Ques.—Is coal dust explosive and, if so, under what conditions?

Ans.—Experience and experiment have both proved that the fine dust of inflammable coal is explosive. The conditions favoring a dust explosion are the fineness of the dust, the inflammability of the coal from which it is formed, the volume and intensity of the flame causing its ignition, and the suspension of the dust in the air. While the presence of methane, even in small amounts, will greatly assist the ignition of the dust and render its explosion more violent, the gas is not a necessary constituent of an explosive atmosphere, which may be due wholly to the presence of a sufficient quantity of fine inflammable dust.

Ques.—What precautions would you adopt to prevent the accumulation of gas on top of falls where it was difficult to remove the gas with the air current?

Ans.—In this case, a special brattice should be erected in such a manner as to deflect the air current to the top of the falls and cause it to sweep the gas coming from the cavity in the roof strata.

Ques.—Should a fall occur on the main intake airway, and a large amount of gas be given off from the roof, what steps would you take to prevent an explosion and rescue the men at work inside?

Ans.—The men should be notified at once to extinguish their lamps. They should be withdrawn from the mine by the shortest and most practicable route to avoid their contact with the gas. It may be possible to short-circuit the air current inby of the fall so that the gas will be carried at once into the return airway and conducted out of the mine. No open light should be permitted under any conditions, and the only safety lamp permitted to burn should be in the hands of the fireboss, who should lead the men out of the mine, to insure their safe escape.

COAL AND COKE NEWS

What Happened in March

Mar. 1—Joint committee appointed by Government officials, eastern railroad representatives and mine operators of Pennsylvania, Maryland and West Virginia to apportion cars to meet the railroad-fuel demand.—Price of coke manufactured in Preston County, West Virginia, between Tunnelton and Grafton and at Meriden, Barbour County, was fixed at $6.75 for blast-furnace coke and $7.75 for selected 72-hr. foundry coke, a rise of 75c.—Flat top or Pocahontas, W. Va., coke is placed at $8, instead of $6 for furnace coke and $7 for foundry coke.—Selected foundry coke, manufactured in Indiana County, Pennsylvania, from washed coal mined from the lower bench of the upper Freeport, is placed at $8 per ton if ash exceeds 10 per cent or the sulphur 0.9 per cent and $8.50 if the ash is less than 10 per cent and the sulphur less than 0.9 per cent.—Byproduct coke at Chattanooga Tenn., is set at $8.25, run of oven, crushed coke over 1-in. in size $8.75 and selected foundry coke $9.25.

Mar. 2—Bill introduced by government of British Columbia for the establishment of an 8-hr. day, bank to bank.

Mar. 4—Public Service Commission holds a hearing relative to the request of A. H. Wiggin, state fuel administrator, that all private power plants in the city of New York be closed down and power requirements supplied by public-service corporations.

Mar. 5—Judge Lovett appointed director of Division of Betterments and Additions in Railroad Administration.—New prices established by Fuel Administration in Wayne County, West Virginia (part of Kenova and Thacker fields). The increase is 40c. per ton making run-of-mine $2.40, prepared sizes $2.65 and slack or screenings $2.15.

Mar. 6—War Industries Board is reorganized, and Bernard M. Baruch is made chairman of National Defense.—Priority given to coal by order of Jan. 17 is removed in all states east of the Mississippi except Pennsylvania, Maryland, West Virginia, Ohio and Eastern Kentucky.—Priority is given to New York Central and Hudson R.R. Co. railroad coal over all other coal contracted for.—Prices granted to certain mines in Preston County, West Virginia, on Feb. 7 made applicable to all mines in county.

Mar. 8—Fuel Administration makes regulations for retailing. Before Apr. 1 all consumers should place orders for one year's fuel requirements in writing. In the case of anthracite, dealers shall proceed to deliver coal till two-thirds of the requirement is supplied. However orders of 6 tons or less may be filled in full. After all consumers willing to accede to deliver till two-thirds of requirement the dealers may supply coal till the full quantity requisitioned is delivered. The dealer may deliver bituminous coal at once up to the full declared requirement. Where the consumer has coal on hand that coal is to be deducted from the annual requirement. No domestic consumer shall purchase or receive more coal and coke than he will need in the year ending Mar. 31, the coal on hand being figured in the receipts. No dealer may sell him more, alone or with other dealers. No dealer may deliver to any one who has not filed with him a statement of the amount of coal on hand, the amount already ordered and the name of the person from whom ordered, the coal used in the year ending Mar. 31, 1918, and the coal required in the year following.—Prices are set by Fuel Administration for Colorado coal. Bituminous domestic coal from the domestic field: Run-of-mine $2.25; prepared sizes $3.50; slack or screenings $1.25. Bituminous steam coal, Trinidad district: Run-of-mine $2.35; prepared sizes, $3.25; slack or screenings, $1.65; Lignite; run-of-mine, $2.25; prepared sizes, $3.25; slack or screenings $1. These figures for bituminous domestic coal shall be reduced 70c. on April 1; 50c. on May 1; 35c. on June 1 and 15c. on Aug. 1 and for bituminous steam coal shall be reduced 40c. on Apr. 1; 30c. on May 1; 20c. on June 1 and 10c. on July 1. To all these figures 45c. may be added where compliance is made with the terms of the Washington Agreement. The order reduces prices considerably.—The Fuel Administration sets the price of run-of-mine at Montana, Wyoming and Utah mines at $2.65; prepared sizes at $3.30; slack and screenings at $1.50. To these figures the 45c. granted in consideration of compliance with the Washington Agreement may be added.

Mar. 9—The Fuel Administration announces that the prices of anthracite will be reduced 30c. per ton from Apr. 1 to Sept. 1 instead of the usual reduction of 50c. in April, 40c. in May and so on till August when only 10c. is usually deducted from the winter circular. It also announces a system of inspection. The coal which proves below standard must be sold for 50c. less than Government prices. Parts of the mine producing coal of inferior value must be closed with due regard to conservation or else provision must be made to clean the coal.—Summer reductions in Colorado will apply only to prepared sizes on both domestic and steam coal. It shall not apply to lignite.—Maximum prices for coal in Marion, Boone and Appanoose fields, Iowa, areas are set as follows: Run-of-mine $2.75; prepared sizes, $3.10; slack or screenings $2.90.

Mar. 10—British government announces that on Mar. 21 it will proceed to the enlistment of 50,000 miners.

Mar. 21—The Somerset coal price field in Pennsylvania is enlarged by adding operations on the Baltimore & Ohio Ry. and from the Somerset County line to and including Indian Creek and the Indian Creek Valley branch of the railroad. The prices are: Run-of-mine, prepared sizes and slack, $2.60 with 45c. added if compliance is made with terms of Washington Agreement. The old prices were $2, $2.25 and $1.75 respectively—Several orders dating back to the order of Jan. 30, 1915, relating to the freight rates on anthracite are vacated by the Interstate Commerce Commission and an increase in rate not to exceed 15c. per long ton is added to the freight rate on anthracite. The freight rates on live stock and fresh meats, petroleum, grain and grain products, brick, clay, cement, lumber and forest products and some other materials are also increased.

Mar. 16—Rules and regulations governing the distribution of coal and coke by persons, firms, corporations and associations subject to license are formulated by the Fuel Administration.

Mar. 20—Manufacturers of box board, paper board, straw board, etc., who reduced their fuel consumption by running 5 days a week resume their full schedule.

Mar. 22—The Fuel Administration announces a new price classification for the entire state of Illinois and for large coal fields in Ohio, Pennsylvania, Virginia and West Virginia.

Mar. 28—New prices are named for Washington, Oklahoma and Arkansas mines.

Mar. 29—Companies and individuals using special means for eliminating impurities from their coal will be permitted to add 20c. to the Government price at the mine.

Mar. 30—United Fuel Administration advises the public to store coal or otherwise there will be a shortage next winter.

Harrisburg, Penn.

Holding that it would be a harsh rule to require corroboration of an accident when it is known that the workmen in mines are frequently employed at isolated points, where accidents cannot be witnessed by others, Judge Strauss (Luzerne County) made an order on Apr. 4 in the appeal taken by Mary Zadwick from a decision of the Workmen's Compensation Board, in which he sustains the appeal of the claimant, reverses the order of the board which set aside the finding of the referee and directs the board to grant a hearing de novo in accordance with the provisions of the act.

The husband of the plaintiff, Joseph Zadwick was taken ill on his way home from work on July 12, 1916, and died Aug. 7. It was claimed his death resulted from a sprain received while he was at his work on July 12, lifting a heavy weight. There was no witness to the lifting or injury, and the Lehigh & Wilkes-Barre Coal Co. appealed from the decision of the referee because there was no relation shown between the accident and the cause of death.

A. Mitchell Palmer, Federal custodian of alien property, has filed more than 50 petitions for reinstatement of claims of nonresident enemy aliens for compensation for deaths of workmen in Pennsylvania, many of whom were subjects of the Austro-Hungarian empire. These claim petitions had previously been disallowed by referees throughout the state because of the failure of claimants to attend hearings and prove their cases.

Arguments on the petitions will be heard on Thursday, Apr. 25, at Philadelphia, and it is expected that Mr. Palmer will appear personally in behalf of the United States Government. It is also anticipated that representatives of coal corporations and insurance companies interested in compensation cases will protest.

The petitions are expected to serve as precedents by which the custodian of alien property will endeavor to have the claims of nonresident aliens in compensation cases tolled until the end of the war. The insurance companies are opposed to this as it will require them to carry a reserve fund in each case. It is estimated that more than a million dollars is involved in the proceedings before the board and most of the cases are said to come from the coal regions.

Birmingham, Ala.

The names of four new coal firms were placed on the incorporation books in the probate office during March, according to a report filed Saturday. The combined capital is $117,000. The new concerns are the Sandstone Coal Mining Co., capital, $2000; The Wabash Coal Mining Co., Inc., capital $10,000; the Cullman Coal Co., capital, $5000 and the Black Warrior Coal Co., capital $100,000. The Wabash company filed its first papers early in March with a capitalization of $5000 and later increased this stock to $10,000. These four companies are included in a list of seventeen new companies incorporated in March with a total capitalization of $344,000.

Among the improvements in the fuel field announced during the week is the opening of a new mine three miles west of Leeds, in the northeastern part of this county. The development is under the direction of T. P. Berry, J. M. Donaldson and Tom Stobert and will be known as the Mary Anderson mines. It is officially stated that the company is counting on producing several hundred tons of coal a day within the next few months. The Central of Georgia R.R. has made a survey for a spur track to reach the new mines, which are located in Section 7, Township 17, Range 1, east in Jefferson County.

Another important announcement is that of President George Gordon Crawford, of the Tennessee Coal, Iron and Railroad Co. The company announces the immediate construction of 154 additional byproduct ovens at its immense plant at Fairfield. This development is intended primarily to increase the production of toluol, ammonia and benzol needed in the manufacture of ammunition and also to bring about a saving of hundreds of thousands of tons of coal for coke making in the byproduct plant as over the beehive oven system. The development will entail an outlay of $2,500,000. The company now has 280 byproduct ovens at Fairfield.

In the mining section of the district there is much activity. Labor is needed in every direction. While it is a fact that there are some negroes returning to the district who left here during the past two or three years in the big exodus that carried hundreds of them to Ohio, Pennsylvania, Illinois, West Virginia, Michigan and other states, the demand for labor comes on at a pace that makes a shortage

keenly felt. In all parts of the district the eight-hour day is in operation at the mines, or will be before the end of this month; the semi-monthly pay is in effect and many other concessions have been made to attract labor. Bonus is being allowed at many of the mines for extra work or tonnage, and every effort is being exerted to hold the output of coal up to the maximum.

Reports reaching the office of State Inspector of Mines show that coal production this week was the heaviest ever seen in the state for a similar period, and records indicate that production through new mines this year will be increased by not less than 500,000 tons.

Fairmont, W. Va.

A glance at the figures showing the production of coal for the fiscal year ending June 30, 1917, in the Fairmont district, which is the Monongah division of the Baltimore & Ohio R.R., shows that it is the mines which have been providing railroad fuel which have been prosperous, accepting that the mining of coal means financial success, a proposition on which all coal people stand agreed even though a request was made recently for an advance in selling price.

The leading producers of the Fairmont district did not get out as much coal as could have been mined but the showing is creditable to the district. The Consolidation company mines in the Fairmont district (it has mines in other regions) could have turned out 2,000,000 tons more readily. The Jamison mines in this district (that company also has mines outside the district) were capable of putting out 800,000 tons more. The Hutchinson Coal Co. (which also has mines outside the region) could have turned out 500 000 more tons in the Fairmont district. The Federal Mines at Grant Town, owned by the New England Fuel and Transportation Co., had an over supply of cars part of the time, but the output could have been increased some in the last year. The Wendel mines, which are fourth in the list, supply Baltimore & Ohio fuel, as does the Century Coal Co. and in fact all the operations which are named below, whose production last year is given in net tons:

Consolidation Coal Co., of Fairmont	4,313,624
Jamison Coal and Coke Co., of Fairmont	914,546
Hutchinson Coal Co., of Fairmont	719,179
Maryland Coal and Coke Co., of West Virginia (mines at Wendel)	701,160
Federal Coal and Coke Co., of Grant Town	688,668
West Virginia Coal and Coke Co., of Elkins	666,188
Elkins Coal and Coke Co., of Morgantown	631,197
Century Coal Co., of Century	490,489
Virginia and Pittsburg Coal and Coke Co., of Kingmont	402,277
Four States Coal Co., of Worthington	337,960
Davis Coal and Coke Co., of Baltimore	302,198
Marshall Coal Co. of Mt. Clare	297,081
Fairmont and Cleveland Coal Co., of Rivesville	243,192
Dawson Coal Co., of Clarksburg	241,085
Madeira-Hill-Clark Coal Co., of Wilsonburg	238,501
Monongahela Valley Traction Co., at Baxter	203,894
Virginia-Maryland Coal Corporation, at Shinnston	201,820
Rosemont Coal Co., of Rosemont	179,086
Merchants Coal and Coke Co., of Pennsylvania (mines at Tunnelton)	153,127
Austin Coal and Coke Co. at Austin	135,849
Stafford Coal Co. at Baxter	134,400
Pittsvein Coal Co. at Flemington	132,693
Harry B. Coal and Coke Co. at Clarksburg	128,148
Francois Coal and Coke Co. at Clarksburg	126,317
Central Fairmont Coal Co., of Clarksburg	118,795
Whyel Coal Co., of Monagh	122,783
Lambert Run Coal Co., of Meadowbrook	112,598

T. W. Arnett has varied mining interests with a large output, the total of which would make a good showing in the list, but he operates them under different corporate names. His total tonnage is certainly more than 300,000.

The Clark interests have the Madeira-Hill and Harry B. in this table while they have three other mines, the total of all reaching something like 400,000.

The Lambert Run Coal Co. is one of several interests in which Clarence D. Robinson is prominent. If his three or four other interests were combined the total tonnage would be in the neighborhood of 350,000.

The poor and irregular car supply reduced the output considerably. Some mines got an 80 to 100 per cent. car supply while others only had 20 to 40 per cent. The mines unfortunate under the assigned car policy favored by the railroads lost many men, who scattered with work dull, and this reduced the output where there was a full car supply.

For instance, the Jamison concern has three mines in this district any one of which could probably have equaled the Federal if the car supply had been as good. It is reasonable to estimate that the Jamison mines in this region could have doubled their output with a full car supply.

Charleston, W. Va.

Though expecting official advice from Washington at almost any moment as to the decision of the National Fuel Administration on the selling price of coal in this state, no orders had been promulgated up until the time this was written. Operators are living in hope that their request for a general increase may be complied with, though of course without any definite assurance that such will be the case. The impression seems to prevail that the New River district may be allowed increases but that the Kanawha District will not be given an increase.

Advices from Fairmont during the early part of last week were to the effect that the car supply in that region had been ample during the early part of the week, though it was said the prospects for the remainder of the week were not very encouraging. The lifting of the embargo on eastern shipments also contributed toward easing the situation in the Fairmont territory where it is estimated the regional supply is about 6000 cars short.

Operations at most mines in West Virginia were suspended last Saturday afternoon at the request of the Governor, to permit miners to participate in the parades and patriotic celebrations held throughout the state which signalized the beginning of the Third Liberty Loan campaign. Miners turned out in force at Charleston.

The Marting War Savings Society, consisting mostly of miners, at the organization of their society last week pledged at the first meeting $6100 to be invested in War Savings Stamps. They have set $12,000 as the goal for January 1, 1919.

Looking ahead to the end of the war, a number of the coal associations, representing West Virginia operators have, through their officers, responded to Governor Jno. J. Cornwell's invitation to attend a conference in this city, some time in May, for the purpose of making plans to extend the export trade to South America. While some of the operators take the view that the present is not the time for action, the Governor has urged that it would be short-sighted to wait until the war is over before making plans to establish a market for West Virginia coal in the countries to the south of North America. It was decided not to hold the conference until the end of the present Liberty Loan Campaign.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Voluntary subscription of funds for the Wyoming Valley Chapter of the American Red Cross has netted $5791 from miners and breaker boys in the employ of the Lehigh & Wilkes-Barre Coal Co. Lately the Red Cross has been hard pressed for money, so many have been the appeals and so great the volume of relief work. Mine workers have attempted to tide the organization over until the next Red Cross campaign.

Nanticoke—Anthony Waicik, a miner at the Loomis Colliery of the Delaware, Lackawanna & Western RR., Coal Department, has been taken into court by Mine Inspector Frank Kettle, charged with violating the anthracite mine law by lighting a match in a forbidden place and against orders of the mine foreman. The place where Waicik was employed was very gaseous and the men worked with safety lamps. The defendant was discovered on Jan. 19 smoking a cigarette, thus endangering lives and property through a possible explosion of gas. The case will be tried before a jury.

Pottsville—The barrier pillar case, involving $300,000 lost in coal when the court directed that an immense barrier pillar be left standing between Morea and New Boston collieries, was heard before Judge Bechtel, on Apr. 3. Dodson & Co., who would have mined the coal if not prevented by an injunction, have sued the Delano Brothers for damages, claiming that the right to mine the prohibited pillar of coal was included in their lease and the land owners failed to make it possible to complete the terms of the lease. Intricate legal questions are involved.

Scranton—Anthracite operators have actively enlisted to aid the work of the nation to produce more food. They are making available for war gardens lands which have gone largely unused. The Delaware, Lackawanna & Western and the Delaware & Hudson Coal companies have set aside a big acreage in their region for this utilitarian purpose. The fields are several hundred acres in extent and have a soil, with the proper tilling and enrichment, to produce abundant crops, which will largely supply local needs.

The Lehigh & Wilkes-Barre Coal Co. printed at its own expense thousands of recipe leaflets, teaching the mine workers the different uses of cornmeal as a substitute for wheat and wheat flour. The recipes include other bread substitutes and a bean loaf. The anthracite operators are also teaching the mine workers the ruling of the food administration in food savings.

Coxton—Owing to the present unsatisfactory manner of mixing anthracite and bituminous coal, and loading it on engines, the Lehigh Valley Railroad Co. has started work on a coal crusher and mixer that will cost about $40,000. The new structure will be modern in every particular and will also have a storage department of 1000 tons capacity, from which the mixed coal will be loaded automatically into engine tanks. The company is at present using a great amount of small sized anthracite, and under the existing plan it was found hard to mix this with the lumps of bituminous, while the loading of it at present is done with the aid of a steam crane. Aside from this the company is experiencing all sorts of trouble, as the automatic stokers on the engines will not distribute the fuel properly in the firebox. The new building will be similar to the one the company has at Hazleton.

Nanticoke—During the 26 working days in March the miners in the Truesdale colliery of the Delaware, Lackawanna & Western Railroad Co., Coal Department, produced 141,282 tons of coal, or an average of 5469 tons per day worked. In March, 1917, the colliery produced 125,122 tons but the output for last month exceeds this figure by 16,160 tons, in one day less time worked. This colliery holds the daily, monthly and yearly record for the hard coal field. The one day record is 8513 tons, which required 208 railroad cars.

Shamokin—The fire at the Corbin slope of the Excelsior Coal Co.'s twin collieries was placed under control by washing great quantities of water and culm down the heavy pitching slope in which the fire broke out. This procedure had the effect of closing a tunnel at the bottom of the slope. The fire, however, will continue to rage in the slope proper until the culm is banked high enough on the slope to reach the flames. Culm is being poured into the workings at a rate of 15 tons an hour.

Bituminous

Chambersville—The Shannon Coal Co. has purchased the Kinter mine here and is making large improvements. A concrete bridge has been erected across the creek and the coal will be hauled to the tipple of the Seneca Coal Mining Co. and loaded with the Seneca output on the Buffalo, Rochester & Pittsburgh Railway.

Rosmoyne—The McCombs Coal Co. has installed a set of boilers, air compressor, rope haulage engine and mining machines at its mine here. The output will be greatly increased. The coal is shipped over the Buffalo & Susquehanna Railroad.

Indiana—The Leydic Coal Co., operating a mine on the Clymer branch of the Indiana County street railway, and supplying fuel for the street car company, has leased the Guthrie siding between Indiana and Homer City and has erected loading platforms and a tipple. It has a car rating from the Pennsylvania R.R. The coal is hauled from the mine to the siding, a distance of about 10 miles, on a large electric coal car.

Connellsville—On Monday Apr. 15, the wage increase of 15 per cent. recently announced by the H. C. Frick Coke Co. will go into effect. More than 20,000 coke workers will benefit by the increase.

East Butler—Many farms in the coal region are being offered for sale because of the migration of boys to the munition works and the operation of the draft, al-

though under a recent ruling the Government eligibles engaged in agricultural work are not to be sent to camp until after the harvests. Hundreds of Slavonian and Polish miners are buying land, and it is predicted that they will be the farmers of the future throughout the anthracite region of the state. Most of these persons lived on farms before they came to this country and are more experienced as farmers than as miners.

Uniontown—An early adjustment of the J. V. Thompson affairs now seems probable, as the Hill Syndicate options will either be taken up or abandoned by Apr. 21. It is considered likely that the West Virginia and Pennsylvania coal properties would be purchases, which would mean the final winding up of the debts and affairs of Mr. Thompson, who will see his estate, figured conservatively at sixty million dollars in value, wiped out to pay debts of about thirty million dollars. The Hill Syndicate if it comes into possession of the vast acreage held by Thompson, will become the chief factor in the eastern bituminous coal reserves of the nation.

Pittsburgh—Industrial corporations which have been securing part of their coal from wagon mines have notified the owners of these mines that in the future they intend to purchase their coal from larger operators. This action has called forth expressions of disappointment and dissatisfaction from the wagon mine owners who have appealed to district representatives and the Fuel Administration.

WEST VIRGINIA

Elm Grove—The Century Coal Co., headed by David H. Thomas, of St. Clairsville, Ohio, is getting both openings at its plant here in shape for loading. Grading for the sidetracks is now going forward.

Morgantown—The New England Fuel and Transportation Co. has transferred all the Pittsburgh vein of coal and mining privileges in 157 acres of the tract recently purchased, to John F. Phillips and C. D. Robinson, of Fairmont. This tract was originally known as the Elkins tract and was purchased by the New England Fuel and Transportation Co., which has resold a great quantity of the coal, nearly every company in this section acquiring more or less of it.

Elk Garden—A new opening is being developed by the Mapleville Coal Co., which recently took over a large tract of coal land, consisting of 340 acres of the old No. 15 mine on Elk Garden branch. At present mining is being carried on in the Bakerstown bed, with the expectation that the Freeport bed will be worked by the Abraham Creek Coal Co. by May 15.

Shinnston—A coal storage bin recently completed at Owings, near here, is of frame construction on a concrete foundation. The bin, which is 35 x 100 ft., has a capacity of about 1800 tons of run-of-mine coal. It is constructed of longleaf yellow pine which has been thoroughly treated with preservative. Coal is dumped over the tipple in the usual way, going from the chutes into a conveyor by which it is carried to the top of the bin and deposited where desired by gates which can be opened or closed. The machinery employed is electrically driven.

Farmington—The Jamison Coal and Coke Co. has installed a coke machine for the 120 ovens at the No. 8 mine. About half of the ovens are already being pulled.

Weston—The Lynch Coal Co. will open a tipple mine here at once, having acquired 500 acres of Redstone vein of coal and 200 acres of surface.

Beckley—With C. R. Stahl, assistant general manager in charge of the work, the E. E. White Coal Co. is building a concrete road and making other improvements at Stotesbury.

Fairmont—The Hope Natural Gas Co. is branching out in the coal business, having perfected plans to develop its 500 acres of coal land in Marion County, the coal to be utilized in making byproducts.

Charleston—Traffic on the Ansted Branch of the C. & O. was only resumed within the last week, it being impossible to operate trains on that branch since the flood of March 14.

Fayetteville—The installation of several new motors by the Price Hill Colliery Co. will enable that concern to produce its maximum tonnage within the next few days, the tonnage having been limited to about 100 tons daily up to this time, because of insufficient equipment.

Wheeling—Water shipments will be discontinued by the West Virginia & Pittsburgh Coal Co., the company having signified its intention of disposing of its river craft and of shipping coal from its Gilchrist and Colliers plant by rail. The company owns two river steamers and a fleet of barges.

Wellsburg—Suit for $10,000 has been instituted against the West Virginia-Pittsburg Coal Co., operating in Brooke County, by Samuel Logan, father of Ray Logan, who was killed at the Gilchrist mine of the company a few weeks ago. As Logan was the miner's checkweighman, it is said that his death does not come within the purview of the Workmen's Compensation Act.

INDIANA

Petersburg—Coal mines along the E. & I. R.R., on Apr. 2 closed down, claiming that prohibitive freight rates made it impossible to operate profitably in competition with other lines. About 800 miners were released, many of whom are leaving the field.

ILLINOIS

O'Fallon—Joseph Schmit has been arrested by Deputy State Fire Marshal Richards in connection with the explosion of two kegs of powder two weeks ago in the Prairie mine. Schmit, who was employed at the mine, was the first man to reach the surface after the explosion. More than 100 miners have quit work at the Prairie mine on account of the adoption of resolutions by the employees providing that every foreign-born man must show naturalization papers before being permitted to enter the mine. Formerly 380 men were employed at the mine. Now there are less than 275. The company operating the mine has contracts for furnishing fuel to several munitions plants.

Lebanon—The People's Coal Co., which has operated the Lebanon mine for the past eight years under a lease, turned the property over to the owners, the Premier Coal and Mining Co., on Saturday Mar. 29. The Premier company also purchased the machinery and equipment, and will operate the mine in the future. The People's company, of which H. C. Chapple is president and General Manager, will continue to operate the Devil's Hole mine near Caseyville, which was purchased last year. William Kolb, head of the Premier company, announces that repairs will be made and the capacity of the shaft increased. Thomas Jones, for several years a mine examiner, has been employed as pitboss.

OHIO

Martin's Ferry—The Pursglove-Maher Coal Co., one of the largest producers in eastern Ohio, will open a large mine west of its Maher plant at Glencoe. It is expected work will be started as soon as material is obtained. The new mine will tap the coal owned by the Pursglove-Maher interests between Glencoe and the Crambers schoolhouse, just south of St. Clairsville.

Adena—The Stellar Coal Co. expects to begin cutting coal this week. Its mine taps the W. B. Francis coal, which is to be mined on a royalty basis. The Costanzo-Monaco interests, which sold their Wheeling Valley Coal Co. to Goodyear Rubber Co. men recently are the owners of the Stellar.

KENTUCKY

Wheelwright—The Elkhorn Coal Corporation is now shipping coal from its mines here at the rate of 1200 tons a day, and this volume is to be substantially increased during the coming season. The coal is said to be of a high grade, and contracts for future delivery cover the output for the remainder of the year. The company is now operating 22 mines.

Whitesburg—The Kentucky Elkhorn Coal Co. had filed amended articles of incorporation increasing its capital stock from $10,000 to $75,000 in order to start the big development work that is scheduled.

Dawson Springs—The Dawson Hotel Corporation, which is planning a large resort hotel, has been forced to give up its plans, the Government holding that the work is not a necessity. The company has decided to begin work at once on development of its coal properties and start several mines instead of building the resort.

Frankfort—The State Legislature recently passed a law under which the chief mine inspector will be required to furnish maps of mines to owners of adjoining property who file affidavits to the effect that the mine is encroaching upon their property.

Pineville—The Kentucky Ridge Coal Co., a corporation, on the first day of April dissolved, action having been taken at a directors' meeting at Straight Creek on Mar. 1. The company has transferred property to E. W. Pittman, of Straight Creek; A. G. Stith, of Louisville and J. A. Swarts, of Straight Creek, who under a partnership will continue operating the mine as the Kentucky Ridge Coal Co.

COLORADO

Cowie—The coal mine here has been developed and equipped and is now producing from 6 to 8 tons per day. The seam is about 5 ft. thick and is a good grade of lignite. It is planned to haul the coal in wagons a distance of about 5¾ miles to the Boulder market, where it will be retailed direct to consumers. The operators estimate that they will be able to produce 100 tons a day after about six months further development.

Foreign News

Montevideo, Uruguay—Experiments conducted here to discover the practicability of bituminous schist as a substitute for fuel oil in electric plants show that there are 9500 calories per cubic meter in the oil recovered from schist as compared with 10,000 in fuel oil. According to Craig W. Wadsworth, chargé d' affaires in Montevideo, the oil obtained from bituminous schist has been tried with good results in semi-Diesel engines.

Personals

Tipton Stillwell, of St. Louis, Mo., formerly with the Johnston City Coal Co., has accepted a position with the Boehmer Coal Co. as sales manager.

John N. Powers, of Frostburg, Md., has been made the new mine inspector for Maryland, having been endorsed by the state central committee of Allegany County.

Charles Carrol, chief electrician of the Iselin mines of the Pittsburgh Gas Coal Co. Iselin, Penn., has been made superintendent of the Coy mines of the Brush Creek Coal Mining Co. at Homer City, Penn.

William Slater, superintendent of the Blaine (Ohio) mine of the Lorain Coal and Dock Co., of Columbus, has resigned to take charge of a mine at Brilliant. Mr. Slater's successor has not been named.

Irving Cox, of Mill Creek L. I., has been appointed fuel administrator for Nassau County on Long Island, succeeding Anton G. Hodenpyl, who resigned. Mr. Cox was the fuel administrator for the Oyster Bay section by appointment of Mr. Hodenpyl.

Robert S. Blake, formerly connected with the Condit Electric and Manufacturing Co., of Boston, representing it in Pittsburgh, is now district manager for the Duquesne Electric and Manufacturing Co. in its Chicago office, located at 230 So. LaSalle Street.

W. Guy Srodes, of Wheeling, W. Va., has been promoted from the position of general superintendent of the George M. Jones coal interests in eastern Ohio, to the position of assistant general manager of all the operatives of the same company, with headquarters at Toledo, Ohio.

Edward de V. Tompkins, Mem. Am. Soc. C. E., consulting and constructing engineer, who has for the past seven years had offices in the Professional Building, 17 East 38th St., New York City, has moved to Chicago to take the general agency of the Cement Gun Co., Inc., of Allentown, Penn., in charge of the Midwest territory, with headquarters in the Fisher Building, Chicago, Ill.

Obituary

Thomas Masters, a coal operator of East Bernstadt, Laurel County, Kentucky, was killed in a boiler explosion on Apr. 30. The explosion followed a cyclone which swept the city.

Alexander Bradley, aged 60, of Mt. Olive, Ill., died on Apr. 1 at the hospital here after an illness of six months. He gained nation-wide fame as a leader of Illinois coal miners when during the strike of 1897 he marched with an army of 500 miners through many Illinois counties. He was since his illness taken care of by the miners' union.

James Edmund Rutledge, 56 years old, president of the Rutledge and Taylor Coal

Co., of Chicago and St. Louis, died suddenly at Chicago on Apr. 6. Deceased was born at Bloomington, Ill., Oct. 30, 1861, and was a prominent figure in commercial circles in St. Louis and Chicago. He was interested in mines at Duquoin, Nokomis, Livingston and Taylorville, Ill. He was also president of the Standard Briquette Fuel Co., of Kansas City.

Publications Received

Monthly Statement of Coal-Mine Fatalities in the United States, November, 1917. Compiled by Albert H. Fay, Department of the Interior, Bureau of Mines. Unillustrated, 32 pp., 6 x 9¼ in.

Five Ways of Saving Fuel in Heating Houses. By Henry Kreisinger. Department of the Interior, Bureau of Mines. Technical Paper 199. Illustrated, 10 pp., 6 x 9¼ in.

New Views of the Combustion of the Volatile Matter in Coal. By S. H. Katz. Department of the Interior, Bureau of Mines. Technical Paper 183. Illustrated, 13 pp., 6 x 9 in.

Occupational Hazards at Blast Furnace Plants and Accident Prevention. Based on Records of Accidents at Blast Furnaces in Pennsylvania in 1915. By Frederick H. Willcox. Department of the Interior, Bureau of Mines. Bulletin 140. Illustrated, 147 pp., 6 x 9 in.

The Mining Industry in the Territory of Alaska, During the Calendar Year 1916. By Sumner S. Smith, United States Mine Inspector. Department of the Interior, Bureau of Mines. Unillustrated, 85 pp., 6 x 9 in.

Abstracts of Current Decisions on Mines and Mining, Reported from May to August, 1917. By J. W. Thompson. Department of the Interior, Bureau of Mines. Unillustrated, 110 pp., 6 x 9 in.

Recent Coal and Coke Patents

Coal Breaker Construction. J. L. Hiller, assignor to Pennsylvania Crusher Co., New York, N. Y., 1,254,137. Jan. 22, 1918. Filed May 1, 1911. Serial No. 624,291.

Tilting Platform for Mine Car Dumps. J. A. Nolan, Bowerston, Ohio, 1,254,622. Jan. 22, 1918. Filed Sept. 30, 1916. Serial No. 123,146.

Apparatus for Removal of Coal Ash. M. Leblanc, assignor to Westinghouse Electric and Manufacturing Co., Pittsburgh, Penn., 1,254,244. Jan. 22, 1918. Filed May 9, 1914. Serial No. 837,557.

Control Mechanism for Automatic Safety Mine Car Cages. J. A. Nolan, Bowerston, Ohio, 1,254,622. Jan. 22, 1918. Filed Sept. 30, 1916. Serial No. 123,147.

Gas Producer. E. A. W. Jefferies, assignor to Morgan Construction Co., Worcester, Mass., 1,255,015. Jan. 29, 1918. Filed Dec. 14, 1904. Serial No. 877,004.

Coke Oven. P. Plantinga,, Cleveland, Ohio, 1,255,047. Jan. 29, 1918. Filed July 26, 1916. Serial No. 111,527.

Mine Car Wheel. T. P. Otterson, Krebs, Okla., 1,255,780. Feb. 5, 1918. Filed Aug. 8, 1917. Serial No. 185,075.

Intermittent Operating Mechanism for Coal Cutters. J. Valencich, Hastings, Ohio, 1,255,669. Feb. 5, 1918. Filed Mar. 14, 1917. Serial No. 154,731.

Coke Oven. F. A. Bredel and J. Bergman, St. Louis, Mo., 1,255,579. Feb. 5, 1918. Filed Aug. 22, 1916. Serial No. 116,241.

Industrial News

Connellsville, Penn.—Coke production in the Connellsville region for the first quarter of 1918 showed a decrease of 662,774 tons, when compared with production for the same period of 1917.

Wheeling, W. Va.—The Industrial Coal Co., which has holdings at Uniontown, in Belmont County, Ohio, turned down seven offers for its disposal after a two days' session of the stockholders.

New York, N. Y.—During February there were exported from the Port of New York, 1184 tons of anthracite; 2157 tons of bituminous and 44 tons of coke. To Canada was sent 945 tons of anthracite, and Cuba received 1776 tons of bituminous.

Washington, D. C.—The Colorado Midland R.R. recently applied to the Interstate Commerce Commission for increases of from 25 to 50c. a ton on bituminous coal from points on its line in Colorado to destinations in Kansas, on the Rock Island.

Charleston, W. Va.—An organization of coal shippers on the line of the Kanawha & Michigan Ry. has been formed, with J. W. Dawson, of Charleston, for president; W. K. Bridges, of Smithers, secretary-treasurer and H. L. Warner, of Longacre, vice president.

Louisville, Ky.—Western Kentucky coal operators who have in the past been delivering considerable coal in New Albany and Jeffersonville, Ind., directly across the river from Louisville, under the new zone ruling which recently went into effect are cut off from these two towns entirely. It is believed that the order will be modified shortly.

Louisville, Ky.—A bill which was in the State Legislature, and which recently became a law, will require the approval of the county judge of any district before mineral rights to property in that district, held in trust, may be leased. Leasing of property held in trust has caused much trouble in the past, and the new regulation may improve conditions materially.

Princeton, W. Va.—Rumor is rife to the effect that a move is on foot to embrace the Norfolk & Western, the Virginian and the Chesapeake & Ohio railroads in one district under one management. The reason assigned for a districting of this kind is the alleged troubles of operations in this field in getting a supply of cars, particularly in the Virginian and Chesapeake & Ohio fields.

Cincinnati, Ohio—John S. Jones, president of the Sunday Creek Coal Co., has filed in the United States District Court a petition for confirmation of the alleged sale by the Hocking Valley Railroad Co. of bonds of $2 506,000 of the Sunday Creek Co. to him. He alleges that the railroad company agreed to sell him the bonds for $625,000, but that the agreement has not been carried out.

New York, N. Y.—Charles S. Thorne, who recently organized the New River Fuel Co., of which he is the president, has opened offices at 50 East 42d St. The offices of the Black Band Fuel Co., of which Mr. Thorne is also the president, will likewise be located at the same address. Mr. Thorne resigned recently as vice president of the Pocahontas Consolidated Collieries Co., Inc., of which he was vice president, as well as from several other concerns.

Logan, W. Va.—The Guvan Valley Coal Operators Association has been recently reorganized under the name of the Logan Coal Operators Association, with headquarters at Logan, W. Va. A. R. Beisel, general manager of the Main Island Creek Coal Co., has been elected president; J. J. Ross, vice president; A. H. Land, secretary, and C. W. Jones, treasurer. P. J. O'Riley has been appointed president of the Labor Committee and H. S. Gay, Jr., secretary.

Cleveland, Ohio—A stiff fight resulted at the meeting of the Ore & Coal Exchange at this place Apr. 4, when efforts were made to exclude Hocking and Pomeroy mine-run from the classifications of pool numbers. In fact action had been taken to exclude such numbers, but through efforts of P. A Coen, president of the Buckeye Coal and Railway Co., and W. D. McKinne commissioner of the Southern Ohio Coal Exchange, such classifications were provided for.

Frankfort, Ky.—The Union Coal Co., of Mercer, Ky., with a capital stock of $100,000, has been incorporated by J. R Collins, P. J. Billings S. H. Fraser and S. C. Eaves. Other companies recently filing articles at Frankfort were: Clinton Coal Co., Jett, Ky., capital $30,000, D. C. Coombs, A. M. Gross and others; Clay County Coal Co., Manchester, Ky., $10,000, G. B. Mays, W. C. Black and others; Frost Coal Co., Wilton, capital $10 000, John Frost, Charles Frost and others.

Columbus, Ohio—Bids have been requested by George A. Borden, president of the Columbus Board of Purchase, for 4800 tons of nut, pea and slack for the garbage and refuse disposal plant; 10,000 tons of nut, pea and slack and 30 tons of lump for the waterworks department and various smaller amounts for other city departments. The bids are to be opened Apr. 22. It is believed that some bids will be submitted, although at the last advertisement a month ago no bids were filed.

Pittsburgh, Penn.—The Pittsburgh Coal Producers Association, representing about 95 per cent. of the coal mines in the Pittsburgh district has made a vigorous protest against the proposed transfer of the Bureau of Mines from the Department of the Interior to the War Department. They argue that the bureau has been efficiently handled by the Department of the Interior and that it would be a mistake and likely impair the efficiency of the bureau were the authority given over to the War Department.

Roanoke, Va.—The Virginia Iron, Coal and Coke Co. has issued its report covering the fiscal year ended June 30, 1917, and the six months ended Dec. 31, 1917. Net profits for the twelve-month period amounted to $1,024,364, equivalent to $10.24 a share on $10 000,000 of stock, as compared with a deficit of $248,094 reported for the preceding fiscal year. Gross earnings for the six months ended Dec. 31 last amounted to $5,314,323 and net earnings were $1,283,820. The net profit for the period was $873,179 after all charges, including $216,650 for taxes and $121,099 for bond interest.

Pittsburgh, Penn.—The United Coal Corporation held its second annual dinner, including heads of departments, superintendents and mine clerks, at the Fort Pitt Hotel, Pittsburgh, Penn., Saturday evening, Apr. 6. Covers were laid for about 40. Edward H. Coxe, general superintendent, acted as master of ceremonies and toastmaster, and the principle talk of the evening was made by President W. Guthrie, who made a strong appeal to all present to do not only their bit, but their utmost in every way possible to help win the war. Talks were also given by a number of other officials.

Columbus, Ohio—The Akron-Gauley River Coal Co., recently incorporated with an authorized capital of $250,000 by Columbus and Akron men, has been organized by the election of H. W. Jenkins, of Columbus, president and general manager; B. M. Moody, Akron, vice president, and Charles A. Coakwell, Akron, secretary and treasurer. The main offices will be at Akron but the operating office will be in Columbus. The product will be sold through the H. W. Jenkins Coal Co., of Columbus. The company has taken over a mine and 1500 acres of coal land on Gauley River on the C. & O. and the K. & M. railroads. The present output of 300 tons daily will soon be doubled.

New York, N. Y.—M. F. Burns, president of Burns Bros., is the chairman of the coal trade division of the Liberty Loan Committee; Harry T. Peters, of Williams & Peters, director of speakers, and Joseph W. Chambers is the secretary. Committees representing the retail dealers have been appointed in the various boroughs. The wholesale committee consists of Thomas Dickson, of Dickson & Eddy; J. F. Birmingham, president, Delaware, Lackawanna & Western R.R., Coal Department; H. E. Meeker, of Meeker & Co.; John W. Whiteley, Whitney & Kemmerer; Robert B. Baker, Sterling Coal Co.; George M. Dexter, Dexter & Carpenter; and G. N. Wilson, president, Lehigh Valley Coal Sales Co.

Denver, Colo.—At the annual meeting of the stockholders of the Midwest Coal & Iron Co., held here on Mar. 14, 1918, the stockholders authorized the directors to issue its negotiable coupon bonds to the amount of $125,000 bearing 7 per cent, interest, bonds to mature in five years and optional after two years at 105, interest and principal payable at the First National Bank of Denver, Colorado, which is acting as trustee for the bondholders. These bonds will be handled by local brokers, as well as brokers in Chicago Illinois and Lansing, Mich. The money derived from the sale of these bonds will be used for the purchase of additional property and for additional machinery at the company's coal mines in Palisade, Colo. These mines are being put in shape to increase the tonnage, considerably.

St. Louis, Mo.—Jackson Johnson, president of the Chamber of Commerce, has written to Director General McAdoo urging the appointment of a regional director of railroads to be stationed in St. Louis, under the direction of Regional Director Aishton of Chicago. The letter points out that five trunk lines terminating in St. Louis extend to the southwest and do not reach Chicago, and it is argued that to place these under a regional director with headquarters in Chicago is an awkward and unnatural arrangement. It is contended that the resources of the Southwest would be utilized more efficiently for the benefit of the Government and the commercial interests would be better conserved if a regional director were placed in charge of the southwestern railroads and the switching district of St. Louis.

MARKET DEPARTMENT

Weekly Review

Anthracite Output Encouraging, Though Field Is Short of Labor—Bituminous Production Discouraging—Railroad Fuel Situation Menaces Industry—Zoning Plan Not Strictly Adhered To—Fuel Administrator Slow in Approving Contracts

FROM the anthracite fields come encouraging reports of increased outputs, notwithstanding the shortage in labor, which promises to become more serious because of the new draft call the latter part of this month. The available labor supply in the hard coal regions is so utterly inadequate that operators are asking for the exemption of their workers on the ground that their services are urgently needed to keep up production. Anthracite is now moving freely to all points of consignment. To further aid in the distribution of coal and to prepare for what will surely be a record-breaking summer, some of the anthracite operators are building new washeries and rearranging old breakers to permit of the loading of 50-ton cars instead of the 25- and 30-ton cars formerly loaded.

As yet there has been no decision regarding the prices of steam coals, and all sales of these grades are being made at the prices which prevailed last year. It is generally believed that the Government will fix the prices on these coals and that this decision will come when the contracts which have been drawn up and sent to the Fuel Administration for approval are acted upon.

Production of bituminous coal continues to be disappointing. To such an extent has the car shortage interfered with the operation of the mines that the miners are becoming restive over their reduced working time. It was hoped that the elimination of most of the priority orders in the central Pennsylvania region would favorably affect the car situation, but this is not proving to be the case.

Another factor, and one fraught with grave consequences, has entered into the situation; and unless immediate steps are taken to prevent it, the country will witness the demoralization of the bituminous coal-mining industry. It is no mere shadow at which these remarks are aimed, but at an actual, menacing reality that bids fair to set at naught the careful plans of the Federal Fuel Administrator and bring about a crisis that will hamper the nation in its efforts to push its war activities to their maximum.

This condition has been precipitated by John Skelton Williams, in charge of purchases for the railroads, who insists that the roads be permitted to distribute cars where and how they please, and to use such control of shipping facilities for the purpose of forcing price concessions from coal producers. Thus we are confronted with the amazing spectacle of one Government activity setting at naught the edicts and rulings of another Government activity.

The Fuel Administration asserts that coal should be furnished all consumers, whether large or small, at the same price. The railroad officials refuse to accept Dr. Garfield's ruling under the specious plea that to do so would add millions of dollars to the railroads' coal bill, something that Mr. McAdoo and Mr. Williams do not wish to do, as they are evidently desirous of showing a large saving in Government operation of the railroads.

In the past, conditions were such that the roads, which take a large percentage of the entire coal production of the country, could not be prevented from securing their coal at cost, or below cost, and industrial consumers paid the difference. Now that the railroads are under Government control no valid reason exists for an adherence to the old policy. However, this practice is still being followed by the railroads, which in many instances have refused to supply cars to mines until "satisfactory" prices have been quoted for railroad fuel.

Unless the mines get cars in which to ship coal to market, they can not operate; and if they do not operate our many vital industries will find themselves clamoring for coal which is still in the ground. Already a number of operations in each mining district have suspended pending an adjustment of this difficulty, and this at a time when the output of soft coal for the first three months of this year is far behind the output of the corresponding period of 1917.

This is stimulation of production with a vengeance. Unless Mr. Williams' demand for cheap coal is withdrawn, it is apparent that more and more mines will be financially embarrassed and production seriously curtailed. The Fuel Administration and the railroad authorities are deadlocked in the matter, and it is likely the President will have to decide the question. That President Wilson will not be a party to any such questionable plan as that proposed by Mr. Williams is a foregone conclusion.

Though the zoning plan is now in effect it cannot be said that all shipments are being made strictly in accordance with its requirements. Occasions arise wherein the need for fuel is so urgent that the provisions of the plan cannot be lived up to fully as yet. However, shippers are of the belief that the zone plan will eventually be the means of avoiding and overcoming many of the difficulties of distribution.

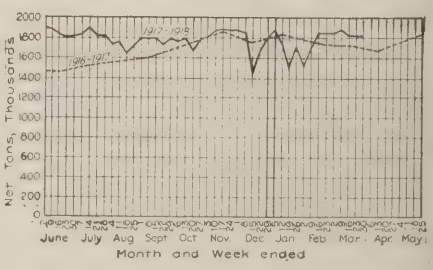
There is a little contract activity, though only the larger concerns are afforded the opportunity of closing contracts, which are made as a matter of policy. On such agreements as have been closed the Fuel Administration is slow to mark its approval, a fact which is causing some uneasiness among consumers who have closed in this way.

COAL PRODUCTION

The output of bituminous coal decreased slightly during the week ended Mar. 30. The total production (including lignite and coal made into coke) is estimated at 10,832,000 net tons, an average production per working day of 1,805,000 compared with 1,833,000 net tons, the average production per working day during the previous week.

The total production of behive coke is estimated at 622,000 net tons or 104,000 net tons, per working day, as against 111,000 net tons for the week of March 23.

During the week ended Mar. 23 the 3984 mines reporting produced 7,763,482 net tons, or 69.3 per cent. of their full-time capacity, compared with 66.8 per cent. reported for the week ended Mar. 16. Losses attributed



to lack of coal cars amounted to 20.6 per cent.; those due to labor shortage 2.3 per cent.; and those due to mine disability to 3.4 per cent. All districts in Pennsylvania (with the exception of the western) report greater losses in production, due to car shortage. The Irwin gas district reports a decline in production from 71.2 per cent. of full-time capacity during week ended Mar. 16 to 56.3 per cent. during the week of the 23d. The Hazard field in Kentucky also reports a decline in production. The southern Ohio district and the Panhandle district in West Virginia show better working conditions due mainly to improved car conditions.

Beehive Coke—Operators in the beehive coke regions of the Connellsville, Greenburg and Latrobe districts of Pennsylvania report the production of 283,745 net tons of coke during the week ended Mar. 30, or 63.7 per cent. of their full-time capacity. Losses due to shortage of yard labor amounted to 81. per cent. of capacity. Losses

due to lack of cars are reported as 24.3 per cent. as against 23.4 per cent. for week of Mar. 23. The same operators produced 178,750 net tons of coal.

Byproduct Coke—Byproduct coke output during the week ended Mar. 30 showed a slight improvement over the previous week. The ratio of tonnage produced to maximum capacity rose from 87.6 to 88.7 per cent. The improvement was effected by a better supply of coal. Losses due to that cause declined from 6.6 to 5.2 per cent., while losses due to repairs to plant increased from 4.1 to 4.7 per cent. The ratio of production to capacity declined slightly in Kentucky, Minnesota, New Jersey and Ohio. West Virginia reported the greatest improvement, ratio of production to capacity rose from 82.7 per cent. during week of Mar. 23 to 98.9 per cent. during the present week.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: Mar. 9	Mar. 16	Mar. 23	Mar. 30
Bituminous shipments, 123 roads..	200,239	190,298	191,127*	189,252†
Anthracite shipments, 9 roads...	41,807	42,265	42,487*	43,642†
Beehive coke shipments, 4 roads...	13,032	13,218	13,643*	12,768†

* Revised from last report. † Subject to revision.

Anthracite shipments increased from 42,487 to 43,642 cars.

BUSINESS OPINIONS

Bradstreet's—Good trade, activity in essential industries, increased outputs, improved transportation facilities, less unrest in labor circles, favorable crop news, some further ease in foodstuffs, the drive to make the third Liberty Loan successful, the rush to pay income taxes, and the ready adoption of the daylight saving plan, are leading features. But the single factor that looms largest is Governmental domination, which is extending, is bound to spread as the country gets more and more to a war basis, and which tends to become more controlling in respect to prices.

Iron Age—Steel mills have been under pressure from Washington in the past week in an effort to have January and February shortages made up, particularly those in plates. The mills have had the help of a better car supply, which in the Pittsburgh district has been especially fortunate in view of the large proportion of output required by the Government. The leading producer there has turned nearly 90 per cent. of its recent production into Government and war contract channels, and several plants in the same district that lately have given 60 to 75 per cent of their production to such business are now considerably exceeding these figures.

Atlantic Seaboard

BOSTON

Outlook unchanged; no developments of any consequence. Congestion increases at New England gateways and embargoes are effective on several of the connecting lines. Bituminous distributors, however, for the most part have little or no coal. Anthracite houses little better off. Tidewater shipments seriously handicapped by lack of tugs and rail deliveries are alarmingly in arrears.

Bituminous—A week of April has passed and there is still no effective move toward speeding up production. State administrators in New England are besieged with inquiries as to contracts, and for a very large proportion of the consumers there is no answer; as the operators are not committing themselves. The less scrupulous producers are making no secret of "premium" coal, and it is queried how long such practices will be permitted to continue and other operators who are following regulations in good faith put to such an unwarranted disadvantage. For a time such sales of "spot" coal were understood to be confined to parts of the Pittsburgh region, but now it is common rumor that illicit sales have spread to central Pennsylvania.

The outlook is as complicated and unsettled as ever. Nobody knows what to do. To the buyer there is abundant advice to make contracts, but the parties with whom customary contracts have been made are unable to get an assurance from the operator who has the coal, and the latter is trying to get some inkling of the Government's plans for distribution. Should consumers seek to buy greatly in excess of their needs through fear of shortage, it would take minute policing to adjust equitably the deliveries made.

There is increased congestion at Maybrook and Harlem River, the New York, New Haven & Hartford gateways to New England. Embargoes have been placed by connecting lines against the Baltimore & Maryland, although the Boston & Albany is as yet unaffected. At Harlem River alone there is an accumulation of 3000 freight cars, with just about the same number being hauled east each day as reach there from the mines. The New England railroads are sending empties to the mines now in the effort to increase receipts of engine coal, and one result is the scarcity of cars at rehandling wharves where coal is sent inland.

After the reduced volume of coal moving to Hampton Roads of last week receipts showed an increase. So much coal was routed for Chicago and other points which were embargoed Apr. 1 that there was much congestion at the scale points. Lack of motive power is another factor; in some cases the movement on one of the roads was hardly in excess of 300 to 400 cars daily. On this basis there would be no chance of doing a normal business over the Virginia piers, let alone an increase of two to three million tons for New England. There are rumors of Kanawha coal being reserved to eastbound movement, but as yet this is without confirmation.

There are practically no barges available from Hampton Roads that are not already under charter. It develops also that several of the coal agencies have in sufficient coal to load promptly all the vessels that report for cargo. The "Ulysses" a Panama collier, had to wait an undue time last trip and it was partly to avoid such situations that Mr. Storrow ceased loading coal on his own account and asked the regular shippers to furnish cargoes. The result is that practically all the water-borne coal is now coming through the usual channels and is distributed by the coal factors under the fuel administration. All-rail "Storrow" coal is still coming forward, although the tonnage is now reduced far below the allotment. In one or two districts the number of cars is placed through the deputy distributor, and so far this system seems to be working satisfactorily. It is of course an expedient for doing away with assigned cars and for regulating distribution.

Houses who have been in business for a generation are still telling their customers they see no prospect for contracts. One firm that had 20,000 tons weekly due on 1917 obligations actually got shipped 3018 tons in January and February. Instances of this can be multiplied. Meanwhile there seems to be no definite understanding about railroad coal. Effort is being made at Washington for a lower price for railroads because to a considerable extent they furnish cars independent of the usual distributive share and then, too, there is a feeling that being Government-controlled there ought not to be any commission paid by the railroads. These are only a few of the problems now arising.

Jobbers' licenses in this territory have now been received for the most part, although the way is not yet smooth. The regulations are by no means clear and there is uncertainty over the invoicing of coal by parties not the actual owners thereof. And then besides there is the difficulty about getting the coal to bill. If it comes forward no faster than during the first week in April there will not be so much occasion for worry over the heavy penalty prescribed. A lot of unnecessary inconvenience will result from sundry interpretations of the rules, and yet there are practices strictly within the regulations that are recognized by the trade as glaring abuses. Take for instance two rehandlers having wharves of their own, coal, and all the facilities for transshipment inland. One's price is $8.13 f.o.b. cars and another's is $11.20, both selling the same grade and similarly placed with regard to receiving coal and selling the same consumers to greater or less extent. Both are selling, presumably, in strict accord with rulings of the fuel authorities. What is the answer? A little attention to matters of this kind would be a welcome sign.

Last week the Hampton Roads situation was almost acute due to lack of coal to load bottoms that were waiting. This is now somewhat improved although the number of cars under load has not increased to the extent necessary to clear steamers and barges without undue delay. Shippers frequently find themselves with actually no coal available, notwithstanding they have ample tonnage standing to their credit in the Tidewater Coal Exchange.

Anthracite—Both all-rail and by water April shipments are disappointing. Water movement is seriously hampered by the lack of tugs, and rail deliveries are held up by embargoes. The freight congestion at Harlem River shows signs of clearing up, it being understood that for the present the New Haven Road will accept from each shipper 25 cars per day. Eastern retailers are getting alarmed over the outlook but are powerless to act.

NEW YORK

Anthracite market continues active with heavy demand. Dealers to heed Garfield's warning. Mines are working steadily but further labor shortage is feared. Efforts of railroads to make contracts below Government prices cause agitation among operators. Some mines are favored while others work hardly half time. Government intervention hoped for.

Anthracite—The situation continues to be active with the demand heavy, but lacking the urgency for shipments that existed a few weeks ago. There has been a heavy booking of orders which indicates that the tonnages that will come here will be easily taken care of. Some relief in the situation is expected in the warning sent out from Washington that dealers should not supply domestic sizes of anthracite for industrial purposes where it is to replace bituminous.

No regular order covering the reduction of 30c. per ton in the price of domestic coals has been received from Washington, but the shippers are billing all coal above ground on Apr. 1 at the new price.

Reports from the mining regions are encouraging. Notwithstanding the labor shortage which is in danger of becoming more serious because of the new draft call the latter part of this month, the mines in some quarters were able during March to increase their output. The seriousness of the labor situation has become such that operators are asking for the exemption of their men on the ground that their services are badly needed to keep up the coal production.

Stocks of the domestic coals at the loading piers show no apparent increase. Receipts have been about the usual quantity and the coal is moved quickly. There was some fear that there would be a suspension of water shipments due to threatened labor troubles, but this has been avoided, at least temporarily.

The only easiness in the steam hard coal situation is in rice and barley. These two sizes are plentiful but far from a drug on the market. Quotations remain firm and dealers meet with little difficulty in getting rid of their supply. A freer movement of bituminous would result in a freer movement of rice and barley.

The real estate interests in announcing an increase in rentals state as one of the reasons the cost of coal, which they say is nearly three times what it was two years ago.

Current quotations, per gross tons, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.15	$6.90
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buckwheat	4.45@5.15	5.10@5.85
Rice	3.90@4.10	4.10@4.85
Barley	3.40@3.65	3.10@4.10
Boiler	3.65@3.90	.....

Bituminous—The efforts of the railroads to get their fuel supply from certain operators at prices under those fixed by the Federal Fuel Administration are taking considerable attention in and out of the trade. The agitation is keen and shippers are being urged by some operators to write the President, Dr. Garfield, United States Senators and Congressmen protesting against such efforts. It is argued that the railroads, which themselves are now under Government control, are taking undue advantage of the operators and are denying proper distribution of cars to those operators who do not agree to give them coal at the lower prices. Unless the plan is stopped it is apparent that the operators who do not favor the railroads will either be forced out of business because of not being able to get cars or will have to get more for their coal to make up for the lack of production, which means that the consumer will have to pay more for his coal. Shippers claim that unless the authorities intervene and insist upon a proper

and equitable distribution of cars the situation next winter will be more serious than it was last winter. In addition to getting enough cars to supply the requirements of the railroad, the favored operator is getting sufficient cars to enable him to take care of his regular trade. This permits him to operate his mine nearly six days a week while the less favored operator is hardly able to work half time.

Taken as a whole the car supply along the Pennsylvania Lines last week averaged about 55 per cent., of which only about 5 per cent. was for regular business, the remaining 50 per cent. being for priority orders. Along the Baltimore & Ohio and the New York Central the car supply was reported somewhat better.

Shippers early this week received notice that the Government will permit the replacing of the cars seized by it during the past winter at the prices then in vogue if the same is desired by the consumer. This will result in much additional tonnage to many shippers, some of whom lost many cars through Government confiscation.

With nearly all contracts ended shippers expect that there will be more free coal available here.

BITUMINOUS PRICES

	F.o.b. New York Gross	Mine Price Net	Gross
Central Pennsylvania	$5.06	$3.05	$3.41
Maryland:			
Mine-run	4.84	2.85	3.19
Prepared	5.06	3.05	3.41
Screenings	4.50	2.55	2.85

PHILADELPHIA

Anthracite prices announced for April. Individual differential retained for present. Some evidence of zoning. Receipts of coal light. Dealers book many orders. Authorities reduce consumers' orders. Distribution plans still hazy. New freight tariffs. Expect fixed steam prices. Bituminous price rumors have not materialized. Supply still short. All a matter of cars. Zone plan slowly developing. Little contract business.

Anthracite—The new anthracite prices have finally been given out after several vexatious delays. The holding back of the prices caused much confusion and dissatisfaction among the retail trade especially. On the afternoon of Apr. 1 the largest shipping company verbally announced to all inquirers that the new prices had been decided upon and then quoted the March or winter rates less 30c. per ton on broken, egg, stove, nut and pea sizes, with no change in buckwheat and the smaller steam sizes. The next day these figures were withdrawn, then given out again, only to be followed by another withdrawal. Finally on Apr. 5 the prices were given to the trade as official, with the exception of broken, on which the 30c. reduction does not apply, but which remains at the price of $4.90 at the mines.

While dealers fully realize that sales were to be based on prices fixed by the Fuel Administration, many were unable to do business without a price and could not persuade their trade to order until they were definitely assured of a reduction from the winter rates.

The independent shippers continue to book orders at prices 75c. above the so-called company circular, and their trade apparently expect to pay that figure; but to date we have been unable to learn of any firm who confidently claims the 75c. premium will stand until Sept. 1. In fact all shippers seem to feel that their present rates are subject to further adjustment.

Another cause of much anxiety is the delay in starting April coal to this market. Practically little coal has been received here during the first week of the month, and one big company with large trade connections here has shipped none at all. There is a feeling that a new system of shipping on the zone plan is being seriously considered and that an entire readjustment of the sources of supply is being quietly worked out and placed in operation. It would appear that shippers whose coal does not reach this market by the most direct routes have hesitated in consigning here until a definite policy has been decided upon.

Uncertainty exists as to whether retailers will have their gross margin reduced, as it is understood was done in New York. When the present $2.50 margin was adopted here the Fuel Administration claimed it was a temporary arrangement; now it is pointed out that the $2.25 margin allowed in New York applies to a "short" ton of 2000 lb., while the margin here is on a "long" ton of 2240 lb. In proportion they are about equal and, although in an adjoining county it was reduced to $2.25, it is not believed there will be any change here for the present.

Dealers, most of whose business has increased since Apr. 1, 1916, are alarmed at the possibility of not receiving more coal during the present coal year than they did from Apr. 1, 1916, to Mar. 31, 1917, as it is understood to be the intention of the Committee of Fuel Distribution to figure on this basis.

As yet there has been no decision on prices of steam coals and all such sales are being made at the prices in effect for the last year. It is generally believed that the Government will fix the prices on these grades for the first time and that this decision will come when the contracts which have been drawn and sent to them for approval are acted upon.

The prices per gross ton f.o.b. cars for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5.70	Rice	2.65	3.65
Stove	4.75	6.05	Boiler	2.45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—Prior to the first of the month there were many rumors of a change in the mines price, which served to further unsettle the trade. Even the fact that we are well into the second week of April does not serve to remove the uncertainty as to the price situation. The rumors were quite insistent that a reduction would be made, though it is hardly believed the Government would make such a move.

BALTIMORE

Many orders pouring in on retail anthracite men, but deliveries are light. Bituminous shortage again looms up. Jobbers still rather uneasy.

Anthracite—Under the public urging by the Maryland fuel administrator to purchase coal early, and the work of a number of coal men who are asking that customers place their orders, sending around agents to get old customers to sign up the Federal application blanks necessary before coal can be delivered, considerable business is going on the books of the fuel men. At present, however, there is little coal being delivered as the receipts here remain comparatively light and stocks are not such as to warrant hurrying of fuel to cellars. There is still some complaint over the fact that the new price schedule is a decided advance over the spring figures of last year, but the fact that the prices have the stamp of Government approval and sanction is saving the coal men much in the way of dispute and complaint.

Bituminous—The soft coal situation here is far from satisfactory. Many important industries are short again, and jobbing and mining interests have been asked in many cases to apportion the coal they are getting through irrespective of contract obligations. While the railroads are not as congested, apparently, the supply of empties at the mines except on priority orders is so far short of necessities that ordinary consumers are getting rather short shrift. Bitter complaint continues that many mines are left far short of requirements under the priority plan of distribution. Jobbers continue uneasy, as they are finding that they can not make the necessary mine contracts to fill the orders they have on their books as purchasing agents. While this situation may adjust itself in part, it seems sure already that all the business on the books of the jobbers will not be taken care of through ordinary contracts, and that fuel administrators will be called upon to fill some gaps for every public utility and emergency concern purchasing agents.

Lake Markets

PITTSBURGH

Zoning system being placed in operation. Byproduct coke ovens and steel mills well supplied with coal. Jobbers doing little thus far.

As a result of frequent conferences between representatives of the fuel administration and of the operators the new zoning system is becoming well understood, and a number of details applying to the Pittsburgh district have been settled. On account of its peculiar position, and the variety of coals produced in the district, it is given particular latitude in the matter of distribution.

The fuel administration has been laying particular emphasis upon the necessity for furnishing the byproduct coke ovens with full supplies of coal, results being quite satisfactory as with scarcely an exception the byproduct plants are in full operation. In practice the zoning system does not apply to the regular distribution of byproduct coal, as exceptions are made in the case of all regular movements. This is desirable because the byproduct ovens had already picked out the particular mixtures of coal they required for their best operation.

There have been no important complaints from the steel industry for several weeks as to supplies of coal, and it appears that on the whole the steel mills are receiving adequate supplies of both gas and steam coal. The mills are not operating at capacity in all cases, but restrictions are due to scarcity of cars for shipping finished steel rather than scarcity of either fuel or pig iron. Shipments of finished steel are approximately one-half greater than in January and February. A moderate amount of free coal is coming into the market. Jobbers are trying to get their business in shape under the new regulations but thus far have not had much opportunity to act. On the one hand, it has proved difficult so far to make arrangements with consumers whereby the jobber may charge them a commission for securing coal for them, while on the other hand operators have been indisposed to make concessions to jobbers, to give them a margin on sales they might make at the Government limits. The market remains quotable as follows: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, jobbers being permitted to charge 15c. extra when regularly constituted by consumers to make purchases for them.

BUFFALO

More bituminous, less anthracite in this market. Situation otherwise not much changed. Jobbers getting licenses. Anthracite price uncertain.

Bituminous—The contention of the local trade and especially of the jobbers is that if the car supply is made adequate all the regulations in regard to zones or anything else can be laid aside. The many rules sent out bewilder the shippers, and they are often so indefinite that the shipper is afraid to put a construction on them lest he make a mistake and lay himself liable to arrest.

The licenses are coming in, but so far only a few jobbers have them. The Government is exacting. If a shipper has had any connection with a mine as agent he must furnish absolute evidence that the connection has been given up before he can get his license. So it often happens that the application is held up till further evidence is furnished.

There is more and more likelihood, as the situation is sized up, that more bituminous is going to be needed in the anthracite trade than ever before. The difference in prices, allowing the Allegheny Valley thin-vein mines to charge more than Pittsburgh, is selling the latter coal much more freely than the valley coal; and it may make it necessary to reduce the latter prices voluntarily before long if the supply is increased much. As it is some shippers are getting quite as much coal already as they can sell.

Anthracite—The supply is adequate in small sizes only. The furnace sizes are always scarce at this time of the year, but they are almost wanting entirely now. This means that the consumers are trying to lay in a winter supply and are not able to get it. Prices are still uncertain, so that some shippers do not dare to take any orders for a definite price. No coal of any account is coming this way for the spring trade. The result is that the town is full of Canadian retailers, as eager for coal as they were last winter, but they are told to wait

DETROIT

Movement of bituminous coal into Detroit continues in good volume. Anthracite is not plentiful. Preparations for lake shipments under way.

Bituminous—Shipments of bituminous coal are now coming into Detroit freely. The movement maintains a volume, which offsets to a rather satisfactory extent the requirements of consumers, though practically all the coal is sold en route or before leaving the mines, and free coal on tracks continues wholly absent as a market factor.

With many of the city's large manufacturing plants working overtime on war

orders, the consumption needs of steam plants are large. Demand continues steady for steam coal. Few of the buyers have been able so far to make much of a start on acquiring reserve stocks, though the railroads and some of the utility companies are reported to be exerting an effort in that direction.

Slack is reported to be not as plentiful as some of the jobbers would desire, in order to provide for their customers' requirements. Lump is more plentiful, but complaints are heard that its quality is not as satisfactory as in previous years. Operation of the Federal Government's zone system of distribution has not been in effect during a sufficient interval for the dealers to have arrived at any definite conclusion as to merits of the plan. Some are inclined to believe that the district from which Detroit is entitled to receive bituminous coal will supply sufficient variety to meet the needs of most consumers, except in the matter of smokeless coal. Both Pocahontas and New River are eliminated from the city's supply and each was popular here.

Anthracite—Though reports received from the anthracite districts have been of an encouraging nature, and the Federal Fuel Administration is reported to have promised a good supply of anthracite, incoming shipments continue light. Many of the household consumers are now endeavoring to avoid next winter the troubles experienced in the last few months, but few of the retailers are able to fill orders for stove or egg sizes of anthracite. There is apprehension that the opening of navigation and resumption of lake coal shipments, within two weeks or so, will cause still further reduction.

Lake Trade—Plans are being arranged for handling a large volume of coal over lake routes early in the season. It is expected many cargoes will be afloat when navigation opens.

COLUMBUS

Considerable weakness in domestic grades has developed as the result of large production. Steam grades continue quite strong, and the market is expected to resume its wonted strength after the lake season opens.

The coal trade in central Ohio continues to show some weakness, especially in domestic sizes. Steam business is about as strong as usual, although a small tonnage is being peddled around which indicates a weaker condition than prevailed several months ago. With the opening of the lake trade at hand this condition is expected to pass away rapidly, and coal is expected to be in good demand all along the line. Prices are generally well maintained at the Government figures. Prospects are for an active lake trade and a good production from all Ohio fields.

The domestic trade is showing weakness because of the inability of some dealers to stock up to any great extent. Their storage space is limited and practically all have accumulated the desired excess stocks. Some dealers are also waiting for Pocahontas and West Virginia splints, which is especially true in sections where those grades have been popular in the past. It is believed that some of both grades will come into the local market, and some householders are waiting to see if they can get the fancy grades. Other users are stocking up for the coming winter on the basis of last year's consumption. On the whole the domestic trade is as active as usual for the time of the year.

Steam business is strong, as manufacturing plants are still stocking up to guard against emergencies. Railroads are taking a large tonnage, as many are accumulating surplus stocks. In fact many users, having learned a lesson from the past winter, are trying to get all the fuel possible. Public utilities are especially anxious over their future fuel supply.

Production has been quite good, although some falling off is reported due to lack of cars. This is explained by the fact that the Government has requisitioned many cars to move ore on the lower lake docks to mills prior to the opening of the lake trade. As a result the output in the Hocking Valley has been reduced to about 75 per cent. and the same percentage of reduction applies to other producing sections.

Prics of short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.80	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

Arrangements for supplying industrial demand occupy attention of trade, Federal control being a difficulty. Domestic storage promises to be unprecedented.

The beginning of another coal year, on April 1, and the desire of large industrial consumers of fuel to protect themselves more extensively than usual for their supply, has made the problem of the jobbers' and operators' agents that of arranging for means of satisfying their customers, rather than that of selling coal. Few operators are now in a position to promise anything definite, and most of them have already committed their normal output to customers under contract, although they have necessarily refrained from stipulating prices other than those which may be promulgated by the Government, and have also protected themselves by the usual provisions against uncontrollable circumstances. For one thing, the fact that favored industries will have prior claims to fuel should it be necessary to choose between consumers, regardless of contract, has to be considered in making contracts. Coal is now coming forward in increasing quantities, and the retail trade is taking more than usual, dealers reporting that consumers are ordering for immediate and early future delivery in greater numbers than ever before.

LOUISVILLE

Demand for all grades good, with supplies short and production light. Car supply causing much worry and showing no improvement. Labor scarce.

According to information received from Washington on Apr. 5 through the Federal Fuel Administration, prices have been set for the eastern and southeastern sections of the state, and while not quite so high as had been expected, are expected to influence summer stocking and result in some contract making. No prices have been made on western Kentucky coal as yet, but they are expected in a few days. Coal in the Harlan County district was reduced about 20c. a ton, whereas an increase had been expected which would have placed it on about the same basis as Blue Gem, which was reduced to the same price as other coal in the same district.

There has been a steady demand for domestic coal, which has improved somewhat due to a spell of cool weather. There has also been a good steam demand. Local dealers report that the efforts of the fuel administrators to get consumers to stock early is resulting in orders coming in which never came in before fall or midsummer. Due to the continued car shortage labor is steadily becoming scarcer, with production lighter, and supplies coming in only about equal to the demand, with very little surplus for stocking yards.

BIRMINGHAM

April ushers in renewed activity in the domestic market. Steam demand holds good, inquiries being plentiful and sufficient to prevent any accumulation. Production on about the normal basis of the past few weeks.

Retailers are beginning to get into the market more actively with the advent of April and a noticeable increase is seen in the stocks being accumulated on local yards. Secretary Duncan, of the Jefferson County fuel board, has furnished every dealer in the county with blanks on which to report his reasonable requirements of domestic coal for the 1918-19 season, based on his average sales for the past three years. With this information in hand the fuel board will lend its aid in seeing that yards are supplied with the tonnage needed.

There has been little if any easing off in the steam trade, reports indicating that there is a demand for the maximum tonnage now being produced, Government prices prevailing.

Complaint is heard at some operations that the change in the hours of the working day, effective Apr. 1, caused considerable loss in tonnage the past week, this trouble being particularly in evidence where miners lived some distance from their working places and arrived at the mines too late to make a full shift.

Coke

CONNELLSVILLE

Car supplies improved. Coke supplies now almost adequate. Large byproduct capacity coming in shortly. Market offerings light.

Car supplies were better last week than the preceding week, when they had dropped off somewhat, and this week has opened fairly well. Many operators had their output cut down last week by celebration of Easter week by foreign-born workmen.

For five weeks Connellsville coke shipments have been much greater than in the early part of the year, averaging about 75,000 tons a week more, or between 20 and 25 per cent. increase. As the coke takes various lengths of time to reach destination the furnaces have had improved supplies for different lengths of time, but all have been working much better for several weeks past. There are now few furnaces actually banked, but a number that are operating are not producing full tonnages, and there are a few furnaces entirely out of blast that would be blown in if a full supply of coke were absolutely assured.

Operations of byproduct plants are practically at capacity, and the attached furnaces have full production of pig iron. It should be noted that the increase in the production of pig iron is somewhat greater than the increase in the supply of coke, because with irregular and intermittent operation of furnaces the consumption of coke per ton of pig iron was above normal.

There has been particular difficulty in shipping Connellsville coke east, the Pennsylvania having rigid restrictions in force most of the time. For four days of last week operators were permitted to ship only 25 per cent. of their output east. Eastern consumers who are not being helped by the Government find themselves particularly short, as operators must first take care of the shipments decreed by the fuel administration.

The large increase that is to occur shortly in byproduct coking capacity is important. The Steel Corporation now expects to be making some coke at the Clairton plant by July 1, with full production from the plant a short time thereafter. This plant, now nearly completed, contains 640 ovens, and on the same schedule are the Cleveland and Lorain plants, with 180 and 208 ovens respectively, making 1028 ovens for the Steel Corporation, with fully 75,000 tons coke capacity a week. Independent interests will probably complete in the next few months fully 600 ovens, but some of these are out of the district supplied until now by the Connellsville region. There will be, in the country at large, a large excess of coke-making capacity, as the new ovens, with those completed since Jan. 1, 1917, involve a capacity of about 11,000,000 tons a year, while the increase in blast-furnace capacity requires only about 4,000,000 tons a year coke in addition to what was being produced in beehive and byproduct ovens prior to Jan. 1, 1917.

Offerings of coke in the open market are still limited and are usually only of coke in "restricted" cars. The market remains quotable at $6 for furnace, $7 for 72-hour selected foundry and $7.30 for crushed, over 1-in., per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 30 at 352,435 tons, an increase of 12,855 tons, and shipments at 383,708 tons, an increase of 50,171 tons. The increase in shipments was due to belated weighings at railroad yards, the coke having left the coke works in the previous week.

Birmingham—There continues a strong demand for every ton of coke that can be produced in this district, the only trouble being the lack of capacity to produce the greater tonnage needed and the difficulty in securing box-car equipment sufficient for its prompt movement. The Government prices of $6.75 at $7.50 for Big Seam, and $8 at 8.75 for the beehive product from the Blue Creek, Black Creek and Brookwood districts prevail. The construction of 154 byproduct ovens at the Fairfield works of the Tennessee Coal, Iron and Railroad Co., work upon which is to begin immediately, will add immensely to the producing facilities in this territory. This company now has 280 byproduct ovens in operation at the above point.

Middle Western

GENERAL REVIEW

Market quiet. Railroads refuse to buy at Government price and try to buy at less.

The position taken by the Middle Western railroads is that they should have their fuel supply at less than the Government prices. They decline to buy any coal or make contracts, and operate trains on the coal they have in stock or what they are able to get on contracts made last year that do not expire until April, 1919.

Regardless of the failure of the railroads to give any assistance to the operators, there has been little or no complaints, except in cases of mines that heretofore sold their coal for railroad fuel. Any high-grade, well-prepared Illinois or Indiana coal is sold without difficulty, at the Government figures, and the mines that have washers

and special preparation devices, such as conveyors and hand-picking tables, and are giving their attention to the cleaning of their products, are able to get the 20c. per ton premium for such service.

Market conditions as a whole have been easier for the past week than for some time, owing to the milder weather and the lessened congestion on the railroads. Retailers are receiving shipments faster than they can move the coal into their customers' bins. If the present policy of the railroads is long continued, no doubt there will be a decrease in production instead of an increase, for in order to keep up maximum tonnage throughout the spring and summer it will be necessary for the transportation companies to do their buying early and assume quickly the tonnage needed.

The car supply in Illinois for the week has been 70 per cent, and less for Indiana. The average for Illinois does not indicate that similar conditions prevail on all coal-carrying roads. In many instances mines have been able to run almost full time, in other cases less than half time has been noted.

CHICAGO

Market dull on all grades except the best Illinois and Indiana.

Any coal that is well prepared from southern Illinois is much in demand in this market and is taken readily by either the dealer or consumer, but some difficulty is experienced in marketing central Illinois and Fulton County Illinois. The limited car supply during the past week in Indiana has kept any large volume of coal from that state off the market, thereby preventing what would have otherwise been a troubled situation had mines been able to load to their full capacity.

Dr. Garfield's order granting the operator 20c. per ton advance on all coal that was cleaned by washing, picking tables or loading booms makes a spread of from $2.65 to $3. per ton on the sizes covered by the order. The Fuel Administration directs that in order to get the 20c. advance until Aug. 1, operators must obtain a license and place in the cars specially prepared two cards indicating that all the provisions of the rule have been complied with. It will not be possible for mines to charge the extra 20c. until they are able to show that they have proper cleaning facilities. In order to stimulate early buying, the Illinois fuel administrator, John E. Williams, has written to dealers at all Illinois points urging them to buy coal early and thus avoid a reoccurrence of last winter's hardships. He states that the dealer who buys in April will be more likely to get a choice connection than if he should delay until later.

Quotations in the Chicago market per net ton f.o.b. cars at mines, are given in the table above.

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

			Smokeless			
	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

State fuel administration office institutes a spring drive for coal. Orders being booked without regard to price. Coal receivers getting ready for business.

The spring coal drive is now in full swing at Milwaukee. Refusal of some coal dealers to accept orders for future delivery on the ground that they wished to ascertain what conditions they were to be called upon to face caused temporary confusion among consumers, who sought to follow the advice of State Fuel Administrator Fitzgerald to place orders for next winter's fuel by May 1 or as soon after as possible. The matter has been adjusted, however, and orders are now being booked by all dealers. The matter of price is left for future determination by those having the fuel situation in charge.

The coal docks are being put in readiness for the rush of coal which will follow the opening of navigation. Hoists are being repaired, channels dredged, and everything put in shape for prompt and efficient service in unloading cargoes. Yards which did not receive a pound of coal last year are expecting consignments this season.

Conferences have been held between coal receivers and grain shippers with the purpose of bringing about, if possible, some adjustment of freight rates which will lead to the shipment of more grain by way of the lakes during the season of navigation and thus furnish return cargoes to steamers which may bring coal to Milwaukee. The lack of return cargoes has deterred owners from sending their vessels here on that account.

ST. LOUIS

An unusually quiet market with no demand and prices far below Government maximum on some coals. Both steam and domestic sizes heavy. No new retail prices as yet. Car supply short. Anthracite shipments fair.

The market here is an extremely easy one. There is an abundance of coal from all fields, with no market to absorb it, and prices have gone to pieces on Standard grade. Certain restrictions on shipment of coal from the Standard field, partial embargoes against Chicago and the north, and the consuming zone orders in effect, have had a tendency to flood the local market. Coal in the past that has moved out into the Northwest has to find a market closer to home, and on account of failure to fix domestic prices there is no domestic buying and business is almost at a standstill. The steam market is being pushed and can not take up anywhere near the tonnage offered.

Some time during the present week the prices will be fixed for St. Louis, and this will have an effect on the entire state. Gregg & Co., who have been making a trade survey of retail conditions here for the last three months, show that it costs $1.45 per ton to sell coal at retail. This covers the cost of handling coal from the time it arrives at the dealer's track. The dealers are asking for an advance of 50c. a ton on all grades and a net profit on each ton of 51c., and it is expected that they will get about one half of what they are asking for. Fuel Administrator Crossley of Missouri and the St. Louis Fuel Committee are hearing the evidence in the case now.

Conditions in the Standard field are about normal. There are car shortages on the Illinois Central and M. & O., and the usual transportation troubles on some of the other lines, with considerable unbilled coal at some mines and other places idle on account of no orders.

The Mt. Olive field conditions are much better than anywhere else. The railroad contracts continue to take the tonnage, and such surplus tonnage of domestic sizes that are mined readily find a market in Chicago and the north to the preference of coal from the Standard field. Car supply in this field is good and working conditions splendid.

In the Duquoin field there is a car shortage on the Illinois Central, but considerable railroad equipment for railroad coal is furnished and this has kept the mines going fairly good.

In the Carterville field of Williamson and Franklin Counties there continues to be a car shortage on the Iron Mountain R. R. There has at times been a little unbilled coal at some mines on account of foreign equipment and restrictions, but in a general way this tonnage finds a ready market. Working conditions are good and many mines are sold up for a considerable time ahead.

The prevailing prices here are the circular, which is:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@2.80	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@2.80	2.65@2.80	2.65@2.80
2x3-in. nut	2.85@3.00	2.85@3.00	2.85@3.00
No. 2 nut	2.85@3.00	2.85@3.00	2.85@3.00
No. 3 nut	2.85@3.00	2.85@3.00	2.85@3.00
No. 4 nut	2.85@3.00	2.85@3.00	2.85@3.00
No. 5 nut	2.15@2.40	2.15@2.40	.....
2-in. scrgs	2.15@2.40	2.15@2.40	2.15@2.30
2-in. lump	.....	.....	2.65@2.80
3-in. lump	.....	2.65@2.80	.....
Steam egg	2.65@2.80	2.65@2.80	2.65@2.80
Mine-run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	$2.85@3.00	$2.85@3.00	2.85@3.00
No. 2	2.85@3.00	2.85@3.00	2.85@3.00
No. 3	2.85@3.00	2.85@3.00	2.85@3.00
No. 4	2.85@3.00	2.85@3.00	2.85@3.00
No. 5	2.15@2.30	2.15@2.30	.....

Williamson & Franklin County rate is 87½c.
Other fields, 72½c.

General Statistics

BALTIMORE & OHIO

The following is a statement of the coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of January, 1918, as compared with the corresponding month of the previous year:

	1918 Tons	1917 Tons
Coal	2,712,573	2,959,434
Coke	213,250	290,986
Total	2,925,823	3,250,420

CHESAPEAKE & OHIO

The comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for the month of February, 1918, and the two months ending Feb. 28, 1918, is as follows:

COAL

TO	February 1918	February 1917	Two Months 1918	Two Months 1917
Tidewater (bituminous)	484,631	512,951	816,086	1,025,903
East (bituminous)	358,153	250,925	680,703	524,395
West (bituminous)	1,142,958	856,479	1,982,372	2,041,895
Company's fuel (bituminous)	181,849	186,464	369,857	394,168
From connections (bituminous)	99,806	115,147	212,283	283,825
Total	2,267,397	1,921,966	4,061,301	4,270,186
Anthracite	2,792	626	6,262	1,344
Total coal movement	2,270,189	1,922,592	4,067,563	4,271,530

COKE

TO	February 1918	February 1917	Two Months 1918	Two Months 1917
East	24,124	12,127	45,662	27,623
West	18,246	22,137	36,443	47,649
Total	42,370	34,264	82,105	75,272
From connections	2,320	6,033	8,235	12,385
Total coke movement	44,690	40,297	90,340	87,657

COAL AGE

Volume 13 NEW YORK, APRIL 20, 1918 Number 16

A Serious Coal Situation

By Floyd W. Parsons

THE present is not a time for disputes among ourselves. We have an enemy without who threatens our very existence. Victory in our Nation's fight for freedom is only delayed by such dissensions as have arisen between Government officials in charge of the railroads and the Fuel Administration.

John Skelton Williams, lieutenant for Mr. McAdoo, in charge of purchases for the country's transportation lines, is responsible for the National railroad policy of demanding coal at prices less than those fixed by the President. Mr. Williams started with the idea that this saving to the roads was $209,000,000 each year. He knows now that the actual saving is approximately 25 cents per ton on 150 million tons, or about $38,000,000 annually.

There is no doubt that President Wilson will be compelled to render a decision. Whatever this conclusion may be, his verdict must be final and must be faithfully observed by all, no matter what sacrifice it entails.

It is already evident that the President recognizes the absolute necessity of an equitable car supply. He knows that the great problem of coal distribution will break down if one-third of the country's production is exempted from operation of the rules promulgated by the Fuel Administration. He knows also that mine labor will not serve the Nation faithfully in this hour of need if the Government sanctions a plan that permits one-third of the miners to work full time while the other two-thirds barely earn a living.

On the other hand, President Wilson appears inclined to favor a saving for the roads. Two ways to accomplish this end have been suggested. The first would permit the railroads to buy their fuel on a cost-plus basis. This scheme is impractical, for it would mean that settlement for this coal would be pending in the courts one hundred years hence—not a pleasant heritage to bequeath to the next generation.

The only other plan is to tear away the camouflage that surrounds the problem and call it what it is—a direct tax of nearly forty million dollars on the whole bituminous industry. The burden must be distributed evenly. Every producer of bituminous coal in such event must sell his entire output at a tonnage price 7c. less than he now receives, this difference to be paid into the Treasury of the United States. The total amount can be handed to the railroads later for their operating expenses. It should, however, be tax exempt.

Mr. Williams says he wants to save for the people, and denies that his primary aim is to show favorable results under government ownership. That being the case, let it be done directly so everyone will understand. In the past the mine owners who sold coal to the railroads at a reduced price at least had an opportunity by skillful management to even up on other sales. Today this opportunity is denied them, for the maximum price they may receive is fixed. The present situation has no parallel in the past.

Since this Nation entered the War, the railroads in many localities have demanded a grade of coal for their locomotives that was not necessary, and that was specially adapted for use in munition plants. The result has been deplorable, for in many cases the production of war supplies has been hampered by manufacturers having to use coal unsuited for their purposes, but which coal burned in locomotives would have met all requirements.

Any man in Washington today who places personal ambitions above his country's welfare is certainly unworthy of high office. When such a man denounces everyone who opposes him as a profiteer and a traitor, he is assuming an attitude of superior virtue that must arouse suspicion.

The coal industry must have confidence that justice will ultimately prevail. Dr. Garfield is a man not easily turned from his course. The President has a faculty for getting to the basic facts in matters of importance. Let us therefore have hope, and whatever the outcome, let coal men prove that the highest patriotism is evidenced by loyal action and not by noisy declarations.

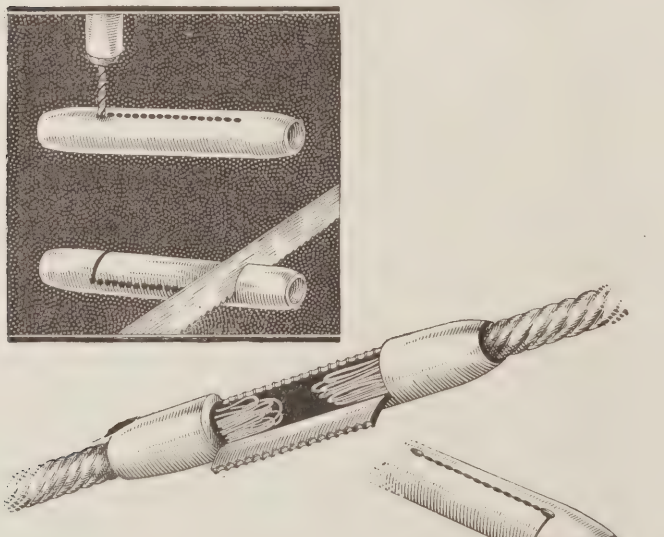
IDEAS AND SUGGESTIONS

Substitute for a Rope Splice

BY L. V. LOUTHER
Guttenberg, N. J.

To neatly splice a wire rope is apt to be a long and somewhat difficult job for a novice. In many instances where the splice need not be the same size as the original rope and the conditions of service do not demand flexibility of the puncture a substitute similar to the one shown in the accompanying illustration may be used to advantage.

To make this kind of a "splice" proceed as follows: Secure a short piece of pipe slightly larger in internal diameter than the external diameter of the cable. Swedge down the ends of this pipe until the wire rope can just be inserted therein. Drill and saw one longitudinal and two transverse cuts, as shown, folding back the "leaf" thus formed. Thoroughly clean the inside of the pipe and treat with acid or soldering salts, also cut out the hemp center of the cable, if any, for a short distance at the ends where it enters the pipe sleeve. Clean the individual wires and treat with acid. Now insert the cable in either end of the pipe sleeve and bend the wires separately back upon themselves. Bend the leaf back into place, heat the whole sleeve slightly and pour in hot zinc, or, if this is not at hand,



NOVEL SUBSTITUTE FOR A ROPE SPLICE

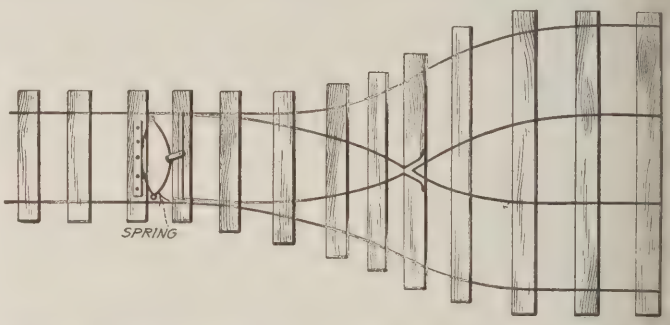
hard babbitt, through one of the drill holes, filling the entire sleeve. When cool the splice is complete and ready for use.

Of course the sleeve and cable should be thoroughly dry before the zinc or babbitt is poured. A splice of this kind has the decided advantage that it requires less cable than does a regular rope splice. It is however entirely unsuited to passing around pulleys or sheaves.

Automatic Spring Switch Throw

BY J. A. SMITH
Albert, W. Va.

The accompanying illustration shows an automatic spring throw for switch points on the lower end of the passing place on a gravity inclined plane. The spring and the connecting piece from it to the bridle



SWITCH THROW FOR LOWER END OF PASSING PLACE ON A GRAVITY INCLINED PLANE

hold the switch points securely against the rail. A loaded trip coming down the plane forces the points over, depressing the spring until the connecting piece is past the center line of the track. Then the spring rebounds and holds the switch points against the other rail. Thus the switch is always in proper position for the ascending trip, with the switch points resting securely against the rails.

Charging Rack for Edison Batteries

BY FRANK HUSKINSON
Lafayette, Colo.

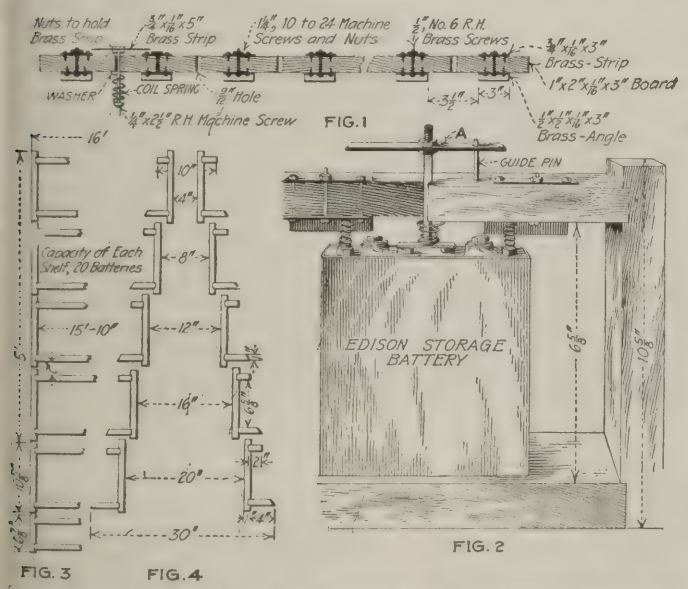
A company with which I was connected decided to put in a lot of the Edison electric safety mine lamps. Not having any storage battery charging facilities at the mine it was necessary to build a suitable charging rack.

Having noticed some crude and unsatisfactory charging racks at some of the neighboring mines, I decided to build a first-class and convenient one, to take care of the Edison portable batteries. In this I had the hearty coöperation of the mine superintendent. I constructed a 200-battery rack which was automatic in operation; that is, 100 or 200 batteries could be charged on it without difficulty. The rack took up a small amount of space and was both convenient and ornamental.

In Fig. 1 is shown the details of the top contact board. In making up these boards I used clear Oregon pine, 1 x 2 x 16 in. These boards were all given two coats of shellac varnish before attaching the parts to them. The contact plates on the bottom part of this board are pieces of brass angle, $\frac{1}{2}$ x $\frac{1}{2}$ x $\frac{1}{16}$ x 3 in. These pieces are spaced $3\frac{1}{2}$ in. apart and are fastened to the board with $\frac{1}{2}$-in. wood screws. On the top side of the board are placed pieecs of brass strip, $\frac{3}{4}$ x $\frac{1}{16}$ x 3 in

These pieces are spaced the same as the brass angle pieces and are bolted to the latter by a 10-24 x 1¼-in. machine screw. In the center of the space between the brass angle piece and strip there is a $\frac{9}{32}$-in. hole bored in the board. A ¼ x 2½ in. machine screw passes through this hole. On the bottom part of this screw is a coil spring and a washer. On the top side is fastened the brass plate *A* (Fig. 3) or strip, ¾ x $\frac{1}{16}$ x 5 in. The object of this brass plate is to close the circuit across the brass angle and strip pieces, on either side. When the batteries are removed, the coil spring holds this brass plate in contact with the brass strips on either side. These strips are in electrical contact with the brass angle pieces through the 10-24 x ¼-in. machine screws. The movable brass strip on top is held from moving out of place by the guide pin.

In Fig. 2 is shown a detail of the movable strip, etc., while Fig. 3 shows the action of the rack. When inserting a battery receptacle the head of the large machine screw comes in contact with the cross-connector on the Edison battery, and at almost the same time the contact springs on the battery come in contact with the brass angle pieces on each side. The battery is pushed up into place, and the large machine screw is forced upward. This screw, with the brass strip attached to the other end, is pushed up far enough so that the brass strip clears the brass pieces on each side. This opens the circuit at this point and allows the current to pass through the accumulator by means of the brass angle pieces and the contact springs on the battery. The back board of the rack is spaced 1 in. from the center of the brass angle pieces, so that the batteries are in proper place whenever they are pushed up in the rack as far as they will go. It only takes a second to insert



FIGS. 1 TO 4. DETAILS OF A RACK FOR CHARGING EDISON SAFETY MINE LAMPS

or remove a battery from this rack. There is no changing or making of electrical connections.

In Fig. 4 is shown a front view of the charging rack. This is built in sections which are assembled and spaced as shown in Fig. 1. The dimensions given in Fig. 4 allow for 20 batteries for each section. The completed rack contains 10 sections, making a rack that will take care of 200 batteries or of only one battery if desired.

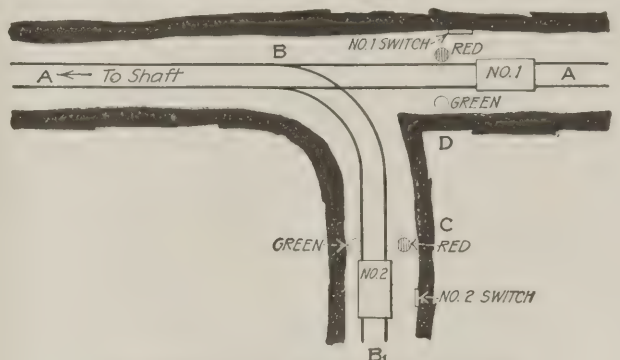
In. Fig. 1 is shown a detailed end view of this rack with all dimensions. When completely assembled the charging rack takes up a space 16 ft. long by 2½ ft. wide and a total height of 5 ft. All of the woodwork is treated to at least two coats of shellac varnish, giving it a pleasing and durable finish and one that is easily kept clean.

Signal Lights at Entry Junctions

By O. H. Hampsch

Washington, D. C.

Considerable annoyance and confusion of signals are frequently created at entry junctions where two or more motors use the same main entry to the shaft. This often results in loss of time through accidents. A simple



AN EFFECTIVE SIGNALING SYSTEM

and effective arrangement (employing red and green incandescent lights on each entry) whereby each motorman knows the relative position of the other is shown in the accompanying drawing.

An alternate switch (marked 1) on entry *AA* is used by the motorman operating No. 1 motor. Throwing this switch forward lights the red light at *C* when going out, and reversing it upon returning, lights the green light at *C*. The motorman operating No. 2 motor then knows before entering the entry *AA* whether No. 1 motor is in or out, and if the track is clear, by the kind of signal shown.

The red and green lights at *D* are operated by No. 2 motorman from switch 2 upon passing in or out of entry *BB*, thus giving his relative position to No. 1 motorman. The lights can be controlled by an alternate switch so located as not to inconvenience the motorman in operating it from his locomotive.

This forms a simple and effective signal that can be read at a distance and can be installed by the mine electrician with small expense of time and money.

Watts per Cubic Foot Required To Heat a Room

By R. G. Flavius

Experiments indicate that, for average conditions, a power expenditure of 1½ to 2 watts per cubic foot of air space will heat a room satisfactorily. For example, what wattage would be required to heat a room 10 x 12 x 9 ft.? The cubical contents of this room would by $9 \times 10 \times 12 = 1080$ cu.ft. Hence, the wattage required would be (assuming an expenditure of 2 watts per cu.ft.) 2160 watts; that is, 2.2 kw., or about 2.9 horsepower.

Recent Dwelling Construction in Pennsylvania

By DEVER C. ASHMEAD
Tarrytown, N. Y.

SYNOPSIS—*Tile bungalows at Rossiter, Penn. Two-story tile houses at Clymer, Penn. Single-family framehouses at Coal Run, Penn., capable, with some small changes, of being used for either a miner's or a superintendent's house. Two-family houses at Coal Run, Penn. Some illustrations of houses at Ebensburg, Penn. Bills of materials and working drawings for the first four houses.*

A NUMBER of houses of new design, of which this article covers only a few, have been erected in Indiana County, Pennsylvania, during the last few years. The Clearfield Bituminous Coal Corporation seems to have concentrated all its efforts in the erection of tile dwelling houses, of which it has two distinct types—a small three-room bungalow and a six-room two-story dwelling.

The bungalows, illustrated in Figs. 1, 2, 3 and 4, and shown in working drawing in Fig. 5, are being built at the Rossiter mine. Seventy-two of these are now either partly or wholly finished. These bungalows have over-all dimensions of 24 x 28 ft. They contain a front porch 7 x 12 ft., a living room 12 ft. by 15 ft. 6 in., a bedroom 11 x 14 ft., and a kitchen 11 x 14 ft. The houses are well lighted both by night and by day. They have three windows in each room. Each room has an electric light as has also the front and back porch. The kitchen door opens on a back porch 6 x 12 ft. Running water is provided in the kitchen. The rooms are heated by coal stoves furnished by the tenants. The use of tile in the construction of these houses tends to keep them cool in summer and warm in winter.

At the Sample Run mine of the Clearfield Bituminous Coal Corporation, at Clymer, Indiana County, Pennsylvania, the second type of house already mentioned is being used. This house is built of tile, is two stories in height and contains six rooms—three upstairs and three down. The house is not so attractive as the bungalow, but it is much better adapted to the needs of large families. These houses have a small front and back porch.

The front door opens into a large living room 10 ft. 6 in. by 17 ft. 6 in. To the rear of this is either a dining room or bedroom 9 ft. by 14 ft. 6 in. and also a kitchen 11 ft. 6 in. No running water has been provided within the houses. Upstairs there are bedrooms and a small hall. The front bedroom is 10 ft. 6 in. by 17 ft. 6 in. and has an angle closet in the



FIGS. 1 TO 4. VIEWS OF THE TYPE OF BUNGALOW BEING BUILT AT THE ROSSITER MINE

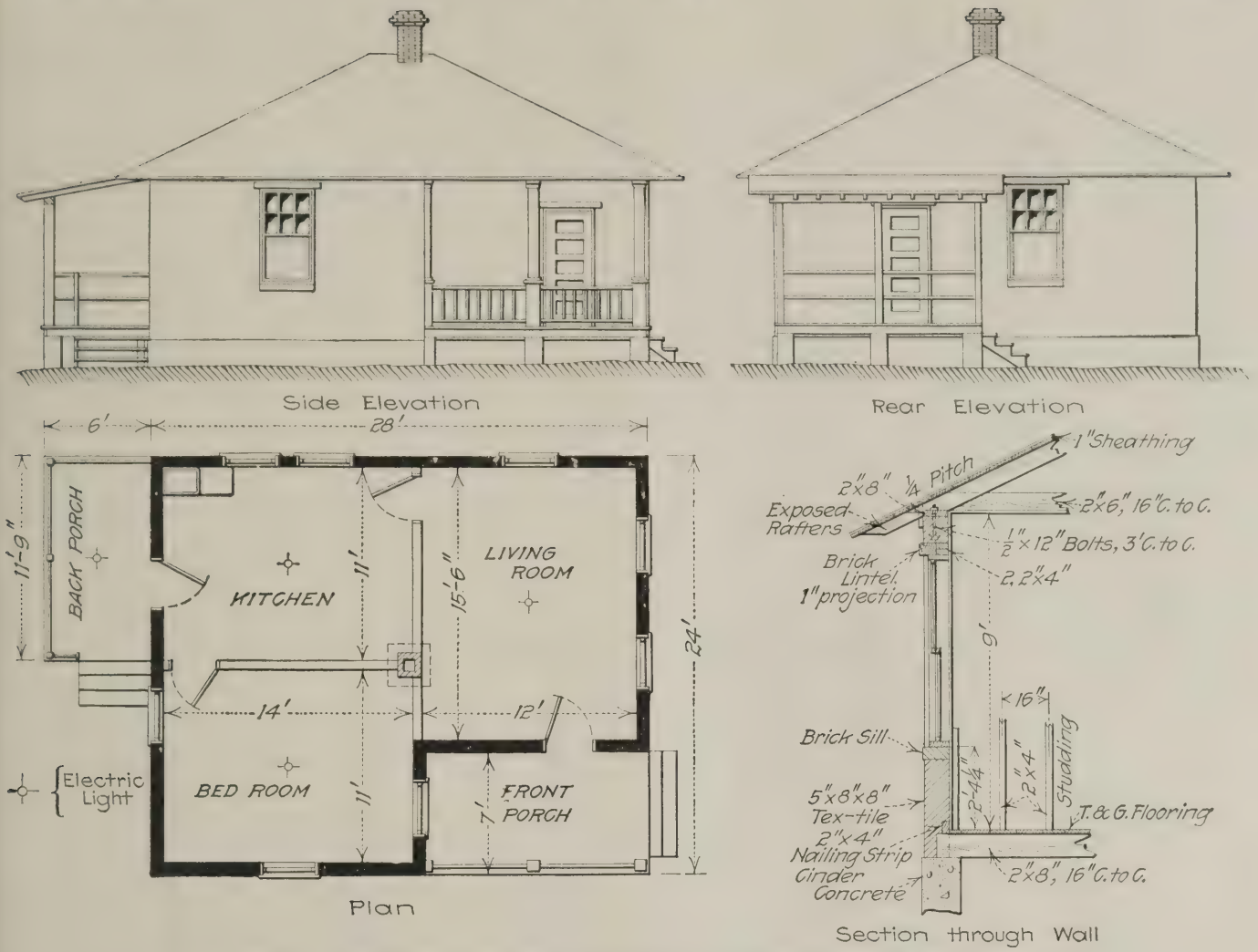


FIG. 5. WORKING PLAN OF BUNGALOWS ILLUSTRATED IN FIGS. 1 TO 4

rear. The bedrooms are 14 ft. 6 in. by 9 ft. 9 in. and 11 ft. 3 in. by 10 ft. 3 in. The chimney is in the center of the house. The roof is covered with Johns-Manville asbestos sheet roofing. The details of construction are shown in Fig. 6.

The following bill of material is approximately correct. In fact the amounts are slightly in excess of what would probably be required.

BILL OF MATERIAL, THREE-ROOM BUNGALOW, CLEARFIELD BITUMINOUS COAL CORPORATION, ROSSITER, PENN.

Finished Lumber

2 outside doors, 2 ft. 8 in., by 6 ft. 8 in., by 1¾ in.	5 panels
2 inside doors, 2 ft. 6 in., by 6 ft. 8 in., by 1⅜ in.	5 panels
8 windows, two sash to window, one 30 x 28-in. light in lower sash and six 10 x 14 in. lights in upper sash glazed	
8 window frames for above sash	
2 outside doorframes	
2 inside doorframes	

	Board Feet
3 pieces, 1 x 4 in., by 12 ft., stools	12
3 pieces, 1 x 4 in., by 12 ft., aprons	12
8 pieces, 1 x 4 in., by 12 ft., window casing	32
4 pieces, 1 x 4 in., by 8 ft., window casing	11
6 pieces, 1 x 4 in., by 14 ft., door casing	28
2 pieces, 1 x 4 in., by 12 ft., door casing	8
160 lin. ft., ¾ in. by 8 in., base board	107
160 lin. ft., ¾ quarter-round molding	
9 pieces, 1 x 8 in., by 12 ft., border board	72
2 pieces, 1 x 4 in., by 10 ft., front porch post	7
4 pieces, 1 x 8 in., by 10 ft., front porch post	27
5 pieces, 1 x 6 in., by 10 ft., front porch post	25
2 pieces, 1 x 8 in., by 12 ft., front porch post	16
2 pieces, 1 x 10 in., by 12 ft., front porch post	20
2 piece, 5 x 5 in., by 14 ft., front porch	29
1 pieces, 1 x 6 in., by 14 ft., front porch	14
1 piece, 1 x 6 in., by 8 ft., front porch	4
2 pieces, 2 x 4 in., by 12 ft., front porch railing	16
36 lin. ft., 2 x 2 in., front porch balusters	12
3 porch posts, 5 x 5 in., by 8 ft., back porch	50
4 pieces, 1 x 6 in., by 12 ft., back porch	24
2 pieces, 5 x 5 in., by 12 ft., back porch	50
4 pieces, 2 x 4 in., by 12 ft., back porch railing	32
14 pieces, 2 x 4 in., by 10 ft., back porch rafters	93
160 lin. ft., 1 x 2 in., nailing strip	27
Total	728

Rough Lumber

60 pieces, 2 x 6 in., by 16 ft., roof rafters	960
9 pieces, 2 x 6 in., by 12 ft., back porch joists	108
9 pieces, 2 x 6 in., by 14 ft., front porch joists	126
1 piece, 3 x 6 in., by 10 ft., front porch posts	15
2 pieces, 6 x 6 in., by 10 ft., front porch posts	60
16 pieces, 2 x 8 in., by 14 ft., floor joists and sills	299
30 pieces, 2 x 8 in., by 12 ft., floor joists and sills	480
14 pieces, 2 x 6 in., by 14 ft., ceiling joists	196
26 pieces, 2 x 6 in., by 12 ft., ceiling joists	312
11 pieces, 2 x 6 in., by 8 ft., ceiling joists, porch	88
34 pieces, 2 x 4 in., by 10 ft., studding	227
1,200 sq.ft., 1 x 8 in., and 10 in., sheathing	1,200
9 pieces, 2 x 8 in., by 12 ft., wall plates	144
15 pieces, 2 x 4 in., by 12 ft., window and door caps	120
700 sq.ft. tongue and groove, ⅞ in. flooring	875
100 sq.ft., tongue and groove, ¾-in. flooring, front porch ceiling	125
300 lin.ft., 1 x 2 in., bridging	50
3 pieces, 2 x 12 in., by 6 ft., front steps	36
3 pieces, 2 x 12 in., by 12 ft., back steps	72
80 pieces, 1 x 2 in., by 10 ft., facing	133
3,000 4-ft. spruce laths	
4 pieces, 2 x 6 in., by 18-ft. ridge pole	72
Total	5,698
Grand total	6,701

Brick Tile, Etc.

2,100—5 x 8 in., by 8 in. tile
450—4 x 5 in., by 8 in. split tile
1,500—standard size trimming brick
500—standard size chimney brick
1,150—sq.ft. of roofing
200—sq.yd. of plaster

Estimates for foundations are not included

A rather interesting type of single house is being built by the Coal Run Coal Co. at Coal Run, Penn. This house is entirely frame, is two stories in height and is covered with Johns-Manville Brooks brand roofing. The house has a front porch 6 x 16 ft. and a smaller back porch. There are six rooms and bath in the house and a cellar excavated under the entire dwelling. Fig. 7 shows the details of construction while Fig. 8 shows the houses under construction.

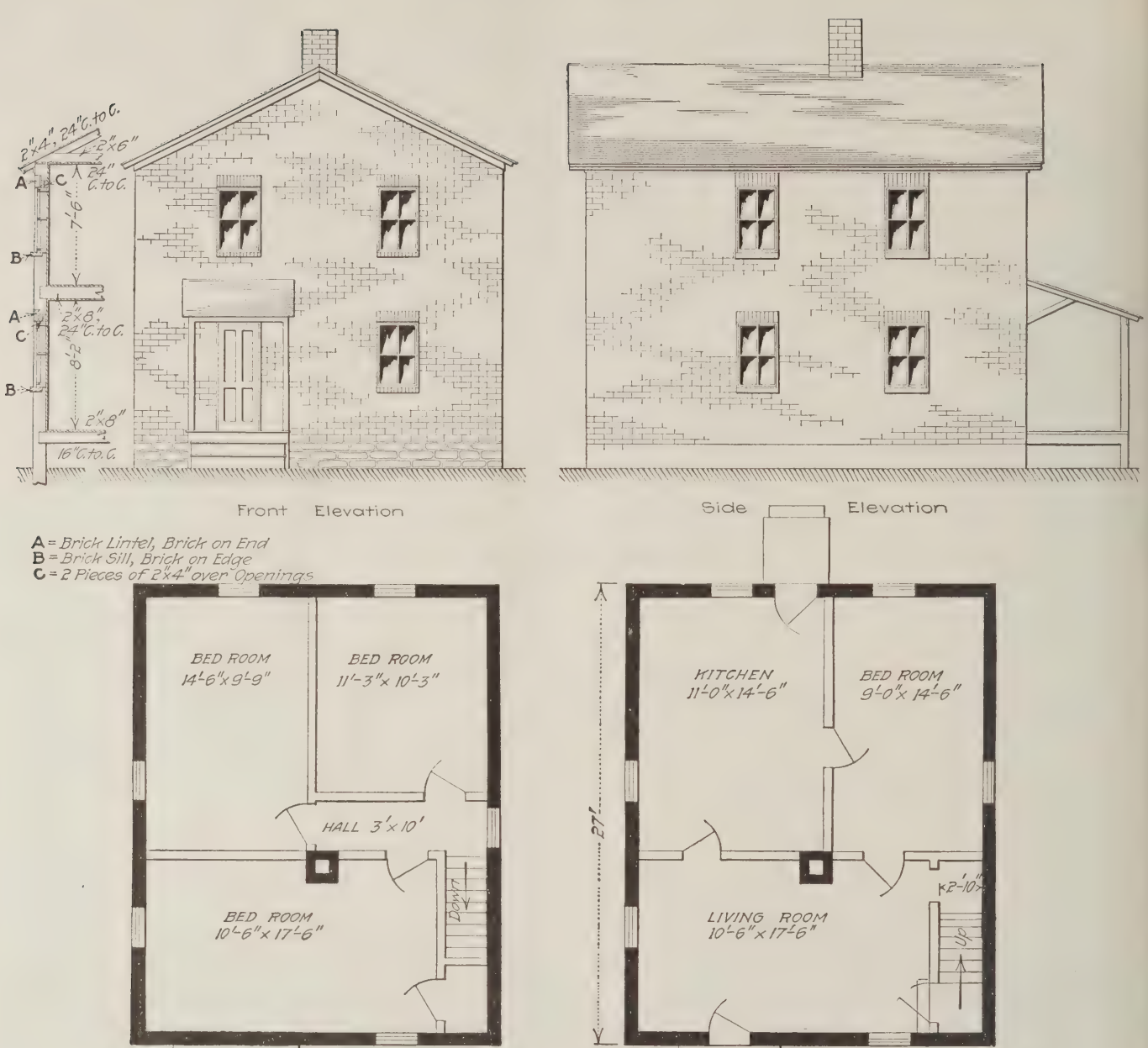


FIG. 6—DETAILS OF CONSTRUCTION OF TWO-STORY, SIX-ROOM TILE HOUSE

BILL OF MATERIAL FOR SIX-ROOM TWO-STORY HOUSE CLEARFIELD BITUMINOUS COAL CORPORATION, ROSSITER, PENN.

Finished Lumber

	Board Feet
2 inside doors, 2 ft. by 6 ft. 6 in.	
2 outside doors, 2 ft. 8 in., by 6 ft. 8 in., by 1¾ in.	
7 inside doors, 2 ft. 6 in., by 6 ft. 6 in. by 1⅜ in.	
13 windows, 2 sash to the window, two 12 x 22 in. lights to sash	
13 window frames for above sash	
2 outside door frames	
9 inside door frames	
20 lin.ft. ⅞ x 3½ in., net facing windows	6
4 pieces, 1 x 4 in., by 12 ft., stools	16
4 pieces, 1 x 4 in., by 12 ft., aprons	16
13 pieces, 1 x 4 in., by 13 ft., window casing	60
6 pieces, 1 x 4 in., by 12 ft., window casing	24
400 lin.ft., ⅞ x 8 in., base board	260
400 lin.ft., ¾ in. quarter round molding	
4 pieces, 6 x 6 in., by 8 ft., front and back porch	96
358 lin.ft., 1 x 2 in., nailing strip	9
2 pieces, 2 x 10 in. by 14 ft., stringers	
4 pieces, 1 1/16 x 9½ in., by 12 ft. stair treads	4
4 pieces, 1 1/16 x 7¼ in., by 12 ft. stair rises	2
3 pieces, 1 x 6 in., by 12 ft., front and back porch	18
27 pieces, 1 x 4 in., by 14 ft., door casing	121
	819

Rough Lumber

50 pieces, 2 x 6 in., by 12 ft., joists	600
50 pieces, 2 x 4 in., by 16 ft., roof rafters	533
28 pieces, 2 x 6 in., by 12 ft., 2nd floor ceiling joists	336
28 pieces, 2 x 8 in., by 12 ft., 2nd floor joists	448
40 pieces, 2 x 8 in., by 12 ft., 1st floor joists	640
2 pieces, 2 x 6 in., by 16 in., ridge pole	32
200 lin.ft., 2 x 8 in., cap for tile "D," Fig. 6	270
8 pieces, 2 x 4 in., by 12 ft., see "C," Fig. 6	64
1,200 sq.ft., 1 x 8 in., or 10 in., sheathing	1,200
1,400 sq.ft., tongue and groove ⅞ flooring	1,750
200 sq.ft., tongue and groove, ¾ in. porch ceilings	262
6,400 4-ft. lath	
72 pieces, 2 x 4 in., by 16 ft., studding	739
180 pieces, 1 x 2 in., by 10 ft., furring	300
600 lin.ft., 1 x 2 in., bridging	100
3 pieces, 2 x 12 in., by 6 ft., front steps	18
3 pieces, 2 x 12 in., by 12 ft., back steps	72
5 pieces, 2 x 6 in., by 12 ft., back and front porch joists	60
108 lin.ft., 2 x 8 in., wall plates	144
Total	7,568
Grand total	8,387

Brick, Tile, Etc.

3,750 5 x 8 in., by 12 in., tile
250 4 x 4 in., by 12 in., tile
600 5 x 4 in., by 8 in., tile
800 common chimney brick
400 sq.yd. plaster

Estimates for foundations are not included

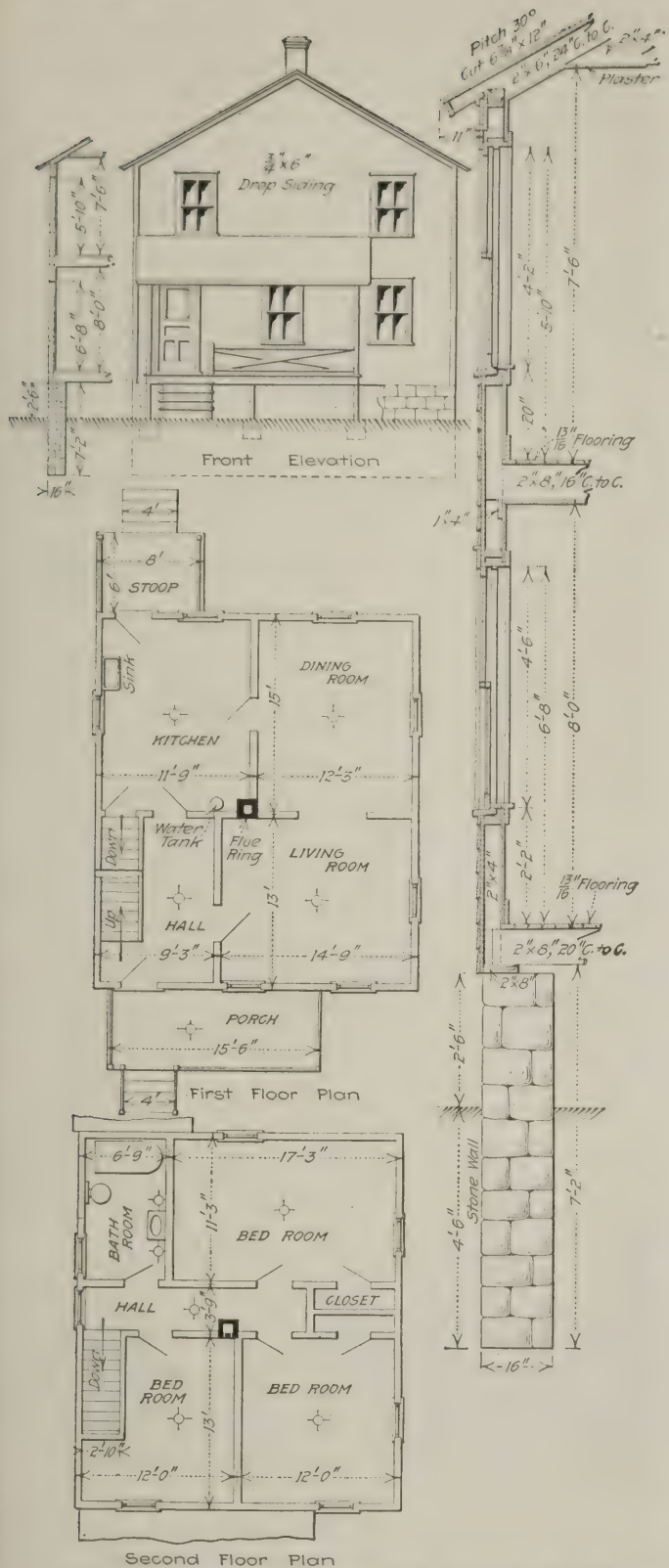


FIG. 7—DETAILS OF TWO-STORY SINGLE HOUSE

On the first floor is an entrance hall 9 ft. 3 in. by 13 ft., in which the stairway is located. There are two doors from this hall, one into a well-lighted living room which measures 13 ft. by 14 ft. 9 in. The other door from the hall opens into a kitchen 15 ft. by 11 ft. 9 in., provided with hot and cold water. A door from the kitchen opens into the dining room, and a large double door connects this latter room with the living room, which room measures 12 ft. 3 in. by 15 feet.

Upstairs there are three bedrooms, a hall and a bathroom. Two of these bedrooms are across the front of the house and have the same dimensions—namely, 12 x 13 ft. In the rear of the house there is one large bedroom measuring 11 ft. 3 in. by 17 ft. 3 in. The bathroom is of ample size—6 ft. 9 in. by 11 ft. 3 in. Between the back bedroom and the two front bedrooms is a hall 3 ft. 9 in. wide. At the end of this hall are two closets.

An exceedingly interesting feature in this design is the ease with which the house can be converted either into a superintendent's house or into a residence for the mine foreman. To prepare for the latter all that is necessary is to change the front porch by adding turned balustrades. For a superintendent's house about eight changes are necessary: (1) Use shingles, instead of drop siding, on the roof gables. (2) Use asbestos shingles on the roof. (3) Use large posts and turned balustrades on the porches and lattice the spaces below the porch floor. (4) Use a two-light instead of a four-light window. (5) Provide a steam-heating plant. (6) Cut a cellar door in the foundations so as to give an outside entrance. (7) Replace the closet space on the second floor by a bathroom; then convert the space in the rear of the house into two bedrooms of equal size, thus giving the house seven rooms and a bath. (8) Decorate the inside of the house to accord with its more elaborate construction. The bill of material is shown in the table on the next page.

At its Coal Run mines, Coal Run, Penn., the Coal Run Coal Co. has erected for its miners 72 double houses of two-story construction and is proposing to build many more in the spring. These double houses



FIG. 8—HOUSES IN PROCESS OF CONSTRUCTION

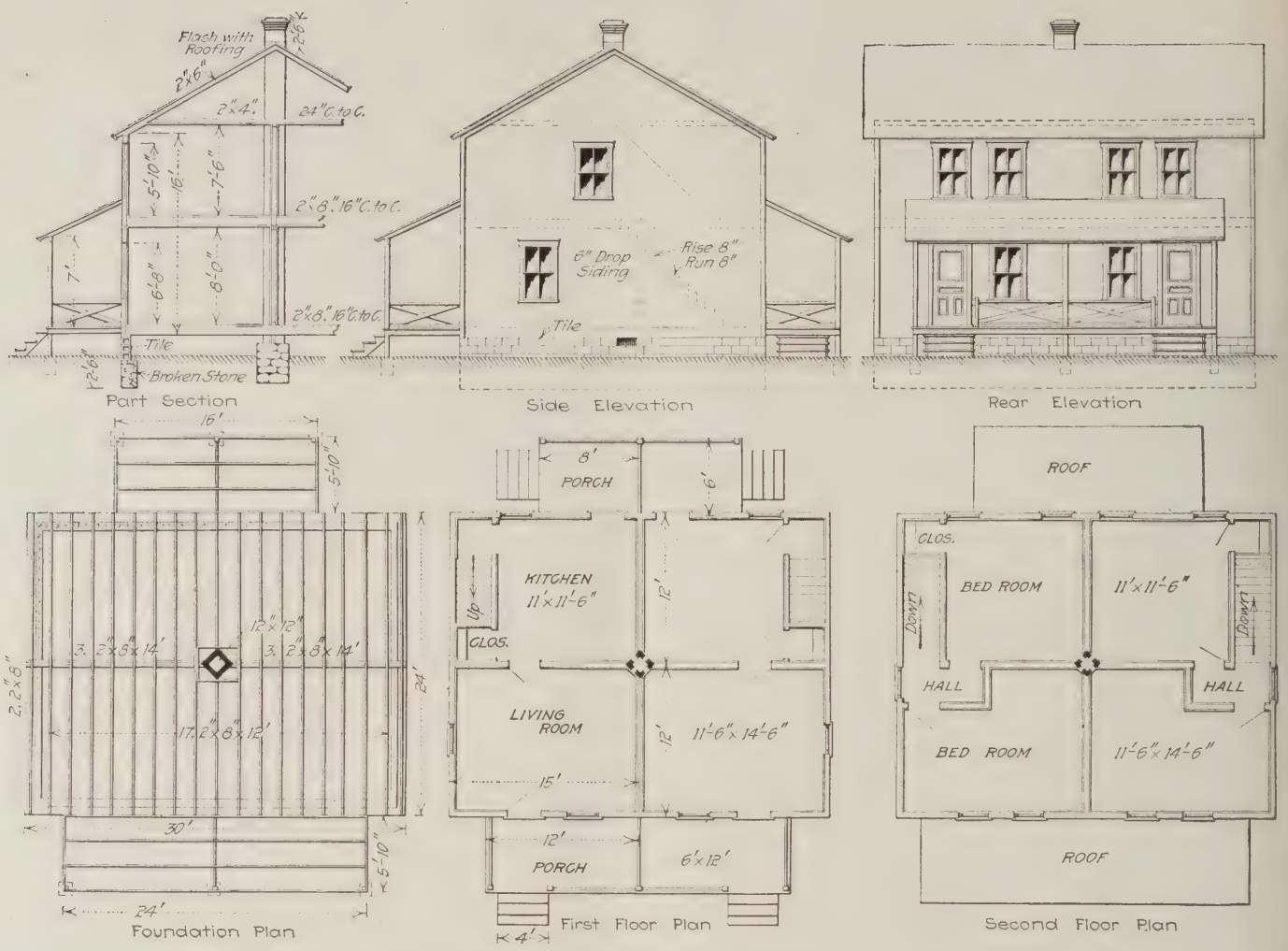


FIG. 9—DETAILED DRAWING OF DOUBLE HOUSES BUILT AT COAL RUN, PENN.

are neat and attractive in design. They are constructed of wood and painted a dark gray. The roof is covered with Johns-Manville Brooks brand roofing. There is

BILL OF MATERIAL FOR SINGLE HOUSE COAL RUN COAL CO., COAL RUN, PENN.

Finished Lumber

1 outside door, 2 ft. 8 in., by 6 ft. 8 in., by 1¾ in	5 panels
1 outside door, 2 ft. 8 in., by 6 ft. 8 in., by 1¾ in	Glazed
1 inside door, 2 ft. 8 in., by 6 ft. 8 in., by 1⅜ in	5 panels
6 inside doors, 2 ft. 8 in., by 6 ft. 8 in., by 1⅜ in	5 panels
3 inside doors, 2 ft. 8 in., by 6 ft. 8 in., by ⅞ in	5 panels
7 windows, 2 sash to the window, 12 x 24 in.	2 lights to sash
7 windows, 2 sash to the window, 12 x 22 in	2 lights to sash
4 windows, 1 sash to the window, 12 x 24 in	2 lights to sash
7 frames for 12 x 24 in., 2 lights	2 sash to window
7 frames for 12 x 24 in., 2 lights	2 sash to window
4 frames for 12 x 24 in., 1 light	2 sash to window

	Board Feet
2 pieces, 1 x 6 in., by 12 ft., front and back porch	12
1 piece, 2 x 6 in., by 16 ft., front and back porch	16
1 piece, 1 x 6 in., by 16 ft., front and back porch posts	8
3 pieces 4 x 4 in., by 14 ft., front and back porch	56
1 piece, 4 x 4 in., by 10 ft., front and back porch	13
4 pieces, 1 x 2 in., by 12 ft., front and back porch	8
1 piece, 2 x 6 in., by 8 ft., front and back porch	8
2 pieces, 1 x 2 in., by 10 ft., front and back porch	4
4 pieces, 1 x 1 in., by 14 ft., front and back porch	5
7 pieces, 2 x 4 in., by 14 ft., front and back porch rafters	70
2 pieces, 1 x 2 in., by 8 ft., front and back porch	3
1 piece, 1 x 1 in., by 8 ft., front and back porch	1
7 pieces, 1 x 4 in., by 12 ft., stools	28
7 pieces, 1 x 4 in., by 12 ft., aprons, back porch	28
7 pieces, 1 x 4 in., by 10 ft., window casing	23
7 pieces, 1 x 4 in., by 8 ft., window casing	21
10 pieces, 1 x 4 in., by 12 ft., window casing	40
475 lin. ft., ⅞x8 in., base board	475
475 lin.ft., ¾-in. quarter round, molding	
475 lin.ft., 1 x 2 in., nailing strips	80
2 pieces, 2 x 10 in., by 14 ft., stringers	48
2 pieces, ¾-in. quarter round, molding	
9 pieces, 1⅛ x 9½ in., by 6 ft., treads	45
9 pieces, 1⅛ x 7½ in., by 6 ft., rises	32
12 pieces, 1 x 6 in., by 18 ft., corner trims	108
3,900 lin.ft., ¾ x 6 in., drop siding	3,225
Total	4,357

Rough Timber

	Board Feet
2 pieces, 2 x 8 in., by 16 ft., ridge poles	42
32 pieces, 2 x 6 in., by 16 ft., roof rafters	512
32 pieces, 2 x 4 in., by 12 ft., ceiling hoists	256
42 pieces, 2 x 8 in., by 12 ft., 2nd floor	672
36 pieces, 2 x 8 in., by 12 ft., 1st floor	576
6 pieces, 2 x 12 in., by 14 ft., girder	168
188 pieces, 2 x 4 in., by 16 ft., studding	1,880
954 lin.ft., 1 x 2 in., bridging	160
1,900 sq.ft., 1 x 8 in., or 10 in., sheeting	1,900
1,100 sq.ft., 1 x 8 in., or 10 in., sheeting roofs	1,100
9,000 lath, 4 ft.	
1,344 sq.ft., 1⅛ tongue and groove flooring	1,680
144 sq.ft., ¾ tongue and groove, porch flooring	180
144 sq.ft., ¾ tongue and groove, porch ceiling	180
477 lin.ft., 2 x 4 in., wall plates	318
477 lin.ft., 2 x 8 in., joists	636
Total	10,260
Grand total	14,617

Miscellaneous

600 sq.yd. plaster	Bath room fixtures
1,100 sq.ft. roofing	Kitchen sink
1,200 common brick	

a front porch 6 x 24 ft., divided into two equal parts for each family. The back porch is 8 x 16 feet.

Each side of the house contains four rooms, two upstairs and two on the main floor. The front rooms up and downstairs are 11 ft. 6 in. by 14 ft. 6 in., and the two back rooms 11 ft. by 11 ft. 6 in. The stairway is located in the kitchen. At the head of the stairs is a small hall 3 x 6 ft. No running water or heat of any kind is provided within the house. The chimney is in the center of the house, and flues open into every room. Light and air are generously provided, there being two windows of ample size in each room. Fig 10 is an illustration of these houses partly finished. Fig. 11 shows one of the rows in the village completed. Fig.

9 is a detailed drawing of the same dwellings. The bill of material is only approximate:

BILL OF MATERIAL FOR DOUBLE MINERS HOUSE, COAL RUN COAL CO., COAL RUN, PA.

Finished Lumber

4 outside doors, 2 ft. 8 in., by 6 ft. 8 in., by 1¾ in., glazed	
8 inside doors., 2 ft. 6 in., by 6 ft. 6 in., by 1⅜ in.	
4 inside doors, 2 ft. 6 in., by 6 ft. 6 in., by ⅞ in.	
8 windows, 2 sash to the window, 12 x 24 in	2 lights
8 window frames for above	
10 windows, 2 sash to the window, 12 x 20 in	2 lights
10 window frames for above	

	Board Feet
12 pieces, 1 x 4 in., by 16 ft., outside trim	64
3 pieces, 4 x 4 in., by 14 ft., porch posts	52
1 piece, 2 x 6 in., by 16 ft., back porch	16
2 pieces, 2 x 6 in., by 12 ft., front and back porch	24
2 pieces, 2 x 6 in., by 12 ft., front porch	24
2 pieces, 2 x 4 in., by 16 ft., back porch	22
2 pieces, 1 x 4 in., by 18 ft., back porch	12
2 pieces, 2 x 4 in., by 14 ft., front porch	18
2 pieces, 1 x 4 in., by 16 ft., front porch	10
2 pieces, 2 x 4 in., by 12 ft., front porch	16
2 pieces, 1 x 4 in., by 14 ft., front porch	10
2 pieces, 2 x 6 in., by 12 ft., front porch	24
1 piece, 2 x 6 in., by 16 ft., back porch	16
9 pieces, 1 x 4 in., by 14 ft., aprons, porch	42
9 pieces, 1 x 4 in., by 14 ft., stools, porch	42
9 pieces, 1 x 4 in., by 14 ft., window casing	42
18 pieces, 1 x 4 in., by 18 ft., window casing	108
20 pieces, 1 x 4 in., by 14 ft., door casing	140
500 lin.ft., 1 x 8 in., base board	335
500 lin.ft., ¾-in. quarter round, molding	
500 lin.ft., 1 x 2 in., nailing strips	85
4 pieces, 2 x 10 in., by 12 ft., stringers	80
6 pieces, 1⅛ x 9¾ in., by 12 ft. treads	60
9 pieces, 1⅛ x 7¼ in., by 12 ft. risers	42
4,000 sq.ft., 6-in. drop-siding siding	3,000
Total	4,284

Rough Lumber

	Board Feet
2 pieces, 2 x 8 in., by 18 ft., ridge pole	38
32 pieces, 2 x 6 in., by 18 ft., rafters	576
32 pieces, 2 x 4 in., by 16 ft., ceiling joists	160
46 pieces, 2 x 8 in., by 16 ft., 2nd floor joists	966
40 pieces, 2 x 8 in., by 16 ft., 1st floor joists	840
9 pieces, 2 x 8 in., by 12 ft., sills	144
163 pieces, 2 x 4 in., by 16 ft., studding	1,630
6 pieces, 2 x 8 in., by 14 ft., girder	114
1,000 lin.ft., 1 x 2 in., bridging	166
4,000 sq.ft., 1-in. sheeting side	4,000
1,100 sq.ft., 1-in. sheeting roof	1,100
9,000 laths, 4 ft., lath	
1,440 sq.ft., tongue and groove flooring	1,820
240 sq.ft., tongue and groove, flooring porches	309
240 lin.ft., tongue and groove, flooring porches, ceiling	333
500 lin.ft., 2 x 4 in., wall plates	333
13 pieces, 2 x 4 in., by 14 ft., rafters for porches	130
Total	12,527
Grand Total	16,811

Miscellaneous

3,000 common brick	600 sq.yd. plaster
	1,100 sq.ft. roofing



FIGS. 10 AND 11.—UNCOMPLETED AND COMPLETED HOUSES

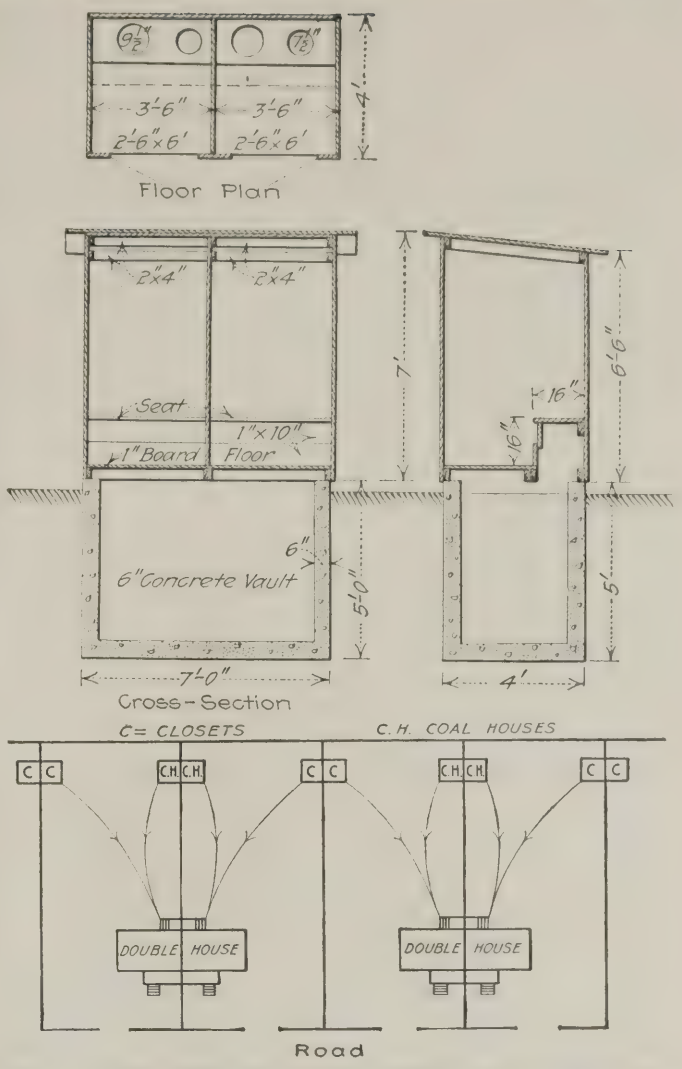


FIG. 12—ARRANGEMENT OF CLOSETS AND COAL HOUSES

The interesting arrangement of closets and coal houses is shown in Fig 12. It will be noticed that the coal houses are set nearer the dwellings than the closets. The following is a bill of material for the appurtenances, see Fig. 12:

BILL OF MATERIAL FOR CLOSETS, COAL RUN MINING CO.

Rough Lumber

	Board Feet
13 pieces, 1 x 12 in., by 14 ft	182
4 pieces, 1 x 12 in., by 10 ft	40
1 piece, 2 x 16 in., by 8 ft	20
1 piece, 2 x 10 in., by 14 ft	24
1 piece, 2 x 4 in., by 14 ft	9
1 piece, 2 x 4 in., by 12 ft	8
2 pieces, 2 x 4 in., by 18 ft	12
140 cu.ft. excavation	
54 cu.ft. concrete	
20 sq.ft. flooring	25
28 sq.ft. roofing	
Total	310

BILL OF MATERIAL FOR COAL HOUSES, COAL RUN MINING CO.

Rough Lumber

	Board Feet
23 pieces, 1 x 12 in., by 14 ft	322
4 pieces, 2 x 12 in., by 12 ft	96
8 pieces, 2 x 4 in., by 12 ft	64
Total	482

When the rate of combustion is doubled the quantity of the volatile matter distilled per unit of time is doubled. However, to burn this double quantity of volatile matter with the same excess of air to the same completeness, the combustion space is increased only about 20 per cent.—*Bureau of Mines Bulletin No. 135.*

The Ross Meridiograph

By J. T. BEARD
Senior Associate Editor "Coal Age"

SYNOPSIS — *Need of a simple means of making a quick and accurate determination of the true meridian at any suitable time and place. The "meridiograph" devised for this purpose. Description of the instrument, its use explained. Diagram for ascertaining at a glance the actual change in declination from that given in the Ephemeris for Greenwich noon, to that for any suitable time and place of observation at any longitude east or west of Greenwich.*

IT IS a rare privilege to be able to present to the readers of *Coal Age* the description of a successful practical device whose need has long been felt by mining and civil engineers and surveyors, but which has heretofore defied many ingenious attempts to construct in a simple and compact manner.

All engineers and surveyors realize that the quick and ready determination of the true meridian of a place is not only a matter of first importance but is, at the same time, a most troublesome feature of the work in hand. As is well known, the indications of the magnetic needle are wholly unreliable. Astronomic methods for determining the true north are not only inconvenient and difficult, but require more knowledge of the heavens than is possessed by the average mine foreman. Such determinations are rarely attempted, even by the more skilled United States deputy mineral surveyors, the accuracy of whose work depends on the correct determination of the true meridian.

The so-called "solar attachment" of the engineer's transit has served the purpose till now of determining true north and has been used very largely by engineers and deputy mineral surveyors throughout the country. The delicacy of the adjustment of this device, however, required a degree of mechanical skill that few possessed; and this fact, together with the added expense of the attachment, is fast rendering its use obsolete in present-day practice.

The meridiograph is a new instrument, designed by Louis Ross, a former United States deputy mineral surveyor of San Francisco. Mr. Ross is to be congratulated on his mechanical ingenuity and the success that has attended his efforts. With the aid of this device, the engineer or surveyor is enabled to locate a true north and south line, in a few minutes, at any time of the day when an observation of the sun for this purpose is practicable.

As in the use of the solar attachment, the observation with the meridiograph will give the best results when made in the early morning or late in the afternoon, at which time the sun's altitude is changing more rapidly. An observation for azimuth taken in the hours approaching or following noonday are naturally unreliable. Observing the sun's altitude at noon, or when it is crossing the meridian, serves to determine the latitude of the place when this is not known. The altitude of the sun at noon is always the co-latitude of the place.

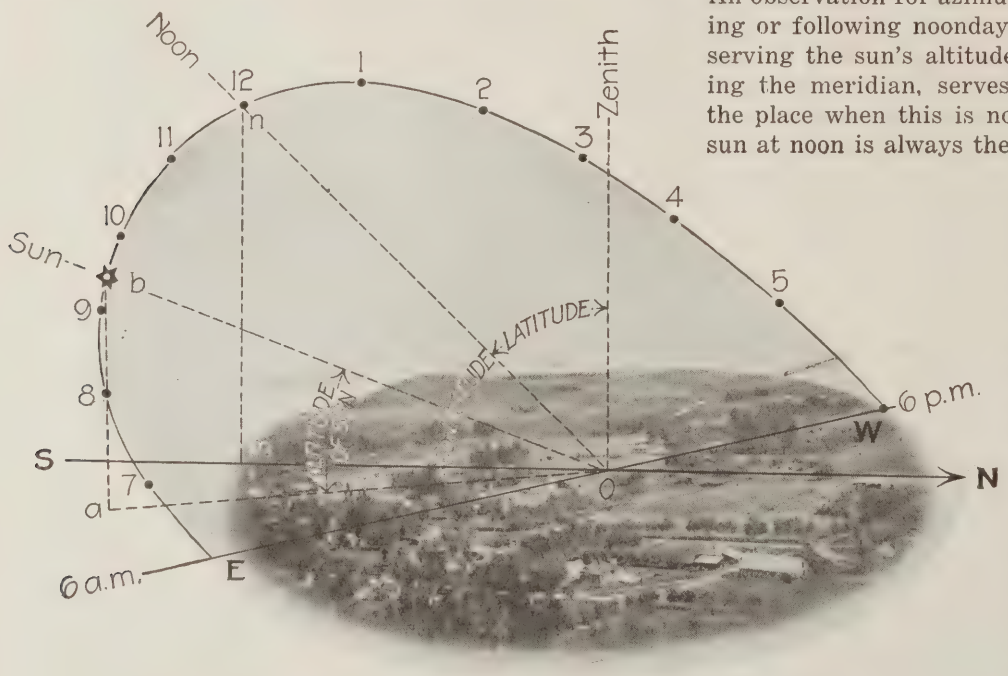


FIG. 1. ILLUSTRATING THE USE OF THE MERIDIOGRAPH IN THE FIELD

The accompanying illustration (Fig. 1) shows an observation taken at the crossroads at *O*, in the center of a landscape. The hour circle, or path of the sun, is described in a plane corresponding to the sun's declination at the time the observation is taken. The meridian to be determined is indicated, in the figure, by the line *NS*, which is the center line of the north and south road, in the landscape. The line *EW* represents the east and west line and is the center line of the crossroad, also shown in the figure.

At the moment of observation, the altitude of the sun, as measured by the transit at *O* is the angle *aOb*. The bearing of the sun, or its angular distance from the meridian *NS*, is indicated by the angle *aOS*. This angle is read on the meridiograph when the latitude of the place and the sun's altitude are set to correspond to each other on the respective scales of the instrument.

The manner of finding this angle of the sun's bearing, by means of the meridiograph, will be described later, but it may be stated here that the latitude of the place, if not previously known, may be ascertained from the co-latitude, indicated by the angle *mOn*, in the figure. This angle is measured by the transit when the sun has

attained its greatest altitude at noon when crossing the meridian. The latitude of the place is always the complement of the co-latitude, or 90 deg. minus the co-latitude. As indicated in the figure, the latitude is the angular distance of the sun at noon from the zenith.

The meridiograph instrument is shown in Fig. 2. It consists of two graduated disks and a reading arm equipped with a magnifying glass adjustable to any



FIG. 2. THE MERIDIOGRAPH

focus. The two circular disks are concentric, the outer graduated circle having a diameter of 7 in. This scale is engraved on a silvered surface, while the inner dial is finished in gunmetal. The arrangement of the scales is such that, although the diameter of the graduated circle does not exceed 7 in., the angular graduations are as open as a protractor 60 in. in diameter.

One has but to use the meridiograph once or twice, in the field, for the purpose for which it was intended, to be convinced of its practical value as a time saver and a guarantee against casual error in calculations. None realizes this better than the engineer who is familiar with common practice in the use of a solar.

There are several scales on the two disks of the meridiograph, the principal ones being known as the A scales, of which there are two, and the B scales, the same in number. There is, beside, a scale for determining sun time, by observation, if desired.

Manner of Using the Meridiograph in the Field

Briefly described, the operation of the meridiograph depends on two steps, assuming that the latitude and longitude of the place are known and that the sun's altitude has been measured with the transit, the first step is to ascertain the declination of the sun at the time of observation. The Ephemeris, or Nautical Almanac, used by engineers and surveyors, gives the sun's declination for each year, at Greenwich mean moon.

An inspection of the Ephemeris shows that the sun attains its greatest declination (23° 27′) twice a year; namely, at the solstices, about June 21 and Dec. 21, the declination being north in the former case and south in the latter. Again, the declination of the sun is zero when crossing the equator, which is twice a year; namely, at the equinoxes, about Mar. 21 and Sept. 22.

Further inspection of the Ephemeris shows that the daily change in declination is greatest at the equinoxes when it is approximately 23.7 min. in 24 hr. At the solstices when the sun attains its greatest declination

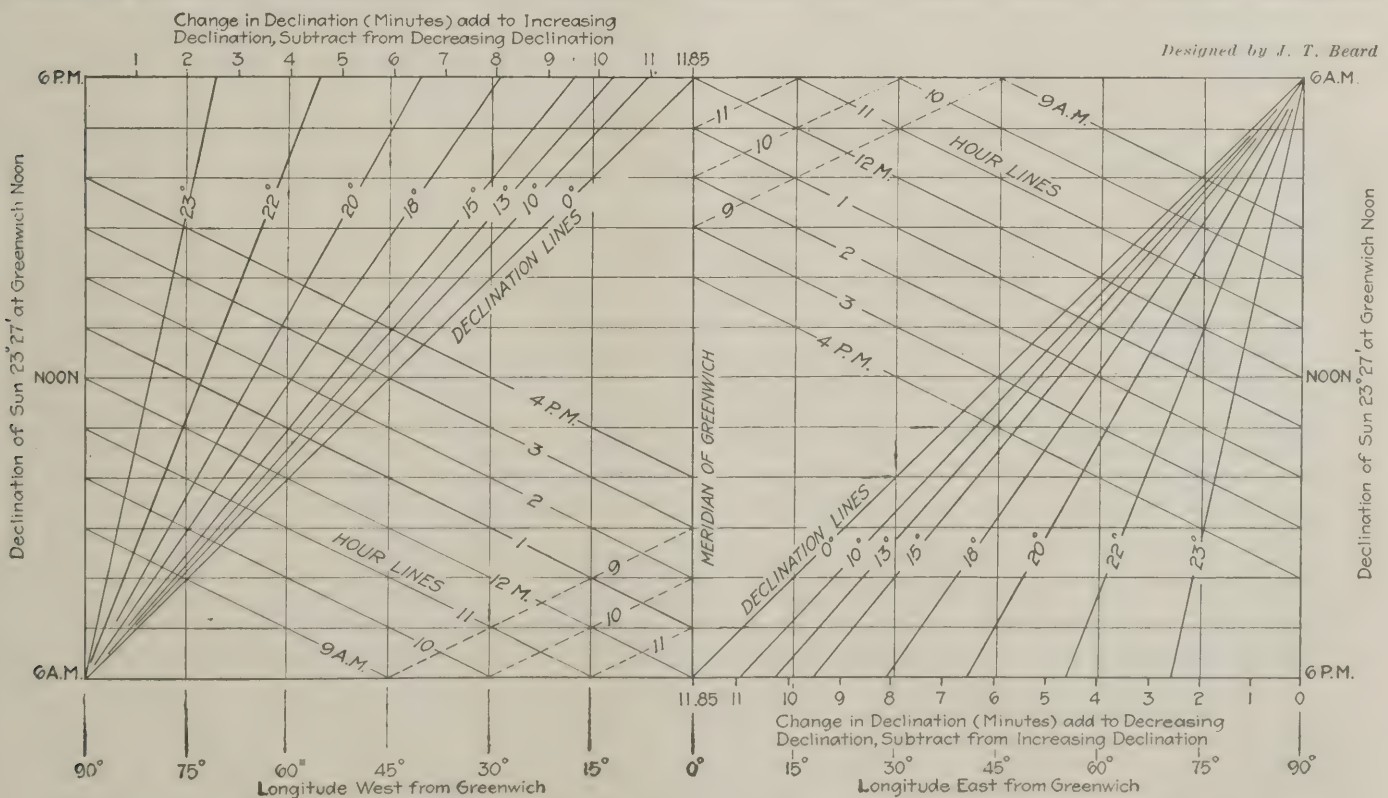


FIG. 3. DIAGRAM FOR ESTIMATING THE APPARENT DECLINATION OF THE SUN, FOR ANY LONGITUDE AND TIME FROM 9 A.M. TO 4 P.M., BY ADDING OR SUBTRACTIN G THE CHANGE TAKEN FROM THE DIAGRAM TO OR FROM THE DECLINATION AT GREENWICH NOON, AS GIVEN IN THE EPHEMERIS

either north or south, the daily change is least, being approximately one or two-tenths of a minute in 24 hours.

The diagram shown in Fig. 3 is based on the varying change in declination, for various altitudes of the sun, and shows at a glance the actual change that must be added to or subtracted from the declination at Greenwich noon, as taken from the Ephemeris. The amount of such change will depend on the difference in time as determined by the longitude of the place of observation east or west of Greenwich, and varies also with the declination. It is important to observe that, for all places north or south of the equator, the declination *increases* from the equinox to the solstice, and *decreases* from the solstice to the equinox. It is necessary, of course, to add the estimated change in declination to that given in the Ephemeris when the declination is increasing to obtain the correct declination at any given time for places west of Greenwich and subtract such change for places east of Greenwich. On the contrary, for a decreasing declination, it is necessary to subtract the estimated change from the declination given in the Ephemeris, for all places west of Greenwich, and to add the change for all places east of Greenwich.

The diagram (Fig. 3) makes it possible to ascertain the amount of change in declination for any longitude east or west of Greenwich, and any mean sun time at which an observation is taken, having due regard to the declination of the sun at that time.

To Find the Declination With the Diagram, Fig. 3

Follow the diagonal hour-line corresponding to the time of taking the observation to its intersection with the vertical line corresponding to the longitude of the place; and project this point of intersection horizontally on to the diagonal corresponding to the declination at Greenwich noon, as taken from the Ephemeris. Then, follow this declination-line to the scale at the top or bottom of the diagram, as the case may be.

The reading of the scale at the point indicated by the said declination-line will give the estimated change of declination, in minutes, which must be added to the declination at Greenwich noon when the declination is increasing, or subtracted from the same when the declination is decreasing, for all longitudes west of Greenwich. For longitudes east of Greenwich, the estimated change in declination must be added to the Greenwich noon declination when the declination is decreasing or subtracted from the same when it is increasing.

It will be observed that when the diagonal hour-line would have to be extended below or above the horizontal lines of the diagram, in order to intersect longitudes less than 45 deg. east or west of Greenwich, such hour-line is extended, as a dotted line, upward or downward, as the case may be, so as to cross these longitudes. The procedure, in that case, is the same as before, the intersection of the dotted hour-diagonal with the given vertical longitude-line being then projected horizontally onto the given declination-diagonal, whose intersection with the scale, at the top or the bottom of the diagram, will indicate the change in declination for the given time and place.

This diagram is somewhat different from the diagram proposed by the inventor of the instrument. It is one I have devised as being a more logical and simple presentation and one that will be more readily used in practice. Fig. 4 shows the leather should bag for carrying the meridiograph, together with ample pockets for field notebooks. As a simple, complete and practical device for finding the true meridian, I can strongly



FIG. 4. BAG FOR CARRYING THE INSTRUMENT

recommend this instrument for field use. It is a remarkable time saver, which will be well appreciated by those whose daily work compels the use of the solar attachment for ascertaining the meridian of a place. The possible error in the use of this device will not exceed one or two minutes at the utmost. Full instructions for its use accompany each instrument. As is well known, the best time for taking observations on the sun, for the purpose of determining a true meridian, is in the early forenoon or later in the afternoon when the error of the determination will not exceed one minute. When the observation is taken closer to noon, the error may reach two minutes. Owing to the increased refraction of the sun's rays, it is inadvisable to take an observation before 9 a. m. or after 4 p. m., if this can be avoided.

Coal Carbonization in Gas Retorts

The present heavy demand for benzol, toluol and other byproducts of coal distillation has modified the gas engineer's methods. A high yield of gas is a prime necessity to meet the demands for gas for its various services. But certain elements enriching gas are reduced to increase the supply of benzol which is of such prime importance in the manufacture of explosives.

At the Macclesfield gas works in England the gas yield per ton of coal is said to have been increased and at the same time to have obtained largely increased yields of tar and ammoniacal liquor, the latter furnishing fertilizers so urgently needed. This result has been attained by injecting steam into the base of the retorts, thus generating blue water gas. This method removes the last trace of gas from the coal and washes out the tarry matter before the tar has been subjected to destructive distillation. No deterioration has been noticed in the retorts as the result of steaming, and scurfing has been reduced to a minimum.

Strip Mining Where Bad Roof Prevails

By RALPH W. MAYER
Connellsville, Penn.

SYNOPSIS — *A considerable area of the Pittsburgh bed of coal near Burgettstown, Penn., has comparatively shallow cover and an extremely bad roof. This is being profitably recovered by means of stripping. Because of the nature of the overlying rock blasting must be extensively practiced and carefully executed.*

A LARGE area of coal at Burgettstown, Penn., about 25 miles west of Pittsburgh, has a poor roof, one that it is almost impossible to hold up without lagging between timbers placed close together. The cover is shallow. The coal worked is the Pittsburgh bed, is of good quality and varies from 5 to 7 ft. in thickness. The same district contains a considerable amount of coal which has a good roof and is easily secured by the usual methods of underground mining.

The Harmon Creek Coal Co. is successfully mining out large areas of this coal which has a poor roof by means of stripping. Six-inch holes are drilled from the surface down to the top of the coal. These are placed 25 or 30 ft. apart. Keystone steam drills and gasoline drilling machines are used. These are self-propelled, moving from place to place under their own power. The covering on the coal is from 20 to 40 ft. thick and consists of soil, shale, slate, and in some places a harder rock closely resembling limestone.

After the machines have finished drilling the holes, they are sprung three times to form a chamber above the coal to hold the final charge of powder. The first springing charge consists of six or eight sticks of dynamite. This shoots the mud out of the hole and slightly enlarges the bottom. The second charge consists of about half a box of dynamite, and for the third springing charge about a 50-lb. box is used. It is unnecessary to clean the borehole after each charge. The shots throw the dirt up through the borehole onto the surface.

After the holes have been sprung three times they are given the final charge, which consists of black powder. Twenty to thirty 25-lb. kegs of FFF black powder are used for each hole. The tops of the kegs are cut partly off and the powder poured from the keg directly down the borehole.

The powder is exploded by using No. 6 electric detonators with 30-ft. wires. Two detonators are placed in each hole, so that in the event of the failure of one a second could be fired. Each detonator is placed in the end of a stick of dynamite and two half hitches of the lead wires of the detonator are taken around each end of the stick. Thus the stick of dynamite with the detonator in it hangs vertically in the borehole when it is lowered into it by means of the 30-ft. lead wires. This prevents the dynamite from catching on the sides of the hole and refusing to go farther. One or two kegs of powder are then poured on top of the dynamite sticks which contain the detonators. After the explosives have been placed in the hole it is filled with tamping, the soil surrounding the hole being used for this purpose.

A stick about 25 ft. long and 2 or 3 in. in diameter is used as a tamping tool. A ½-in. rope is fastened to the end of this stick, so that it hangs perpendicularly in the hole when supported by the rope.

One man continuously uses the tamping stick while the powder and tamping is being put into the hole, pounding both firmly into place. He also holds the lead wires of the detonator to prevent them from dropping into the hole. He does this by taking a couple of turns of each lead wire around each of his feet, thus holding the wires against the side of the hole. He has free use of both his hands for tamping the hole. Two men usually pour out the powder, while a fourth man occasionally helps and in general oversees the work of loading and tamping. It is necessary to exercise care in filling the holes with tamping and not introduce the soil into the hole so fast that it chokes and gets clogged.

Holes Fired at One Time by Electricity

When 10 or 15 holes have been loaded and tamped they are all fired simultaneously by means of an electric current. The resultant explosion has the effect of lifting the rock for a considerable space or area up off the coal and dropping it back again, thus shattering it but causing little disturbance upon the surface. The charge of explosives for a hole is of course varied according to the depth and nature of the overburden.

Where the rock is unusually hard, or the hole a trifle moist, four or five boxes of dynamite in the bottom of the hole, then 15 to 20 kegs of powder and three or four boxes of dynamite on top of the powder may be used. The holes are almost all dry after being sprung. Occasionally a wet hole will occur. In such a case a hanging charge of dynamite is exploded at the top of the water in the hole. This cracks the rock so that the water drains off, leaving a dry hole. The dynamite used is of 40 per cent. strength.

As a protection in inclement weather for the persons loading the holes and to keep the explosives dry, a V-shaped shelter is used. Each side of this shelter is about 6 ft. wide, and 6 ft. high. It is set on its end over the hole to be loaded, the point of the V facing the wind. The top of the V is covered with a flat roof affording protection from above. This shelter is made strong and light in weight so that it can easily be moved from hole to hole.

The drilling machine has a small blower or fan which is placed just in front of the flywheel of the engine. The fan has a pulley of small diameter fastened to its shaft and is mounted on a small swinging platform which may be swung so that the pulley of the fan comes into contact with the circumference of the revolving flywheel of the engine, thus rotating the fan. A 2-in. hose leads from the fan to a forge, which is used for heating the bit of the drill when it is necessary to sharpen it. The hose terminates in 3 ft. of iron pipe which finally leads the blast to the forge. This pipe is buried

a few inches underneath the ground and over its end a simple forge made. The air from the fan coming through this hose and pipe makes a good fire.

A few loose bricks set up on edge, two high and others laid loosely across their top and across one end, and covered with dirt, leaves an opening large enough for the bit of the drill. This makes an effective forge, and one that is quickly built and easily moved from place to place. It has only the opening at the bottom where the air enters through the 2-in. pipe and the opening at the end which receives the bit. Into this the coal is fed, and from it the smoke issues. A few small lumps of coal will quickly heat the bit of the drill.

This forge is made two brick lengths long. These two bricks are placed on edge and two more are placed on edge on top of them. Four bricks thus form one side. The two sides are so placed that bricks can be laid lengthwise from one side to the other. The top and end are built up in this manner. They are covered with dirt to give the entire structure firmness.

When the overburden has been broken by the use of explosives it is shoveled back off of the coal and deposited upon the ground from which the coal has been removed. A strip of ground across the coal field is drilled and loosened by explosives. This strip is then cleaned of its overburden and the coal underneath removed. The strip from which the coal has been removed makes room for depositing the overburden of the next adjoining strip.

Waste Shoveled Back by Steam Shovels

Four Marion steam shovels, Model 300, are used for stripping or shoveling back the waste. The buckets range in capacity from 6 to 8 cu.yd., and the booms are from 85 to 95 ft. in length. Each shovel runs on short lengths of rail which are removed from its rear and placed in front as the machine advances. The track for the railroad cars is placed immediately upon the coal and on the side of the stripping next the virgin ground, or on the opposite side of the strip from the waste pile or dump.

These works are on the main line of the Pennsylvania R.R. Panhandle route. The railroad cars are left on a siding. The Harmon Creek Coal Co.'s locomotives take them from this siding and haul them directly into the pit or onto this track laid upon the top of the coal. Here they are loaded by means of a Marion steam shovel, Model 36. This model is provided with a caterpillar truck, and can travel over the inequalities of the floor with ease. It works in the lowest part of the cut into which the water drains if any is present and where it might be troublesome to lay track. This type of truck gives it great freedom of movement.

The shovel moves by its own power, but in a hard place where this is insufficient the power of the dipper engine is also utilized. This is done by means of a piece of cable or sling having an eye spliced in each end. This cable is passed underneath the top half of the caterpillar belt a few feet back from its front end. The eyes on the two ends of the cable are then hooked over the teeth of the shovel. When the dipper is raised or pushed ahead the cable tightens and pulls on the belt, thus helping to move the machine ahead. The coal in the seam is not shot, the shovel being powerful enough to loosen it.

This shovel runs upon the floor of the coal bed and loads the coal directly into the railroad cars. The shovels work in pairs, each stripper being accompanied by a digger. Each stripping shovel works two 10-hour shifts per day, while each loader works one shift.

Several men work ahead of the loading shovel, sweeping off the top of the coal with wire brooms and throwing back the sweepings. Three men also work in the car while it is being loaded, throwing out slate and refuse. Picks are here used to break the pieces of slate loose from the coal when necessary. They also signal the shovelman not to dump a shovelful of coal when they have not all the slate thrown out of the car. The craneman dumps the coal into the car in such a manner that it is spread out so that the slate may be easily seen. The slate is thrown off the car on the side opposite the shovel or between the railroad track and the face of the next stripping. The stripping shovel throws this slate back along with the waste when it makes its next cut.

Locomotive Works in Conjunction With Shovel

A locomotive constantly serves the loading shovel to shift the cars to the proper position for easy loading and to take away the loads and return with empties. Only a few minutes are required to take out the loads and return with empties from the sidetrack. While the locomotive is doing this the shovelman is loosening up the coal for loading succeeding cars. The company has its own locomotives and sidetracks.

The coal seam lies practically level and high so that the water drains off into the valleys, which cut the seam where it outcrops. Where there are swamps or depressions the water is pumped out with gasoline pumps. Box drains made of planking are laid on the floor and covered with the waste piles where the deposits of waste would dam back the water from flowing out of the pit or open cut.

The water-supply for the boilers of the steam shovels and locomotives is obtained from a reservoir made by damming a small creek. The face of the dam is riprapped with flat stones, and a concrete spillway takes care of the overflow. A pumping plant at the reservoir forces the water through pipe lines to the different works, connections being made to the steam shovels by hose. The locomotives fill their tanks from stand pipes placed at convenient points.

Part of the field carries another seam about 2 ft. thick, overlying the Pittsburgh bed but separated from it by several feet of rock. This bed (known as the Rooster seam) also contains a good quality of coal, but aside from being used in the steam-shovel boilers, where it can be conveniently secured, it is wasted as the cost of its recovery would be prohibitive.

Several men are employed to keep the waste shoveled up to the face in front of the stripping shovel on top of the coal. This top of the coal seam forms the floor upon which the stripping shovel operates. The stripping shovels easily handle any pieces of rock which they encounter without difficulty.

The company began stripping operations in February, 1917, and commenced loading coal in September, 1917. In this short time the shovels have uncovered a large area of coal a mile or more in length.

The Harmon Creek Coal Co. also has underground operations in this same vicinity. At present the output

from these workings amounts to about 300 tons per day, but eventually it is the intention to secure at least 1000 tons from below ground. Power for underground mining and haulage will be purchased from the West Penn Power Co. It will be received at 22,000 volts and stepped down and converted before application to the various motors. At present power is supplied by a Western Electric generator direct connected to a three-cylinder gas engine working on natural gas.

The Coal Problem*

By E. G. Bailey
Boston, Mass.

The biggest and most important question before the American people today is the coal problem. The abnormally high percentage of ash and impurities in the coal is like sand in the bearings of transportation and of industry, slowing them down at the most critical time in our history. The less ash and impurities in coal, the less the number of tons required. The greater the demand for coal, the higher the price and, under present conditions, the poorer its quality. The price has been regulated; but the quality has run riot.

Why have we allowed this to happen just at the time when we need heat in concentrated form? Why are the railroads burdened today with hauling millions of tons of utterly worthless dirt? To say that this excess of ash in the coal is worthless, does not describe the situation. The price paid for this dirt is only a small fraction of the damage. The rest lies in the decreased efficiency, the lowered capacity, the increased labor and the excessive repair bills involved in the combustion of this coal—and in the necessity of closing down industries because of the lack of the coal which might have been shipped in place of these so called "worthless," but really exceedingly costly impurities.

Results show a 10% decrease in the amount of coal delivered to many plants during the past year. Considering that the Navy and other Government requirements receive a greatly increased tonnage of the best coal, a conservative estimate of 5 per cent. is made as representing the increased demand for coal due solely to the poorer quality of that received. This means that 30,000,000 tons of utterly worthless slate and dirt were loaded into railroad cars and delivered to the consumer, where it caused additional trouble in burning the coal with which it was mixed.

On the basis of the average price of coal delivered to the consumer being $4 per ton, this excessive amount of impurities has cost the country $120,000,000 during the past year. Adding to this the various estimates made of the cost of our heatless holidays, ranging from $1,000,000,000 upward, it is obvious that this question of impurities in coal is of such tremendous importance that an effective remedy must be found immediately. Manufacturers would be glad to pay a dollar per ton more for coal if they could get what they need and of standard quality.

Competition normally compels the mine operator to clean his coal, but when the coal shortage began, in 1916, manufacturers were so anxious to get fuel that they offered and gladly paid prices of $5 to $6 per ton at the mines and took anything that was black. For this reason quality went from bad to worse. Under the present system of paying the operator prices fixed by the Government, no distinction whatever is made between the best and poorest grades of coal. They both command the same price, so why should one operator go to additional expense of shipping clean coal when he receives no more pay than his competitor who loads dirt?

To simply appeal to the miners and operators, even on the grounds of patriotism, is not sufficient. To increase the Government price on the present basis of control of $5 per ton at the mines would not reduce the percentage of impurities in the coal one iota. We must apply a remedy that has some economic foundation.

The remedy suggested is to establish standards of quality and pay a premium for clean coal. The price paid to the operator should be based on standards established by the Fuel Administration according to different mining districts, etc., with premiums based almost entirely upon percentage of ash, and especially the free ash such as slate and rock which can and should be eliminated at the mines.

Coal-sampling stations should be established by the Government at certain central points where large quantities of coal are received direct from mines. Each station should be equipped with machinery for obtaining representative samples from as many individual cars as necessary to determine the average quality of coal shipped from each mine during each month.

The operator would not know what cars were to be sampled, for the Fuel Administration could consign or reconsign any cars in transit to the coal piers or power houses where the sampling stations were located. The mine operator would therefore have a real incentive to load every car with as clean coal as possible.

The car distribution at the mines, which is an important point to the operator, should also be based upon the quality of coal produced so that there would be an added incentive to load clean coal, and the market would always be supplied with a greater proportion of the better quality of coal than if the empty cars were prorated equally as at present.

Actual knowledge of the quality of coal would also be of great benefit to the Fuel Administration in classifying various mines into pools so that the consumer and particularly the railroads would receive coal of uniform quality, thereby enabling them to obtain maximum capacity and efficiency in the combustion of this coal.

There is sufficient labor at the mines to clean the coal, and the railroads can haul enough good coal, but they cannot get the necessary heat units to the consumer if they must be burdened with 30,000,000 tons of unnecessary dirt. We have our choice of either building thousands of locomotives and a hundred thousand cars and adding to the terminal facilities of our railroads within the next few months or removing the excessive impurities from the coal. The latter can be done quickly and effectively.

It is also urged that all power plant engineers put forth every effort to obtain maximum efficiency from the combustion of coal. A few simple points in regard to improving the work of the fireman by observing the appearance of the flame from the boiler furnace, and

*Abstract of a lecture delivered at the Johns Hopkins University, Baltimore, Md., Feb. 27, 1918, as one of the J. E. Aldred lectures on Engineering Practice.

maintaining boilers and baffles in good condition will secure worth-while results.

Are we going to have enough coal to see us through the coming winter? The present indications are that unless some radical steps are taken immediately, the coal shortage will be much worse than it has been. To be satisfied with preferential shipments and permit many of our basic industries to close down, is to be a quitter; when, by concentrating our efforts on loading clean coal at the mines, and improving the efficiency of its combustion in furnaces we can have ample coal for all.

We have heard the argument that we should be patriotic and be content with inferior coal—old culm banks and other refuse fuel—the same as we are with wheat substitutes in our bread. But the food and fuel problems are different.

Economy in the use of these commodities applies equally to both, but the neck of the bottle of the food question is production, while the weakest link of the coal problem is transportation. It is a crime to burden our railroads with hauling dirt when it is within our power to ship clean coal and supply heat in concentrated form.

It is as important to be on time for a business appointment or a business schedule as it is to meet a train or be prompt at a wedding. It's all a matter of habit and calculation. The man who never calculates to meet his appointments will be equally lax about his bills. Form the habit of arranging your affairs so as to be prompt or even a little better than prompt.

Increase in the Output of French Coal During the War

In spite of the difficulties caused by the submarine war, and the occupation by German troops of several important centers, the Chamber of Commerce of Paris states that the production of French coal is continually progressing, as will be seen by the following table giving, in tons, the whole monthly output of the different coal fields.

	1916	1917
January	1,691,399	2,011,377
February	1,689,566	1,903,179
March	1,879,527	2,367,090
April	1,710,394	2,181,172
May	1,904,478	2,296,950
June	1,751,180	2,345,251
July	1,771,769	2,410,039
Output for first 7 months	12,398,313	15,515,058

The monthly output, in France, rose in a year from 1,771,769 to 2,410,039 tons, making an increase of 36 per cent.

Each of the coal-fields has taken its part in the common effort. The Pas-de-Calais mines, some of which are in the hands of the enemy, have increased their output by 50,000 tons a month since May last. The Loire coal fields yielded, from 1916 to 1917, about 400,000 tons more than the previous year. In the Gard coal fields the increase from one year to another exceeds 33 per cent. The secondary fields of the Tarn, Saône-et-Loire, are also helping with the increase in the general output, which enables us to conclude, judging by the figures for the last four months, that the total yield for 1917 will be over 28 million tons, whereas in 1910 it hardly realized 20 million tons.

Dig!

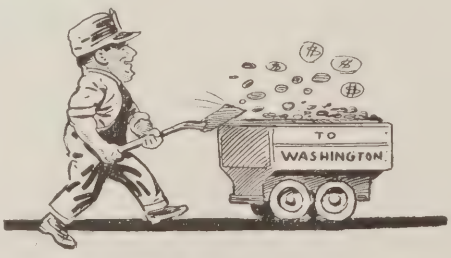
Written Expressly for "Coal Age"
By Berton Braley

Blast away your selfishness, sink a shaft of light
Deep into the chambers of your heart;
Make your vein of loyalty plain to all men's sight
Mine it for your country—do your part!
Drill into your pocketbook, shoot the dollars free
(Even if the seam is not so big);
Trade them to the Nation for the Bonds of Liberty
Dig—the way a miner ought to dig!



Shoot the Dollars Free

Make a proper job of it, pick your pockets clean,
Don't leave any dust, a single pinch;
Bring up every particle that your eye has seen,
Uncle Sam can use it, that's a cinch.
Undercut extravagance with the chain of thrift,
Shovel up the savings, neat and trig,
Ship them into Washington, give the war a lift,
Dig—the way a miner ought to dig!



Shovel Up the Savings.

Tilt your spendthrift tendencies over on the dump,
In the test of war they're only slate;
Strip your purse and bank account—collar down to sump—
Do it now! Don't lallygag and wait.
Miner, trapper, engineer, checker, clerk and boss,
Hoist up all you've gathered, small or big.
Buy the Bonds of Liberty, smile and come across,
Dig—the way a miner ought to dig!

The Byproduct Coke Oven, Its Coke and Its Byproducts—II

By WILLIAM HUTTON BLAUVELT
Consulting Engineer, Syracuse, N. Y.*

SYNOPSIS—*The use of coke for domestic purposes has become widespread. Coke is now made from coals that formerly were considered unsuitable when the beehive oven was still the recognized medium for coking. Observations are made by the author on the recovery of ammonia and benzol and the use of coke-oven gas. Tar is used as a fuel in metallurgical furnaces.*

In addition to the iron blast furnace, foundry cupolas afford a steady market for coke, and in recent years the domestic market has grown to importance. Before the war, sales of coke for domestic use amounted to over 1½ million tons per annum, although these sales really rather demonstrated the value of coke as a domestic fuel than showed what were the ultimate possibilities of the trade. Foundry coke is usually made on a somewhat slower coking time than furnace coke, as cupola practice calls for larger and tougher pieces.

The production of domestic coke is now a greatly different industry from what it was in earlier days, when most of the domestic coke was produced in gas works. At that time it was often regarded as something to be got rid of with the least trouble, rather than as a regular and important source of income to the works. Great care is now taken in the sizing and preparation of domestic coke and the complete removal of breeze and dirt. The following table shows approximately the usual sizes produced:

	Size of Square Through, In.	Opening on Screen Over, In.
Egg coke	3.5	1.5
Nut coke	1.5	1.0
Pea coke	1.0	0.5
Breeze	0.5	...

These screens are varied locally to meet market requirements. It would be desirable to have a standard for each domestic size throughout the country, but where the demand for one size is large relative to another, it is natural for the operator to modify his screen openings accordingly.

In American practice, where domestic coke competes mainly with anthracite, a hard structure is generally regarded as desirable. This is contrary to English practice, where familiarity with bituminous coal as a domestic fuel makes quick inflammability a desirable quality, so that coke containing a considerable amount of volatile matter is often sold successfully. Even the partially coked coal, known as "Coalite," which is produced by a low-temperature distillation, is preferred to the hard clean coke which is becoming familiar to the American consumer.

*By an error the author of this paper was said in the previous instalment, which appeared Apr. 6, to be the coke expert of the United States Fuel Administration, thus confusing him with Warren S. Blauvelt. This paper was presented at the New York meeting of the American Institute of Mining Engineers, Feb., 1918.

The practice of locating American ovens at the point of consumption of the coke has made it easy to bring together several coals of different qualities, and this has in many cases permitted the production of a better coke by admixture than could be made from either of the coals used alone. For example, a coal of excellent coking qualities but high in ash can be mixed with a low-ash coal of poorer cokability, or an excess or deficiency in the coking quality of the main coal supply can be corrected by mixture with another coal.

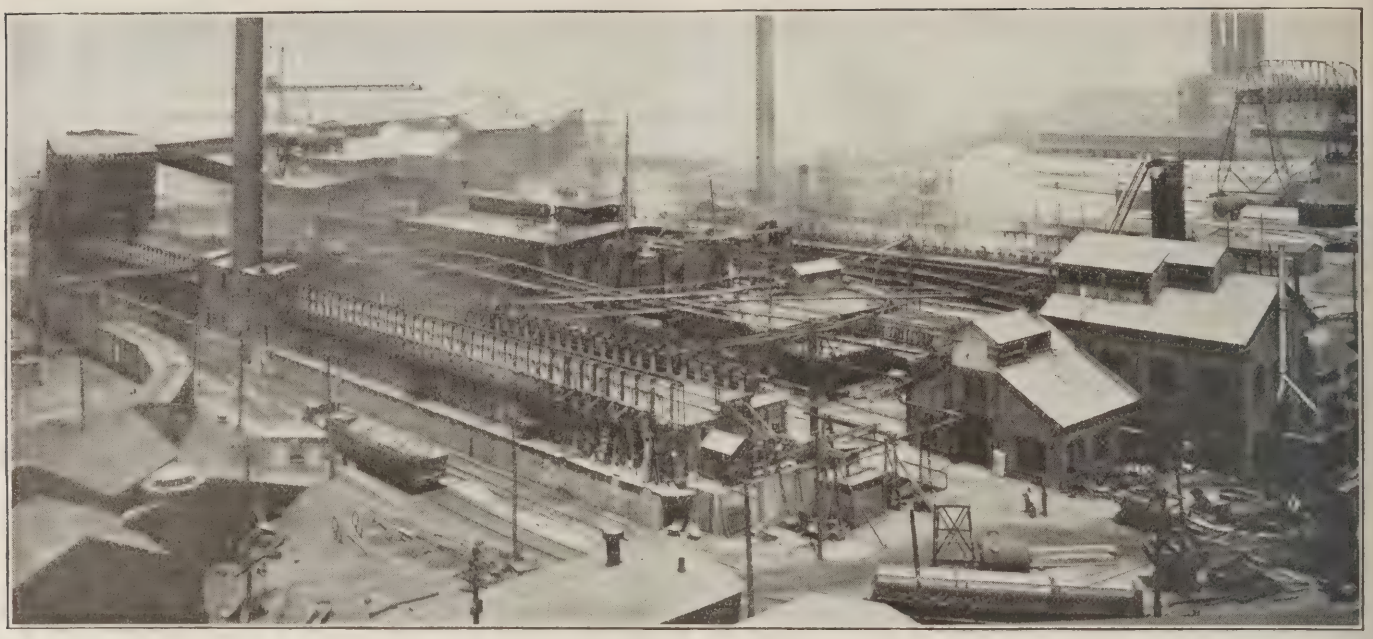
Except in cases where the source of coal supply is fixed, it seems desirable to arrange the plant for the preparation and mixing of as many as three kinds of coal. Means permitting the accurate proportioning of the different coals are, of course, essential in such a plant. The mixture of coals generally calls for their being ground quite finely, in order to bring the particles of the different qualities of coal closer together. The general practice is to grind so that from 70 to 80 per cent. or more will pass through a ⅛-in. screen. This fine grinding is also often advantageous where there are many pieces of slate of considerable size in the coal, since a large piece of slate in the coke is usually a center of cracks that tend to shatter the structure.

Use of Coals Formerly Considered Unsuitable

Various degrees of fineness in grinding are often adopted to improve the structure of the coke, but in some cases, especially where only one coal is used, a better structure is produced from considerably coarser coal. Fine grinding reduces the weight of the coal mass per cubic foot, and consequently the capacity of the oven. With ordinary coals the weight per cubic foot of charge is generally taken at from 40 to 43 cu.ft. per ton, depending somewhat on the coals, and largely on the degree of fineness.

The byproduct oven, with its control of heats, coking time, mixture of coals and fineness in grinding, has permitted the use of many coals for making metallurgical coke which would not have been suitable with the beehive oven. As the best coals are being progressively exhausted, this point becomes more important. Owing to the extraordinary conditions caused by the war, some coals hitherto considered entirely unsuitable for making metallurgical coke have been successfully used; for example, the unwashed coals of southern Illinois.

To use these hitherto unsuitable coals successfully it is necessary to make a careful study of the coking qualities of each one in order that any deficiencies it possesses may be supplied by the proper selection of the coals forming the mixture. Very satisfactory furnace results have been gotten when using important percentages of coals heretofore considered unsuitable, and these results are encouraging on account of the progressive disappearance of the best of the coking coals now available. The distillation of coking of coal in closed retorts,



LARGE SEMET-SOLVAY OVEN PLANT AT DETROIT, MICH.

now generally known as byproduct ovens, was first introduced for the purpose of saving the several valuable products contained in the volatile matter of the coal, which were all destroyed in the beehive process. The advantages in the production of coke outlined above were not then realized. In fact it was often thought that a sacrifice of coke quality must be accepted in order that the byproducts might be recovered. Fortunately it has developed that the best oven conditions for the production of coke are, in general, the best for the production of byproducts also.

The composition of the volatile matter in bituminous coal is very complex and the changes through which these compounds pass during the process of distillation are also complicated. It is not appropriate here to attempt to trace out these changes or to discuss the method of formation of the ammonia, benzol or other byproducts. It is well known that only about one-fifth of the nitrogen in the coal combines with hydrogen to form ammonia, and that the remainder is found in the coke and gas.

Attempts have been made to obtain higher yields of ammonia by blowing steam into the coke, somewhat after the manner followed with the Mond producer, which recovers from three to four times as much ammonia, but none of these processes have been developed commercially. Higher coking heats tend to break down the combinations to their ultimate elements.

For example, the gas produced from high-temperature coking will contain more hydrogen and less marsh gas, and a larger volume will be produced of lower calorific value. When coking at very low temperatures, as in the production of "Coalite," practically no benzols are produced and the hydrocarbons recovered are of the aliphatic series. At high coking temperatures the tendency is for the toluol, the more complex hydrocarbon, to break down into benzol, and at very high temperatures the yields of both are reduced. The temperature conditions to which any particular particle of hydrocarbon is submitted in its travel from the original piece of coal up to the hydraulic main are so complicated and so varied that a theoretical discussion of these reactions would be of little value to the coke manufacturer. The gases passing off from the oven are heavily laden with various hydrocarbon vapors and with water vapor and consequently carry a large amount of latent heat. So the cooling of the gas and the condensation of the vapors require efficient condensing apparatus and large amounts of water. The gas-works manager of early days used to deal gently with his gases in removing the tarry vapors and cooled them very slowly in order to prevent their taking up the benzols from the gas, with injury to its illuminating power, but in coke-oven practice this precaution is not considered necessary.

Much improvement has been effected in the efficiency of the condensing apparatus since the early days of the tubular cooler, in which the gas circulated around the tubes of an apparatus similar to a vertical boiler, while the cooling water flowed through the tubes on the countercurrent principle. I have in mind one single-stage condensing apparatus 10 ft. in diameter and 45 ft. in height of effective cooling surface in which 12,000,000 cu.ft. of gas per day is cooled on the average from 80 degrees to 20 degree C.; in which the cooling liquor enters the apparatus at a temperature 5 degrees below the exit temperature of the gas, and leaves it at not more than 10 degrees below the entering gas temperature. In such an apparatus very little condensate separates from the gas at a low temperature, and as a result the benzols remain in the gas and the separation of tarry matter from the ammonia liquor is sharp and easily effected.

A small quantity of the lightest tar vapors remain in the gas with the benzols. These may be removed by some efficient form of the old Pelouse and Anzin tar extractor, or where the gas is washed with water to remove the ammonia in the indirect process of ammonia recovery, these light tars are efficiently washed out. An efficient system of removing these light tars in a high-tension electric field has been developed by F. W. Steere, the plan adopted being similar to that used in the well-known Cottrell system, except that the special conditions permit the use of an alternating current of the necessary high voltage, since the problem is merely the agglomeration of the minute globules of tar to permit

their effective removal by tar extractors of the usual type. This process has been worked out commercially and is simple and effective.

One of the interesting developments in the operation of byproduct ovens in connection with steel plants is the growing use of tar as a fuel for metallurgical furnaces. I have in mind one plant producing over 20,000,000 gal. of tar per year, in which the entire amount has for years been utilized as fuel in open-hearth and heating furnaces, where its value as fuel is much higher than its value in the ordinary tar market. Generally speaking, the tar used in steel furnaces is handled in the same manner as ordinary petroleum fuel oil, having about the same viscosity, and its use presents no difficulties after the details of its application have been worked out. It has a higher fuel value per gallon than ordinary petroleum fuel oil.

It was formerly the universal practice to extract the ammonia from coke-oven gas by scrubbing with water, which has a large capacity for absorbing ammonia at moderate temperatures. This was the old gas-works method, and the processes as used in oven plants are the same except as modified to meet the conditions of large volumes and efficient recovery. The ammonia is recovered by these absorbing processes in the form of a crude liquor, usually containing from 0.5 to 1 per cent. of ammonia.

This liquor usually contains practically all of its ammonia in the free state, whereas the condensate from the coolers carries considerable amounts of fixed ammonia, sulphate, carbonate, chloride and sulphide. After removal of the tar by decantation the combined liquors are distilled with steam, after setting free the fixed ammonia by means of lime, the product being the crude ammonia liquor of commerce. In other plants the vapors from the still are passed through a sulphuric-acid bath and sulphate of ammonia is formed.

The so-called direct and semi-direct processes for the manufacture of ammonium sulphate have been very generally applied to oven plants in recent years. The direct process requires only the removal of the tar from the gas without any more cooling than is necessary for this purpose, after which the gas is passed through a bath of sulphuric acid and the sulphate recovered. The direct process has been applied to a considerable extent in Europe, wherever the percentage of chlorides in the coal is small, but where the amount of chlorides is relatively large it is necessary to remove them before the acid bath is reached.

This introduces the "semi-direct" process, in which the gas is cooled to remove the chlorides and then reheated and passed into the acid. The fixed ammonia condensed out in the cooling process is distilled and generally the ammonia from the stills is returned to the gas before it reaches the acid bath. The percentage of ammonia that has to be distilled in the "semi-direct" process depends upon the amount of fixed ammonia in the gas and varies from 15 to 40 per cent. of the total ammonia.

Sulphate of ammonia was formerly the only source from which pure ammonia in the form of *aqua ammonia* or anhydrous ammonia was produced. This process consists in the distillation of the sulphate of ammonia using lime to free the ammonia from the sulphuric acid,



BLOCK OF BYPRODUCT OVENS WITH THE PUSHER BY WHICH THEY ARE DISCHARGED



BETHLEHEM STEEL CO.'S SEMET-SOLVAY BYPRODUCT OVEN PLANT AT LEBANON, PENN., COMPRISING 90 UNITS

the small amount of hydrocarbons remaining in the sulphate being removed by charcoal filters or other similar means.

If anhydrous gas is to be produced the gases in the top of the still are dried by means of quicklime or other desiccating material, and the pure gas is then compressed and pumped into the steel cylinders so familiar to the trade. *Aqua ammonia* is produced by absorption of the pure gas in distilled water. This process is essentially a simple one, but the purification of the ammonia gas and the necessity for providing against the blocking of the apparatus by accumulations of calcium sulphate scale somewhat complicate the work.

In recent years by refinements in the distillation process it has been made possible to produce pure ammonia direct from the crude weak liquor and this product is quite equal in quality to that produced from ammonium sulphate as above described. These processes have the advantage of avoiding the waste of sulphuric acid inherent in the ammonium-sulphate process.

Effect of the War on the Ammonia Market

The war has introduced many unprecedented conditions to the ammonia producer. Before the war the price of sulphate of ammonia varied, in general, between 2½ and 3c. per pound. Official quotations are now running from 7.25 to 7.35c. While these high figures do not represent the average of actual transactions, any more than the $55 per ton frequently quoted represented prices at which the pig iron of the country was moving last summer, yet they illustrate the unsettled conditions of the market. Recently the Government has asked for very large amounts of ammonia for war purposes, and this call for ammonia has introduced much discussion as to the best methods for producing it.

In times of peace the great bulk of the ammonia goes into sulphate for fertilizer purposes, and most oven plants have been built for supplying this product. The Government's needs have caused many inquiries regarding the changing of these plants to produce other forms of ammonia, but this is usually practically out of the question on account of the great time and expense involved. Large parts of the recovery plants would have to be entirely rebuilt in order to change the product. Fortunately there are several practical methods for the conversion of ammonium sulphate into ammonium nitrate, and the synthetic ammonia plants will soon have a large production directly available for this purpose. The total ammonia from all oven plants now built or building is estimated at somewhat over 130,000 tons of NH_3 per annum.

In the earliest European byproduct ovens the gas distilled from the coal in the coking process was not sufficient in amount to heat the ovens properly and had to be supplemented with solid fuel. As the efficiency of the heating increased, the surplus, which was rather unreliable, was utilized for raising steam. As the supply became still larger it began to be introduced as one of the regular sources of fuel in metallurgical and manufacturing plants.

Oven Gas Used for Domestic Purposes

In America oven gas has long been used for domestic purposes, and now over forty important cities and towns are wholly or partly supplied with oven gas, and a number of years ago the daily sales for domestic purposes had reached 50,000,000 cu.ft. Europe has lagged far behind America in this application of oven gas.

Since the first introduction of byproduct ovens into America many experiments have been made in the use of oven gas for metallurgical furnaces, and several experiments have been recorded describing unsuccessful efforts to apply it to open-hearth steel furnaces, although it has long been used in heating other furnaces, soaking-pits, etc. During the last few years, however, the whole subject of using oven gas in openhearth furnaces has been successfully worked out, and it is now in regular operation in several important steel plants. Since the benzol is now generally extracted from oven gas, it is usual practice to burn a certain amount of tar with the gas to give it luminosity and higher radiating power.

From 12 to 16 gal. of tar, together with from 8000 to 8200 cu.ft. of gas, the quantity depending upon its calorific value, are required per ton of ingots produced, and it is found that furnaces fired in this way can be depended upon to produce from 10 to 15 per cent. more steel than when heated with producer gas. These figures are based on work at stationary furnaces. On the basis of these figures it may be stated that the surplus gas and the tar obtained in the production of a ton of coke will furnish the necessary fuel to produce a ton of ingots from an open-hearth furnace. This statement shows how important as a source of fuel the byproduct oven is to a blast furnace or steel plant. Furthermore the value of the byproducts, other than the gas, should never be overlooked as a source of revenue.

Early in the development of the byproduct oven in America the principle of the separation of the richer portion of the gas, which comes off during the early part of the coking period, from the leaner portion was developed in a practical way. The chart showing analyses of gas [appearing in a previous installment of this article] were made when the oven was coking at the rate of about 1.15 in. of width per hour. That chart shows plainly the progressive decrease in the percentages of methane and the progressive increase in hydrogen and carbon monoxide, as the coking proceeds.

The separation of the rich from the lean portion of the gas is probably not advantageous when the surplus is to be used for fuel purposes, as, of course, separation introduces some complications into the apparatus, but where a higher calorific value than the average is desired, the separation method is of great value.

Before the general use of the byproduct oven, benzol and its homologues, toluol and xylol, or solvent naphtha, were produced from the distillation of tar, which usually contains about 3 per cent. of these compounds. Now, the main source of supply is coke-oven gas, from which the benzols are scrubbed by bringing the gas into contact with a heavy oil of petroleum or tar. This process is usually carried on after the removal of the ammonia. The benzolized heavy oil is distilled to drive off the benzols and the heavy oil is cooled and returned to the heavy-oil scrubbers. The benzols are recovered in the form of a "light oil," containing usually about 60 per cent. of benzol, 12 per cent. of toluol, and 6 per cent. of solvent naphtha, although these percentages vary considerably with the details of the coking process and the light-oil recovery.

Before the war the light oil produced was used largely for enriching illuminating gas, and the refined products were employed in the manufacture of paints, varnishes and in other similar industries. At that time many plants were not equipped to recover light oil. Since the beginning of the war the enormous demand for the high explosives, picric acid and trinitrotoluol, familiarly known as T. N. T., has resulted in the equipment of practically all the plants in the country for the recovery of these products. It is estimated that the plants now built or building have a capacity of 101,500,000 gal. of light oil per year. For the production of these explosives the benzol and toluol have to be thoroughly refined by washing in sulphuric acid and by accurate fractionation, which processes require skillful supervision. The removal of the light oils from the gas practically destroys its luminosity, but the reduction in calorific value is relatively small, about 10 B.t.u. per cubic foot per gallon of light oil recovered per ton of coal.

When the demand for high explosives ceases after the war a large amount of the benzol now produced will probably be sold as motor benzol. This product is usually a mixture of benzol, toluol and solvent naphtha in the proportions in which it occurs in the light oil, and it is obtained by a comparatively simple process of refinement from the light oil. Motor benzol has a fuel value from 18 to 20 per cent. higher than gasoline, and may be used alone with the ordinary carburetor if a somewhat larger proportion of air is used, or it may be mixed with gasoline in any proportion. Pure benzol freezes at 5.18 degrees C., and toluol at—180 degrees C. No trouble is experienced from freezing, even in the coldest weather, when proper percentages of toluol or gasoline are mixed with the benzol.

The dye and color industry in the United States has greatly expanded during the war, and it will flourish after peace has returned if given proper Government protection. This will furnish a large market for benzol which is the raw material for aniline. Also it seems not improbable that trinitrotoluol will be widely utilized as an industrial explosive. It is claimed that it can be manufactured more cheaply than nitroglycerine, and as a commercial explosive it has many advantages over nitroglycerine compounds.

Trinitrotoluol is very stable and ignites only at high temperatures, and even then it does not explode. It does not freeze, as does nitroglycerine, and on many counts it has advantages on the side of safety and convenience. When used alone it produces large amounts of carbon monoxide; but this can be entirely prevented by combination with other bodies, such as ammonium nitrate for example, if these are added in proper proportion to produce complete combustion.

From the above brief discussion of the development of what has grown to be one of the important American industries, it will be seen that the byproduct oven has given this country something which is much more than merely a cheaper method of producing coke.



PLANT AT CLEVELAND, OHIO, WITH BLAST FURNACE ON LEFT AND SEMET-SOLVAY BYPRODUCT PLANT ON RIGHT

Should New Coal Mines Be Opened?*

By GEORGE S. RICE
Chief Mining Engineer, United States Bureau of Mines, Washington, D. C.

SYNOPSIS — *There has been no increase for several years in the number of men employed at coal mines, but a large increase in daily and yearly productivity, but this gain approaches a limit. The coal tonnage required per year is increasing, and the mines are continually being worked out. If no new mines were opened for two or three years the industry would cease to have the capacity for production necessary to supply the nation.*

DURING the coal famine of last winter an interesting and important question arose as to whether the opening and development of new mines should be discouraged, the purpose of those favoring the restriction being to save the large amount of labor involved in the construction and development of new mines. This action was urged because of the scarcity of labor and more especially because the existing mines appeared to have a greater capacity than the consumption of coal made necessary. The question was referred to me for my comments and led to a study of the statistics relating to the development and production of coal.

The essential results of this study are indicated on the accompanying chart, which illustrates, among other things, the increase in production and consumption, and the estimated maximum production capacity of bituminous coal based on data published in the "Mineral Resources" of the United States Geological Survey. It covers the period from 1900 to 1916 inclusive.

The following curves have been drawn from the data secured: 1. Average number of days that the mines worked. 2. Yearly total production of bituminous and sub-bituminous mines. 2*a*. Yearly production of machine-mined coal. 3. Average annual production, equivalent to consumption, for a period of 17 years. 4. Number of coal-mine employees for each year. 5. Estimated capacity of mines, on basis of 300 working days in the year. 6. Estimated drop in capacity if no new mines are opened.

Considering these curves and the data from which they were constructed, it will be noted that the average number of days the miners worked varied from 193 in 1908 to 234 in 1900, the average being 217. The reasons why there is such a large proportion of idle days to the total number of working days in the year are well known, namely: (*a*) Lack of business; (*b*) lack of cars. Taking the country as a whole, lack of business is the important factor and this might otherwise be viewed as being an excess of productive capacity.

The yearly production of the mines, which practically equals the consumption, has shown on the whole a steady increase. An average line has been struck which indicates that the average annual increase of production has been 18 million short tons.

*A written discussion on the article entitled "Review of the Coal Situation of the World" read by the same author, George S. Rice, at the New York Meeting of the American Institute of Mining Engineers, February, 1918, and recorded in Bulletin No. 133, Jan. 1918, pp. 131 to 141.

The number of employees steadily increased until 1910; then for the succeeding 6 years it stood practically still. Fortunately, however, there has been a steady increase in the individual daily output of the bituminous and sub-bituminous mine employees, from a low point of 2.94 tons per day in 1901 to 3.91 tons in 1915. There was an insignificant falling-off to 3.89 tons in 1916. This increase in the individual capacity is unquestionably due to the larger use of undercutting machines and labor-saving devices.

Curve 2a, which shows the production of machine-mined coal, indicates that there has been a steady increase in the proportion of coal so mined. It remains

STATISTICS OF COAL PRODUCTION IN THE UNITED STATES
(Tons of 2,000 Lb.)

Year	Days Worked	Men Employed	Tons per Man-Day	Total Production, Million Tons	Machine-mined Coal, Million Tons	Estimated Capacity,* Million Tons
1900	234	304,375	2.98	212	53	271
1901	225	340,235	2.94	226	58	301
1902	230	370,056	3.06	260	70	339
1903	225	415,777	3.02	283	78	378
1904	202	437,832	3.15	278	79	413
1905	211	460,629	3.24	315	103	449
1906	213	478,425	3.36	342	119	482
1907	234	513,258	3.29	394	139	505
1908	193	516,264	3.34	333	123	518
1909	(*a*)	(*a*)	(*a*)	380	142	(*a*)
1910	217	555,533	3.46	417	174	593
1911	211	549,775	3.50	405	178	595
1912	223	548,632	3.68	450	211	606
1913	232	571,882	3.61	478	242	618
1914	195	583,506	3.71	423	218	652
1915	203	557,456	3.91	443	243	655
1916	230	561,102	3.89	503	284	656

*If mines worked 300 days at same rate. (*a*) Statistics not collected for year 1909.

to be seen whether the mine employee will continue to increase his production per day as in the past. It has been alleged that the tremendous increase in the unit prices paid for labor has caused a drop in efficiency. If this is true, it may prevent any further increase in the daily output per employee and may militate against the increased use of labor-saving machinery. In this way the total production might conceivably be curtailed until additional miners and laborers became available.

In estimating the maximum capacity of the mines in which labor and mechanical equipment are factors, it is possible, assuming ample transportation facilities, to work the mines 300 days in the year. Some well-situated mines, especially mines owned and operated by railroads for their fuel supply, have done better than this, 310 days or over being reported. On the assumption that the rate of output for the days actually worked could be maintained for the remainder of the 300-day working year, curve 5 has been constructed. This indicates that the total possible productive capacity of the mines of the country rose steadily at the rapid rate of about 32 million tons annually, until 1910. From then to 1914 the rate of increase fell to 15 million tons, and for the years 1914, 1915, and 1916 it was practically stationary. In the chart I have assumed that it was practically stationary in 1917.

An attempt has been made to obtain figures for the number of mines which are worked out and abandoned

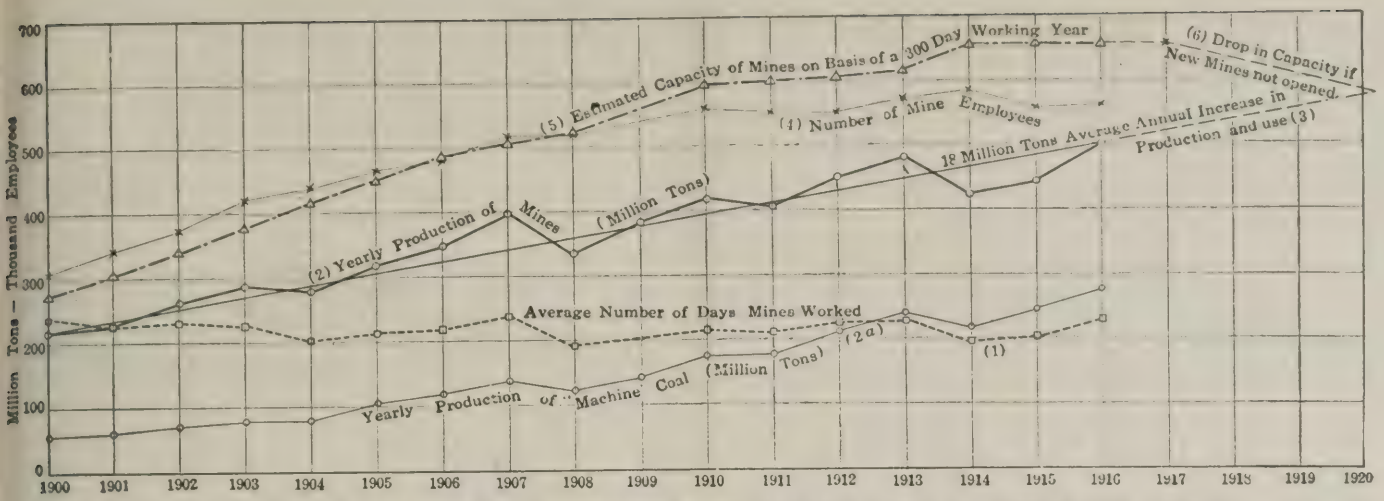


CHART SHOWING WHAT MIGHT BE EXPECTED TO HAPPEN WERE NO NEW MINES OPENED

each year but the statistics gathered have been considered unreliable. In order to arrive at certain approximate results, I have had to make an assumption of the average life-time of a bituminous coal mine. From my own experience, and that of other mining engineers whom I have consulted, the assumption has been made that the average life-time is 20 years. If this is true, then one-twentieth of the mines are worked out and abandoned each year.

The Geological Survey compiled the number of mines, and the outputs for mines of different sizes from 1909 to 1914 inclusive ("Mineral Resources"). This compilation shows that the output of mines producing over 10,000 tons annually was over 98 per cent. of the total production of the United States. The number of such mines and their output is as follows:

Year	Number of Mines with Outputs Over 10,000 Tons Annually	Total Output, Million Tons	Average Output per Mine
1909	3,721	371.6	100,000
1910	3,909	419.7	107,000
1911	3,810	397.9	104,000
1912	3,977	443.0	111,000
1913	4,027	471.3	117,000
1914	3,916	415.3	106,000

In 1913 the number of these large mines reached a maximum. If 5 per cent of the mines were worked out every year then we are justified in assuming that 201 mines, producing 23 million tons cease production annually.

Extending the line (curve 3) representing the average annual output to 1917, figure for the total output during that year is obtained, namely 520 million tons, 5 per cent. of which is 25 million tons. This amount must be made up by the opening and development of new mines. In addition to this enough new developments must be made to provide for the natural increase in consumption, which as has been shown has steadily increased for 20 years at an average rate (see curve 3) of 18 million tons per annum. In other words, to maintain the margin of capacity over consumption enough new mines to produce 43 million tons per year must be opened in 1918 and the number of new mines opened per year must increase during the years that follow. From the foregoing it is clear that at present 400 new mines are needed per year to take care of increased consumption of coal and the exhaustion of mines now in operation.

Assuming that the maximum capacity of all the mines on a 300-day basis was the same in 1917 as in 1916 (the capacity for 1914 to 1916 inclusive apparently being stationary), and assuming that no new mines were opened after Dec. 31, 1917, then the line 6, which indicates a drop in capacity of 25 million tons per annum, would intersect the extended average consumption line 3 in 3 years, or at the end of 1920. As a matter of fact, it is probable that the estimated maximum capacity indicated on the chart could never be quite reached, on account of transportation difficulties. Hence, if no new mines were opened after Dec. 31, 1917, it is probable that inside of 2 years, or by the end of 1919, the consumption would have to be curtailed by reason of the decrease in the capacity of the mines now shipping.

Fortunately, however, the situation was appreciated, and I understood that no legal restrictions have been placed on the opening of new mines.

Alabama Coal and Coke Production in 1917

In the following tabulation is shown the Alabama coal and coke production by counties for the year 1917 as compared with 1916. The data were furnished by C. H. Nesbit, chief mine inspector of the State of Alabama.

COAL PRODUCTION IN ALABAMA DURING 1917 AS COMPARED WITH 1916

County	1917	1916	Decrease	Increase
Jefferson	10,927,707	9,973,202		954,505
Bibb	1,507,669	1,507,141		528
Blount	381,777	329,693		52,084
Etowah	49,929	53,407	3,478	
Jackson	3,266	778		2,488
Marion	108,795	77,658		31,137
Shelby	791,405	609,369		182,036
St. Clair	842,750	771,992		70,758
Tuscaloosa	919,316	959,431	40,115	
Walker	4,839,289	3,926,752		912,537
Winston	40,938	25,202		15,736
Grand totals	20,412,841	18,234,625	43,593	2,221,809
Increase in 1917 over 1916				2,178,216

COKE PRODUCTION IN ALABAMA DURING 1917 AS COMPARED WITH 1916

County	1917	1916	Decrease	Increase
Jefferson	4,240,981	3,872,738		368,243
Etowah	127,542			127,542
Tuscaloosa	396,843	389,372		7,471
Walker	103,232	123,383	20,151	
Grand totals	4,868,598	4,385,493	20,151	503,256
Increase in 1917 over 1916				483,105



Zone Plan Working Well

The zone system is functioning better than had been anticipated. The comparatively few mines which have been affected adversely have been relieved promptly. There is abundant proof that the system is elastic and that modifications developed in practice can be made quickly. The plan is being well received by operators. The Fuel Administration and the railroad management are acting in entire harmony. The railroad administration, which really had an important part in the development of the plan, seems to be more than willing that it should be regarded as purely a Fuel Administration project, with the latter organization getting all the credit and incidentally all the blame for its proper operation.

One of the difficulties which have to be overcome is that many retailers and consumers, who have been cut off from their previous sources of supply, do not know how to proceed in establishing new connections. In order that such arrangements may be made in the most advantageous way, the district representatives have been instructed to pay particular attention to lending assistance of this character. All the license cases have been acted on and work began Apr. 16 with a clean slate.

Under an order modifying the zone system of bituminous coal originating on the Pennsylvania R. R., Monongahela R. R. and Huntington & Broad Top Mountain R. R., and their short line connections, in the States of Pennsylvania, West Virginia and Maryland, when routed via the Pennsylvania R. R. is embargoed from Baltimore and Washington markets.

To meet this situation, the United States Fuel Administration will arrange for the essential supply to the points designated from mines on the Baltimore & Ohio R. R., the Western Maryland R. R. and their connections, which lines afford a much more direct route to these points. As a consequence, a vast amount of time and mileage will be saved to the Pennsylvania lines, thus assuring an increased movement of coal to points in eastern Pennsylvania, New Jersey and New England.

Consumers of the classifications named in Preference List No. 1, of the Priority Board, will receive coal in preference to any other individual or class of consumers.

Under the modified order, which will become effective on Apr. 20, producers in the sections named will be prohibited from selling, shipping or distributing coal to dealers and consumers at Washington and Baltimore and at all stations on the Baltimore & Sparrow Point R. R., when routed via the Pennsylvania Railroad.

The order forbids the shipment of bituminous coal over the railroads named for railroad delivery or transshipments to vessels in Baltimore, at President St., Highlandtown, Jackson's Wharf, Calvert, Bolton, Frederick Road and Gwynns Run Station, and points of delivery between any two of such stations; all stations and points of delivery on the Baltimore division of the Pennsylvania R. R. from Loudon Park, Md., to Catonsville, Md., inclusive, and Arbutus, Md., to Washington, D. C., and Rosslyn, Va., including Popes Creek branch running from Bowie, Md., to Pope's Creek, Md., inclusive.

Consumers located on the Pennsylvania R. R. and Baltimore & Sparrow's Point R. R. will continue to receive their coal at their regular points of delivery, the coal moving via the Baltimore & Ohio and Western Maryland being delivered to the Pennsylvania R. R. at junctions near destinations.

Railroad Fuel Situation

While a deadlock exists in the railroad fuel controversy, the Fuel Administration gained a great advantage last week when the President, himself, ruled out assigned cars. From the developments of the week, it is apparent that the Fuel Administration is determined to stand by its contention that coal must be sold to all consumers at the same price. The price-fixing policy has been conducted on that basis. The purchasing agents of the railroads, however, are not willing to relinquish the advantage that they hold in being large consumers and are insisting that they get coal at the lowest price they can squeeze from the operator.

Finding that the Fuel Administration is an obstacle of consequence to the carrying out of this plan, the railroads have stated their willingness to purchase coal at cost plus 10c. a ton. There was a rumor current in Washington last week that this proposal came from the President after the matter had been laid before him. The rumor proved to be unfounded, however. It is generally understood that it was the President himself who insisted that the prices fixed on various commodities are to be the same to the Government and to the public.

One effect of the activities of the Fuel Administration in this matter has been to bring to its support many of the operators who have been antagonistic to it. In fact, the confidence of operators generally in the Fuel Administration has increased.

The action of the railroads in withholding purchases is having an untoward effect on the general fuel situation. Every effort has been strained to remove doubt

and uncertainty during the new coal year. It now has come to be generally known that the price regulations are not going to be revised downward and, as a result, one of the confusing uncertainties of the last coal year has been removed. It is a cause of deep regret at the Fuel Administration that the action of the railroads should have injected a new uncertainty into the fuel situation.

Weekly Production Statistics

A drop of 14 per cent. in the bituminous coal production took place during the week ended Apr. 6. Telegraphic advices indicate that most of the loss was recovered during the week ended Apr. 13, but the production still will be under that of the week ended Mar. 30. The observance of Apr. 1, the anniversary of the enactment of the eight-hour law, is responsible for a portion of the poor showing.

Anthracite forwardings, during the week ended Apr. 6, totaled 32,232 cars, or 11,410 cars less than were forwarded during the week ended Mar. 30.

Beehive coke production declined 4 per cent. during the week ended Apr. 6, as compared with that of the week preceding. The total production for the week was 624,000 tons. Byproduct coke production totaled 466,324 tons.

Some Industries To Receive Preference in Coal and Coke Supplies

By instituting a priority policy in the supply and distribution of coal and coke, the War Industries Board has taken a step which will be far-reaching in its results. The priorities division of the War Industries Board has issued preference list No. 1. Speaking of this list, the Board says:

While the list speaks for itself, it is proper to say that the Board has not undertaken to classify any industry as nonessential or at this time to limit the quantity of fuel which any particular industry or plant shall receive. The Board has, however, listed certain industries whose operation is of exceptional importance measured by the extent of their direct or indirect contribution either toward winning the war or toward promoting the national welfare, and these industries will be accorded preferential treatment by the Fuel Administration in the distribution of coal and coke and also in the transportation of such coal and coke by the railroads.

This same plan will be followed in according preferential treatment to war industries and plants in the transportation of raw materials and supplies required by them in their manufacturing operations, so that they may not be delayed or hampered in complying with priority orders issued against them governing their products.

The following industries and plants are to be given preference in the matter of coal and coke supplies:

Plants engaged exclusively in manufacturing aircraft or supplies and equipment therefor; plants engaged in the manufacture of ammunition for the United States Government and the Allies; Army and Navy cantonments and camps; plants engaged in manufacturing small arms for the United States Government and for the Allies; plants engaged exclusively in manufacturing chemicals; coke plants; domestic consumers; plants manufacturing electrical equipment; plants producing electrodes; plants manufacturing explosives; manufacturers exclusively of agricultural implements and farm operating equipment; plants producing feed; plants producing ferro-alloys; manufacturers of fertilizers; plants producing firebrick exclusively; plants manufacturing, milling, preparing, refining, preserving and wholesaling food for human consumption; manufacturers of tin and glass containers and manufacturers exclusively of other food containers; gas-producing plants; plants manufacturing exclusively gas-producing machinery; plants manufacturing large guns; plants manufacturing exclusively hemp, jute and cotton bags; manufacturers exclusively of insecticides and fungicides; blast furnaces and foundries; laundries; plants manufacturing machine tools; mines; plants engaged exclusively in manufacturing mining tools and equipment; plants printing and publishing exclusively newspapers and periodicals; refineries of both mineral and vegetable oils; plants manufacturing exclusively oil well equipment; public institutions and buildings; public utilities; railways; plants manufacturing locomotives, freight cars and rails, and other plants engaged exclusively in manufacture of railway supplies; refrigeration for food and exclusive ice producing plants; producers or wholesalers of seeds (except flower seeds); ships (bunker coal), not including pleasure craft; plants engaged exclusively in building ships (not including pleasure craft) or in manufacturing exclusively supplies and equipment therefor; manufacturers of soap; steel plants and rolling mills; tanning plants save for patent leather; plants manufacturing tanning extracts; manufacturers of tin plate; plants producing exclusively binder twine and rope and manufacturers of wire rope and rope wire.

Regulations Covering Bunker Coal

To insure greater speed and a greater steaming radius, bunker coal is to be limited to the smokeless variety. Regulations governing bunker coal are as follows:

At Atlantic ports, north of Cape Hatteras, at which all tidewater coal is pooled and delivered through the Tidewater Coal Exchange, permissible bunker coal is specified as follows:

At Hampton Roads—Coal originating in the Pocahontas and New River fields which have been or may be classified by the Tidewater Coal Exchange for consignment to Pool No. 1 or Pool No. 2 at Lambert's Point, Sewall's Point or Newport News.

At Philadelphia, New York and Baltimore—(a) Coal originating in mines on the acceptable list of the United States Navy, which has been or may be classified by the Tidewater Coal Exchange for consignment to Pool No. 1.

b. Coal originating at mines on the New York Central R.R., on the Pennsylvania R.R. or any of their connecting lines, which has been or may be classified by the Tidewater Coal Exchange for consignment to Pools Nos. 9 and 10.

c. Coal originating at mines on the Buffalo, Rochester & Pittsburg R.R. which has been or may be classified by the Tidewater Coal Exchange for consignment to Pool No. 14.

d. Coal originating at mines on the Baltimore & Ohio R.R., Western Maryland R.R. or any of their connecting lines, which has been or may be classified for consignment to Pool No. 22.

At ports north of New York which receive their supply of coal from New York, Baltimore, Philadelphia or Hampton Roads, coal for steamship use is to be supplied from the permissible list as herein specified.

F. J. Herman has severed his connection with the estate of W. J. Rainey in order that he may give his full time to his work as chief assistant to W. S. Blauvelt, coke director of the Fuel Administration.

A deficiency in the supply of blacksmith coal has been reported to the Fuel Administration. Since producers are not allowed to make an extra charge for coal of this character, it apparently is not being loaded in sufficient volume to meet the demands.

It's our war and we must win it. Do your bit by buying LIBERTY BONDS.

THE LABOR SITUATION

General Labor Review

This week the main event to record is the telegraphic protest of the United Mine Workers on Apr. 13 against any further reconsideration of prices by the United States Fuel Administration on the ground that when prices are raised the mine workers become restless and when they are lowered many mine workers working at plants of inferior efficiency are laid off. Assuming that the first prices established by the Fuel Administration, in the hurry of the first days of its inception, were perfectly just, there is no logic in the establishment of new prices.

But the Fuel Administration admits that it did not have until now any costs of production from which it could adequately arrange a price schedule. Guesswork is now giving place to knowledge. The old prices were recognized as unscientific, but that mattered little when no coal was obtainable at the prices set. So long as all coal was sold on earlier contracts the prices of the government were a future menace or a pleasing prospect, as the case might be, but nothing more.

Union Complains of the Many Idle Days

This telegram of the United Mine Workers declared that mines in Iowa, Oklahoma, Missouri, Kansas, Colorado, Wyoming, Montana and West Virginia are working less than half time. It did not, however, explain just why this fact is more distressing in those states than in some others where the working time is as short, but it may be assumed that the union singles out these regions because it believes that the reason for this slow run is, in part, due to the prices which have been established for them. The telegram added that many large mines are actually shut down. It then goes on to say that the men are leaving the mines and "if this exodus of miners to other lines of employment is permitted to continue, even though full-car supply and the most satisfactory distributing facilities are provided later these provisions will fail to relieve the situation."

The communication then asserts that the miners are ready to dig all the coal the nation can possibly use and declares that they are "able and eager to break all records in coal production and distribution (sic?) if given the necessary facilities and coöperation." It goes on to say:

Declares Union Has Bought $2,000,000 of Bonds

"The best evidence of this fact is the record of production of 1917 under the most trying circumstances. The international, district and local organizations have subscribed for approximately $2,000,000 of the three Liberty Bond issues. We want to help with all our force in the present crisis—not hinder. But the outlook for an adequate coal supply is of such grave concern that we must, for the protection of the mine workers and as a public duty, call your attention to what we are constrained to believe is a menace to the hope of providing sufficient coal.

"Almost every day coal prices are changed in the whole or part of some state. Distributing agencies are annulled as they exist, or restricted, or so completely changed as to upset every stable calculation. Whenever the prices are lowered in any state the operators affected immediately ask for a hearing. This invariably results in decreased production until the operators' appeals are definitely determined. When prices are raised the coal miner naturally feels that he should receive a proportionate amount of such increase. This condition has created an unrest that nothing short of a stable, permanent price arrangement can satisfy.

"The coal miners feel that they have not had that degree of consideration in adjusting the affairs of the industry and the promulgation of policies that rightfully is theirs. Therefore we feel it our duty to ask of the Fuel Administration that a greater degree of consultation be given the half million of our members through the organization's representatives in order to promote the most efficient and effective coöperation."

In the anthracite region, especially around the Panther Creek Valley the miners are using coercion to induce every mine worker to buy Liberty Bonds. On Apr. 11 the mine workers at No. 10 mine of the Lehigh Coal and Navigation Co. refused to go to work till a German miner of their number had been induced to sign for the purchase of a bond. At No. 8 colliery a Hungarian, with a decidedly pro-German bias, who refused to buy a bond was compelled to do so and also forced to kiss the flag. The mine workers do not want any "Liberty Loan slackers," and are determined that at every colliery every employee shall buy a bond. At some collieries this aim has been fulfilled.

On Apr. 9 a small strike occurred at Young's Landing, near Pottsville, Penn., because the loaders at the Taylor culm-pile were required to do increased work without additional pay. The firm is loading culm for the New York City markets for admixture with bituminous coal. The men were receiving $2.40 a day for loading six 2-horse wagons with culm, the culm being hauled a short distance to the nearby freight station.

Malcontents Not Numerous in Hard-Coal Region

On Apr. 12 the Tridistrict Board of the United Mine Workers of America in the anthracite region met and issued an appeal to the mine workers to buy Liberty Bonds. The board took no action on the dissatisfaction in the Shenandoah field in relation to the increase in dues decreed by the international convention. The promise of an independent union does not seem likely to materialize. In the future the legal department of the United Mine Workers of America, of which Rogers Devers, of Wilkes-Barre, is head, will have the assistance of qualified physicians and surgeons in presenting testimony to the compensation board and referees.

There has recently been quite a general unionization of the Georges Creek field where William Diamond, former international statistician of the union is president. The men went on strike Monday, Apr. 16, for higher wages and recognition of the union. William Diamond was called to Washington, D. C., by H. L. Kerwin, the head of the bureau of conciliation and mediation of the Department of Labor.

Georges Creek Strike Ends in a Few Hours

The Government promised to adjust the differences and the Fuel Administration issued a notice that it would not treat with the mine workers while they remained on strike. As a result 2000 men returned to work early on Wednesday, Apr. 17, and 4000 more men during the course of the day. The strike involved not only the Georges Creek, but the Upper Potomac, region also. Among the more important firms affected were the Consolidation Coal Co., the Black-Sheridan-Wilson Coal Co. and the Davis Coal and Coke Co.

West Virginia has been quiet except for a strike at the Minden mine of the New River & Pocahontas Consolidated Coal Co., a Berwind-White affiliation in the New River region. The men at the mine struck because they objected to the assistant mine foreman, but the trouble has been finally settled through the State Department of Mines.

The Illinois mine workers are still endeavoring to Americanize those whom they suspect of pro-Germanism. Probably nothing so severe as lynching is purposed, but violence, like other vicious practices, feeds on its own fires. Prager's death, let us hope, and the action of the grand jury at Edwardsville, in presenting a true bill against five of Prager's alleged murders, leading among whom is Joseph Riegel, will subdue a spirit which should never have been allowed to arise. It is expected that the grand jury will indict some 40 others. It is generally felt that Prager was a better man than his tormentors.

The Marvel mines, of the Roden Coal Co., in Alabama recently had a partial suspension of work, but fortunately a temporary settlement has been reached and the mines are now operating with full force. H. G. Selheimer will act as umpire to consider and determine as to what should be done relative to the demands of the miners.

To turn to eastern Canada, a labor convention recently met in Sydney with delegations from all the various labor unions in the province of Nova Scotia. It instructed the executives of those unions to draft a bill to be presented to the House of Assembly for enactment. This bill will force corporations to recognize the labor unions of the men's choice.

In Alberta a strike occurred Apr. 9 among the men employed at the Federal Coal Mines near Lethbridge. The men struck to prevent the discharge of an Austrian agitator. The company refused to reinstate this man. The mine workers declare, and the manager denies, that the contract is violated by the discharge of this employee.

In Nanaimo, Vancouver Island, British Columbia, the Western Fuel Co. recently announced an advance of 50c. a day which took effect Apr. 16. The increase applied to all the 1500 employees underground and to the surface workers. The payroll is thereby increased some $20,000 monthly.

Salute the Flag or Quit the Work

No miner can enter the St. Louis & O'Fallon Coal Co.'s No. 1 mine in St. Clair County, Ill., without saluting the United States flag. Recently Thomas Simpson, a mine examiner, found a bottle in the mine which contained what seemed to be a dangerous explosive. When the miners heard of it they called a special meeting and adopted resolutions declaring that their loyalty was brought into question, and that it was their duty to demonstrate that they were loyal. To this end a committee was appointed to place a flag at the pit entrance and post a guard there to see that every man entering the mine saluted it. The resolution also called upon all employees of the mine, including in this unnaturalized men, to buy at least one Liberty Bond.

Belleville miners, in the same county, have voted that they will go no further with plans for the erection of a Labor Temple, on the ground that patriotism requires them to put into Liberty Bonds the money which would be needed for the erection of the temple. Employees of the Superior Coal Co., near Belleville, subscribed for almost $10,000 worth of bonds. One miner bought $1200 worth and several others took $500 worth each.

Even the Spirit Is Unwilling

The "jumpy" condition of the Illinois miners, due to a number of recent mine explosions, believed to have been caused by disloyalists, was shown when 450 men employed in three mines near O'Fallon, Ill., refused to work on Saturday, Apr. 13, on account of a "spirit message" received by one of the men, Elmer Birch, who is employed at the Taylor mine. This message came in the form of a telegram Saturday morning: "This is warning. Don't go to work Saturday thirteenth. There is an accident for you if you go. Don't think this is fun. Grandpa said there would be an explosion, and listen to this. Letter will follow. Mamma." It was sent from Kansas City, where Birch's mother lives. She is a spiritualist and the "grandpa" referred to is her deceased husband. When the 200 miners employed at the Taylor mine heard of the message they refused to work. Two hundred employed at the Yoch mine and 50 at the Angell mine heard about it and also refused to go down. Federal officials were asked to make an investigation.

An explosion in the Shoal Creek mine at Panama, Ill., which is situated in the Springfield district, occurred on Friday, Apr. 12, and caused such damage that the mine was temporarily closed. It happened before the men had entered the mine, and is believed to have been of I. W. W. origin. As already stated about two weeks ago a number of sticks of dynamite were found in the shaft, with a burned-out fuse attached. Since that time some of the miners have refused to return to work.

Battles Between Loyal and Disloyal

The recent lynching of Prager came as the culmination of a period of disorder and violence in Illinois. Most of this disorder was not of an extremely harmful character, but the authorities were always afraid that it might result in an outbreak, of which the state would be heartily ashamed.

It is probable that some of the "direct action" of the Industrial Workers of the World was caused as much by a desire for retaliation as from undiluted pro-Germanism.



IN BUYING A LIBERTY LOAN YOU ARE STARTING A BANK ACCOUNT. AND IN STARTING A BANK ACCOUNT YOU ARE STARTING TO GET SOMEWHERE. CLIMB ABOARD.

The men who were compelled to kiss the flag one day in abject simulation of Americanism may well have been the men who a few days following were seeking by violence "to break even" with those who tried to make them simulate a virtue that they did not possess.

A review of the events leading up to the lynching of Prager, which has brought apprehension both to loyal and disloyal, is for these reasons quite timely.

The trouble started at Staunton, Ill. The disloyalists were not satisfied with performing disloyal acts, but they tried to get the loyal men to pay for their disloyalty, and it was just there that all their plans went awry and turned a lot of quiet, law-abiding citizens into a mob with which they could not hope to cope.

Severine Oberdan violated the law and was put in jail and let out on bond. His friends took advantage of the fact that union meetings were not any too generally attended, and they voted away $100 of the local's money to defend Oberdan.

The loyal men, when they heard of the misuse made of the local's money, seized and tarred and feathered Oberdan and Metzen, his attorney. They then invaded the homes of the disloyal and made them kiss the flag and take an oath of allegiance.

Starting in this way, the disorder spread to Mt. Olive, Hillsboro, Nokomis and Gillespie. At Hillsboro a fatality occurred as a result of the general disorder, a band of "loyalists," early on the morning of Feb. 18, storming the home of Clifford Donaldson at that town, in search of a Socialist editor. Shots were fired and Donaldson, a naval recruit, received a wound from which he died the next day. Ernest Fath, a prominent young man, and Chief of Police Emory were wounded. The editor was not found. His effects were taken from his room in another building and burned. At Nokomis and Gillespie, suspected disloyalists were compelled to kiss the flag.

Loyalists Took Charge of Union Finances

As the Industrial Workers of the World were completely cowed, no attempt was made by them at the later meetings of the Staunton local to have the $100 paid which had been subscribed for the defense of Oberdan. The meeting was turned into a patriotic demonstration. All members of the union now in the service who had been dropped for nonpayment of dues were reinstated and the local agreed to keep up the necessary payments. The union appropriated $1000 for Thrift Stamps and assessed the members 50c. a month for the Red Cross.

On Feb. 18, 500 employees of the Citizens' Mining Co., at Springfield, seized Henry Martini, their superintendent, and his two sons, and escorted them from the mine to the courthouse and made them kiss the flag, because it was said Martini refused work to a man who had been discharged from the navy for physical disability, and told him: "If you wan't a job, you'll have to go to the navy for it." Martini strongly denied that he was disloyal and explained that the man was not employed because there was no vacancy in the blacksmith shop, where he had been employed before. He said he offered the man other work in the mine. The men did not work Feb. 25 and about one-third remained away from the mine Feb. 26, laying themselves subject to the automatic penalty.

Later the mine workers at Bingham and Mayville took up the cudgels against those they regarded as disloyal. At Bingham there was a free-for-all fight and six men were forced to kneel and kiss the flag. At Maryville, after a contingent of drafted miners had departed for the training camp, a crowd marched through the streets carrying a large flag and several persons whose loyalty was considered doubtful were compelled to kiss it.

But Miners Must Be Discreet as Well as Loyal

Both Governor Lowden and President Walker of the State Federation of Labor issued statements condemning the outbreaks. The Governor's statement was issued after he had been appealed to by Charles Enos, a Hillsboro miner, who said that he was loyal but had been driven away from Hillsboro. The Governor declared that mob rule would not be tolerated in any part of the state, even though it was in the name of loyalty. "If any man in any community is guilty of treason or sedition or any other crime," he said, "there are proper tribunals open for his punishment. They who take the law into their own hands at such a time are helping not our own cause but that of the enemy. Mob rule is mob rule, whatever disguise it wears."

President Walker, in admonishing union men to do nothing unlawful, said: "I again want to point out the danger of the precedents that are being established by mobs taking the law into their own hands, no matter what the motives may be, and to urge upon you in every community in the state to use your influence to keep these things from being done, for just as sure as day follows night, if these things are done by any of our members or any friends of the labor movement, the enemies of the humble toiler will use them now and in the future wherever possible to destroy our movement under the same pretext."

A survey made by P. M. Greenlaw, Secretary of the Fifth and Ninth Districts Coal Bureau, reveals that 23.9 per cent. of the miners in the districts are subject to the draft, on the basis of returns from 34 mines. Some weeks ago Greenlaw sent questionnaires to the mining companies. The 34 replies received show that in that number of mines 7804 men are employed and 1867 are subject. Of this number, 996, or 12.7 per cent., are in Class 1.

Successful Coöperation with Labor

District No. 25, the Missouri district, the home in the past of continual labor trouble, where both operators and laborers looked at one another with suspicion and dislike, has been recently the seat of a remarkable experiment in coöperation which has proved most successful. The credit is due largely to Wallace Crossley, the state fuel administrator, who felt convinced that it was his duty to speed both mine operators and mine workers in their work of producing coal.

On Dec. 14, he brought the representatives of the United Mine Workers of America and those of the Southwestern Interstate Coal Operators Association together. The aim of the mine workers in meeting with the operators was not to get more wages or more satisfactory working conditions, but to coöperate with the operators in the production of more coal and to seek a way of settling troubles with a minimum of disturbance to industry. They met with a will to peace and progress rather than with a will to disorder and disagreement.

War efficiency committees were provided at each mine. The Coal War Board makes general suggestions as to the manner in which the mine shall be conducted in the interest of safety and of efficiency of operation. It hears complaints and receives suggestions from the miners and operators. The war efficiency committees at each mine are composed of the mine superintendent and foreman and a committee of mine workers, and until recently they met weekly or more often to consider safety and production needs. The present slackness of operation, however, has made these meetings unnecessary.

As long as the mines were working, the mine workers who took part in such war efficiency committee meetings were paid for their time, the expenses being shared between the mine workers and the operators.

There have been many instances where the war efficiency committees successfully solved difficulties that might have resulted in serious conflicts, and it is certain that strikes have been prevented. As a result Missouri has been freer from strikes than at any prior period, the mine workers have been patriotic and loyal, and production has been maintained at a high level.

Much of the credit must be given to D. A. Frampton, the president of the district, who has worked zealously in promoting the aims of the Coal War Board, and it must not be assumed that activity on his part was unnecessary. There has been possibly as much scrapping as ever, but there have been few strikes.

Coming Meetings

Canadian Retail Coal Association will hold its 14th annual meeting Apr. 25 and 26, at the King Edward Hotel, Tronoto, Ontario, Canada. Secretary, B. A. Caspell, Brantford, Canada.

American Association of Engineers will hold its fourth annual convention May 14 in Chicago, Ill. Secretary, A. H. Krom, 29 South La Salle St., Chicago, Ill.

National Coal Association will hold a meeting May 8 at the Bellevue-Stratford, Philadelphia, Penn. Secretary, J. D. A. Morrow, 707 Southern Building, Washington, D. C.

Illinois Mining Institute will hold its next meeting May 23, 24 and 25, at Peoria, Ill. Secretary, Martin Bolt, Springfield, Ill.

What Doth It Profit a Man?

Germany is working, by every scheme that ingenuity can devise and money can put into operation, to make American workingmen traitors to their country in its hour of need.

What Doth It Profit a Man

if he sends his sons and brothers to the battlefields, and after he gets them there he betrays them to the enemy by stopping the industrial home work without which they can neither win nor escape?

The courses of nations—the lives of millions—are changed by very small events. Had the Monitor not been ready for the Merrimac exactly when she was, the Union fleet would have been rendered useless and the Civil War might have had a different ending. Had someone then succeeded in making serious trouble in a mine, a foundry, or a shop—had someone then succeeded in delaying transportation while the Monitor was under construction, what would have become of the whole Union fleet of wooden ships which was blockading the Southern ports?

Germany wants us to be unready or confused when a similar crisis comes.

Our whole nation is preparing for the turning point in this war which is to determine whether every man shall have a chance to work out his destiny, or whether he and his country are to become subject to the dictation of a Prussian group.

If we are not fully ready when the test comes it will be easier for German armies and German ships, German submarines and German aircraft, to kill the men that go out from your community to protect you and your rights.

Whoever from any motive delays work bearing directly or indirectly on the war will be an accessory to the murder of his fellow Americans.

Every strike in the United States, while this war is in progress, is a blow in favor of Germany.

What Doth It Profit a Man

—to increase his wages or decrease his working hours if by so doing he contributes to the victory of a nation that makes slaves of white men and scourges them as they work? The condition of the blacks in America before the Civil War was far better than the condition of the whites of Belgium who today are carried off like cattle, are overworked, underfed, beaten and, sick or well, must labor incessantly, often under the fire of their own guns.

What Doth It Profit a Man

—to aid a monarch who in this manner has shamelessly re-established the slavery of white men? The workingman in America who obstructs the cutting of wood, the mining of fuel, the weaving of cloth, the turning of wheels in factories or on rails while this war is in progress—he is helping the slave masters, the destroyers of civilization, the murderers of women and children.

What Doth It Profit a Man

—who has lived in a land of incomparable liberties, of advantages unparalleled in all the history of the world, to contribute by any act, however small, to the success of an autocracy to whom a common man is but a clod of earth? The workingman who stands faithfully by his duties day by day, allowing no person and no thought to get between him and an honest performance of his work, is rendering the highest kind of patriotic service to his nation and to his family.

What Doth It Profit a Man

—to sell his manhood, his self-respect, perhaps his soul, for a little selfish gain in such an hour? When life's services are measured up at the end, those who have faithfully labored through the war shall be entitled to their credit as well as those who have led the charges in battle.

What Doth It Profit a Man

—who wants to improve the condition of laboring men if he gains a little but in so doing prolongs the slavery of Belgian workingmen, who now cannot gain their freedom but by death, or through the victory of the Allies?

Stand by your work for your own honor and safety, for the safety and success of your fellow countrymen who go forth to fight, as well as for the sake of workingmen who are now in actual slavery beneath German slave drivers

CONFERENCE COMMITTEE ON NATIONAL PREPAREDNESS
Metropolitan Life Building, One Madison Avenue, New York City

For more copies write to the address above.

EDITORIALS

What Is Needed from the Wage Earner

THE Third Liberty Loan has one powerful competitor, the Collector of Internal Revenue. Probably the loan would have been much bigger if William G. McAdoo had not realized that those who are paying phenomenal taxes, roughly four and a half billions of dollars, cannot buy Liberty Bonds at the same time, for the loan and the taxes together will reach the phenomenal sum of seven and a half billion dollars.

The bulk of the Third Liberty Loan must be carried by the untaxed and lightly taxed people of the country. Those who pay only a few per cent. on their yearly incomes may be classed with the untaxed so lightly will their burdens rest upon them. To all such the appeal is particularly pressing. Such people must not be content to buy bonds equal to 7½ per cent. of their yearly income, which would be their share if there were no taxation, and this for three reasons: First, because the larger incomes will be considerably hampered by large taxes; second, because more than three billion dollars is desired, and third, because in any voluntary collection of dues, loans or contributions, some supererogation is necessary to make up for the under subscriptions of the less liberally minded. It is for this reason that every wage earner who does not have special obligations at the present moment should feel it incumbent on him to buy bonds equivalent to 10 or 15 per cent. of his yearly income. This he should pay before the next loan is floated so that he will be able to do his duty again when the opportunity is afforded.

General Leonard Wood recently said that twelve million men were battling on the front in France. If the numbers are equally divided between Germans and Allies each will have six million men. The killing of a million Germans, which would be a tremendous victory for the Allies, almost more than they could hope for, and the arrival of a million or two Americans on the field will not turn the tide of battle.

If, as stated some time ago, and as seems probable from recent developments in the field, the Allies are much less numerous than the enemy, then the recent slaughter and the arrival of American troops will do little more than restore the balance. Looking at it from this point of view the case would be desperate were not the defense so much stronger than the offense. But this fact puts the final victory further off. We must look for a long war and for sacrifices far greater than we have yet faced.

In the past year we have spent on *our own* conduct of the war about four billions of dollars, about one-third of what we expected to spend. In the second year of the war now just commenced we shall be organized so that more can be spent. Perhaps we shall eventually reach such a state of efficiency that twenty billions will represent our capacity for warfare. When we do, the war will end but it is hardly possible that it will end before that time.

What's Wrong With the Mines?

AN INCREASE of 21 per cent. of fatalities in 1917 as compared with those in 1916 is a severe blow to our self-esteem, and not an easy one to explain. Certainly the increase in tonnage of 10 per cent. does not explain it.

The foreigner, on whose broad shoulders most of us delight to lay the blame for accidents, is surely able to prove an alibi. For is it not true that for some few years foreigners have not been coming across the water and entering our mines? A few Mexicans perhaps have joined our laboring forces, but surely few others made acquaintance with our mines for the first time during the past year. Probably at no time within a half century have our mines been operated by a larger percentage of Americans than today, and yet we are confronted with more accidents than ever!

Is it more general labor turnover that is the cause of the increase of accident frequency or is it the spirit of unrest, absent-mindedness or discontent? No one seems to know. A few facts about the relation of labor turnover to accidents are, however, timely and may shed some light on the subject. J. S. Herbert, of the Cambria Steel Co., speaking at the National Safety Council's Congress in 1917, said that he found that in the latter part of 1914 the accident record, which had been falling, began suddenly to mount, and the safety engineers were disposed to dodge the general manager till they could find out just why.

Investigation of the records showed that the new men, those who had been employed for less than 30 days, were 12 times as liable to injury in an iron and steel plant as the men who had been employed for a longer period of time. The breaking-in time broke the workmen. Till he had memorized the hazards and sensed the dangers of the plant he was 12 times as liable to accident as he was afterward.

This, then, is the naturalization which is mainly needed for safety—an introduction to the dangers of the plant. While the men who had 30 days of training in the specific dangers of the Cambria plant and in the perils of iron and steel plants in general had an average loss of time of 0.13 day per month, the men who had been at the plant less than 30 days lost on an average 2.41 days in the same period. The relative loss of time is 19 to 1. The accidents suffered by the new men, as just defined, were more serious than those from which the old hands suffered, for only 14 per cent. of the older employees who were injured went to the hospital, whereas 41 per cent. of the new men so injured had to receive hospital treatment.

Mr. Herbert was able to report that by helping the new man to accommodate himself to his environment the Cambria Steel Co. had cut the relation of the hazard of new men to old from 12 down to 6. Some plants, perhaps the Cambria Steel Co. also, have a man known as the "plant preacher." He takes the new man to his

work by the nearest route, shows him all the dangers on the way and the perils of the work, and tells him that the company has an interest in his safety and welfare.

In contradistinction to this kindly method of treatment compare the method at some mines where the miner is told off to some other miner or a driver, to be shown the way to room 25 on the 16th left. All he is shown is his place. He has absolutely no introduction into the dangers of the mine.

Perhaps, as stated, labor turnover is not the source of increased fatality rate, but no one seems to know as yet what is the real cause. But in any case it would at least pay us to take a little more care with the new man and not leave his training to the spare moments of a foreman who is probably not a good teacher. Most of them are not skilled in the work and do not have the time.

The "plant preacher" is chosen, not for his power of getting work out of men or for directing operations, but for his power of visualizing the other man's needs and gaining his coöperation in safety and in other like matters. He is the employee's friend, not his boss. The difference is not in mere words, and his mediatorial work may well stave off many a difficulty as well as many an accident.

Expansion is the life of the royalty trade. The house of Hohenzollern has done some pushing in Europe. A LIBERTY BOND *bought now may act as a stone wall to their designs on America later on.*

Germany Never Was a Paradise

THE greatest propagandists of all times have been the Germans. No one could state a half truth or an untruth with more appearance of passionate conviction. In fact, like most deceivers they were probably themselves the most deceived. The most skillful of all Germany's press agents were those who had been long domiciled among us. Strange to say with some men, the more remote their connection with their fatherland or motherland—German or other—the more worshipful their regard becomes.

Those who never lived or worked abroad, and those who left many years ago have no touchstone of experience. They can believe all they please without restraint. They can magnify single instances into the broadest generalizations, and again, they can minimize a general condition into an unimportant instance, as the fancy pleases. The foreign country is like an earlier age, not an object of sense but of the mind; not something actually experienced, but something merely imagined.

It was these men, with a sort of nostalgic dementia, who thus idealized Germany, who misrepresented it to America, who made us confuse "kultur" with culture. The less they actually knew, the less their imaginations were hampered. It must be admitted that Germany really had the symbols of some extremely pleasing institutions, both political and sociological, as for instance, the symbols of a parliament, of a freedom of thought and utterance, of a farm-loan provision, of an old-age pension system, of unemployment insurance, of accident compensation and accident prevention, of model housing and so forth.

That they had the symbol and not the institution itself made it quite easy for the Germans in America, and especially for the children of Germans in this country, to think over well of their fatherland. It is not the intention here to take up political matters, but a few sociological facts presented by the League for National Unity are interesting.

Coal miners averaged $334 a year in 1907; lignite miners, $297; salt miners and salt workers, $309; copper miners, $271 and iron miners, $266. Yet in Germany the mine workers usually worked every day and for long hours.

The average invalidity pension was $46.51 a year—less than $1 a week. The average sickness pension was but little more, $48.45 a year. It was still as much less than $1 a week as eleven months is less than a year. The average old-age pension was $39.75 a year, about 76c. a week. Just imagine staying out of the poorhouse to starve to death on 15c. a day or 5c. a meal, not to mention, of course, rent and clothing.

But the pensioners had nothing to complain of. Compared with pensioned widows and widowers they were grossly overcompensated. For the aforesaid widows' and widowers' pension was $18.49 a year, or about 35c. a week or 6c. a day—just 2c. a meal without charges for rent or clothing. The average widows' sickness pension was $18.59 a year, and the average orphans' pension $19.07 a year. This in a country where the poorest paid adult needed at least $140 to $155 a year for the cost of the barest subsistence.

The German government certainly showed its efficiency in ducking its obligations to its more unfortunate citizens, who in America would have been far more adequately supported by the local authorities.

Until the beginning of the war the highly skilled workers of Germany worked 57 to 60 hours a week. In other trades 12 to 14 hours were the rule. Hours of labor in Germany, at least in 1908, were 10 to 12 per cent. higher than in England and 10 to 34 per cent. higher than in the United States.

As a result of the low wages women and children were more generally employed than is customary in the Anglo-Saxon countries. In 1914, before the war made the labor of women common, 7265 women and 51,290 children worked in the salt mines. In Berlin, according to Ambassador Gerard, 55 per cent. of the families live in one room. Workingmen quite usually live in a two-room flat, and in these flats are crowded four to six persons of the family and lodgers besides.

Germany is a land for the imagination to idealize and for the workman no place to live in. It never was a paradise for the workingman. When you see the citizens from a foreign land work hard, save money, live in narrow quarters, easily satisfied with conditions, enduring, persevering, you may be sure they come from a place where these qualities have become ingrained from long necessity. Without the severe culture of penury the virtues described would never flourish.

Don't TALK about winning the war. Help to win it. If you cannot fight, help the boys to do it. Feed them, cloth them, give them guns and shells. You can do this by buying LIBERTY BONDS.

DISCUSSION BY READERS

Loading and Shipping Clean Coal

Letter No. 2—Reference has been made, in *Coal Age*, to the shipping of an inferior quality of coal and the Daily Press reports plants as being compelled to shut down because they have been unable to raise steam with the coal sent them. In these anxious days when the conservation of transportation facilities means so much to the country, the shipping of slate and rock for coal is nothing more nor less than an act of treason.

While it would be unfair to charge this condition to dishonest shippers, there can be little doubt but that it arises from carelessness and a lack of mine discipline. A false sense of fairness to their miners, or a false sense of patriotic duty to speed up the production of coal, may have caused some operators to neglect the means necessary for the proper preparation of their coal for market.

It can be stated without hesitation that there are comparatively few mines in the country working under conditions that make it next to impossible to avoid the shipment of dirty coal. When due attention is given to the proper separation of coal from its impurities, by the miners at the working face, and the suitable preparation of the output of the mine for shipment, there is seldom any excuse for sending an inferior quality of coal to market. The trouble can generally be traced to the miner. It does not take many miners, in an average size mine, to render the output of an otherwise good grade of coal almost unfit for market. A half-dozen men loading dirty coal throughout the day will destroy the quality of the entire output.

No Excuse for Shipping Impure Coal

In normal times, especially if the market is dull and competition keen, more attention is given to cleaning the coal and preparing it for market. This fact is proof sufficient that it is possible to give the same attention to the loading of clean coal, at the present time, when this is demanded for the welfare of the country instead of the reputation of the mines.

There are always some miners who cannot be reached except by the most drastic remedies. If not watched closely and made to suffer for the violation of rules, they will load dirty coal whenever opportunity offers. They are paid a high price today for every pound of coal sent to the surface, and there is good reason why they should perform their work well as a patriotic duty. On the other hand, the operator is responsible for permitting the loading of dirt and refuse with the coal. It is his duty to weed out these undesirable loaders, even though it may be found necessary to discharge half a dozen of them, which would show the company's determination to stop the practice in the mine. The loss of a few men in a mine will do less harm in the country's present crisis than to permit the shipment of an inferior quality of coal, which would tie up plants and factories and delay the sailing of ships from our ports.

Every mining official should be proud of the service he is in a position to render to his country in this regard. If a miner fails to consider his own interests or that of his family and persists in a practice that he knows is unpatriotic and wrong, any mine official can well afford to do without him. Let us then be true to the colors and serve the country the best way possible during the period of the war.

Thomas, W. Va. W. H. NOONE.

Safety in Shotfiring in Mines

Letter No. 1—The recent letters appearing in *Coal Age*, relating to shotfiring in mines, have set me to thinking in regard to some of the dangers attached to the work; but, first, I want to say a few words in regard to the enemy-alien miner and what he might accomplish when insufficient restrictions are in force in the mine where he may be employed.

In many of our mines, the miners are permitted to use dynamite in blasting. In such places, it would be a comparatively easy thing for a German sympathizer to allow small pieces of dynamite to get into his coal that he loads out of the mine. It is easy to imagine what damage these small pieces of dynamite would do when the coal is burned in the furnaces of a power plant or factory. The presence of the explosive would rarely be discovered when the coal is dumped into the chute and loaded for shipment.

There are other ways, however, that dynamite can get into the coal. For example, when a miner fires a shot that is heavy at the point, he frequently employs the practice of placing a small piece of dynamite at the bottom of the hole, before inserting the charge of black powder. He uses for this purpose a low-grade dynamite and depends on the explosion of the black powder to set off the dynamite. This frequently fails, however, especially if the hole is not well tamped or the dynamite is slightly frozen. In either case, the unexploded dynamite is quite liable to be loaded out with the coal unnoticed.

Explosive Loaded With Coal Shipment

I recall an extraordinary incident that happened some time ago when 12½ lb. of permissible explosive was loaded out in a miner's coal and escaped notice until it was observed in the railroad flat standing under the chute where it was being loaded. The explosive was scattered through the coal, and it was a difficult matter to recover all of it with certainty. Such accidental happenings would bring an enemy-alien miner under suspicion of committing acts of which he was not guilty.

The system of employing competent shotfirers to charge and fire all holes drilled by the miners appeals to me as the safest method to adopt, and is

particularly needful at the present time. Not only would this greatly reduce the number of accidents in blasting, but more and better coal would be produced for the same weight of powder burned. Most accidents in blasting occur from overcharging or improperly tamping the holes, and these are the results that come from allowing unskilled and reckless miners to shoot their own coal.

Undoubtedly, many questions would arise in the consideration of the employment of shotfirers. These men might require to be certified by examiners appointed by the Government. Competent shotfirers would have to be paid good wages, and it would be necessary for two to work together. The charging and firing of a large number of shots by shotfirers would require considerable time. Two men could probably charge and fire, say six holes an hour, or 48 holes in an 8-hour shift. One advantage that would result in this slow rate of firing would be that the mine atmosphere would never get so hot as to invite an explosion.

Assuming that two men could charge and fire 48 shots in an 8-hour shift, and that each shot would blow down 5 tons of coal, making a total of $5 \times 48 = 240$ tons; and, say the shotfirers were each paid $6 a shift, the cost of firing the shots would then be $1200 \div 240 = 5$c. per ton of coal broken down.

It would be interesting to hear from others who are in charge of work where the shots are all fired by shotfirers, after the men have left the mine, and to learn the details of how the work is performed and how the shotfirers are paid. Does this system increase the cost of production, or is the expense of firing the shots charged to each miner, according to the number of holes fired in his place?

Shelburn, Ind. R. J. PICKETT.

What Caused the Explosion?

Letter No. 1—I have read the inquiry of "Fireboss," *Coal Age*, Apr. 6, p. 645, asking for suggestions as to the possible cause of the explosion that he has described as having occurred in a mine that was not known to be producing gas, and which had been idle for a period of two months previous to the event of the explosion.

It is stated that no one was in the mine at the time, and the cause of the explosion is therefore a mystery. The mine is said to be a drift opening, having a shaft 32 ft. deep, located a short distance back from the entrance. It is further stated that the ventilation was wholly natural, there being no fan or furnace.

I agree with the suggestion in the editorial note that follows this inquiry; namely, that there was sufficient gas generated in the mine to have caused quite an accumulation in the workings, during the two months of idleness, inasmuch as the mine was not ventilated except by natural means. The amount of gas might be very small and escape detection by the lamp; and, yet, when the mine was not working this gas could easily accumulate so as to form a dangerous body of firedamp.

In addition to the suggestion made that this gas was ignited by a fall of roof, I would like to say that another possibility is the existence of a gob fire somewhere in the workings. It seems to me that this is a more natural cause of the ignition of the gas.

Let me say, in this connection, that no mine should depend on natural ventilation as the only means of circulating an air current and keeping the mine free from gas. Had this mine been ventilated by a fan, I venture the remark that there would have been no explosion. I shall hope to hear the expression of opinion from others. OSCAR JONES.

Worley, Ky.

Surveying and Mapping

Letter No. 6—From the letters that have been written on this subject, it would appear, as F. C. Sanner has already suggested in his letter, *Coal Age*, Mar. 16, p. 517, every engineer will prefer that method with which he has long been familiar and which he considers best adapted to his use. All will agree, however, that an accurate and complete map of the inside workings of a mine, showing, besides, the surface improvements and physical characteristics of the tract, is one of the primary necessities of every well-managed colliery.

Speaking of an accurate and complete map, I do not refer to such apologies for maps as are in use at some mines, and which show nothing more than an approximate outline of the main workings, together with the various haulage roads and airways on which is marked the direction of the air current.

MINE MAPS SHOULD BE COMPLETE AND ACCURATE

Many coal operators do not see the advantage of going to the expense of making a complete map, which in time cannot fail to prove a great source of satisfaction and avoid many mistakes that would otherwise be made in the planning of the workings. A mine map may be accurate and yet incomplete. I do not wish to be understood as decrying an accurate map of this kind, since it is far better than no map at all.

The point I wish to urge is that a mine map to be of the most value must be a complete history of the mine and show the progress of the work done year by year, giving the date of each survey of the working face and showing the thickness of the coal and the elevation at different points of the seam. This will enable the manager, superintendent, or other official to observe at a glance the work that has been done from time to time.

HOW A MINE SURVEY SHOULD BE MADE

Allow me, then, to outline briefly the manner of making a good mine survey, which should be commenced by traversing the entire property so as to accurately locate all boundary lines and such physical features and surface improvements as will be of interest in the future development of the property. This survey should include the accurate location of all prospect boreholes or shafts, and show the position of any streams or other bodies of water on the property.

The surface survey should be carefully connected with the nearest section corners or other monuments, in order to enable the notes to be correctly plotted in relation to the land lines and other properties. The same survey should then be carried into the mine so that the survey underground will correspond or conform to the same meridian as that on the surface survey.

An important feature in making any survey is the careful establishment of a true meridian line, which must form the basis of this and future surveys. The instrument must be carefully adjusted before starting the survey. No reliance should be placed on the readings of the magnetic needle, which are merely used as an approximate check on the bearings of lines as determined by their azimuth or deflection angles.

The survey underground should be made by running the transit lines from station to station throughout the several entries and airways. The ribs of all entries should be carefully located by offset measurements taken at different points of the transit lines. The survey notes should show what pillars are being drawn back and what rooms are worked out and abandoned, so that when plotting the map from the notes it will be possible to show the exact condition of the workings in every part of the mine. It is often possible to tie the underground survey to that on the surface through the finding of a borehole that has penetrated the workings or an air shaft. Such an opportunity to check the accuracy of the surveys should never be missed.

Let me say, in closing, that inaccuracy in the surveying and plotting of underground workings is not excusable. Not only may an inaccurate map be the direct cause of a serious mine accident, but much valuable coal will often be lost. Millions of tons of coal have been lost beyond recovery, in the anthracite field, through the inaccuracy of mine maps that should have guided the operations of the mine. At times, I have observed mine pillars many times the thickness required for the support of the roof, while in other places they would be so small as to be crushed by the roof pressure and start a squeeze that would make it impossible to mine large areas of the coal. On the other hand, an accurate mine map means not only greater safety in the operation of the mine, but larger profits and a more complete extraction of the coal.

Kingston, Penn. MINE SURVEYOR.

Echoes from the Mine and Camp

Letter No. 1—How frequent are the complaints and grumblings that are heard from mine workers, owing to misunderstandings and lack of sympathy between them and their employers who operate the mines. It has occurred to me that this condition is largely due to the total ignorance of mine workers of the costs attendant on the mining, loading and shipping of coal.

To the average miner, the difference between the amount paid for the mining of coal and the price at which the coal is sold on the market is the clear profit, which he thinks goes into the pockets of the operator. He has no knowledge of the overhead charges in the operation of a coal mine.

Overhead Expenses in Operating a Mine

Miners seldom stop to consider the amount the company must pay for deadwork, in the mining of the coal; the wages paid to daymen, drivers, timbermen and trackmen; the salaries paid to the monthly men, both in the mine and in the office; the freight charges for transporting the coal to market; claims for shrinkage and loss in transportation; the expense of upkeep of buildings and equipment; and numerous other items involved in marketing the product of the mines.

It is safe to say that if the average miner were shown the monthly cost-sheet of the mine where he is working he would receive the greatest surprise of his life. At a certain small operation, for example, the cost of keeping the horses alone averaged from $500 to $600 a month; the expenditure for lubricating oil, grease, etc., was another $100, besides $1200 was paid a year for taxes and an almost incredible amount for mine timber, iron rails, bolts, splices and other mine supplies and electrical equipment.

Consider for a moment what the cost of mine timber may be with crossties 23 c. apiece, props 22 c., crossbars 46 c., with an additional cost of 29 c. for the labor of handling and putting in place. A little reflection, on the part of the miner, in regard to these manifold expenses, which I have hardly begun to name, would soon cause him to cease from complaining that he is not getting his share of the profits of the mine.

Rentals Barely Cover Expense of Upkeep

From the camp the complaint is often heard that the rent demanded by the company for the houses in which the miners live is exorbitant. The idea often prevails that these rents collected from the miner net the company a very nice income, whereas they barely suffice to cover the cost of improvements and repairs and yield a fair interest on the investment.

The welfare work conducted by many of the larger companies for the education, entertainment and betterment of its men is no small item of expense. The amount expanded for this purpose brings excellent returns but they are not such as can be classed as financial profits.

One frequently hears a miner's wife remark about improvements such as playgrounds, bath-houses, etc., "Oh yes, they are nice and we enjoy them, but the company can well afford to give them to us when you think of the money they are making." However, I am frank to say that this sentiment comes more frequently from the men, as the women who have the care of their children are more appreciative of any efforts put forth in their behalf.

Class Distinction Harmful to Success

Is it not true that too many coal operators treat their employees as belonging to what they term the "mining class," because their occupation in life is the mining of coal? In the same way, the occupation of the farmer determines the "farming class" and that of the common laborer the "laboring class." But, after all, these men are all more or less alike in their sensibilities and necessities. Because their occupation is different, does not make them worthy of less consideration. It is true that their education and habits of life may differ widely, but this places a larger responsibility on those possessed of greater advantages.

It is needless and unwise for operators to claim that the miner does not need more money, for the reason that he would not appreciate the changes made for him. Or, that he does not require better living conditions than those to which he has been accustomed, claiming that he would not appreciatethe changes made for his benefit. The better class of miners do like to own

their own homes and educate their children. They enjoy the same recreations and pleasures of life as their employers if these are placed within their reach.

In closing, let me say that greater progress would be made if we did not classify men and people according to their trades and occupations, in the sense that their desires, needs and sensibilities are different and call for different treatment. Let us strive to educate them to a higher plane of living, and not withhold from them the opportunities for improvement. The wage question would then not be so great a bone of contention as it is at the present time. M. P. H.

————W. Va.

Mine Cars

Letter No. 6—I have been following with great interest the discussion regarding the change of mine equipment from plain to roller bearings for mine cars, which started with the letter of L. B. Paul, *Coal Age*, Feb. 16, p. 346, and would like to add a word or two expressing my own view.

The consensus of opinion among the correspondents who have referred to the letter of Mr. Paul seems to be that there is no objection whatsoever to installing roller-bearing cars, in either anthracite or bituminous mines, while there are a good number of plain-bearing cars yet in service. I presume that these writers all have referred in their letters to mines where the plain-bearing cars had been in use for some three or four years.

The saving effected, in respect to lubrication, etc., brought out in the several letters, is certainly quite remarkable and very interesting to me. The discussion has opened my eyes with regard to some points about which I was a little hazy before. I must say that looking at it from as practical a viewpoint as is possible, the mine that is operating with plain-bearing cars is simply wasting a great deal of energy that could and should be conserved. Either that or it is failing to produce the tonnage which it would otherwise be possible to produce.

In conclusion, allow me to say that these various letters have opened up a good field for discussion, and I hope that many other members of the mining fraternity will give us the benefit of their experiences.

Brooklyn, N. Y. J. R. STURGES.

Frozen Mine-Car Journals

Letter No. 1.—The short article that appeared in *Coal Age*, Mar. 30, p. 573, by Henry M. Payne, describing the method of overcoming the difficulty due to the freezing of the journals of freight cars in extremely cold weather, reminds me of my experience last winter when visiting the mines in western Pennsylvania.

At that time, my interests called me several times to the mines in that section, and I was greatly impressed by the serious delay in the operation of the mines, caused by the freezing of the journals of mine cars. At one operation, I counted at least 35 cars overturned at the side of the track, being thrown out of commission because they could not be moved on the track until they could be thawed out.

This trouble would not be so serious if the mines had a surplus of cars, which is not usually the case, however. At most mines the entire rolling stock is kept constantly in use, except such as are undergoing repairs, and where a few cars are thrown out of service, in the manner I have mentioned, the output of the mine is much reduced, which means a considerable loss of profits. This feature alone would seem to serve as a strong argument for the use of roller bearings on mine cars. If I am correctly informed, it is possible to lubricate a roller bearing with a lighter oil, as Mr. Payne says is the common practice in automobiling in winter when the heavy oil used is discarded for one that will flow more freely.

The advantage derived, in this respect, by the use of roller-bearings on mine cars was first brought to my attention by coal operators whose mines were equipped with such cars. They stated that, in the coldest weather, they had never experienced any difficulty from the freezing of journals and the operation of the mine had not been delayed by this cause for several winters past since the adoption of roller-bearing cars. To my mind that is an important consideration, since there must be no interruption in the movement of coal, from the working face in a mine to the tipple, if coal properties are to return dividends to their owners.

Washington, D. C. MAVERETTE ASHLEY.

Mutual Capitalizing

Letter No. 2—The largest joint meeting of employers and employees, in the history of the safety movement in Kansas City, was held Jan. 19, 1918, when 420 owners, managers and workmen in 75 industrial plants sat down together to listen to and discuss matters pertaining to their common interests. I could not help but feel that this was a practical illustration of the idea of the mutualizing of industries referred to and particularly urged with respect to coal companies in this country, in the excellent Foreword, in *Coal Age*, Jan. 5, 1918.

About 18 months previous to this meeting, 20 resident members of the National Safety Council organized a Local Safety Council. The movement received the hearty coöperation of the Kansas City Chamber of Commerce. Monthly meetings were held at noon in the various plants, when methods were discussed for promoting safety work and the prevention of accidents and fires.

THE FOREMEN'S "ROUND TABLE"

Probably the most important feature in this movement was the establishment of a "Foremen's Round Table," to which the superintendents, foreman and members of plant safety committees were invited. At first, the Local Council provided the program, by supplying a speaker and directing the discussion. A little later, however, the foremen assumed control, and the program of each meeting was based on the discussion of matters that seemed of the most importance to them. The interest greatly increased with each meeting, and all the foremen learned much from each other in regard to the practices in the various plants by which greater safety was insured.

While there are 70 plants in this city, an average of 20 of these was represented at each meeting, and, during the year, practically all the plants had been represented at different meetings. It frequently hap-

pened that the managers of some of the plants would come to the meeting, because they could not get away at the noon hour to attend the regular monthly meetings of the Council. This seemed to cause no embarrassment, however, on the part of the men who spoke freely on the subjects under discussion.

The fear of some employers that the Round Table might become a source of unreasonable demands for safety devices and hygienic improvements has proved to be ungrounded. There has never been a complaint heard at these meetings regarding the failure of an employer to provide the necessary safety appliances, although frequent reference has been made to the conditions existing in different plants.

To illustrate: At a discussion relating to toilet facilities, one foreman remarked, "Well, we've been up against this question, but some day we are going to have an entirely new equipment; and, until that time, we are going to keep the old equipment painted white. The men who have the right idea often speak to the other fellows who are careless and urge them in a friendly way to help in keeping things in good condition; so that we're doing fairly well." The men show their desire to coöperate with their employers by the use of the pronoun "we" in their discussions, which tends to give them a feeling of pride that they are part of the plant.

Joint Meeting of Managers and Foremen

This narration would not be complete without referring to a big joint meeting of the managers and foremen, which was held after the Round Table had been running about a year. This consisted of a banquet at which it was first thought about two hundred would be present. The interest was so great, however, that more than four hundred tickets were sold, members of the National Safety Council taking anywhere from 10 to 50 tickets to give to their foremen and Safety Committee chairmen.

The Committee on Arrangements had so distributed the men that representatives from different plants were seated at the same table, and the suggestion was made by the president, who presided at the dinner, that "everyone get acquainted with the men at his table," which all proceeded to do at once, shaking each other's hands across the board.

One of the speakers epitomized the situation by saying that "it is up to the foremen to see that plant operations are conducted safely and men kept at work without loss of time to themselves and the plant, through accidents to men or equipment." I have described this movement briefly in the hope that it would lead to similar movements equally successful in other places.

B. S. Brown.

Kansas City, Mo.

Coal Production and Booze

Letter No. 8—No one can doubt, after reading the many letters that have appeared in *Coal Age* relating to the effect of booze on the production of coal, but that the drink habit among miners gives valuable assistance to the Kaiser and handicaps our Government in its efforts to win the war. Men working in and around the mines see the effect of booze every day.

Some time ago, one of the leading newspapers in the Wyoming Valley (Penn.) advocated the proposition that the court should regulate the hours when saloons could be kept open. The scheme was to compel the saloons to close from 10 p.m. until 8 a.m. every week day. It was hoped, by this means, to keep those miners who are controlled by the drink habit, in a fit state for work in the mine. The plan was favored generally throughout the valley, by mining men, who declared that the efficiency of mine workers would be greatly increased if this action should be taken.

Courts Petitioned by Societies and Churches

The courts were further petitioned by patriotic and fraternal societies and church organizations. In the little mining camp of Shickshinny, the Odd Fellows Lodge and the Patriotic Order of Sons of America unanimously adopted resolutions, asking the court of the county to refuse licenses for saloons in that camp, during the continuance of the war.

They urged this for patriotic purposes, stating that the little borough was practically a mining settlement and that, following payday at the mines and after holidays, it is practically impossible to operate the mines at anything like their full capacity, owing to the miners failing to report for work, because of their drunken state. It was stated that the two orders just mentioned represented about 85 per cent. of the men in the camp.

In response to these petitions, the honorable judge stated that he could not withhold licenses from the saloons when no complaints had been made by the operators of the mines. This fact would make it appear that what is needed is that mine operators should link hands with the better class of their men and, with them, petition the courts to close the saloons or regulate them in a manner that will not interfere with the steady and complete operation of the mines.

Coal Operators Strongly Urged to Do Their Part to Exterminate the Saloon

It goes without saying that coal production, everywhere, suffers from the presence of the saloon in the vicinity of the mine. No mine worker can do efficient work unless he is in fit condition, and this is not possible where his time and money are spent in the saloon, during idle hours.

Allow me to suggest, further, that coal operators would do well to follow up and advocate strongly the suggestion of Fuel Administrator Garfield, who gave warning of the possible revocation of the license of any saloonkeeper or bartender who sold drink to miners previous to their going to work in the morning.

Much can be done, also, in this direction, if mine foremen would impress on their men the fact that the saloon is a poor place for a miner to visit in his idle hours if he expects to hold the good will of his employer. In every mine, there should be the strict prohibition of drinking before and during working hours.

Let me repeat, here, that the Kaiser and booze go hand in hand. If the coal miner is, as the President has said, an important factor in the winning of the war, he must let drink alone and do his bit in support of the fighting men at the front.

Kingston, Penn. Fred B. Hicks.

INQUIRIES OF GENERAL INTEREST

Air Compressor in a Gassy Mine

In our mine we have recently come face to face with a problem that has caused us some concern, and I want to ask the opinions and advice of *Coal Age* and its readers, in regard to a method that I have had under consideration for some time. I have hesitated putting the plan into operation for fear that the condition of the mine in respect to gas might invite disaster. The situation is becoming urgent, however, and it will soon be necessary to adopt a temporary expedient in order to maintain the output of the mine.

Ours is an old mine that was formerly operated by compressed air exclusively. The growing development of the workings decided us, some time since, in favor of installing electrical equipment, and the result is that we have at present ample electrical power. Not long ago, owing to the inadequacy of our compressed air installation to operate the coal-cutting machines in use at the face, the attempt was made to replace the air machines with electric coal cutters. It was then found that we could only get one machine in three or four months; and, as we require six machines to cut our coal, it became necessary to adopt some expedient that would tide over the difficulty.

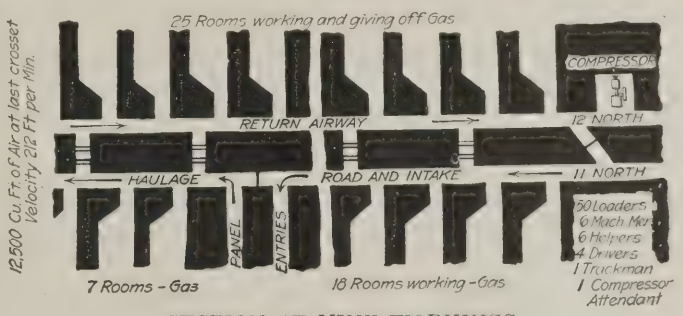
The situation is about as follows: The air compressor located on the surface is of sufficient capacity to supply plenty of air to run the six Harrison coal cutters now in operation, if it were not for the extensive piping system that conducts the air from the compressor to the machines. Starting from the plant, there is 1500 ft. of 12-in. pipe followed by the same length of 6-in. pipe. From this point there are three branches, making from 1000 to 2500 ft. of 4-in. pipe leading to different sections of the mine, and 1¼-in. pipe is then used a short distance from the working face.

We have taken good care of this piping system, everything possible having been done to stop the leakage of air. After a close examination of the entire pipe line, I have concluded that in order to operate the machines with anything like efficiency, it would be necessary to replace much of the line and to purchase about 3000 ft. of 12-in. pipe. This, however, is plainly out of the question, as we shall soon abandon the air system.

Casting about for some way out of the difficulty, I have found that it is possible to exchange some of our pipe and other equipment for some small air compressors that have been in use in another operation and which can be run by electricity. The idea of making this exchange has interested me greatly, but there are one or two questions that must be settled regarding which I wish advice.

The accompanying figure shows the general arrangement of the workings, there being some fifty rooms working on the 11- and 12-N. The ventilation is sufficient for all present needs; but the fan is now working to the limit of its capacity, and it will not be possible to further increase the circulation of air. In the figure, I have marked the rooms as generating gas, although this is not the condition at present, but I wish to provide against trouble that may arise later. Today, there is not sufficient gas generated in the rooms to show a cap on a safety lamp, except when the face has advanced 40 or 50 ft. ahead of the air.

In connection with the electrically-driven air compressors mentioned, my plan is to locate these at a convenient point near the working face, which will save the great length of pipe line now required to conduct the air to the machines. By rights, the compressors should be located on the intake airway to avoid the possible ignition of gas in the return air. In the sketch, however, I have shown them on the return airway where



SECTION OF MINE WORKINGS

less difficulty would be experienced by reason of having to carry the pipe under the track on the haulage road.

There are close to seventy men working in this territory. The ventilation is sufficient at all times to keep the return air current below the explosive point when working under the present conditions. I would like to ask: (1) With the compressors located on the return airway, and compressing that air charged with some gas, would there be any danger of explosion? (2) With the compressor located on the intake airway, would this interfere with the necessary ventilation of the working faces by reason of using the intake current for the compressors and what effect would this have on the fan?

————, Ky. INQUIRER.

We cannot recommend the location of an electrically-driven air compressor on the return airway in this mine. While the return air may appear to be below the explosive point in the airway, when this air has been compressed to five or six atmospheres, especially if some dust is present, there is a grave possibility of explosion taking place in the compressor cylinders.

On the other hand, it can be stated that the location of the compressor on the intake airway would not interfere with the ventilation of the working faces, because the air compressed would again be released at the working face, after operating the drills. The effect, if any, on the fan would be to assist the circulation of air. This is a good question for discussion.

EXAMINATION QUESTIONS

Bituminous (Penn.) Mine Foremen's Examination, April 9-12, 1918

(Selected Questions)

Ques.—What observations should a mine foreman make during his visits through the mine and what should his written report of the same include?

Ans.—The mine foreman is responsible for the safety of the men employed underground. He must, therefore, be particularly observant of the condition of the roof and sides and the timbering in all working places and on the haulage roads and airways to detect any danger that may be present because of loose top, broken timbers or other causes. He must observe the manner in which the men are performing their work in mining coal, loading cars, or when otherwise employed.

The foreman must see that there is a plentiful supply of timber of the proper length and kind, in every working place. Where safety lamps are used, he must observe the condition of the lamps and the manner in which they are used. Where miners blast their own coal, the foreman must examine carefully the placing of the shots and note what explosives are on hand and the amount of powder charged in the holes.

The foreman must observe the ventilation of each working place and see that the air current is conducted forward so as to reach the face of the coal in sufficient quantity and with the velocity required to sweep away any gases that might otherwise accumulate. He must also see that all void or abandoned places are properly ventilated or sealed off. He must examine, from time to time, all stoppings, doors and air bridges to see that they are not leaking air and observe the breakthroughs and crosscuts made in rooms and entries to see that they are of sufficient size and made at proper distances apart. Finally, he must see that the mine is being operated, in every respect, in compliance with the mining law and note any violations of the mine rules and regulations.

Ques.—What are the economic and other dangers of creeps and squeezes, and what methods would you adopt to prevent them?

Ans.—From a point of economy, the occurrence of a creep or squeeze in a mine presents the danger of the loss of much coal or the use of a large amount of timber and an increased expense for labor in setting the same, or both. It often happens that there is a large amount of tracking, tools and timber lost when the workings take a sudden squeeze. There may also result considerable surface damage for which the company may be liable. There are, besides, the dangers to life caused by heavy roof falls and the possible emission of large quantities of gas located in the roof strata.

The best method of preventing a squeeze or creep is to leave ample pillars for the support of the roof, and avoid maintaining too large a standing area in the workings. Except in particular cases, all pillars should be drawn back as quickly as the rooms are finished. It is necessary, also, to adopt a method of working that will be adapted to the conditions existing in the seam, having due regard to the depth and character of the overlying strata and the kind of material underlying the coal, the hardness and thickness of the seam and its inclination.

Ques.—Suppose a workman was found in contact with a live electric wire and was rendered unconscious. State what steps you would take to revive him. Also, state your procedure in reviving a person found unconscious from noxious gases.

Ans.—Shut off the current or break the circuit at once, if this is possible. Throw an iron bar or other instrument of iron across the live wire, on the side of the victim toward the power plant, which will help to short-circuit a portion of the current. Without delay, if the ground is dry and likewise the patient's clothing, seize the latter and attempt to drag the person off from the wire. Do not touch the person's skin, and, in no case, stand on wet ground or handle wet clothing. Give one steady pull and avoid rocking the person to and fro, which will increase the shock and burn. It is safe to cut the wire on the side of the victim toward the generator, using a sharp dry ax and standing in dry ground.

After removing the victim from the wire, artificial respiration should be performed at once to restore the person to consciousness. Spirits of ammonia on a handkerchief or sponge passed back and forth near the person's nose will assist to revive him. He should be kept warm and every effort should be made to assist the circulation of blood in the body by rubbing the limbs toward the heart. This should not be done, however, until breathing is commenced.

To revive a person found unconscious from inhaling gas, he should be removed promptly to fresh air and artificial respiration applied. If the patient is conscious and able to swallow, give a half-teaspoonful of aromatic spirits of ammonia in a half-glass of water. In giving artificial respiration, the patient should be laid on his back with a coat rolled to form a light pillow placed under his shoulders. When he shows signs of breathing, the circulation of blood should be assisted by rubbing the limbs toward the heart. In all cases, send for a doctor at once while continuing to administer first aid.

Ques.—The cause of the greatest number of accidents being falls of roof, slate, coal, and sides, what methods would you enforce to reduce the accidents from these causes?

Ans.—Insist on the regular and frequent inspection of the working places and a systematic method of timbering. Enforce strict discipline in regard to the setting of timbers and see that the necessary supplies are on hand in every place. Insist on the spragging of the coal while mining the breast.

COAL AND COKE NEWS

Harrisburg, Penn.

The basic point in the proposition submitted by the coal operators of the anthracite region to the sub-committee of the civic bureau of the Board of Trade of the City of Scranton, for the amicable settlement of the mine cave question, is the appointment of a commission of three to administer a fund for the repair of cave damage, this commission to have absolute control of the fund.

The membership of the commission is to be composed of a man named by the coal companies, another by the trade board and the third to be selected by the first two. They are to be paid a salary large enough so that their entire time will be taken up with the work of administering the fund.

The fund is to be created, it is understood, by a voluntary tax on every ton of coal mined in Scranton and the surrounding towns. Every case of damage done surface property will be referred to the commission and its action in the case will be final as far as the administering of the fund is concerned.

The operators included in their proposition that they will repair all damages to properties of the city that have an assessed valuation of $5000 or less; the creation of the fund to be approximately $100,000 to repair damages to properties in areas where abandoned mine workings are located, this fund to be perpetual; the non-repair of damage to property of public service corporations; the repair of all city streets, sewers and conduits.

Birmingham, Ala.

In the mining sections of the Birmingham district the activity is regulated only by the labor available. There is need of men at all mines, and though there is no indication of a labor shortage the lack of ample help is noticeable. Second to the labor problem is the car shortage situation. While production in Alabama shows an increase, producers are raising a general complaint against the transportation facilities which are being offered them. Early relief is deemed essential by the producers to offset a serious shortage of fuel, and an urgent appeal has been addressed to the Federal Fuel Administration in an effort to bring about a change in conditions.

While some complaint has been raised in Alabama on the zone system of shipping, every ruling is being obeyed the local representatives of the Fuel Administration state. The complaint of producers centered upon the closing of a good market west of Memphis for the mines in the western part of Alabama, Carbon Hill, Corona and other places. It has been demonstrated to the Alabama producer, however, that a ready market awaits every ton of coal that can be produced in this state, and he is rapidly adjusting himself to the new state of affairs.

The coke ovens of the Birmingham Trussville Iron Co., of Trussville, have started manufacturing coke on an extensive scale, the coal being furnished from the Labuco mines in the western part of the county. The Central Foundry Co., which has extensive properties in Alabama at Anniston, Bessemer and Holt, including the Central Iron and Coal Co., at Holt, in its financial statement for 1917 shows after interest and taxes had been paid, the company earned $1,228,441, the business being the best of any year for the company. Its net working capital as of Dec. 31, 1917, was $1,888,687, or more than twice the present market value of outstanding bonds. In 1917 the company wiped out its floating debt of more than $500,000. The first mortgage sinking fund 6s, 1931, of the company are selling around 83½ to yield about 8¼ per cent.

Charleston, W. Va.

The increasing shortages in cars furnished the Fairmont field is causing the operators and even the Fuel Administration at Washington serious concern. Recently, of 150 mines reporting to the Central Coal Operators Association, 62 of the number were shut down, causing 5629 men to be idle and causing a loss in production of 39,910 tons. On some of the days during the recent week the supply has declined to 437 cars, or about one third of the number of cars needed, it being estimated that it takes about 1500 cars to supply the Fairmont District. Not only has there been a loss of production, but the loss of employment has caused serious hardship among the miners, causing intense dissatisfaction and having a tendency to disorganize the industry in the field affected. The union miners in Taylor County recently protested to the Director General of Railroads against the failure of the Baltimore & Ohio to furnish the region's proportional supply, calling attention to the fact that the region was 6000 cars behind the amount to which it was entitled.

The war program of the Government calls for so many more cars from the Fairmont region than has been supplied that a hurried conference was called and held at Baltimore between Vice President A. W. Thompson, of the Baltimore & Ohio; President J. H. Wheelwright, of the Consolidation Coal Co., and George T. Watson, general manager of the same company, at which plans were perfected to improve the present conditions prevailing in the Fairmont region. As a result of the conference the restriction of the Fairmont district to 700 cars East per day will be increased to 800. The plans worked out have the approval of the National Fuel Administration.

Coal mines in many sections have been forced to close down because of the inability to secure cars. Mines supplying fuel to railroads have been able to secure a far better supply of cars than mines having coal for purely commercial shipment. This discrimination has had the effect of making it possible for companies supplying railroad fuel to maintain their efficiency by keeping their organization intact while mines supplying commercial coal have found it difficult to keep their employees because they have not been able to keep them working regularly.

Dallas, Tex.

Regulations put into effect by the Federal Fuel Administration, at the request of Wiley Blair, of Dallas, Tex., Federal Fuel Administrator of Texas, are designed to increase the use of Texas lignite for fuel and thus release a large amount of coal for other and more imperative uses. The regulations include fixed maximum prices to be charged by the lignite operators. The fixed prices are as follows: Run-of-mine, $1.40, per ton; screenings, over ¾ in. screened with 15 per cent. of screenings deducted, $1.50 per ton; lignite screenings, 85c. per ton.

Before recommending fixed prices and regulations for handling lignite as a fuel, Mr. Blair employed Alex Cobden, of Fort Worth, an experienced coal and lignite man, to make a careful survey of the Texas lignite fields and mines in operation. This survey disclosed that the use of lignite for domestic and industrial purposes in Texas is rather limited, and Mr. Cobden assigned the following reasons:

1. Because of lack of knowledge of the most efficient method of combustion of lignite.
2. Difficulty of transporting and storing.
3. Ability of consumers to purchase fuel oil or bituminous coal in Oklahoma and Arkansas at about the relative cost of lignite and the rejection of the latter for the fuel with the higher heating efficiency.

The report of Mr. Cobden shows that the supply of lignite in Texas is enormous. In the United States it is estimated that there are 127,000 square miles of lignite territory, distributed in ten states, and of this total, Texas has 60,000 square miles, or 47 per cent. of the aggregate. Conservative estimates show workable beds in the state containing at least 17,000,000,000 tons.

The Texas Fuel Administrator declared that if lignite is given an even break with other fuels and its sale prosecuted vigorously and intelligently, there is no reason why the annual production should not reach 5,000,000 tons instead of approximately 1,000,000 tons, and the revenue kept within the state amount to $7,000,000 or more annually instead of about $1,000,000, the probable revenue from the output of lignite in Texas in 1917.

Comparative figures on cost of lignite and various kinds and grades of coal at various points in the state, which cost includes expense of unloading, firing and removal of ashes, show that Oklahoma and Arkansas screenings are 14 per cent. higher than lignite and fuel oil is 8 per cent. higher than lignite. These comparative costs, the Fuel Administrator says, demonstrate the economy in the use of lignite instead of coal, especially in view of the uncertain deliveries.

For domestic use lignite is not an ideal fuel, yet it is freely used in central and southwest Texas. Lignite can be used, however, in almost any type of furnace, although in some cases it may be necessary to change furnace grates to get better combustion and greater efficiency.

The heat efficiency of Texas lignite with the other steam fuels with which it competes are as follows: Texas lignite, 7500 B.t.u. per pound. Oklahoma and Arkansas screenings, 11,500 B.t.u. per pound. Fuel oil, 19,500 B.t.u. per pound. North Texas natural gas, 700 B.t.u. per cubic foot.

Texas lignite contains 25 to 35 per cent. moisture, which must be evaporated before the lignite will burn readily, and this consumes about 5 per cent. of its heat value.

Lignite operators in Texas now have 15,942 acres of developed lignite lands, and the average thickness of the lignite vein on this developed land is 7 ft. 4 in. It is conservatively estimated that the present operators possess approximately 148,000,000 tons of lignite, or about 8.7 per cent. of the total lignite in the state.

There are now thirty producing lignite mines in Texas, distributed by counties as follows: Bastrop County, 7 mines; Henderson County, 3 mines; Hopkins County, 5 mines; Houston County, 1 mine; Leon County, 2 mines; Medina County, 1 mine; Milam County, 6 mines; Robertson County, 1 mine; Titus County, 2 mines; Wood County, 2 mines.

The estimated total consumption of fuel in Texas during 1917 is as follows: Lignite produced in Texas, 891,116 tons. Bituminous coal produced in Texas, practically all consumed by Texas railroads, 1,197,972 tons. Fuel oil consumed by railroads, 9,100,000 bbl. Fuel oil consumed by industrial plants, 8,000,000 bbl. Natural gas produced in Texas, 13,323,747,000 cubic feet.

The lignite industry opens up a great investment field for Texas money, and companies are now being organized to develop some of the idle lignite lands.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Marcin Urbin, a miner in the Bliss colliery of the Lehigh & Wilkes-Barre Coal Co., has been presented with a medal by officials of the company for having established a new record in individual mining. During the month of March, Urbin, who is 25, mined 350 cars of coal and 58 tons of rock. He worked every day, Good Friday included.

Mount Carmel—Two of the largest verdicts ever awarded by juries in Northumberland County have been sustained by Judge F. B. Moser in opinions filed on Apr. 13. Joseph Ford was awarded $11,636 against the Reading Coal and Iron Co. for the loss of his leg at the knee. Peter Sebastin, a miner, was awarded $6425 against the same company for permanent injuries to his spine and hips.

Bituminous

Uniontown—J. G. Carroll, referee in bankruptcy of the J. V. Thompson estate, recently confirmed the $6,000,000 purchase of the J. V. Thompson coal lands by the H. C. Frick interests. He dismissed all exceptions to the sale and directed that all mortgage creditors involved in the 12,000 acre deal be paid in full with interest. He directed that none of the costs should be borne by the mortgagees. Mr. Carroll directed that $3,200,000 of the purchase

price should be paid to the Thompson estate. The decision will be forwarded to the District Court of Western Pennsylvania for final confirmation.

Uniontown—Remonstrances have been filed in the Fayette County courts asking that all the liquor licenses be suspended during the war. It was pointed out that the coke operators in the county discovered this year that on account of the intemperance of the miners at Easter their output was diminished from 14 to 21 per cent. Police records of Uniontown, which has a population of 20,000, show that there were 5000 arrests for drunkenness made during the last year. There are now 54 retail licenses, 18 distillers and 9 brewers in the county. Two of the distilleries are not asking for renewals of their licenses, but there are three new applications for retail licenses at hotels.

Johnstown—A precedent is believed to have been established by Jacob Snyder, compensation referee in a decision rendered in the case of Mrs. Robert McTavish, of this city, in which he refuses to order the discontinuance of compensation granted for the death of her son, although she has remarried. Mrs. MacTavish lost a son as the result of an accident in a mine of the Pennsylvania Coal and Coke Corporation. Compensation was granted for 300 weeks at the rate of $2.71 a week. Mrs. MacTavish remarried a short time ago. The fact that the beneficiary remarried does not affect the compensation, Referee Snyder ruled.

WEST VIRGINIA

Edgwood—At a recent meeting the Council unanimously decided to prohibit the Fairmont & West Virginia Coal Co. from putting in a proposed sidetrack at its new operations here. It is not known what steps the company will take. It is claimed that if the mines are established in this district it would greatly decrease the value of surrounding property.

Clarksburg—A tract of Pittsburgh coal on the West Fork River, near here, has been bought by W. F. Bickman from Lauda Custer and others at the price of $1000 an acre. Several tracts of Pittsburgh coal have lately brought this price in this county.

Weston—A railroad siding will be laid and a tipple built at the farm formerly owned by W. J. Nichols, which has been bought by the Beckley Coal Co.

The Lynch Coal Co., of Berkeley, has recently acquired 700 acres of coal lands on the Baltimore & Ohio R. R. between Weston and Gaston, and is planning for the installation of the necessary machinery, including the construction of a grader tipple, for immediate development work.

Elm Grove—Work is to begin at once on the new tipple at the No. 1 mine of the Elm Grove Mining Co. The lumber has been on the ground for some time, and the contractor, P. T. Finnegan, will put a force of men to work on the structure at once.

The Century Coal Co. has already driven an entry into its coal field here and is taking out coal sufficient for its present needs. The large force of workmen required to carry on the work will necessitate the erection of a large number of houses during the coming summer.

Williamson—The Gray Eagle Coal Co. is preparing to tap the No. 2 Gas seam with a slope which it will soon sink.

A new tipple will be built and 3600 ft. of siding laid by the Wigarb Coal Co. as a preliminary step toward operating a mine at Goodman.

A new tipple of the Bailey Coal Co. at its mines on Pond Creek has almost been completed.

Beckley—Fifty-five new houses will be built and three-quarters of a mile of siding laid by the Ingram Branch Coal Co. of which C. H. Mead is general manager.

Clothier—The Boone County Coal Corporation, controlled by Philadelphia capitalists, has acquired the mines of the Coal River Coal and Coke Co., at Dobra, on Coal River.

KENTUCKY

Hazard—Frank Raney, of Raney & Denham, civil engineers, has been named superintendent of the Hazard-Jellico Coal Co., which was formerly operated at the Harvey Coal Co., with mines on First Creek. E. E. Denham has become engineer for the First Creek Coal Co. These coal properties have been taken over by Jouett, Biglow & Brooks, of Detroit, Mich., and have named E. L. Douglas, former manager of the Harvey Coal Co., as general manager of the combined interests.

ILLINOIS

Gillespie—Workmen have installed the tipple scales in the tipple at the Superior Coal Co.'s mine No. 4, a new mine. As soon as the main shaft is completed coal will be hoisted that way. From 300 to 400 tons are being handled now and a much larger production will be made when the tipple is ready for use.

The Coyne Drill Co. has begun testing operations half a mile north of here. If the results are satisfactory a mine will be sunk by a company which is being organized by G. W. Schmidt, S. M. Westwood, W. E. Schmidt and others. A new building addition will be laid out adjacent to the development.

Pana—An explosion in the Shoal Creek mine Apr. 12 wrecked the air shaft and the fan. It is believed to be the work of I. W. W. workers. About ten days ago ten sticks of dynamite were found in the mine, but the fuses had burned out without any damage being done. Since that time many of the miners have refused to work in the mine.

Toluca—The Toluca Coal Co., operated by the Jackson-Walker Coal and Mining Co., is installing improvements to cost $175,000, including steel tipples and modern power plants and mining machines. This will increase the tonnage from 1000 to 1800 tons a day. The same company is installing a new power plant at Marceline, introducing mining machines and crushers to crush all production for railroad purposes. The tonnage in southwestern Kansas, Frontenac, has been increased by reason of new mines from 2000 to 4000 tons and a further increase will be attained by fall, from openings of mines and development of present ones.

Farmersville—The ownership of the Farmersville coal mine is being investigated by the Government. When it was sold at receiver's sale several years ago it was bought by boadholders in Germany and is supposed to still belong to them. If this is found to be the fact the mine will be seized by the Government and disposed of. The mine has a 14-ft. vein on excellent quality, but there is no rock above it to act as a roof, which makes mining expensive. It is probable that if a sale takes place an effort will be made to reopen it.

Springfield—County Clerk Byers has been authorized by the Government to issue licenses to miners to buy fuse. Some time ago Government inspectors ordered that no fuses be sold to the miners except at the mines where they were employed. Protest was made against the restriction, on the ground that fuse by itself is not an explosive, and the miners asked to be permitted to buy from merchants, who sometimes sell at a lower price than the employers. Hereafter miners who hold licenses may purchase the fuses wherever they please.

OHIO

St. Clairsville—The Pursglove-Maher Coal Co. is making plans to open a new mine to tap the coal owned by it between Glencoe and the Chambers schoolhouse south of here.

Cannelville—The Brush Creek Coal Co., of Columbus, recently chartered with a capital of $25,000, has acquired a coal property near here, on the Toledo & Ohio Central R. R. The operation has been in idleness for several years and steps have been taken to resume operations. E. I. Washburn is president and general manager.

Athens—The Cincinnati Mining Co., chartered some time ago with a capital of $300,000, has taken over the property of the Luhrig Coal Co., consisting of approximately 2500 acres on the Baltimore & Ohio. The operation of the property will be pushed by another corporation, known as the Luhrig Collieries Co. Officials of the New York Coal Co. are interested in the two companies.

Foreign News

North Sydney, N. S.—Coal areas at Sydney mines have been taken over by the Indian Cove Coal Co., of Boston. T. H. Hartigan of the Nova Scotia Steel & Coal Co., has been selected president and general manager. The areas which adjoin those of the Scotia Co. and are at tidewater, are extensive. The colliery, which is already a going concern, is expected to produce about 300 tons a day.

Fernie, B. C.—The annual report of the Crow's Nest Pass Coal Co., Ltd., showed net profits for 1917 of $57,635, as against $340,501 in 1916. The balance at credit of profit and loss was $381,013. The coal mined during the year was 504,768 tons, as against 910,839 tons in 1916, and the coke produced 146,533 tons, as compared with 268,989 tons. The decrease in tonnage was due to a five months' strike and labor shortage. During the year the company spent $125,102 on improvements and developments.

Toronto, Can.—The manufacture of briquets from the lignite coal of Saskatchewan is to be undertaken on a large scale by the Canadian government acting in conjunction with the provincial governments of Saskatchewan and Manitoba. A recommendation to that effect was made by the Advisory Council for Scientific and Industrial Research in pursuance of which a briqueting plant capable of producing 30,000 tons of briquet fuel per year will be erected in Saskatchewan, where there are extensive lignite deposits in the vicinity of a good market for the ouput. The estimated cost of the plant, including the outlay for operation and administration during a sufficient period to establish a commercial process is $400,000, of which $200,000 will be borne by the Canadian government, Saskatchewan and Manitoba contributing $100,000 each. The plant will be managed by a commission which will shortly be appointed.

Personals

W. E. E. Koepler, of Philadelphia, Penn., has been elected secretary of the Pocahontas Operators' Association, headquarters to be at Bluefield, W. Va.

N. M. Garland, of New York, district manager for the Ohio Brass Co., of Mansfield, Ohio, has been elected a member of the board of directors of that company.

O. P. Chatfield, formerly of the Big Sandy, Ky., field, has been appointed general superintendent for the Kanawha Central Coal Co., which recently acquired the holdings of the Black Band and Brier Creek companies at Olcott.

William H. Patton has resigned as Exide depot manager for the Electric Storage Battery Co., of Philadelphia, Penn., to accept a position as salesman for the Ironton Engine Co., making his headquarters at Pineville, Ky.

J. R. Smith, of Jasper, Ala., has been appointed associate mine inspector, vice Thomas Roscoe resigned, effective May 1. Mr. Smith will have jurisdiction over the sixth district and will serve during the administration of Governor Henderson.

C. W. Chappelle has resigned his position as district engineer of the Cleveland office of the Electric Storage Battery Co., of Philadelphia, Penn., to take the management of the St. Louis office of the Ironton Engine Co., with headquarters at 314 North Fourth St., St. Louis, Mo.

Robert S. Blake, one of the founders of the Blake Electric Manufacturing Co., of Boston, Mass., and more recently connected with the Condit Electric Manufacturing Co. as Pittsburgh district manager, is now with the Duquesne Electric and Manufacturing Co. in the capacity of Chicago district manager.

E. L. Sparks, lately Industrial Editor of "Engineering News-Record," has been appointed New England representative of the Ball Engine Co., manufacturer of Erie revolving shovels. Mr. Sparks has had considerable experience in construction work having done a great deal of pioneer work for the Southern Pacific in New Mexico.

M. E. Haworth, of Pittsburgh, Penn., has resigned his position as chief draftsman in the engineering department of the United Coal Corporation to accept the position of chief engineer in charge of construction with the Cambria Collieries Co., with headquarters at Bellaire, Ohio. Mr. Haworth will take up his new duties early in May.

Morgan W. Price of Hazleton, Penn., attached to headquarters of the first aid department of the Lehigh Valley Coal Co., has resigned to accept a position with the C. M. Dodson Coal Co., which operates in the coal fields of Pennsylvania, Virginia and Maryland. Mr. Price has been connected with the Lehigh Valley company for more than 10 years and was considered one of the most efficient men in first aid work in the hard coal region. He will be engaged in a similar capacity with the Dodson interests.

Industrial News

New York, N. Y.—The Homestead Valve Manufacturing Co., of Homestead, Penn., has opened a branch office at 1 Franklin St., New York City.

Louisville, Ky.—The firm of Volkman & Kerlin, one of the older retailing concerns of Louisville, has been dissolved, M. D. Volkman having withdrawn from the concern, which in the future will be conducted by C. M. Kerlin, who has been the junior partner.

New York, N. Y.—The Hyatt Roller Bearing Co. announces that it has opened completely equipped engineering and sales offices in the Metropolitan Tower. All information on Hyatt bearings can be obtained quickly and correctly from these offices, and the concern advises that all communications be sent to the new address.

Columbus, Ohio—The announcement came out of Washington last week of the resignation of Homer H. Johnson, of Cleveland, who has been Ohio Fuel Administrator for about six months. No reason was given for the resignation and no successor was announced. No information could be secured from the Ohio Fuel Administration office.

Madisonville, Ky.—The O. & R. Coal Co., which recently took over the "No Clinker" mine at Grapevine, has incorporated with a capital of $20,000 and a debt limit of $100,000, to handle coal, oil and gas development projects. The company plans installation of a tramway at its mine. James D. Overall, J. B. Ramsey, and others are named as incorporators.

Pittsburgh, Penn.—The Hyatt Roller Bearing Co., has established an office here at 1272 Frick Annex. W. J. Kearns and S. G. Little are the engineers in charge, and it is expected that the location of the office in this city will enable the Hyatt Company to give better service to the mine operators in western Pennsylvania, northern West Virginia, Maryland and Ohio.

Columbus, Ohio—The Colonial Coal and Coke Co., which is a large operator and retailer in the Buckeye capital, will soon open a new retail yard to be located on Cleveland Ave., near the Norfolk & Western tracks. A site has been purchased and the work of building the plant will start at once. It is expected to have the yard ready for operation by May 1.

Louisville, Ky.—Charles Powell, of Louisville, who recently organized the Powell Coal Co., of Whitesburg, Ky., plans development of several thousand acres of coal land now under lease. An electrically equipped plant and mining town will be installed at a cost of about $500,000. Plans are being laid for starting the work at an early date. Mr. Powell will be general manager.

Cincinnati, Ohio—President R. A. Colter, of the Coal Exchange of the Chamber of Commerce, has named a coal quotation committee which will have charge of securing and recording prices of coal for the official records of the chamber, with the following members: Thomas H. Richardson, chairman; W. T. Ulland, M. E. Lynn, William E. Minor, A. A. Liggett, F. B. Raines, James A. Reilly and R. S. Magee.

Charleston, W. Va.—A call has been issued by J. C. McKinley, president of the Richland Coal Co., and other coal operators in the state, to West Virginia mining men to meet in Washington on Apr. 23 for the formation of the West Virginia Mining Association, which is to be known as the West Virginia branch of the American Mining Congress of Washington, D. C. The meeting is set for 11 a. m. at the Munsey Building, Washington.

Lexington, Ky.—The Marion Coal Co., recently organized to develop the Branson coal lands at Indian Bottom, consisting of about 1000 acres of coal property, has purchased most of the machinery for an electrically operated plant of 1000 tons daily capacity. The officers of the company are John P. Gorman, president; George P. Morrison, vice president and treasurer; Robert Curry, secretary, and Harry R. Smith, manager. Offices are in the City Nat'l Bank Building, Lexington.

Centertown, Ky.—The Centertown Coal Co., incorporated last October with a capital of $160,000, plans development of 1,700 acres of land, and intends to have a daily capacity of 3000 tons of coal. Machinery contracts have been let. The promotors are P. O. McKinney, who is president and manager; W. Pratt Dale, vice-president; and Brent Altsheler, secretary-treasurer. The latter two men are of Louisville. The same interests are also interested in a new lumber mill at the same point.

Hazard, Ky.—The engineering firm of Raney & Denham has practically gone out of existence. Frank Raney has become superintendent of the Hazard-Jellico Coal Co., while E. E. Denham becomes engineer for the First Creek Coal Co. These properties were recently taken over by Jouett, Bigelow & Brooks, of Detroit, Mich. E. L. Douglas, formerly manager of the Harvey Coal Co., now the Hazard-Jellico Coal Co., has been named general manager of the Detroit company's interests in this section.

Springfield, Ill.—Notice of an embargo on "gas coal," to go into effect Apr. 15, has been received by A. D. Mackie, general manager of the Springfield Gas and Electric Co. The embargo is under the zoning order restricting that coal, which is mined in Pennsylvania, to use in that section. Illinois coal can be used for the manufacture of gas, but it is inferior to the Pennsylvania coal. The company has a supply on hand sufficient for 30 days. After that Illinois coal will probably have to be used.

Springfield, Ill.—The Illinois Central Railroad Co. is conducting a school of instruction at various shops and terminals on fuel conservation. Two cars are sent out to various division and terminal points, and lectures and demonstrations are given in coal saving. The cars are fitted with seats and the talks are given in the cars. It is the plan of the railroad company to acquaint its employees as fully as possible with the fuel problems of the purchasing department and of the best methods of coal conservation.

St. Louis, Mo.—The St. Louis Coal Club, at its annual meeting Monday night, Apr. 8, at the American Annex, elected H. B. Wessel, sales manager of the Kolb Coal Co., president for the ensuing year. The other officers elected were L. P. Coan, first vice president; C. M. Snow, second vice president; E. L. May, secretary; H. C. Richner, treasurer, and E. G. Ridgway, W. H. Riester and H. F. McDonald, directors. Wallace Crossley, Missouri Fuel Administrator, was guest of honor at the dinner and entertainment which preceded the election.

Boyerstown, Ohio—The Mining Safety Device Co., manufacturer of automatic safety mine car cagers, is introducing this equipment into many mines. Among those operations which have recently installed this company's cagers are the following: Rachel mine at Downs, W. Va.; New River Collieries Co. at Gun, W. Va.; Colorado Fuel and Iron Co. at Walsenburg, Colo.; Fernwood Mining Co. at Mine No. 2, Montana, Ark.; Southern Anthracite Coal Mining Co. at Russellville, Ark.; Pantha Creek mine at Auburn, Ill.; Byproduct Coke Corporation at its Nos. 18 and 19 mines in Franklin County, Illinois.

Columbus, Ohio—Chieftain Coal Co., of Columbus, incorporated for $30,000, has been organized by electing W. E. Wheeler, president; John W. Mason, vice president; F. F. Wilkinson, secretary, and Charles C. Green, manager. The company has purchased two operating mines, one located in Vinton County and the other in Noble County. The Vinton mine consists of 221 acres in No. 6 seam near Hope Station. The other property was purchased from the Central Ohio Coal Co., and consists of 77 acres located on the Ohio River & Western R.R. The product will be sold through the Wheeler & Mason Coal Co., Columbus.

Columbus, Ohio—A story is current of how the state of Ohio lost a half-million dollars which it might have realized on a coal deal. Last fall when the State Board of Administration was considering the policy of mining coal for the various institutions under its charge, it was given an option on a tract of Hocking Valley coal lands near Athens, at a price of $175,000. The option was allowed to expire. Some time ago, when it was decided by the board to again take up the project, attempt was made to get another option on the same property, when it was discovered that the holding had been sold to a New York syndicate for the sum of $775,000 cash.

Columbus, Ohio—Ohio wagon mines have been struck a hard blow by a recent ruling of the Federal Fuel Administration in ordering that no open-top cars be apportioned to such mines, where they are unable to secure box cars. Owners of wagon mines claim that they are unable to get sufficient box cars to take care of their output and that the ruling, if permitted to stand, will put hundreds of them out of business. The owners point out that it was the wagon mines of the state last winter that saved the situation and that they will be in the same position to help next winter, if there is an acute fuel shortage, if allowed to operate and ship their product. The ruling is an annulment of a former ruling permitting the use of open top cars by wagon mine owners.

Columbus, Ohio—One-fourth of the coal consumed by rural Ohio can be substituted by wood next winter, states Edmund Secrest, forestry expert at the Ohio experimental station. He estimates that the population on farms and in villages less than 2500 is 2,101,978, and that it consumes 1,890,000 tons of coal annually. By the use of available wood 12,000 carloads of coal would be diverted to war industries and that number of cars released on the already overburdened railways. This substitution would require 700,000 cords of wood, which it is claimed is now going to waste. Its value in stumpage and labor is estimated at $5,970,000. A campaign will be started urging wood as fuel for rural homes, churches and assembly halls.

Belleville, Ill.—The St. Clair Central Railway Co. has been incorporated by J. T. Taylor, W. C. Wolf and P. K. Johnson, of Belleville, and Louis E. Fischer and John Henderson, of St. Louis, to lease the properties of the Southern Illinois Traction Co. and extend the line, which has been constructed from East St. Louis to Belleville, through St. Clair, Washington, Perry and Franklin Counties to Benton, to be used principally for the transportation of coal. The Southern Traction Co. is now in the hands of a receiver and its affairs are being wound up in the United States District Court. The new company expects to operate the road in a short time as far as Belleville for the transportation of coal from three mines adjacent to it, and extend it to Benton as soon as possible.

St. Louis, Mo.—The St. Louis Fuel Committee, with the approval of Wallace Crossley, Missouri Fuel Administrator, announced Apr. 13 the summer scale of prices for St. Louis. On orders placed in April for April and May delivery the price is to be the same as at present. On orders placed in May for May delivery the price will be advanced 15c. a ton. On orders for delivery in June or thereafter the price will be 30c. higher than at present. The total advance of 30c. a ton is 21c. a ton less than was asked by the Coal Service Bureau, which introduced evidence to show that distribution cost had advanced 51c. a ton since last year. Administrator Crossley has issued a statement warning nonessential industries that if they fail to lay in early their next winter's supply of coal they will get scant attention when the supply is below the requirements of essential industries and domestic consumers.

St. Louis, Mo.—The Terminal Railroad Association filed with the Interstate Commerce Commission at Washington, Thursday, Apr. 11, its answer to the petition of the Chamber of Commerce for the removal of the bridge arbitrary of 20c. a ton on coal. The answer denies that St. Louis and East St. Louis are one industrial zone and that the charge is a discrimination against St. Louis. The charge of 20c. a ton, it is claimed, is not only for hauling coal across the bridges but for all terminal services. It is declared that there is a difference between St. Louis and Chicago, Minneapolis, St. Paul and other cities mentioned in the Chamber of Commerce petition, in the circumstances under which coal is delivered. It is claimed that transportation conditions since the present rate was granted by the Commission would justify increasing the rates instead of lowering them. A hearing on the petition will be held at the Jefferson Hotel on May 2.

Philadelphia, Penn.—At a meeting of the Philadelphia Wholesale Coal Trade Association, held on Tuesday, Mar. 26, 1918, at the Manufacturers' Club, it was decided to appoint a committee to express appreciation of the services rendered the association by its president, Noah H. Swayne 2d, while acting as commissioner at Washington of the National Coal Jobbers Association. The following resolutions were engrossed, suitably framed, and sent to Mr. Swayne at Washington: RESOLVED: That the members of this association owe a lasting debt of gratitude to Mr. Swayne for his untiring efforts in behalf of the coal trade during the past several months and for the very valuable assistance to the United States Government by his suggestions and recommendations to the United States Fuel Administrator. Be it further resolved that we express the unanimous assent of the entire membership when we say that Noah H. Swayne 2d has nobly and loyally done his whole duty and that we fully appreciate him and wish him every success.

MARKET DEPARTMENT

Weekly Review

Many Orders from Consumers—Dealers Unable To Get Coal To Satisfy Demand—Bituminous Coal Situation Getting Worse—Stimulus Needed for Greater Production

COAL-DISTRIBUTION plans go on apace; modifications are being made to the zoning system to facilitate the shipping of coal; the Fuel Administration is rapidly winding up most of its immediate problems—but the coal itself is lacking.

Repeated urgings that consumers lay in their next winter's supply of coal during the coming summer months have resulted in a flood of orders from domestic users, but the trade is at a loss to know how the demands are to be satisfied.

Supplies of the domestic sizes of anthracite coal are short, and the efforts made by a number of dealers to stock up proved unavailing. And this in spite of the fact that March was heralded as the banner month in the history of the anthracite industry. The situation is serious. Great improvement must be shown in the near future if the plans to have a large tonnage stocked this summer are to be carried out. Steam coal business continues to be active. Buying on the part of steam plants is good, and a marked disposition is shown by many factories to accumulate a surplus. Every available ton of steam coal is quickly taken up.

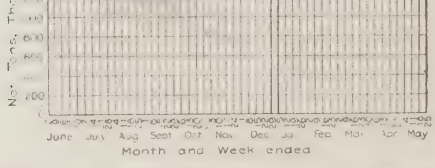
The bituminous coal situation is getting worse. So far as production is concerned the past month has proved to be as barren of favorable results as any month in 1917. The basic cause for the meager output is the poor car supply furnished by the railroads. Another obstacle is the unsettled question of the price to be paid for railroad coal. Despite the pressure being brought to bear upon the director general of railroads to renounce the fuel policy promulgated by John Skelton Williams, no tangible results are yet in evidence.

Owing to the lack of cars many of the large producing mines can work only half time. This is having a demoralizing effect on mine labor. In West Virginia the mine workers are deserting the mines for the large steel mills and munitions plants, as these industries hold out the promise of high wages and regular employment.

The settling of the railroad fuel matter and the introduction of an equitable plan for the distribution of empty cars to the mines will go far toward providing the much-needed stimulus for greater coal production.

COAL PRODUCTION

A decrease of 1,500,000 tons, or 14 per cent. as compared with the preceding week, marked the total output of bituminous coal during the week ended Apr. 6. The total production of bituminous coal (including lignite and coal made into coke) is estimated at 9,395,000 net tons. It is difficult to determine the rate of production per working day because of the unequal observance of Mitchell Day, Apr. 1 (anniversary of enactment of eight-hour law), as a holiday. Next week when the reports from individual operators will be available it will be possible to make allowance for the effect of the holiday in reducing working time. Comparison of the production of Monday, Apr. 1 of 16 roads reporting 10 per cent. of loading, with the average of the two Mondays previous thereto and Monday, the 8th instant, indicate that Mitchell



Day was equivalent to 0.4 of a regular working day.

The total production of beehive coke is estimated at 624,000 net tons, about 4 per cent decrease. The average per working day is estimated at 104,000 compared with 108,000 for the week previous.

Decline in production is reported by the western Pennsylvania fields 73.7 per cent. for the week of Mar. 23, to 61.6 per cent. for Mar. 30; Somerset County, Pennsylvania, from 49.6 to 36.9 per cent.; high volatile fields of south West Virginia from 59.5 to 49 per cent. and northeastern Kentucky from 63.1 to 47.9 per cent. Losses in production by these districts are mainly attributed to lack of coal cars. Losses on account of no market in the Kansas and Missouri fields rose from 19.2 per cent. for the week ended Mar. 30 to 26.8 per cent., although production in these districts decreased but slightly due to improvement in the car situation. In Iowa the decrease of 3 per cent. in production was due to losses on account of no market which rose from 20.5 per cent the week previous to 24.9 per cent. Oklahoma and Arkansas, however, report no market losses at 18.6 per cent.; 6.3 per cent. lower than last week.

Beehive Coke—Sixty-six operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report improvement in operating conditions during the week ended Apr. 6. These operators produced 306,320 net tons, or 67.2 per cent. of their full-time capacity as against 63.7 per cent. for the week previous. Losses due to car shortage declined from 24.3 per cent. for the week of Mar. 30 to 12.8 per cent., but labor shortage increased nearly 8 per cent. The week's performance, however, was the best since the early part of December. The same operators shipped 156,109 net tons of coal.

Byproduct Coke—The output of byproduct coke during the week of Apr. 6 was slightly below the production of the previous week, and the decrease is attributed mainly to labor shortage in Pennsylvania. The ratio of tonnage produced to actual capacity declined from 88.6 per cent. the week of Mar. 30 to 87.5 per cent. No material changes were reported by any of the states with the exception of Pennsylvania, where production amounted to 79.9 per cent. of full-time capacity compared with 83.8 per cent. for last week. The loss in this district is attributed to labor shortage, reported at 5.3 per cent. of full-time capacity, while no loss due to labor trouble was reported during the previous week. The lowest ratio of production to capacity was reported by Indiana at 78.1 per cent of full-time capacity.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: Mar. 16	Mar. 23	Mar. 30	Apr. 6
Bituminous shipments, 123 roads	190,298	191,127	189,546*	161,500†
Anthracite shipments, 9 roads.	42,265	42,487	43,642*	32,232†
Beehive coke shipments, 4 roads.....	13,218	13,643	13,320*	12,801†

* Revised from last report. † Subject to revision.

Anthracite shipments decreased from 43,642 cars for the week of Mar. 30 to 32,232 cars.

BUSINESS OPINIONS

Bradstreet's—War needs naturally grow at a great rate, and industrial operations in lines essential to them continue to expand. Cereal crop news is exceptionally favorable, whatever may be conjectured as to storm effects on northern fruits and southern truck. Wholesale trade in staple commodities is probably as active as could be expected, seeing that supplies are short, that quotations are inordinately high, and that the Government gives some indication of eventually extending a firm grasp over the price situation in many lines of manufacture.

American Wool and Cotton Reporter—The woolen goods situation has been much upset by what amounts to the commandeering of available machinery for fabrics required by the Government. Little change is expected in the woolen goods market for some time to come. Production will be largely upon special fabrics and there will be little available production for ordinary distribution. During the week under review the only change in the cotton goods market has been the comparatively small trading. Altogether the cotton goods market may be characterized as a runaway market. Prices appear to be at or very near the top. The demand for goods is much smaller than it actually appears to be and existing conditions create high prices.

Marshall Field & Co.—Current wholesale distribution of dry goods is ahead of the heavy shipments for the same period a year ago. The total volume of road sales for both immediate and future deliveries shows a good increase over the large volume of the corresponding week of 1917. Merchants have been in the market in fewer numbers. The market on domestic cotton goods is strong. Collections continue good.

The Iron Age—This week most plate mills are running 100 per cent. on Government and Ally work, save such part of their product as in ordinary practice cannot meet ship requirements. Great Britain is getting 5000 tons of plates a week to apply on the 300,000 tons her yards are to have in return for British advances of munitions and other steel to the American army in France. The War Industries Board is urging the Railroad Administration to take Bessemer steel rails instead of open hearth as far as possible for this year's renewals, so that all the open-hearth steel needed may be available for shells and other war requirements.

Somewhat lighter rail sections are also suggested so as to conserve steel.

Dry Goods Economist—The sudden stoppage of trading in wool in the Boston, Philadelphia and New York markets and the prospect that the production of wool fabrics of all grades for commercial purposes will be halted until August, or later, have formed the principal topics of discussion in dry goods circles this week. To what extent cotton dress goods can take the place of woolen and worsted fabrics is likely to be demonstrated next winter if the supply of raw cotton proves equal to the demand. Prices of cotton goods will probably be stiffened as a consequence of the increased call now looked for. Spot cotton was quoted on Wednesday at 35c. per lb., a decline of 1c. from the high price reached last week.

Atlantic Seaboard

BOSTON

Some progress on "contracts," and shippers show more confidence in receipts by water. Still a large number of plants not "covered." Unsettled question of railroad fuel one of the obstacles. New England all-rail factors decide to oppose assigned cars for engine supply. Order that bunker coal be confined to high-grade low volatiles another cause of realignment, together with Government 65 per cent. ruling. Meanwhile production lags. Hampton Roads piers short of coal. New England Fuel Administration gives attention to zoning of consuming territory. All-rail embargoes lifted on Apr. 11. Anthracite deliveries still disappointing.

Bituminous—The rehandling factors at Boston and Providence having opened the way by "covering" the consumers who regularly look to them for supply, several of the all-rail shipppers have arranged "purchasing contracts" which are assumed to guarantee to the buyer their best efforts to secure coal. The all-rail shippers, however, have lately stated their inability to get assurances from operators beyond 50 to 60 per cent. of the tonnage they were able to engage last year, and it is obvious that a large number of New England plants are leaving no stone unturned in their attempt to get their supply lined up. A large volume of anthracite steam sizes down to silt and culm has been placed, and everyone knows this would not have been done if good steam coal was thought in prospect in sufficient quantity. In spite of spasmodic outcry against using car service on stuff that runs 30 per cent. ash, the outlook is for a big increase in its tonnage this year.

Distributors of water coal inland who were guarded in making commitments six weeks ago have now closed with their 1917 customers for 100 per cent., some rehandlers making a price subject to increases in Government prices, freights, etc., and others making no price but on a cost-plus basis. In this way a large tonnage has been covered. There seems to be a new optimism among the Hampton Roads shippers over the New England prospect, due apparently to the assurance that a large number of boats, including steamers from off the lakes, will be placed in the coastwise service. Some dependence also is being put upon the extra volume of Pocahontas and New River that is expected to flow east under the zoning plan. Certainly ideas of price have been modified the past week on spot coal f.o.b. Boston and Providence. Pressure brought to bear by the New England fuel administration has tended to bring prices down to a cost-plus basis, and from now out there is likely to be less complaint along this line.

Production is sagging off while important questions remain unsettled. A mine operator who tries to do the fair thing by the Government and by his accustomed trade sees his men leave and he is rapidly being deprived of an organization it has taken years to build up. It will require most skillful handling on the part of the fuel authorities to avoid a far worse situation this fall than obtained at any time the past winter. The reservation that operators shall not contract for more than 65 per cent. of output is another serious influence on production.

The shortage of coal at Hampton Roads is another sign of the times. We are constantly being assured that more boats will be forthcoming, but shippers are not likely to take on boats unless there is reasonable assurance that the coal will be brought to tidewater. It has been officially affirmed that New England needs this year 20,000,000 tons by water. This means nearly 1,700,000 tons monthly, against which the average for January, February and March was 667,000! Certainly there will have to be some speeding up before long.

The New England fuel administration is beginning seriously to take up the question of zoning New England territory as between shipments all-rail and those by water. It is felt that a considerable gain can be made by restricting points within a short distance of Tidewater to water shipment, and should rail movement be relieved to that extent the congestion that was usual last winter will be obviated. It follows that any such action must be arbitrary, for the inequality in price is such that it will be impossible to make a regulation without drawing a hard-and-fast line. Wherever the line is drawn there is bound to be a lot of adverse criticism, but the feeling is so strong that next winter it is going to be a question of getting coal and not so much a question of price that the trade as a whole will back any reasonable arrangement. There is a feeling, for instance, that Maine should be entirely excluded from all-rail deliveries, and with this question up the conference which Mr. Storrow has called for the 22d will be an interesting occasion. All embargoes against coal into New England were lifted by the 11th instant.

Anthracite—All-rail deliveries show improvement over last week. Apr. 15 was the biggest day on anthracite through the New England gateways since Mar. 14, 803 cars being passed through. This, of course, includes junior sizes and culm, but is nevertheless a satisfactory showing, considering the congestion that has been the rule and the number of embargoes that were in effect ten days ago. The Boston & Albany and Boston & Maine show a movement about normal, and although the New Haven is still in poor shape as to deliveries via Maybrook and Harlem River there is really a considerable improvement even at those points. Not so much can be said for receipts by water. On barge shipments from New York and Philadelphia the tonnage is uniformly disappointing.

NEW YORK

Lack of coal a serious matter for New York. Record-breaking shipments apparently of little benefit to this market. Complaints are numerous and everybody demanding coal. Prospects for next winter not promising. Commercial bituminous scarce. Operators complain of car supply and deflection of employees. Railroads continue efforts to buy coal at low prices.

Anthracite—The last half of April finds the situation extremely serious. Supplies are short and efforts of the dealers to stock up result in nothing. The trade was interested in the statement of the Anthracite Bureau of Information that March was the banner month in the history of the anthracite industry, only to inquire where the coal shipped to market was sent.

Market conditions show no change for the better, but on the contrary are apparently growing worse. Taking the advice of the Fuel Administration the public have placed their orders for winter supplies but are unable to get the coal. Retail dealers are likewise unable to buy coal, and the wholesale offices are crowded at all times with dealers willing to take any of the domestic sizes obtainable.

There is not much hope held out for any improvement in the situation this month. Reports show that shipments for the first week of April were about 11,000 cars less than they were the last week of March and about 7000 cars less than the first week of the same month.

Dealers are apprehensive of the plan of distributing coal on the 1916-17 basis. Demand has steadily increased and dealers are fearful that if the plan is strictly adhered to there will not be coal enough to go around. Meanwhile the wholesale dealers are making every effort possible to induce heavier shipments to this market.

Stocks of the domestic sizes are low with no immediate betterment in sight. The steam sizes are in better shape and now, on account of the higher temperatures and the consequent let-up in consumption, stocks are larger and in some instances quotations are lower.

Current quotations, per gross ton, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.15	$6.90
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	4.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—There has been no change in the attitude of the trade toward the railroads in their efforts to secure fuel below the fixed Government price. Car supply is unsatisfactory and numerous complaints are heard from the miners because of the lack of work. Stocks of commercial coal are low at the docks but bunker fuel is in better condition. Generally speaking, the past month has been about as bad for the trade as any within the past year so far as supplies are concerned, but the demand has not been so urgent because of the higher temperatures.

Operators are not taking kindly to the efforts made to secure railroad fuel at lower prices than those fixed by the President, although they realize that failure to do so will probably mean that their mines will go without anything like a normal car supply, while those mines whose owners give in to the railroad companies will be provided with sufficient cars to permit them working nearly full time. Efforts are being made to have the Fuel Administration supported in its efforts to make the railroads pay the full Government price and also to provide an equal distribution of cars. The extraordinary efforts of the railroads to secure fuel has resulted, according to report, in at least one company having so much coal on hand that it was found necessary for it to dispose of some of the coal to individuals.

Some contracts have been closed with individuals at the full Government price, the dealer acting as purchasing agent.

Labor conditions at the mines are reported as serious. Many of the mines are working less than half time because of the poor car supply which, along the Pennsylvania, is less than 25 per cent., with no better reports coming from along the Baltimore & Ohio. Along the Western Maryland complaints are numerous and operators in addition are threatened with labor troubles.

Many complaints are heard regarding shipments. Some cars already on the road a full month have not been heard from at their destination. Some relief may be expected from an order expected to be issued the latter part of this week modifying the zone system of coal distribution as it affects Baltimore and Washington, and which change it is expected will insure increased shipments to this market and New England. There are reports to the effect that some shippers are shading the Government price on bunker and coal for export.

BITUMINOUS PRICES

	F. o. b. New York Gross	Mine Price Net	Gross
Central Pennsylvania	$5.06	$3.05	$3.41
Maryland:			
Mine-run	4.84	2.85	3.19
Prepared	5.06	3.05	3.41
Screenings	4.50	2.55	2.85

PHILADELPHIA

Anthracite trade stirred by return of winter storms. Receipts light. Heavy retail orders. Retail labor shortage. Big task ahead of fuel officials. Complaints of distribution plan. Bituminous shortage serious. Lack of cars still the cause. Miners suffer. Railroads try to contract. New bunker regulations. Priority list revised.

Anthracite—Unusual weather conditions, including severe rain, hail and snow storms, caused the dealers to forget all about filling cellars for next fall and winter and devote their attention to small orders of a ton or two for immediate use. The call for chestnut and pea was heavy and the short supply of many dealers was soon exhausted. If it had not been for the liberal shipments here during the latter part of March many yards would have been entirely out of supplies. April shipments to date have been light and the excuse has been that the distribution orders of the Fuel Administration were not clearly understood. No shipments were made by one large company until Apr. 10. However, there are hopes now that this market will be regularly taken care of, and this week some heavy consignments have been made to Port Richmond piers. Altogether the market has been in an unfavorable condition. Little progress has been made in retail deliveries and orders are piling up in the retail offices.

With the opening of spring the dealers are alarmed at the labor outlook, as help is growing scarcer and more independent each week. During the recent stormy weather every yard was shorthanded. Owing to the inferior preparation of much of the coal that came to market last win-

ter there are undoubtedly many dissatisfied customers who are now seeking new affiliations, yet are receiving little consideration from the more conservative dealers. There are others, however, who are taking every order that offers, inasmuch as they are covered as to price at time of delivery, and if orders cannot be delivered they lose nothing.

The fact that the operators are not allowed to make contracts with manufacturers for pea coal is giving the retailers considerable satisfaction, and they are expecting to receive greatly increased shipments of this size during the present coal year. They might, though, feel discouraged if they could learn of the almost unbelievable tonnages of buckwheat and the smaller steam sizes for which the operators are being called upon to reserve for steel and other preferential plants.

The present ruling of the local fuel administration forbidding more than two-thirds of an order calling for more than six tons, to be delivered until all the dealers' customers have received that proportion, is working a hardship on the retail men. They claim that many customers will withhold payment of their bills until their orders are completed and will use this as an excuse to hurry them.

While the independent's charge of 75c. above the companies' price is being accepted as a matter of fact, we find some in the trade who consider the arrangement only temporary and who look for an entire rearrangement of rates, both company and individual. This view is supported by the report from Washington this week in which the National Fuel Administration was reported to have said that a new coal price list and order of distribution had been prepared, but would not for the present be made public.

The steam coal market continues to display much activity, with all production quickly taken up. If there is any lagging at all it is with culm, but even this size has shown some added strength recently owing to the continued stringency in the soft coal market.

The prices per gross ton f.o.b. cars for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5.70	Rice	2.65	3.65
Stove	4.75	6.05	Boiler	2.45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—Meager supplies have been received recently and all industrial plants are running on close margins. Only one cause continues to be assigned for the shortage—no cars. Despite all the efforts that have been put forth by the mining interests they so far have been unable to get any tangible results from the railroads.

Ordinarily at this time of the year the industrial and utility plants hereabouts endeavor to accumulate coal, but now are really fortunate when they have more than a week's supply ahead of them.

The only thing of interest in the contract situation is the fact that the railroads have been endeavoring recently to place their year's business under the usual plan. However, with a fixed Government price they have been unable to do so and now face a heavy increase in fuel costs. It is rumored that the Railroad Administration is working on a plan to allow the companies to buy fuel from the usual sources at cost plus 10 per cent.

Shippers interested in bunker coal this week receive special instructions specifying the grades of coal which must be used in this business. The coals are classified as to their smokeless qualities, which are fixed at four grades for this part, being turned into pools of the local exchange numbered 1, 9, 10, 14 and 22.

BALTIMORE

Order cutting off Pennsylvania R.R. shipments to Baltimore district disturbs trade. Coal supplies low. Hard coal men plan for future.

Bituminous—The entire coal trade, and many consuming interests here, have been plunged into a further state of uncertainty by an order of the Fuel Administration which embargoes coal to this city and vicinity from originating points on the Pennsylvania, Monongahela and Huntington and Broad Top Mountain railroad connections, and all short line rail connections in Maryland, West Virginia and Pennsylvania. Under the zone system it is planned for the Baltimore & Ohio and Western Maryland railroads to make up the deficiency thus caused. As there is no intimation of the last two railroads being embargoed elsewhere, and both are now failing to meet even their existing obligations here, much uneasiness is caused in trade circles generally over the possibilities of the order. Consumers on the Pennsylvania lines in this section must rely on coal originating on the other roads and transshipped. Among those uneasy over the order are some coal men here who had relied on Pennsylvania R. R. mine connections to fill their business requirements. Jobbers who failed to protect themselves on the other roads must now hustle for new mine supplies and with little prospect of success. Even the jobbers who have Baltimore & Ohio and Western Maryland supply connections, many existing over years, are unable to promise customers what they will deliver, as the mines in most cases are refusing to promise supplies.

The bituminous supply situation here is most unsatisfactory. The only class of coal reaching here in anything like adequate amount is bunker fuel. This has a price difference of $1.35 for the operators and the difference is undoubtedly a big spur. Many industries here are already short of coal, and one of the important plants the past week was shut off for a time from power because the supply concern could not get coal. Conditions are far from promising, and the local fuel administrator can give no assurance of relief. The long line of red tape needed now to get preferential shipments for emergency needs has further crippled deliveries here apparently.

Anthracite—The hard coal men here are facing the fact that deliveries of anthracite here continue approximately light, and are largely planning for the future. A heavy business is going on the books. Some of the firms are making customers send checks for orders with their Federal applications, and then designating delivery periods, subject of course to the supply received by the dealer. The trade believes that consumers here will be lucky to have two-thirds of their needs in their bins when the next winter rolls in.

Lake Markets

PITTSBURGH

Late opening of navigation. Zoning system getting into operation. Practically sufficient byproduct coal. Market quiet.

A late opening of the lake shipping season is presaged by the general plan adopted for handling the lake coal and ore movement. The governing influence throughout will be the rail situation, the object being to avoid congestion at all points and to obtain maximum efficiency from the cars in service. The vessels will be operated subject to the requirements produced by the rail situation. Thus it is announced that the lake vessels will not buck the ice this season in order to secure an early opening of lake navigation, but will let Nature take her course, this suggesting free channels by Apr. 25 or later. The railroads are busy taking ore from Lake Erie docks and are expected to improve in condition from week to week, so that the later the better for moving the limited tonnages of ore and coal that are absolutely required. Coal shipments in force will not begin until the vessel movement is fully established.

There is little being done in the coal market. Nearly all the regular contract business was done before Apr. 1, subject to any new prices the Fuel Administration might possibly establish, though it was the common expectation that there would be no change in prices. Since the reaffirmation of prices was made some points have been added to a few contracts, but in general the business was done some time ago. There is little free coal being offered in the market, while there is not a great deal of demand. Shipments were not altogether satisfactory last week, but on the whole the situation is improving, and the zoning system is gradually working out into a more orderly distribution of coal. The byproduct coal movement, which is largely exempt from the zone restriction, has been practically satisfactory, the byproduct ovens with few exceptions receiving full supplies. The market remains quotable at $2.20 for slack, $2.45 for mine-run and $2.70 for screened coal, per net ton at mine, Pittsburgh district, with 15c. extra permitted to be charged by any broker regularly constituted as buying agent for a consumer or retail dealer.

TORONTO

Heavy demand from consumers anxious to stock up ahead. Dealers busy. No summer price reduction. Manufacturers oppose controller's restriction. Attempt to introduce Alberta coal.

The demand for coal continues unusually heavy, as consumers are anxious to lay in stocks in anticipation of a shortage next fall. Dealers are busy and supplies are coming forward well. The usual summer reduction in price is not likely to be made, as any reduction in price at the mines will be fully offset by the increase in freight rates. The order of the Fuel Controller limiting the supply to 70 per cent. of the year's normal requirements is strongly opposed by the manufacturers, who will appoint a committee to urge that it should be rescinded. Hydro-electric power is to be substituted for industrial purposes as far as possible. Fuel Controller Magrath has issued an order that in cases where such power can be economically installed the use of coal for power purposes may be prohibited. Some Alberta coal companies are endeavoring to introduce coal from the Western mines into the Toronto market, but none from that source has as yet been received. Dealers do not regard the movement as practical, considering that the freight rates will be prohibitive.

Quotations per short ton for best grades are as follows: Retail anthracite egg, stove, nut and grate, $10; pea, $9; bituminous steam, $9; slack, $8. to $8.50; domestic lump, $10; cannel, $11. Wholesale f.o.b. cars at destination as per present contracts, three-quarter lump $7 to $7.50; slack, $6.50 to $7. New prices as fixed by Government should be, for three-quarter lump, $6.11; slack, $5.18.

BUFFALO

Car shortage cuts down bituminous supply. Jobbers get their licenses. Little Pittsburgh coal to be had here.

Bituminous—The situation does not change much, though the car supply is so light that it is hard to get shipments through. Shippers complain that the railroad operating force is lax; for if it would do the work of listing and searching for cars that shippers are so often obliged to do, there would be much less delay. Often cars get to destination after all record of them has been lost.

The difference of price between thick and thin-vein coal is making it hard to get as much Pittsburgh coal here as is needed. Nobody wants to pay extra for the Allegheny Valley coal if Pittsburgh can be obtained, and so the demand for the latter has cut out the surplus entirely. Besides, the shipments to the lakes have begun and it looks as if the shortage will increase, especially if the car supply does not improve. The Pennsylvania, on which the shippers must depend for most of the Pittsburgh coal, is short of cars, while the Buffalo, Rochester & Pittsburgh and the Shawmut lines are not so short as they were.

Quotations, based on Government prices, f.o.b., Buffalo, are $4.45 per net ton for Allegheny Valley and Bessemer thin vein, all sizes, and $4.25 for lump, $4 for mine-run and $3.75 for slack, Pittsburgh or Bessemer thick-vein.

Anthracite—The local trade complains of lack of coal in all of the sizes except chestnut, and it appears to be getting none too much of that. Shippers are not much disturbed, as they say it is always the case at this time of the year. Large consumers with furnaces lay in the big sizes now. The shippers claim that they have sold more coal in Buffalo so far this season than usual.

DETROIT

Bituminous coal arrives in satisfactory volume. Anthracite shipments are disappointing. Lake rate is named for season.

Bituminous—Shipments of bituminous coal are apparently moving freely into Detroit, though jobbers say there has not been a volume of receipts so great as to create any free coal on tracks. The larger proportion of the shipments seem to be of coarse coal, with domestic lump predominating. Slack is not plentiful, though the supply is described as improving and jobbers predict the amount received will be increased when the loading of coal for lake shipment gets fairly under way.

With Detroit industrial plants operating at nearly capacity, turning out products essential for war, there is a well sustained demand for steam coal. Some progress is said to have been made by certain of the

manufacturing establishments toward building up a reserve, though the volume of requirements for daily consumption leaves no great amount of stock available for storage. Jobbers and wholesalers are warning their customers to make the most of the present opportunity, however, on the theory that receipts are likely to be curtailed when the navigation season opens, within a week or 10 days. Except for by-product and railroad coal practically all incoming shipments of bituminous coal are being handled through the Detroit terminal pool, the expense of the pool's operation amounting, it is said, to about 1c. on each ton.

Anthracite—While fuel administrators, federal and state, are urging household consumers to put in at once a sufficient supply of coal to meet next winter's needs, the quantity of anthracite coming into Detroit continues far short of expectations. The larger number of household consumers have heating equipment designed for use of anthracite, and being unable to obtain that kind of coal are unwilling to stock up with soft coal. Little or no coke is to be had and there seems no prospect of improvement in supply. The absence of Pocahontas and New River coal increases the demand for anthracite.

Lake Trade—Ice still closes St. Mary's River and St. Clair River. It is disappearing rapidly and lake navigation may be reopened the week of Apr. 21. The carrying rate on coal to ports at the head of Lake Superior has been fixed at 48c. for the season, which will apply also to a number of long time contracts.

COLUMBUS

Stocking of domestic sizes is still going forward actively. Weakness continues in the mine-run business, and prices in certain districts are being cut.

The coal trade in Ohio continues quiet, especially in mine-run sizes. There is a good demand for domestic sizes and consequently a good movement of that grade. Outside of cutting in certain districts prices are strong at the Government figures. The tone of the trade is generally satisfactory and production is fair. Car shortage on some roads is cutting down the output appreciably. Activity is expected just as soon as the lake trade is formally opened.

Domestic business is still one of the best features of the trade. Retailers are buying rather actively as stocking on the part of householders is quite active. Some sections are still waiting for the fancy grades such as Pocahontas and West Virginia splints, but on the whole the consumer is trying to get under cover for the next winter's supply of fuel. Stocking on the part of retailers has just about reached the limit of storage space. Pocahontas is quite scarce, but there is considerable other West Virginia grades arriving. The main portion of domestic business is in Hocking and Pomeroy varieties. Jackson No. 2 lump is also being stocked, but there is considerable weakness shown in No. 4 Jackson. Retail prices are firm at the levels which have maintained for several months.

The steam business is active to the extreme. Buying on the part of steam plants is good and there is a marked disposition to accumulate a surplus to guard against an emergency. This is especially true of public utilities, which were caught short handed last winter. Railroads are also stocking to a large degree. On the whole the steam business rules firm and all available tonnage, with the exception of mine-run, finds a ready market.

Production in Ohio districts has not been up to the records of previous weeks. This is due largely to shortage of equipment, more especially open top cars on certain railroads. This is explained by the order of the railroad director to have all ore moved from the lower lake docks before the opening of the lake season. As a result of the car shortage the Hocking Valley output was curtailed to about 80 per cent. and Pomeroy Bend about 70 per cent. Eastern Ohio is still suffering from shortage of cars and its production is estimated at 55 per cent.

CINCINNATI

Efforts to secure early ordering are proving successful, but the trade is finding difficulty in securing deliveries. Car situation is not improving as expected.

Realization of the necessity of storing coal for next winter's consumption during this spring and summer has been forced upon the public by the joint efforts of the Fuel Administration and the coal trade, and it is now fairly certain that there will be a continuous heavy demand for coal from all quarters during the entire period of warm weather. Whether the trade will be able to take care of that demand is becoming a serious question, however, as the situation at the mines in this section as to the supply of cars is giving cause for anxiety. The snows which fell during the past week, causing a decided stimulus in orders for immediate delivery on the part of domestic consumers, hampered the movement of freight somewhat, and emphasized the shortage of cars at the mines.

LOUISVILLE

Domestic demand excellent. Steam demand fair, with steam consumers holding out for better grades. Supplies low due to car shortage and shortage of labor, with few carlots being delivered to domestic consumers.

Sleet, snow and cold weather on Apr. 10, and a full week of cold weather, resulted in a regular December demand for domestic coal throughout Kentucky. Domestic consumers had let their stocks run out, and had figured on getting through the season. Retailers had trouble in taking care of the heavy demand which resulted, and which kept delivery departments working overtime.

Regulations under which western Kentucky coal could not go into New Albany and Jeffersonville, Ind., which were left out of the west Kentucky zone, have been modified at Washington to permit such coal to go into the two cities across the river from Louisville.

In eastern Kentucky as well as western Kentucky much labor is deserting the mines to go into agricultural pursuits, and production has dropped off considerably due to lack of labor as well as cars. Manufacturers and large consumers are getting particular about grades, and are demanding the best of coal of any stated grade, refusing to accept dirty coal. One large coal company reported the demand as so heavy that it was accepting about one order out of ten offered, and that it had found the demand for domestic coal to be heavier than for steam grades.

BIRMINGHAM

Trade active in both domestic and steam grades. Domestic stocking slow, dealers not being able to place their requirements. Output badly off due to irregular work and sickness among the mine workers. Car shortage not being keenly felt.

Inquiry among representative domestic dealers brings out the fact that stocking is proving extremely difficult this season, the output of the mines being prorated to such an extent that retailers are only able to place from one-quarter to one-third of their usual bookings. A dealer who had approximately 7000 tons on his yard this time last year reports that he has not over 1500 tons at this time. Consumers as a whole are showing an unusual degree of indifference about laying in their coal and the orders on the books of the yards are probably not over 50 per cent. normal for the time of year.

The Jefferson County Fuel Board has fixed a gross margin of $2.50 per net ton over mine prices for dealers, which will make the retail price of prepared sizes of Montevallo coal $6.50; Cahaba, Black Creek, Blue Creek, $5.60; Big Seam, $4.95; Corona, $5.25. This price must absorb the broker's commission when acting as purchasing agent for the dealer.

The steam market continues strong, the available supply being inadequate to fill requirements. It is reported in coal circles that the railroads will endeavor to place contracts under the mine prices now in effect. Any effort in this direction will be stoutly fought by operators, who for years prior to 1917 have been furnishing the railroads fuel at little or no profit—in some cases under cost. Contracts involving from one-half to three-quarter million tons taken in this field will expire June 30, if not cancelled by the Fuel Administration before that time.

Coke

CONNELLSVILLE

Car supplies improved somewhat, but reports misleading. Market quiet. Contracts absorb shipments.

It develops that the 100 per cent. car supply furnished Monday of last week was so far beyond the preparations of the operators, accustomed for many months to greatly restricted supplies, that the cars held over and not loaded made technically a 100 per cent. car supply not only on Tuesday but also on Wednesday, and thus there was the phenomenon of a 100 per cent. car supply, in railroad parlance, for three successive days, when the actual fact was that the total cars available for the three days fell far short of representing three times the full loading capacity of the region for a day, when ovens are all in operation. Finally the ovens got the cars loaded and then the rate of influx of cars into the region was shown by there being only 30 per cent. for Tuesday, 50 per cent. for Friday and 40 per cent. for Saturday. The actual supplies for the whole week were about 55 per cent of ratings, on an average, though the average of the technical supply, taken day by day, would come out at 70 per cent., altogether a misleading figure.

On the whole there is a better car supply, due partly to the railroads getting into better shape in general and partly to the work done by the authorities at Washington who are interested in seeing heavier production of pig iron and steel. This week's car supplies promise to average as good as those of last week, and the two weeks may show an average of shipments, per week, of about 375,000 tons, including coke shipped by water. This is probably the full requirement of the furnaces dependent on the region. The "Courier" report shows for the week ended Apr. 6 a production of 333,065 tons, a decrease of 19,370 tons, and shipments of 322,398 tons, a decrease of 60,310 tons.

The coke market continues quiet, as nearly all the shipments are absorbed by regular contracts. It appears that with few exceptions the furnaces are covered by contracts for the year. The majority of these are contracts made at flat prices, averaging about $8.25, while a few are on a ratio basis, depending on the price of pig iron, and a few are based on the current market for coke, being therefore adjusted weekly or monthly to the Government price of $6. Scarcely any contract business will expire June 30. As consumers would be willing to take extra shipments of coke, beyond their daily requirements, to accumulate a stock, increased coke shipments expected may not at once result in coke being offered in the open market. Offerings even of foundry coke are quite limited. The market remains quotable at the Government prices, $6 for furnace, $7 for 72-hour selected foundry and $7.30 for crushed, over 1-in., per net ton at ovens.

Buffalo—Jobbers report that they are practically unable to get any coke except the small amount of byproduct that is on the market, most of which is not suitable for regular furnace firing. The iron furnaces are losing their contracts by expiration and are looking eagerly for new connections. At the same time the coal supply at the coke ovens is poor, so that the output is light. With poor car supply both in and out the ovens are having a hard time to keep up with the demand. Furnace companies that did not set up as coke manufacturers when labor and material were more plenty are sorry. Buffalo has two large furnace companies that make their own coke and two that do not.

Middle Western

GENERAL REVIEW

Demand for prepared domestic sizes good, while screenings and slack market drag.

The failure of the railroads to start their storing campaign has caused operators to divert their attention to the preparation of domestic sizes, and they are having little or no difficulty in keeping their mines well supplied with orders for lump, egg and nut. During the past week railroad fuel agents have called meetings with their line operators, and this would indicate that purchasing agents are becoming alarmed at the solid front presented by the operators, who are in almost every instance contending they should not be asked to accept a figure less than that made by the Government. One of the inducements offered by the railroad is to take the output of mines with a full car supply, which argument is met with the statement by the operators that such a contract is within their belief contrary to the instructions of the Federal Fuel Administrator. At this writing special extraordinary prepared sizes are freely moving at the 20c. per ton premium price. Although some companies report difficulty in moving slack and screenings,

The maximum tonnage production in any mining district during the past week has not exceeded 85 per cent. In some localities 50 per cent. working time has been noted. However, there is an occasional railroad mine that has worked full time.

CHICAGO

One of the heaviest buying campaigns of the year by dealers was the feature of the past week.

Acting on the advice of the state fuel administrator, the dealers of Chicago have been active in not only putting all the coal possible into the consumers' basements, but in storing all the high-grade southern Illinois and Indiana coal that they could get. During the week quite a few dealers contracted for their year's supply, and in almost every instance such contracts call for equal weekly or monthly tonnage, with an understanding that should the operator at any time have any surplus they are willing to take care of it. This movement on the part of the dealers has been a lifesaver for some of the large producers in Illinois and Indiana, who had formerly provided considerable tonnage to the railroads.

Anthracite movement in this section is limited to those who have in past years had an established trade relationship, and those that have not been so favored are anxious to connect with some concern that will promise to furnish them with some hard coal.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00		.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00		.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00		.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Hocking	West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

MILWAUKEE

Coal docks are about bare, but a heavy run of cargoes is expected on the opening of navigation in a few days. Troubles of the coal administration are many.

With Uncle Sam performing the duties of jobber and solicitor free of charge, and almost ordering people to buy their coal supplies at once, it would seem that the coal man had reached Elysium, but he is having his troubles, nevertheless. Consumers still complain that some dealers are refusing to book orders, claiming they have no coal on hand. Fuel Administrator Fitzgerald's advice in all such cases is to go to the next dealer.

Urgent appeals are being sent out by county Councils of Defense for prompt reports on future coal needs, so that something definite as to the amount which may be called for at once by lake will be known by May 1. The docks are bare of coal at present, but the opening of navigation is only a matter of a few days, when Milwaukee will be in line to receive all the coal needed to meet the accumulation of advance orders.

Because of limited lake tonnage, it is aimed to increase the consumption of bituminous coal in the Northwest. The haul for this quality of coal is comparatively short, and it is believed the supply can be kept up all summer without detriment to rail tonnage.

State Fuel Administrator Fitzgerald has received the report of the Federal Trades Commission on the coal price situation in Oshkosh. The report shows that the average gross margin on all sizes of anthracite in April and May is $2.94 and $2.29, respectively, and that since $2 per ton is ordinarily an ample gross margin, it is clear the retailers of Oshkosh, on the whole, obtained unreasonable margins.

ST. LOUIS

Market extremely quiet, except on Carterville. Prices way below maximum and coal extremely hard to move. New retail prices will stimulate market some. Movement extremely slow and cars scarce. Anthracite shipments small. General condition shows improvement.

The conditions show signs of improvement here in view of the fact that new prices have been made by the St. Louis Fuel Committee on domestic coal. The lull in the market has been because of no prices for the public to buy on excepting last year's prices, and there seemed to be a feeling that this would be cut. When the new prices showing an increase were announced, on the 13th, there was an instant response in the retail demand.

For the month of April prices remain as they are, and on the first of May prices advance 15c. a ton on everything, and on the first of June another 15c. per ton. They remain at that for the balance of the season. The present prices on Illinois prepared sizes are: Standard, $5 per ton; Mt. Olive, $5.25; Duquoin, $5.50; Carterville district, $5.75; Big Muddy, $6.25; Anthracite, grate and egg, $10.75 per ton; stove and chestnut, $11 per ton.

On account of the variance in the mine price on Arkansas coal there is a $2.50 gross margin on Arkansas-Oklahoma coal allowed the dealer on the semi-anthracite and also on Bernice anthracite. The gross on Spadra anthracite is $2.75.

The maximum gross margin of profit on steam coal delivered shall not exceed $1.50 per ton to the dealer. There is a reduction of $1 a ton to a wagon dealer and 75c. deduction to a domestic consumer f.o.b. dealer's yard. There is a sliding scale of prices for less than two-ton lots, allowing the dealer greater margin for delivery.

The dealers asked for an increase of 51c., basing that contention on figures submitted by Gregg & Co., who have for the past three months made a retail survey of the coal trade conditions. The figures submitted by the survey were accepted by the committee, but there was a difference on what constituted the proper net margin.

Conditions in the Carterville field are extremely good. Mines are working full, with exception of those unable to get cars.

In the Duquoin field conditions are satisfactory. There are plenty of orders and the only thing that prevents full working time is shortage of equipment. This also prevails in the Carterville field on the Iron Mountain and Illinois Central, and transportation conditions on both these roads are miserable. The Mt. Olive field shows almost steady work. The car supply is good and only at one or two of the small mines is there any trouble in handling the output.

In the Standard field, however, conditions are much different. The market has gone to pieces on this coal and there are rumors that some coal from this field has gone to Chicago in large quantities that sold for as low as $1.75 the mine. Locally it is offered as low as $2.25 for 2-in. lump and $1.65 for screenings. The 6-in. lump sells at $2.35 and $2.40.

Owing to the 20c. increase on prepared sizes, which is effective mostly in the Carterville field, the maximum market here is about as follows, beginning with the operator's price up to the jobber's commissions, and including the special prices:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@3.00	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@3.00	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 2 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 3 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 4 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 5 nut	2.15@2.40	2.15@2.40	2.15@2.40
2-in. scrgs	2.15@2.40	2.15@2.40	2.15@2.40
2-in. lump	.....	.....	2.25@2.50
3-in. lump	.....	2.50@2.65	.....
Steam egg	.....	2.35@2.50	2.25@2.40
Mine run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	2.65@3.00	2.65@3.00	2.65@3.00
No. 2	2.65@3.00	2.65@3.00	2.65@3.00
No. 3	2.65@3.00	2.65@3.00	2.65@3.00
No. 4	2.65@3.00	2.65@3.00	2.65@3.00
No. 5	2.15@2.30	2.15@2.30	2.15@2.30

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

SEATTLE

Coal prices are readjusted on a sweeping scale and retail dealers' profits fixed in drastic measure.

A complete and comprehensive reclassification of the coal produced in the state of Washington, with maximum prices fixed on every grade put on the market, has just been put into effect. Readjustment of retail prices in accordance with the new mine prices has also been made and is the result of over four months' close study of dealers' costs by the local fuel administration, as recommended to the National Administrator.

The fuel administration announces classification of bituminous coal mines and maximum coal prices at the mines for the state of Washington, on the lines heretofore laid down by the President in fixing the prices of coal. If, upon completion of the investigation now being made of operators' costs in the fields affected, it is found that these prices are not justified, further modifications will be made at once.

No run-of-mine coal is to be sold from King, Pierce, Skagit or Lewis County bituminous fields except in cases of emergency, prices to be fixed by the fuel administrator. The maximum retail prices of coal which may be received by Seattle dealers shall be determined as follows. Bunker Sales—On sales of coal from dealers' bins or bunkers the dealer may add to the prime cost of one ton of 2000 lb. of the kind of coal specified the following margins:

Class 1, lump nut, egg, lump nut or lump egg mixture, $1.10. Class 2, mine-run, mixed steam or special steam, $1. Class 3, pea, buckwheat and finer sizes, 75c.

General Statistics

ANTHRACITE SHIPMENTS IN MARCH

March was the banner month in the history of the anthracite industry as is indicated in the record of shipments as reported to the Anthracite Bureau of Information at Philadelphia. The shipments by carrier companies in March, 1917 and 1918, and for the coal year, were as follows:

	March, 1918	March, 1917	Coal Year, 1917–1918	Coal Year, 1916–1917
P. & R. Ry	1,339,051	1,374,051	14,798,496	12,915,229
L. V. R.R.	1,355,933	1,234,871	14,221,783	12,169,141
C. R.R. of N. J.	777,642	785,209	8,376,398	7,270,945
D., L. & W. R.R	1,155,587	1,162,230	12,528,523	10,938,844
D. & H. Co.	861,253	728,857	8,754,113	7,247,090
Penn. R.R.	519,806	517,704	5,643,501	5,519,220
Erie R.R.	864,968	792,453	8,840,579	7,722,506
N. Y. O. & W. Ry.	199,680	185,496	2,065,236	1,925,038
L. & N. E. R.R.	356,888	323,157	4,027,449	2,858,336
	7,430,808	7,104,028	79,256,078	68,566,349
* Deduction	*154,031	*114,953	*1,503,763	*789,760
	7,276,777	6,989,075	77,752,315	67,776,589

*Deduction: Tonnage reported by both C. R.R. of N. J. and L. & N. E. R.R.

COAL AGE

Volume 13 NEW YORK, APRIL 27, 1918 Number 17

Putting the Roof on First

By FLOYD W. PARSONS

IT IS necessary to complete a foundation before we can build high and safe. It is slow traveling when we place the cart before the horse. It cannot be denied that some of this Nation's present plans and policies bluntly ignore fundamentals.

The Government has entered on a shipbuilding program destined to practically bridge the ocean. We all applaud, for we see the necessity. But let us inquire, how are we going to fill the ships if we haven't sufficient locomotives and cars to haul the supplies to tidewater? The slogan "Build Ships" is fine, but we had better add another—"Build Locomotives and Cars," especially the former.

It appears incredible, but it is a fact that the American railroads today are not only attempting to handle the present enormous freight tonnage with practically the same number of cars and locomotives that were employed by these same roads three years ago, but they are using engines and cars that are badly in need of repair. The transportation shortage today is about 150,000 cars. With our present plants, we can manufacture not more than 80,000 cars this year, while 150,000 are necessary to carry out our minimum war plans.

In the face of a railroad construction program that will hardly replace engines and cars going to the scrap heap, it is difficult to avoid questioning the wisdom of other Government officials who plan to build an endless variety and number of war plants throughout the country when present mills, factories and mines are working only part time. Is it not better to bring present plants up to capacity before we clog our already inadequate transportation lines with materials for building additional works?

The productive capacity of all our great industrial regions is limited by the railroad gateways serving these districts. Let us take for instance the busy Lehigh Valley region in Pennsylvania, where great steel and munition plants are located. It is a fact that if the war works located here were to operate at 85 per cent. capacity it would be impossible for the railroads serving the region to handle a pound of unessential freight. There are other districts that present a similar case, so that it is plainly evident what is going to happen very soon to lines of business not necessary to the conduct of the war.

A further case of building from the top down is shown by the drafting of miners. In one of the most important anthracite districts 2½ per cent. of the entire population has enlisted for war service, whereas the average for the country is only about 1 per cent. The reason for this is that miners constitute a class of men who are disinclined to await being drafted. Hundreds of these men enlisted from each coal district, and later, in arranging the draft, no recognition was given to the fact that these same regions had already furnished their quota. As a consequence, the labor situation in the anthracite field is critical; but, notwithstanding all this, draft boards are still refusing to place these men on a preferential list.

Coal is vital if we intend to play an important part in the war. We must have men to mine our coal, and we must have adequate transportation facilities to get this fuel to our war plants. Even ships, as necessary as they are, should come second.

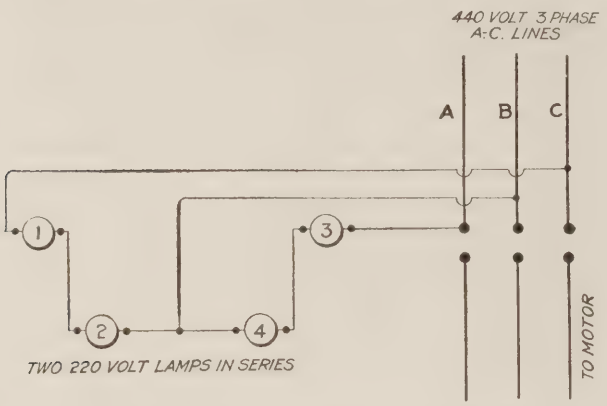
When will the agents of Uncle Sam in Washington see the necessity of building a solid foundation on which to erect our war machine? If the light does not dawn soon, such things as last winter's closing down order of all business will be as a summer zephyr to a tropical typhoon. The outlook was never so bad.

IDEAS AND SUGGESTIONS

A Phase Test Set

BY FRANK HUSKINSON
Lafayette, Colo.

One of the worst troubles experienced with a three-phase alternating-current system is called "single-phasing"; that is, one of the lines may be broken at some point, generally at a set of fuses, or a break may occur in the line. Many small three-phase induction motors



SET OF LAMPS AT EACH THREE-PHASE INSTALLATION

will start equally well on two phases or three phases, and larger sizes will keep on running if one phase goes out.

The result of a three-phase induction motor running on two phases is that the windings will become hot and overheat to such an extent that the insulation becomes charred, and the wires will short-circuit together. Sometimes, also, the insulation breaks down between the windings and the motor frame. In a short time it then becomes necessary to rewind the motor.

In order to avoid starting a motor on two phases, and also as a visual sign that all three phases of the circuit or lines are right, I am using a set of lamps arranged as shown in the accompanying illustration at each three-phase motor installation, also at each main or branch line switch or fuse set.

A glance at the lamps will indicate the condition of the current. If phase *A* is open lamps 3 and 4 will not burn. If phase *B* is open lamps 1, 2, 3 and 4 will burn at one-half candle-power. If phase *C* is open lamps 1 and 2 will not burn. If all three phases are O.K. all four lamps will burn at full candle-power. A leak in a line is indicated by the lamps on that phase not burning up to full candle-power.

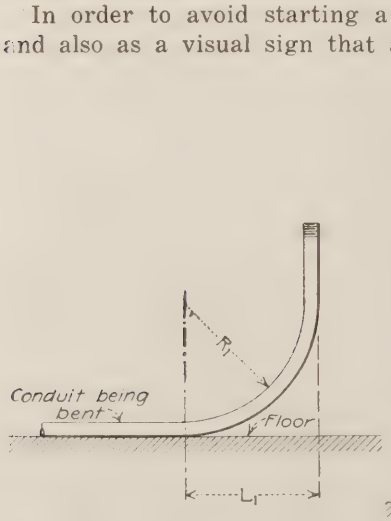
A phase test set should be installed at all alternating-current motor installations, and also at all switches and fuse sets. Such a set will save its cost many times over if it gives a warning once.

A single evidence of carelessness, even though slight, may destroy confidence which has been years in building.

To Shorten a Bend in Conduit

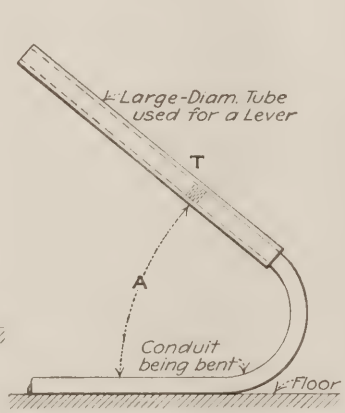
BY LESLIE C. DALTON

To shorten a bend in conduit (Fig. 1) which has already been formed, a tube *T* of such diameter that it will slip over the conduit is used as a lever (Fig. 2) and the end of the conduit, the operator standing on the other end to hold it to the floor, is bent back so that the angle *A* is somewhat less than 90 deg. Then the lever tube (*T*, Fig. 3) is slipped down further on the conduit and the conduit then bent back to a vertical position. Thus the radius of the bend may be decreased from that of R_1 of Fig. 1 to R_2 of Fig. 4. That is, the offset has been decreased from $L_1 = 19$ in. to $L_2 = 11$ inches. The entire operation is simple.



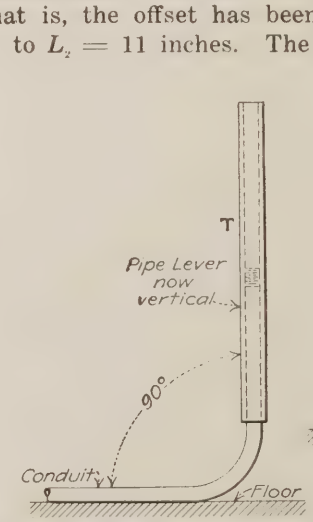
SHOWING THE ELBOW WHICH IS TO BE SHORTENED

FIG. 1



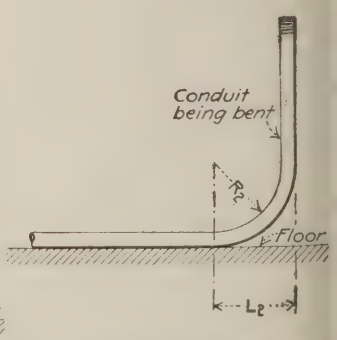
METHOD OF SHORTENING THE BEND (First Operation)

FIG. 2



SHORTENING THE BEND (Second Operation)

FIG. 3



COMPLETED BEND

FIG. 4

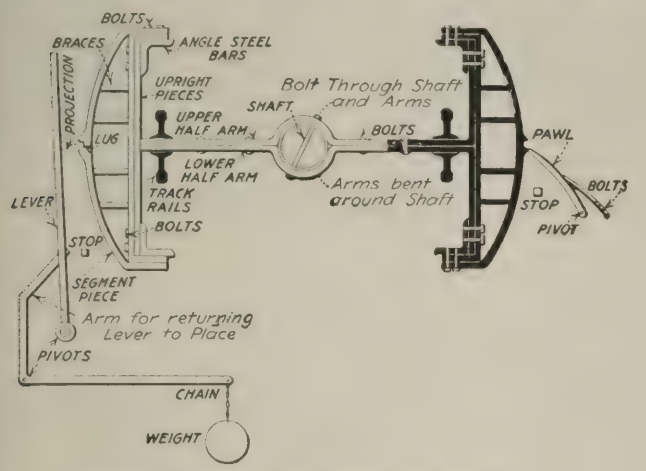
FIGS. 1 TO 4. OPERATIONS FOLLOWED IN ORDER TO SHORTEN A BEND IN CONDUIT

Rotary Car Dump for Boiler Room Coal

By Ralph W. Mayer
Connellsville, Penn.

Dumping coal at the boiler room or at a mine just being developed, which is sometimes a more or less difficult operation, may easily be accomplished by the aid of a rotary dump. Such a contrivance may be readily and inexpensively constructed.

For such a dump as that shown in the accompanying illustration a piece of 6-in. pipe serves as a shaft. Bars of strap iron about ⅜ x 2 in. are so bent as to half encircle the shaft and extend outward at right angles to it. These are firmly clamped in pairs upon the shaft and a hole drilled straight through each pair of straps and the shaft. A bolt is then placed in this hole, which effectually prevents the arms from turning upon the shaft.



DEVICE ASSISTS THE DUMPING OF COAL

At the proper distance from the end each strap is bent at right angles. The bent portion of each strap lies in the same plane as that of its mate, but the two extend in opposite directions. A bar of iron of the same size as that forming the arms is then bolted securely to the bent ends of the arms. About five sets of arms are thus built up upon the shaft, and track rails are securely attached upon each side of the arms.

A piece of angle iron with about 4-in. legs is next bolted across the ends of the bars attached to the ends of the arms. These angle irons, four in all, are parallel to and directly above the track rails and at such a distance therefrom as to permit the tread of the mine car wheels passing between the rails and the angle iron. The edge of the angle will of course then be in such a position as to prevent any considerable sidewise movement of the car by catching against the wheel flange. The angles thus form the track supporting the car when it is upside down beneath the dump. Slight depressions in these angles at the points where the car wheels rest will be sufficient to prevent longitudinal movement of the car.

Two pieces of bar or strap iron are now bent to the proper radius and bolted to the ends of each pair of angle irons at the end of the dump where the loaded cars arrive. These segments are securely braced to the crossbars holding the angle irons.

At the middle of each segment two wedge-shaped lugs are fastened by means of countersunk bolts with a space of about 3 in. between them. A notch is thus formed upon each segment into which a pawl may drop, thus stopping movement of the dump, while on the opposite side a suitable projection upon a hand lever holds the dump stationary. The pawl is pressed against the segment by a suitable spring while a stop prevents its going too far. The lever pivoted at its lower end is also prevented from moving too far by a suitable stop. The hand lever is pressed against its work by a weighted bell crank the upper extremity of which is bent at right angles to this arm and bears against the lever.

In operation the dump revolves toward the lever. In order to insure this movement the track rail upon this side of the approach is depressed about 4 in. below its mate upon the other side. The rails on the dump meet those of the approach and the car, upon reaching its proper place upon the dump, is slightly tilted toward the lever side. Its center of gravity is thus not directly above the dump-shaft center.

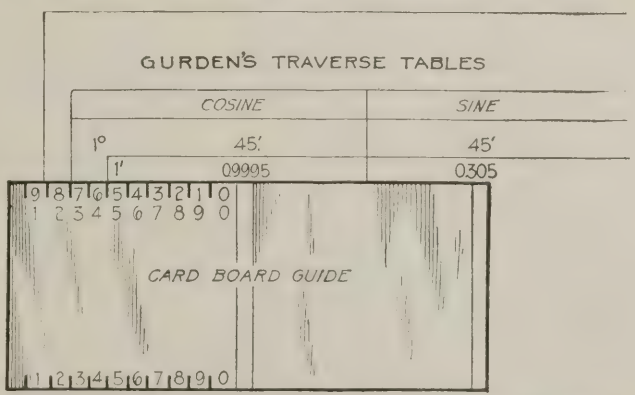
The dump should be made about a foot longer than the car it is to handle. The bearing upon either end of the shaft should be so set as to bring the track rails to the proper elevation. The shaft should extend about a foot beyond the bearing at one end of the dump. Here a wheel or pulley about 12 in. in diameter should be fastened and encircled by a band brake. This brake is used to prevent too rapid a rotation of the dump. It may be operated by means of a foot lever placed near the hand lever so that one operator can handle both.

Another Table Indicator

By Harry Goodnow
Duquoin, Ill.

Mr. Gurden has had so many "guides" devised to facilitate the reading of his tables that one more won't hurt him. I accordingly evolved the one shown in the accompanying illustration, which has been found handier than any we have tried heretofore.

A flat piece of cardboard is fitted over any page in the table and marked so that the "minute" indicator on the finder will come directly under the "foot" column of the tables when the parallel column indicators are under their respective decimals. For reading the tables up a secondary row of figures on the top or a row on the bottom can be used.



GUIDE FOR THE READING OF TRAVERSE TABLES

The advantage of this guide is mainly in that it puts the minutes and feet together on the paper just as they are usually carried together in the head when glancing from the traverse sheets to the tables.



Byproduct Coke and Coking Operations*

BY
C. J. RAMSBURG †
AND
F. W. SPERR, Jr. ‡

THERE has been so much written and published bearing on the surprisingly large development in the building of byproduct coke ovens that it seems unnecessary further to emphasize this point in detail. Suffice it to say that in the three-year period—Jan. 1, 1915, to Jan. 1, 1918—byproduct coke production has practically doubled, and there has been as much gain in capacity as in the previous twenty years. The cause of this rapid increase has not been a desire to take advantage of the inflated prices for byproducts due to war conditions, but a financial condition favoring large investments brought about by the war, and making it possible to carry forward plans made previously for such development when opportunity presented. That many of the plants have been completed and put into operation at a time when they might take advantage of the high prices for tar, ammonia and benzols is a fortunate coincident and not a contributory cause.

While one is much impressed by the amount of money saved from the recovery of these byproducts and by the stimulus given to the chemical and manufacturing industries by the supply of such an abundance of raw materials, the most impressive fact is the conservation of our coal supply brought about by the introduction of modern methods. It may be of interest to put aside, for the moment, the question of profits obtainable from the sale of ammonium sulphate and other byproducts as materials of chemical industry and to make a few calculations simply from the standpoint of fuel values. To put the matter on the most conservative basis possible, let us figure such values in terms of coal.

Table I shows the fundamentals of the matter from this standpoint. This table shows a total fuel saving of 825 lb. of coal per ton of furnace coke. Please note in this that the fuel value of the gas is put not at its value compared with the coal necessary to replace it with producer gas, which is necessarily made at a low efficiency, but as against raw coal, B.t.u. for B.t.u. There is a further saving in the blast furnace. Reports from a large number of blast furnace plants indicate that a saving of 200 lb. of coke per ton of beehive coke formerly used is a conservative average figure. Figured back on a coal basis, these 200 lb. of coke represent 282½ lb. of coal at the beehive oven, so that the total saving amounts to approximately 1100 lb. of coal—0.55 ton—for each ton of byproduct coke made in the modern plant.

Since the ovens gained in operation from Jan. 1, 1915, to 1918, will produce practically 16,200,000 tons of coke per annum, it follows that these ovens will save annually to this country the fuel equivalent of 9,000,000

TABLE I. BYPRODUCT FIELDS FROM COAL SUCH AS NOW USED TO MAKE FIRST-CLASS BYPRODUCT COKE IN THE MIDDLE STATES DISTRICT. 85 PER CENT. HIGH VOLATILE, 15 PER CENT. LOW VOLATILE

		Fuel Value Equivalent Pounds of Coal
To make 1 ton furnace coke 1.4—1.5 tons coal required By beehive coking, the byproducts wasted have a heat value equivalent to 625 lb. of coal. At least 200 additional pounds of coal are wasted in the process of beehive coking by combustion.	Surplus Gas: 9,000 cu.ft., 550 B.t.u. Used as fuel.	350
	Tar. 12 gal. Used to make creosote oil, pitch, lampblack, various oils and dye materials.	133
	Ammonium Sulphate: 33 lb. (or, in form of 25 per cent. ammonia liquor, 33 lb.). Used for fertilizer, for refrigeration and for nitric acid and other chemical manufactures.	(No fuel equivalent)
	Benzols (as light oil): 4.5 gal. Used for motor fuel, dye material base, phenol and other chemical manufacture, solvent and cleanser	42
	Coke Breeze: 120 lb. Used as fuel.	100
	Total	625
	Add coal equivalent wasted in beehive oven	200
	Total economy of byproduct oven per ton of coke	825

tons of coal. While it is true that the total coal resources of America have up to this time hardly been scratched, nevertheless it is important to emphasize that this saving is taking place in low ash, low sulphur, high-grade coking coal—coal which, from its mining locations, naturally carries the most favorable freight and labor conditions, and as such is of vast importance—to us and to posterity.

*Presented by Mr. Ramsburg at a joint meeting of the Mechanical and Engineering Section and the American Society of Mechanical Engineers.

†Second vice president, the H. Koppers Co., Pittsburgh, Penn.

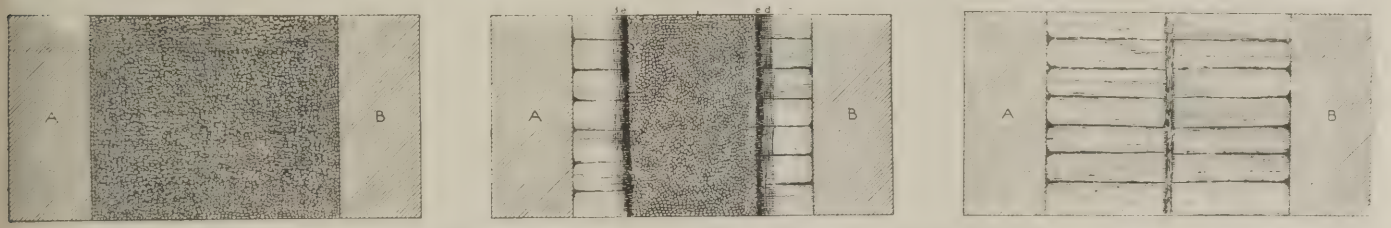
‡Chief chemist, the H. Koppers Co., Pittsburgh, Penn.

Looking backward over the years consumed in bringing the coke oven to its present stage of development in America, there are a number of events and conditions which stand out preëminently and may be considered as the high spots in progress. The first of these dates back to 1906. In that year the United States Steel Corporation was brought face to face with the necessity of formulating a definite policy as to its coke supply and, in preparation, appointed a committee of its leading engineers and works managers, whose object was to study beehive coking and byproduct coking and to make a recommendation to the company as to the course to pursue after a comprehensive study of the whole matter. This committee did not restrict its investigations to America, but spent a long period in England, Germany and Austria, studying with great care and attention to detail the most minute phases of the various processes submitted for consideration. It has been said that the report of this committee, which was headed by G. G. Crawford, now president of the Tennessee Coal, Iron and Railroad Co., was one of the finest and most complete reports ever presented on an engineering and general technical subject.

The advice of this committee was quickly acted upon by the corporation in the decision to build a byproduct oven plant at Joliet, Ill., in connection with the blast furnace and steel plant of the Illinois Steel Co., and to build that type of oven which they found to be giving the most efficient results in the European countries.

The success of this Joliet plant was so immediate, not only from a standpoint of economy of coke manufacture, but in the increased blast furnace capacity and efficiency, that the corporation without delay proceeded with the construction of additional plants of the same type, including the largest byproduct coke plant in the world at Gary, Ind., consisting of 560 Koppers ovens, and a plant of approximately the same size as the Joliet plant (280 ovens) at Ensley, Ala., for the Tennessee Coal, Iron and Railroad Company.

The second high spot was the selection of silica material for one of the oven batteries at Joliet. While some silica had been used on other types of ovens previous to this time, the use of it in the ovens of the Koppers type, with their inherent qualities of uniform heating due to their basic heating principles, intensified the value of this type of oven enormously, and put a new aspect on the entire coke situation. The value of the silica in this connection is due to four characteristics:



FIGS. 1, 2 AND 3. DIAGRAMS OF INITIAL, MIDDLE AND COMPLETED COKING STAGE IN BYPRODUCT OVEN



FIG. 4. CHARACTERISTIC BLOCKS OF BYPRODUCT COKE



FIG. 5. STANDARD BYPRODUCT COKE ON WHARF AT OVENS

(1) The conductivity at high temperatures is superior to that of clay brick. (2) The fusing or softening temperature is much higher than that of fireclay. (3) The action under heat may be calculated with scientific exactness, due to its practically constant composition. (4) The expansion and contraction of silica material between 2000 and 2600 deg. F. is practically negligible, so that when the material has once been heated to within this temperature range (under which condition the coking operations are conducted) no further appreciable movement takes place.

The Koppers oven is designed to utilize all of these characteristics to great advantage. From the time that the silica battery (one of four) was first built at Joliet, Ill., no Koppers oven has been built in America of any other material.

The third high spot might be better represented by some other simile, since it was more gradual in its development. It consisted in a realization that with uniform heat distribution in the ovens and with the use of silica material much higher heats and consequent higher coking velocities could be employed and, further, that with the lower coking periods higher volatile coals could be used, with increased yields of byproducts and equally satisfactory coke.

The result can be demonstrated by the fact that the Joliet plant of the United States Steel Corporation, put into operation in 1908, was originally planned to use from 70 to 80 per cent. of low volatile coal, and the coking time was figured at 24 hours. The Koppers company is now building at Clairton, Penn., near Pittsburgh, a coke plant for the Steel Corporation of 640 ovens, and the plant is so designed that it may be operated on 15 hours' coking time and is expected to use 100 per cent. high volatile coal. Even if the 100 per cent. high volatile coal proves not to make quite as high grade furnace coke as the coke at Joliet, its use will work out on broad lines to better purpose and time will tell where the comparison lies, after opportunity has been given the furnace operators to adjust themselves to the new type of coke.

The effect on the products can best be shown by reference to Table II.

A comparison in value of byproducts on a basis of normal values shows a credit per ton of furnace coke of approximately $1.25 in favor of the high volatile coal.

The fourth high spot in development was the awakening to the fact that, while an increase in the cubical content of an oven tends to a reduction in plant cost

TABLE II. YIELDS OF BYPRODUCTS PER TON COKE

	Coal Mixture A. 80 per cent. low volatile, 20 per cent. high volatile.	*Coal Mixture B.* 100 per cent high volatile
Tar	6.5 gal	13.5 gal.
Ammonium Sulphate	23.3 lb.	38.0 lb.
Surplus Gas (debenzolized)	7500 cu.ft.	10,000 cu.ft.
B.t.u. per cu.ft. gas	500	560
Total B.t.u.'s in surplus gas	3,750,000	5,600,000
Light oil (benzols)	2.6 gal.	5.4 gal.

and in operating labor due to handling larger units, a decrease in oven width would more than offset this unit size advantage because of absolutely different conditions.

The reason for this becomes apparent with an understanding of the factors involved. Increased length of oven gives increased cubical content, and the ultimate economic length depends on the mechanical and structural limits. Of increased height the same may be said, except that this involves questions of time of contact of volatile products and speed of their flow which modify the advantage and which are yet to be finally worked out.

Increased oven width involves an entirely different consideration. Practically all the heat supplied for the coking of the coal mass flows from the two walls toward the center. This flow of heat depends, to a large extent, on the resistance and temperature, and in the coke oven the average rate of coking depends, of course, on the rate of heat penetration.

For example, it becomes apparent at once, in a comparison between a 16-in. oven and a 20-in. oven, that the following is true: (a) With the same temperature of wall the average velocity of coking in the 20-in. oven will be less than in the 16-in. oven, and the time required to coke the 20-in. oven will be more than proportionally greater than the 16-in. oven. (b) To coke the 20-in. oven in the same time as the 16-in. oven, the wall temperature must be increased very markedly. (c) To coke the coal in the two ovens at the same average rate, the wall of the wider oven must be considerably hotter than the narrower one. (d) With the same wall temperatures, more coke can be

made per day in the narrower oven than in the wide one. (e) To make the same amount of coke per day, the wall temperature in the 16-in. oven would be lower.

Four points are of great value in this connection: (1) Overcoked material is of less value in a furnace than a greener coke. (2) The wider the oven the more overcoked the outside layers will be and the larger the proportion of overcoked material for a given output. (3) The production of byproducts is enhanced by reducing the wall temperatures. (4) The life of oven brickwork is increased by being operated at lower temperatures.

The result of this reasoning was the decision, in 1914, to reduce the width of oven from 19¾ in., average then being built, to 18½ in. Plants of the reduced width are now in operation as follows:

	Ovens
Toledo Furnace Co.	94
Youngstown Sheet and Tube Co.	204
United Furnace Co.	47
River Furnace Co.	204

There is no doubt among those who have been acquainted with the wider ovens that the narrower oven has the following distinct advantages: (1) Less sponge in the coke. (2) Better coke from the same coal. (3) As good coke from higher volatile mixtures. (4) Higher yields of tar, ammonia, and benzols. (5) Low temperatures for the same coking velocity.

We shall now consider the fifth high spot in coke oven development—namely, the universal recovery of benzols. This may be laid almost entirely to the war, but partly to the increasing demand for motor fuel. It was the war which furnished the primary inducement to developing this phase of the industry; but the fact that the material might be disposed of advantageously for motor fuel after the demand for explosives would cease had an important bearing in stabilizing the investments demanded.

Previous to the war comparatively few plants were equipped for benzol recovery; in fact, outside the plants of the Semet-Solvay Co., operated for their own account, there was comparatively little benzol extracted, and this was used, for the most part, in enriching illuminating gas. Today practically every coke oven plant in America has installed this recovery.

While the removal of benzol reduces the heat units in the gas, the loss in this manner is a very small factor, and the return to be secured from the sale of this product is likely to be greater than that secured from the recovery of tar. One feature of the benzol credit as related to motor fuel is the smallness of the quantity compared with gasoline production, and, since benzol and gasoline are miscible, the utility of benzol will be enhanced by increasing the quantities available.

Experiments recently conducted by a large oil company on its trucks and passenger automobiles proved that not only is benzol more valuable than gasoline as a motor fuel when used straight, but its effective value is increased by being mixed with gasoline. While these experiments are not complete, nevertheless they indicate that a mixture of equal parts of gasoline and benzol gives a value over 16 per cent. greater than that of straight gasoline, which shows 32 per cent. increased value for the benzol half. In 1917 there was produced in this country over 1,000,000,000 gal. of



FIG. 6. TYPICAL BYPRODUCT COKE AT OVENS

gasoline, so, while the value of benzol is stabilized, for this reason it cannot be a very great factor in the motor fuel situation. Every means should be taken not only to secure additional quantities from a standpoint of preparedness, but from a standpoint of motor-fuel supply.

In connection with the value of benzol as a motor fuel there is an interesting fact which may in the future have a very marked influence. Alcohol is in many quarters looked upon as the ultimate fuel, but it cannot be employed except with less efficiency and with greater difficulties, due to its high hydrogen content. Commercial alcohol and gasoline are not miscible. Alcohol and benzol are miscible and make a most efficient fuel, and, further, after the addition of benzol to alcohol the mixture will carry quite a high proportion of gasoline. The future may see benzol as the tie between gasoline and alcohol, permitting a piecing out of the gasoline supply and an introduction of alcohol as a commercial motor fuel.

So much for the introduction of benzol recovery into all coke plants, and for the salient points in coke oven development in America. We shall now take up a somewhat more detailed study of byproduct coke and its use in blast furnaces.

The phenomenal growth of the byproduct industry has stimulated a renewed interest in the main product. This interest is due, first, to the recent revolutionizing

of ideas regarding the relative values of byproduct and beehive coke. The tardy recognition of the fact that byproduct coke of a fairly wide range of origin, when properly used in the blast furnace, gives results not merely as good as, but much superior to, those obtained from beehive coke, was accompanied by a realization that the limit of efficiency had by no means been reached; that Grüner's "ideal performance"—long the *ne plus ultra* of blast furnace men—was actually

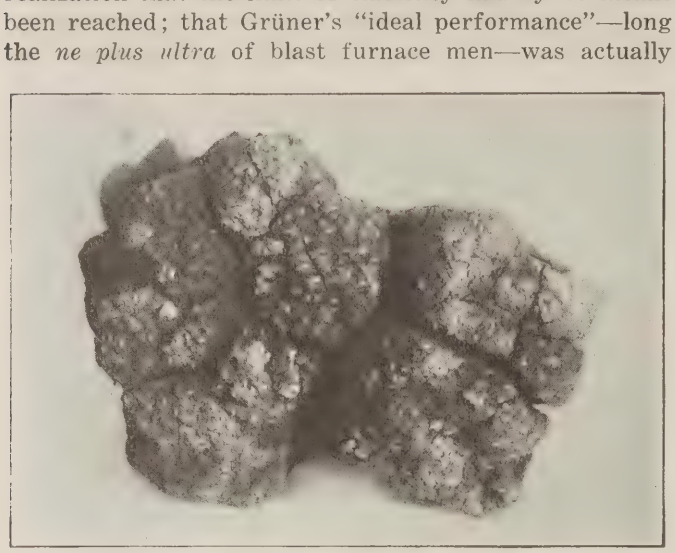


FIG. 7. COKE ADJACENT TO WALL OF OVEN

being surpassed by many blast furnaces, and that much regarding the question of coke economy still remained to be learned. In the renewed study of the subject that this realization is just beginning to stimulate, we have the inestimable advantage that the byproduct coke plants are being located in proximity to, and usually under the same management as, the blast furnaces that they are intended to supply, instead of being placed at the coal mines, long distances away, as was the case with the beehive ovens. Thus the blast-furnace operator knows better the sources of the material that he has to use and the conditions under which it was produced, while the coke plant operator can more intelligently regulate the performance of his ovens and the quality of his product, according to the requirements of the furnace. Above all, the combination and coöperation of the two plants result in a regularity of performance that is perhaps more to be desired than any specific quality of material. It is to be hoped that this coöperation may soon be extended to the foundry and other industries using coke as fuel.

It will assist in following the few descriptive studies of coke that we have to present, to give a brief account of the generally accepted theory of the coking process. The development has received such abundant confirmation from every practical standpoint that there can be no question of its soundness.

Let Fig. 1 represent a section across a byproduct coke oven immediately after the charge of coal is introduced. The layer of coal next to each wall *A* and *B* is rapidly heated. A complicated process of destructive distillation begins, and at a temperature of about 375 to 400 deg. C. the layer becomes soft and pasty. The pasty mass is for a while in a state of violent ebullition, due to the rapid expulsion of its volatile matter, and then rapidly solidifies, the indurated residue retaining the vesicular form and structure of the pasty, foaming stage.

The adjacent layer toward the interior has in the meantime reached the pasty stage, the fusion being assisted by the penetration of some of the soft material forced over from the outer layer. The gases and vapors follow always the line of least resistance and pass through the porous outer layer and up along the wall of the oven instead of forcing their way through the viscous inner portion of the fused layer, and then through the mass of coal. In passing through the highly heated porous layer, the hydrocarbons undergo a partial secondary decomposition, depositing part of their carbon on the cellular surfaces, just formed, thus building up and strengthening the coke. The coking process is thus to be conceived as involving the formation of a fused zone, and the gradual advance of this zone toward the center of the oven, the evolved gases and vapors depositing part of their carbon in the vesicular mass left as the zone progresses. The condition of the material in the oven when the coking has fairly well advanced may be represented by Fig. 2—*c* is the portion already coked; *d* is the fused zone merging into an adjacent zone *e*, which, being in a state of incipient fusion, is more viscous; *f* is the uncoked coal.

The actual thickness of the fused zone is probably not over $\frac{1}{2}$ in. The drop of temperature across this narrow zone is very great, and the interior of the oven remains comparatively cool, even at an advanced stage in the coking process. Simmersbach's experiments on a Koppers oven of 500 mm. (19$\frac{7}{8}$ in.) mean width, operating on 29 hours' coking time with a final maximum temperature of 1120 deg. C., showed that the temperature in the middle of the oven, 1 meter above the floor, remained about 10 deg. C. for 2.5 hours after charging; then rose to 100 deg. C., and remained

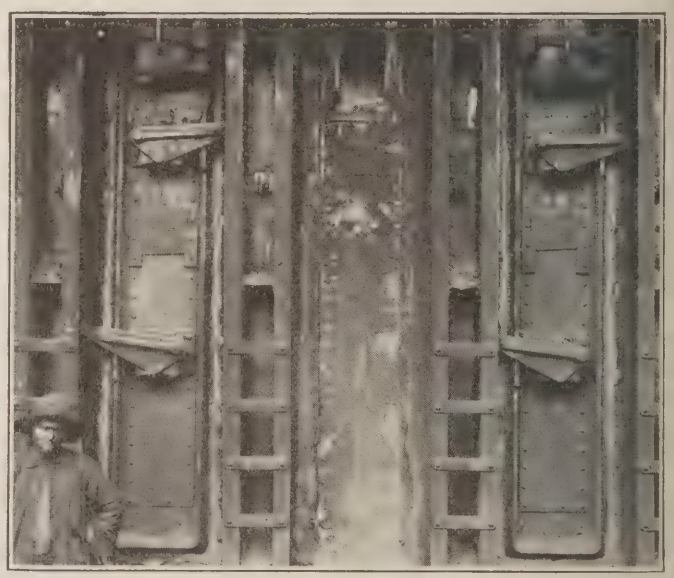


FIG. 8. COKE IN OVEN AFTER REMOVING DOOR

at this temperature until 13 hours after charging. At 20 hours the temperature was only 410 degrees.

The rate of advance of the two zones toward the center of the oven depends principally upon the temperature of the walls (*A*) and (*B*). In present practice, with ovens 18 in. wide and wall temperatures about 1000 deg. C., the average rate is about $\frac{3}{4}$ in. per hour. The initial rate is, however, much more rapid than this, and decreases as the center of the oven is approached.

As the coking progresses, cracks or joints develop perpendicular to the walls of the oven, thus determining the blocks of coke as they are eventually formed when the oven is discharged. These cracks form avenues of escape for a larger percentage of the gases, hence the amount of deposited carbon is greater in proportion on the surfaces of the blocks than in the interior. Eventually the two zones merge at the center of the oven (Fig. 3) and, with the practically complete expulsion of the last of the volatile matter, the coking process is finished. There is always a distinct parting in the center of the oven, so that the length of the blocks is equivalent to about half the width of the oven. Fig. 8 shows a view of the coke as it appears when the door of the oven is removed. Most of the coke immediately adjacent to the walls of the oven is covered with a skin of carbonized pitch. The true form of the blocks may be seen in a few places.

Fig. 5 shows a lot of standard byproduct coke used on one of the lake furnaces as the material appears on the wharf, just after being run out from the quenching car. Fig. 4 shows a closer view of another typical coke. In this figure the individual blocks may be seen more distinctly. A few characteristic blocks are shown in Fig. 4. The three smaller pieces in this figure are cross-sections. The end of the block (Fig. 7) that was originally adjacent to the wall of the oven may always be distinguished by its cauliflower-like appearance and dense layers of deposited carbon. We shall designate it as the wall end and shall call the other extremity the center end, for want of a better term. The structure of the coke towards the center end is always more open, and occasionally is somewhat spongy.

The shape of the coke is quite characteristic, depending upon the coal from which it was produced, and also, to a considerable extent, upon the method of heat treatment. The coke-oven man classes his product as either "blocky" or "fingery," coke of the former character being preferred. Some typically fingery coke is shown in the headpiece. As a rule, the coke from coals of over 30 per cent. volatile matter is apt to have a fingery tendency—and this becomes highly pronounced if the coal has a high oxygen content. By coking such coals very slowly at temperatures somewhat lower than used in ordinary practice, the fingery tendency may be disguised or in many cases entirely eliminated. By disguising it, we mean that the product will actually appear to form large, massive blocks, but these blocks, if closely examined, will be found actually to be bundles of slender pieces more or less firmly cemented together. However, if the heat treatment be very carefully regulated during the coking process—especially in ovens designed and adapted to this particular type of coals—genuine, firm, blocky coke may be made from many coals regarded as producing only the fingery variety.

The size of the blocks is affected to a certain extent by almost all the conditions pertaining to the manufacture of coke. The length is, of course, dependent upon the width of the oven, the average being, on account of shrinkage, a little less than half the width of the oven. The blocks from the top of the oven are usually (especially with high volatile coals) shorter than those from the bottom. Overcoking and high temperatures tend to produce small-sized cok

(*To be continued*)

Iowa Coal Production in 1917

The production of coal in the state of Iowa during the calendar year 1917, by counties and districts, is shown in the following table:

COAL PRODUCTION OF IOWA FOR THE YEAR 1917

Statistics Given by Counties and Districts

First District Counties	Total Production in Tons for the Year 1917	Number of Miners and Loaders Employed, 1917	Number of Other Inside Employees, 1917	Number of Surface Employees, 1917	Total Employees in the Mines, 1917
Appanoose	1,262,677	2,089	495	299	2,883
Lucas	610,230	526	220	61	807
Monroe (Part)	188,367	182	81	39	302
Adams	19,224	68	6	9	83
Taylor	18,142	48	6	6	60
Page	8,408	37	5	9	51
Wayne	5,122	24	0	4	28
Totals	2,112,170	2,974	813	427	4,214
Second District Counties:					
Monroe (Part)	1,788,822	1,551	551	277	2,379
Marion	521,620	604	208	117	929
Wapello	375,083	412	138	87	637
Jasper	306,386	262	146	52	460
Mahaska	147,967	174	58	40	272
Warren	67,432	27	4	4	35
Keokuk	9,952	15	2	7	24
Van Buren	8,551	18	5	8	31
Davis	1,425	5	0	2	7
Jefferson	355	2	1	1	4
Totals	3,227,573	3,070	1,113	595	4,778
Third District Counties:					
Polk	1,880,812	1,761	689	231	2,681
Dallas	581,391	602	292	95	989
Boone	247,845	365	121	51	537
Webster	22,598	43	19	9	71
Greene	10,062	21	5	3	29
Guthrie	6,950	20	2	5	27
Totals	2,749,658	2,812	1,128	394	4,334
Total Production of Coal in Iowa by Districts for the Calendar Year, 1917					
First District	2,112,173	2,974	813	427	4,214
Second District	3,227,596	3,070	1,113	595	4,778
Third District	2,749,658	2,812	1,128	394	4,334
Total Coal Production for Iowa, 1917	8,089,421	8,856	3,054	1,416	13,326

Production in the State of Washington During 1917

The final figures for the 1917 production of Washington's coal mines as prepared by State Mine Inspector James Bagley show that the mines of the state produced 34 per cent. more coal in 1917 than the year before. The total output for 1917 was 4,002,759 tons, an increase over 1916 of 983,159 tons. Last year's production was the state's largest output, though Mr. Bagley estimates that the 1918 production may reach 5,402,000 tons if the present demand continues throughout.

In 1917 all the coal-producing counties except Whatcom showed increases. King and Kittitas Counties show the largest increases, about 850,000 tons. The coke output was also the largest the state has ever had —96,427 tons—all manufactured in Pierce County.

Five thousand three hundred and forty-three men were employed in and around the mines in the past year. This number worked an average of 271 days for the year, a higher average than the state has heretofore shown. Thirty persons lost their lives in or around the coal mines during 1917.

Every man in the world is a salesman—some good, some bad and some indifferent; some sell ideas, some goods, some service and others pretenses. What do you sell?

Coal Company Organization

Coördination of Departments, Elimination of Red Tape and Efficient Systems Secure Action and Results

By W. W. BEDDOW
Lundale, W. Va.

WITH the expansion of business, concentration has characterized modern times even to the restriction of trade as our lawmakers viewed it. Later the same legislative body gave the stamp of approval to this method by uniting a whole country's industry under the direction of a high Government official. We have lately had impressed upon us the futility of division of authority and responsibility—the necessity for coördination of departments, elimination of friction—all looking to directness and quick action. The unwieldiness of the cumbersome machinery of large governing boards has also been corrected. In some cases coal companies reflect these ideas, and their methods and successes point to the wisdom of their judgment. Get-together meetings of the officers of a company for an exchange of ideas prove highly beneficial. In some instances office men are sent out into the field and field men are taken into the office, to give each the point of view of the other man. The benefits a large corporation secures through its specialist officials can be largely duplicated by smaller companies combining positions and consulting experts. The adoption of a real efficiency system constitutes one of the important steps in the successful conduct of business today.

WITH the exception of a few of the very large coal-producing companies, there are not many coal corporations whose directors and officers have a definite idea of just what their organization is. The officers of most coal companies would probably be puzzled if they were asked to diagram their organizations; to outline, definitely, the interrelations of the officers, superintendents and foremen of their companies. Their organizations were built up in a manner somewhat similar to the ways our ancestors used to build houses. When starting housekeeping, they would build a four-room cottage, which would then amply suffice for their needs. As their family grew larger, they would add a room here, with a step or two down into it and a room there, with a step or two up to it. In a like manner our coal-producing organizations grew.

Modern developments made advisable the use of electricity in the mines, the use of scientific methods in the employment of men and in the designing of houses, the laying out of towns, the projection of mines, the cleaning and handling of coal and the conservation of by-products. The growth of the companies made it impossible for the chief executive to go into details and give matters his personal supervision as formerly; he was compelled to add a department to inspect operating conditions, raw materials and the product—coal—both at the mines and at the market; it made the purchases of the companies so large that a separate department was added to take care of this function alone; it made necessary the addition of an auditing department to check up the records of the companies and the systems of obtaining these records.

This expansion required the employment of electrical engineers, employment experts, expert architects, landscape engineers, mining engineers, mechanical engineers, chemists, purchasing agents, inspectors and auditors. And the science of efficiency has come into sight, bringing with it a department for the scientific introduction of efficiency methods. This requires the determination of time standards, material standards and equipment standards to cover all operations necessary for the production, shipping and selling of coal.

Accordingly, the chief executive of every company should have his organization diagrammed as it is and then have it charted as it should be, or as he wants it to be. The next step should be to gradually effect what changes are necessary to accomplish the proposed organization.

The chart of the proposed organization of a producing and selling company is here shown. It is what would probably be called by organization experts a "line and staff organization." Line functions are shown by rectangles; staff functions, by circles. The full lines show line authority, the path of the chain of command; the dotted lines show advisory relations only.

In this diagram, the directing head—the chief line officer—of the organization is the president or general manager. Next in authority to him, in the order named, are the manager of operations, the treasurer, the sales manager and the chief of staff. To these and no others the chief line officer communicates his commands. Thus he maintains the chain of command, which is so necessary to an industry fraught with as many emergencies as coal mining.

Treasurer in Charge of Finances

The treasurer is a line officer in charge of finances. He has line authority over the chief accountant, the chief paymaster and their respective clerks. His relations to the sales manager, the chief of staff and the manager of operations are advisory only. Here note that the treasurer has not line authority over the auditor; their relations are but advisory. It is incongruous to give the man responsible for the finances and records line authority over the man who audits these accounts.

The sales manager is also a line officer. He has directly under him the district sales managers, the traffic manager, the chief billing clerk and the advertising manager. These line officers are advised by the chief of staff and his associates.

The staff and their chief occupy the same position to the president or general manager as the general staff of an army occupy to their commanding general. Their purpose is to maintain the efficiency of the organization at a high point. Their relations to everybody else in the organization, except their own subordinate staff officers, are purely advisory. They have no authority over the line. They should not have this authority for three reasons. First, it would seriously interfere with the chain of command. It would mean a division of authority and therefore a division of responsibility. Second, if the staff were given authority, naturally

they would soon be taking up so much of their time issuing orders and directing workers that they would neglect the thinking, investigating and inspecting parts for which their office was created. Third, a good organization is but a proper system of checks and balances. When the staff is advisory, the line checks the plans drawn up by the staff. When the line acts on its own initiative, the staff checks up. If the staff had authority, it would both advise and execute. The organization would thus lose its system of checks and balances.

The director of employment advises in regard to the personnel of the organization. He recommends to the management the employment of the officers of the company, and he advises the colliery superintendents and

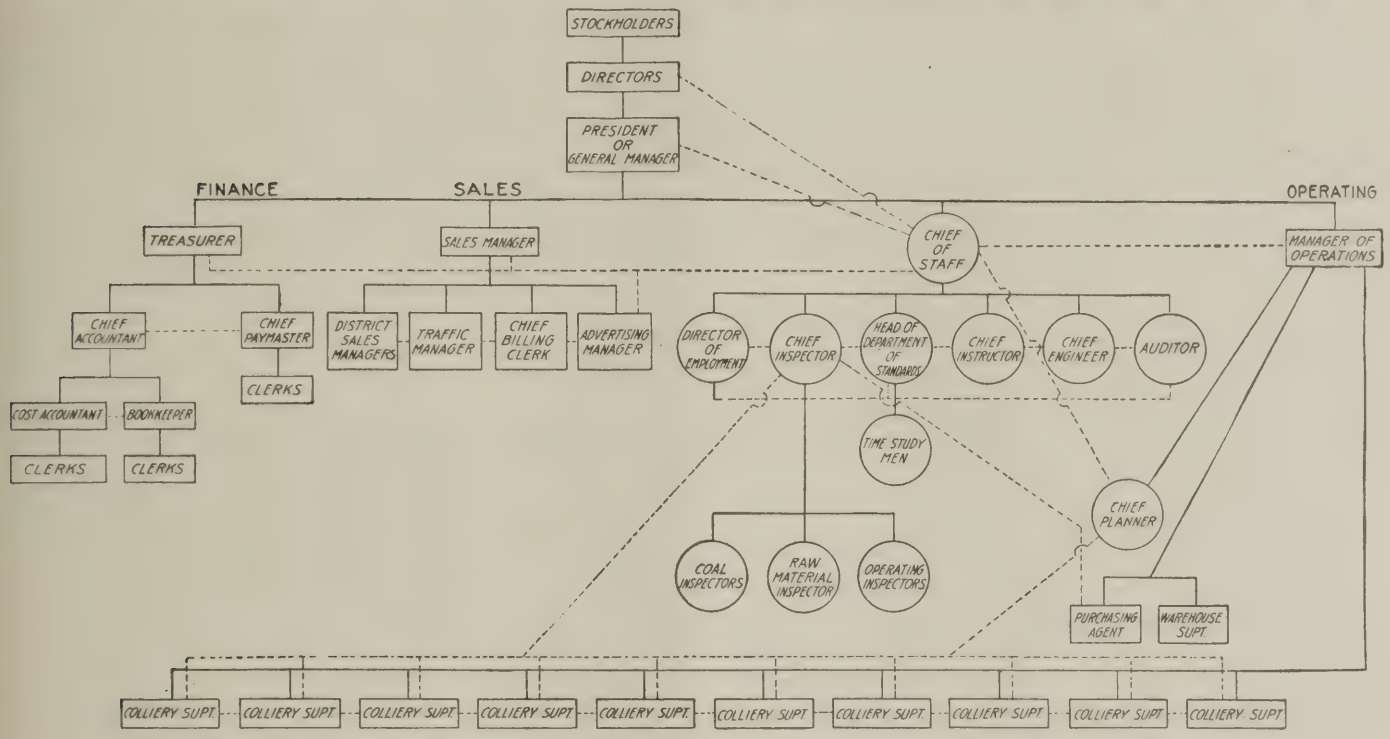


CHART SHOWS THE PROPOSED ORGANIZATION OF A PRODUCING AND SELLING COMPANY.

investigates and determines the most efficient ways of working mines, of planning towns, buildings, water systems, drainage systems, tracks, tipples and the thousand and one engineering details necessary for the production of coal.

The auditor inspects the records of the company. He reviews the methods of obtaining and keeping these records and advises the proper officers of his findings. Not shown on the chart are the lawyers, which the chief of staff retains for advice and instruction on legal matters.

It should be noticed in the diagram that the staff advise each other whenever an occasion arises to do so. For instance, a coal inspector finds that they are loading coal at a colliery not up to the standard set for their employment supervisors. He selects a scientific method of employment, and as his investigations warrant improves it from time to time.

The chief inspector, through his aides, advises the sales manager and the operating department of the quality, cleanliness and loading of the coal; the purchasing agent and other officers concerned of the quality and condition of supplies and equipment purchased or on hand; the operating officers of the efficiency or condition of their respective departments. This department usually takes the yearly inventory and plant appraisal.

The head of the bureau of standards, through his time-study men, advises the line officers of the standards of efficiency which should be set up for each job. He also determines the standard of efficiency of each department, of each colliery, and finally of the whole organization.

The chief instructor advises all department heads and instructors in the instruction of their men and themselves so as to reach the desired standards of efficiency. He prepares the written standard practice instructions to cover each and every job in the organization.

The chief engineer heads the technical experts. He cleanliness. He first advises the colliery superintendent of this fact. If the colliery superintendent states he cannot remedy the trouble on account of the inadequacy of his tipple equipment, conditions in his mine or other factors beyond his control, then the inspector sends a report covering it to his superior staff officer, the chief inspector, and leaves a copy of this report with the colliery superintendent. The chief inspector reviews the report, and if his judgment dictates he advises immediately the sales manager and the manager of operations. He also advises the head of the department of standards, the chief instructor and the chief engineer. The sales manager has the coal shipped where it can be used; the manager of operations reviews the matter with his superintendent; the head of the department of standards has his standard checked up for this case; the chief instructor sees if anything can be done in the way of improving the method of instruction so as to increase the efficiency of the slate pickers; the chief engineer studies the tipple equipment to see if a remedy can be found in a convenient improvement. The colliery superintendent thus has focused on his problem the expert attention of special-

ists. He very likely makes suggestions, but he need not concentrate his attention on the problem and therefore does not neglect his many other line duties.

The manager of operations is the chief line officer in charge of operations. His superior officer is the president or general manager, from whom only he takes his orders. He issues orders to the next lower officers in the chain of command—the chief planner, the purchasing agent, the warehouse superintendent and the colliery superintendents. He is advised by the chief of staff and his subordinate staff officers.

Duties of Colliery Superintendent

The colliery superintendents are the line officers in charge at each operation. They rank as assistant managers of operations, and the manager of operations, by a circular, designates the order in which they succeed him in authority. The lines of authority run from the colliery superintendents to the manager of operations and thence back to the purchasing agent and the warehouse superintendent. However, an ordinary requisition would cut across corners, thereby eliminating red tape, by going direct from the colliery superintendents to the chief planner, whose staff would study it with regard to its efficiency; if satisfactory, would forward it to the warehouse superintendent for filling. If the records of the chief of staff showed the requisition to be inefficient, he would advise the colliery superintendent accordingly. However, the colliery superintendent, possessing the authority of assistant manager, could insist upon the filling out of this requisition. In fact, in an emergency the colliery superintendent would telephone the warehouse superintendent and order out a requisition immediately. In any case the superintendent would have to send the chief planner a copy of the requisition for his records. If the chief planner thought that the colliery superintendent insisted, against his advice, on the instant issue of material on requisition, through pure arbitrariness, he would advise the superintendent's superior officer, the manager of operations.

It is evident that the superintendent or any other line officer, if he is the proper one for his position, would accept all the good advice he can get from the staff. By doing so he would certainly increase the efficiency of his colliery or department, and therefore would augment his own efficiency reward. However, it frequently happens that the staff, having a highly specialized and thus naturally narrow view of a situation, advises something which, while very good in itself, is incompatible with the operation as a whole. The line officer, having a broader view of the situation, rejects the advice and tenders his reason for doing so. The staff officer, if he still sincerely believes that if his advice were followed out it would increase the efficiency of the operation as a whole, should take the matter up with the superiors of the line officer, up to the stockholders if necessary. In the meantime the colliery superintendent would conduct the operation as he judged best. The line officer has the authority and must therefore bear the responsibility. If the line officer is arbitrary and resists progress unreasonably, the efficiency of his department and consequently his own efficiency reward is affected. But probably before that time his attitude has attracted the attention of his superior officers and he has been reprimanded, demoted or discharged.

In all organizations the difficult thing to accomplish has been the successful coördination of staff and line. Great strifes have occurred and millions of dollars have been lost by staff officers taking upon themselves line authority and by line officers neglecting their own functions in the performance of staff work. All corporations have likely had their greatest troubles in achieving this coördination.

A high degree of coördination could be obtained by the amalgamation of staff and line. For instance, we might appoint a colliery superintendent as chief engineer for a certain period and make the chief engineer a colliery superintendent; we might let the purchasing agent and the head of the department of standards trade jobs. The experiment should bring forth many gratifying results. A chief engineer often changes his tune when he takes hold of the management of a company. The staff officer would find that it is easier to advise than to do; the line officer would find that it required an immense amount of what would very likely be to him constant, boresome study in order to properly advise. The test would probably result in the true staff officer (doubtless a high, long-headed type) qualifying for a permanent place in the staff; the true line officer (a broad, motive, vital type) qualifying for a permanent place in the line, each one considerably improved by the experience he has been through.

Functions Vary in Different Organizations

In the chart the squares and circles represent functions only. In a large company it would likely be necessary for one man or even a man and an assistant to handle each function; in a small company one man could handle several functions. For instance, the chief of staff might also be the chief engineer and the head of the department of standards. The qualifications of the personnel should determine such arrangements. In another method the staff might be committees formed by appointments from the line. There might be a committee on standards, a committee on instruction, a committee on employment, a committee on each of the different technical problems. Such committees would be appointed by the general manager or his chief of staff. It would be unwise to give these committees line authority, as they should act in an advisory capacity only.

Still another way for small companies to obtain the benefits of a good staff organization would be to employ consulting experts for short periods of time. When this is done, however, great pains must be taken to secure the coördination of this casual staff with the line officers—the old or tried and trusted men—of the company. Otherwise, more harm than good will come of their employment. This coördination can be best accomplished by means of get-together meetings where all points of controversy can be thrashed out, where the staff will fully explain the efficiency of their proposed methods and where the line officers will declare their intention to follow or execute these methods.

As mentioned before, every company should carefully plan its organization, first as it is and then as they want it to be. Different conditions will demand different methods. But in every case there should be brought to bear upon the problems offering themselves higher common sense—practical, common-sense experience, combined with theoretical knowledge.

Minecdotes

In Which Bill Miner's Wife Takes a Hand.

Bill Miner's wife was worried, and she was having quite a lot to worry about. Moving from one place to another over quite a stretch of railway, with two or three changes in between, isn't exactly a picnic for a woman with three children to look after; not to mention the bother and upset of tearing up house in one place, getting straightened out in another and the financial outlay involved.

Now things were shaping round for another move before she had well got over the last, according to the tone of Bill's conversation lately: "The pit was rotten, the boss didn't know his business, he gave all the best places to his pets, the company was cheating on the weights, they were overcharged at the store, a fellow would be a fool to spend his time where he couldn't get a square deal if he worked there from now till the crack of doom, and he was going to pull out as soon as he could make it."

"Well, you haven't given them much of a show, have you?" answered she. "We've not been here long enough to get thoroughly acquainted yet, and you've not done bad so far."

"Oh, that's just how they work it," came the reply. "Give a fellow a good place for a week or two to jolly him on, and then as soon as he gets a bit settled put him in a rotten one where he can't make expenses. Why, Tom Jackson says—" what Tom Jackson said made Mrs. Miner wonder how ever any member of the company contrived to keep on the sunny side of the pen—"and he's worked here four winters running," said Bill, as he ended up.

"That so? Put in his summers on the homestead, I suppose?" queried his wife.

"Yes, that's where his folks are," came the reply.

"Well, why don't you ask him up some time, if he's such a friend?" asked Mrs. Miner. "It must be tiresome at the bunkhouse all the time."

"All right, if you say so. It'll be a change. Bye, bye" —and he went, slamming the door quite happily. He hadn't met with any reproaches this time, and it was quite a relief to think of going away without them.

"I thought as much," said Mrs. Miner to herself after her husband had gone. "Another doggone anti as usual, and I'll bet he's got the whole bunch 'on the go.' Gee, some of those boys make me tired. If somebody'd saw their blocks off and roof the rest of 'em in with shingles they'd never know the difference," she told herself disgustedly. "Well, I'll just get busy and do a bit of 'anti-ing' myself for once. Here's one case of anti-itis that'll get stopped before it gets out of hand, or I miss my guess."

A week or two passed, and still the question of moving kept cropping up.

One day Jackson arrived, with another man. The talk was all shop, and since Bill's wife wasn't exactly a fool she could follow most of the discussion with ease, passing a remark now and then, but not allowing anything to get past her. She listened to everything that was said. "How long have you been mining, Mr. Jackson?" inquired she, when a pause came at last.

"I've worked at that job ever since I knew what work was," came the reply. "There isn't a pit in the country where I couldn't work if I wanted to."

"My!" exclaimed Mrs. Miner admiringly, with a glitter in the corner of her eye which didn't quite match her manner. "You must have an awful lot of patience to put up with such things. A smart man like you that knows his job from the bottom up and can get work anywhere, with your people settled and all, and only yourself to move, I can't understand why you stay with it. Not only that, but even when you are out you don't stay out. If it was such a whale of a rotten place to work one would think you'd be tickled to death to get out and keep out, and yet they tell me this is your fourth season here and you come back of your own free will. Nobody asked you to. You see," she went on, "it's only likely that men with families and household effects are going to think twice before they'll let themselves in for the expense and inconvenience of a move, when somebody like you can stand it that's got nobody but yourself to shift, and can pack all you need to move in a suitcase."

Evidently this was a new one, and Jackson didn't make much of an effort to answer. Soon after the visitors rose and took their leave.

"Lord! Bessie," grinned Bill when they had gone, "wasn't I a fool not to think of that myself. I guess it's up to a fellow to figure things up for himself a bit, after all. I'll try it out a while longer, anyway."

Determining the Presence of Manganese in Iron and Steel Pipe

In establishing the identity of iron and steel pipe, as used in buildings, the following test for determining the presence of manganese in the sample has been used, according to the A. M. Byers Co., of Pittsburgh, Penn., manufacturers of wrought-iron pipe:

Place in a porcelain dish, preferably a small porcelain crucible, a clean, bright drilling or some filings of the metal to be tested, about the size of a pinhead; add six drops of pure nitric acid, heat, add two drops of silver-nitrate solution, then one crystal of ammonium persulphate not greater than $\frac{1}{8}$ in. in diameter. Warm the solution but do not let it boil. If the metal is steel, a pink color will begin to develop and at this point it should be removed from the source of heat, when a decided red coloration will result. If no coloration develops, but a small amount of dark residue remains in the dish, the metal is wrought iron. Care should be taken at all times to test only clean drillings and to keep dirt or foreign matter out of the dish. If a small thimble-size crucible is used, a match will supply sufficient heat for the purpose.

Manganese, in the process of steel manufacture, has to be added to the molten metal in order to make it possible to roll and weld it into pipe, while wrought iron requires no such manganese addition and therefore usually contains only a trace of this metal. Wherever it is possible to obtain samples, the manganese test can be supplemented by the crushing test, revealing the bright crystalline fracture of steel or the dull gray, fibrous fracture of wrought iron.

Smother the Fire Before It Appears*

By G. J. YOUNG
Assistant Editor-in-Chief, "Engineering and Mining Journal"

SYNOPSIS — *Why not keep coal when in storage under a perpetual dampening atmosphere of carbon dioxide and so prevent the possibility of spontaneous ignition.*

IN a paper presented at the February meeting of the American Institute of Mining Engineers, C. M. Young gave the results of certain experiments and tions upon the proper storage of bituminous coal. He pointed out the limitations caused by the heating of the coal when stored and contributed the valuable suggestion observations upon the proper storage of bituminous coal. He pointed out the limitations caused by the heating of the coal when stored and contributed the valuable suggestion that by the admixture of lump with fine coal heating can be controlled. Mr. Young showed that if air can be excluded from the coal or reduced in amount there will be less heating. The storage of coal under water was touched upon, but the possibility of other methods for excluding air received no mention.

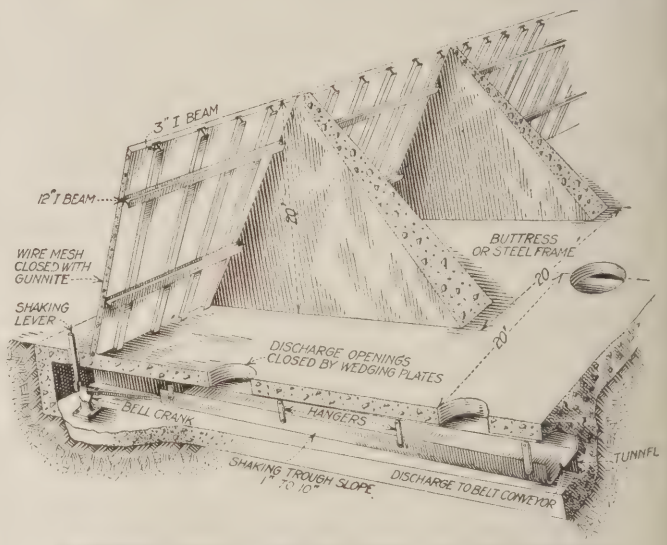
Pursuing the thought that the exclusion of the oxygen of the air is the vital element in the storage of coal, it occurs to me that a gas could be substituted for water and that by this means the difficulties of storage under water might be eliminated. Two gases suggest themselves, carbon dioxide and sulphurous acid gas. Both of these gases are heavy enough to displace air. Of the two, carbon dioxide is the one which promises most, both because it can be cheaply generated and because it is less objectionable than the sulphurous acid gas.

Dioxide Will Prevent Fire Starting

The quantity of carbon dioxide required to fill the interstitial space in coal is comparatively small. If we assume an interstitial space of 20 cu. ft. per ton of coal, it will require 3 lb. of carbon dioxide to fill this volume, which weight of carbon dioxide could be generated from 7 lb. of limestone and 4 lb. of hydrochloric acid, and the cost would be nominal.

It is evident that it would be impracticable to use carbon dioxide in the case of open heaps. To construct bins or bunkers of the ordinary type that would be sufficiently gas-tight to prevent a reasonable loss of gas would be prohibitive in cost. Such being the case, a type of bin departing from usual practice is suggested. A bin to meet the requirements of the case should be exceedingly simple in structural elements and low in cost. These conditions could be met by the use of light side walls inclined at a slope approximating the angle of repose of piled coal. These side walls would be constructed of steel mesh embedded in from 1½ to 2 in. of cement applied by a cement gun, the thin walls to be supported by light structural steel and this in turn supported by reinforced concrete buttresses (or steel frames) which would divide the bin into bays 20 ft. wide. The bin would be placed upon the ground and a concrete floor laid to cover the entire bottom.

To provide for the reclaiming of the coal, a tunnel would be constructed under each bay. Openings through the floor of the bin, provided with cast-iron doors of gas-tight construction, would communicate with the tunnel. In each tunnel a suspended trough would be placed below the line of openings. The trough would be sloped and provided with a reciprocating mechanism to facilitate the delivery of the coal to a collecting belt conveyor, which would be placed in the center of and transverse to the length of the bay. The belt conveyor would deliver to an elevator, which would



STORAGE BIN IN WHICH COAL IS SMOTHERED
Coal is surrounded, not supported, by the reinforced-concrete side walls

discharge into loading bins placed at such a height as to secure convenient discharge into motor trucks or other vehicles. The filling of the bin could be accomplished from a bridge constructed along the center line of a series of bays or by means of conveying appliances.

For the operation of the shaking troughs beneath each bay, a car carrying an ordinary machine drill, operated by compressed air, could be used. This car would be shifted from bay to bay as required, and attachment would be made to each shaking bar. A compressed-air main would be required on each side of the bin. Significant features of the bin are shown in the sketch. Other methods for reclamation are also available.

To provide for the introduction of the gas a gas main would be placed close to the center line of each bay and a number of outlets at symmetrical points provided. Connecting with the main would be a delivery pipe which would extend from a central generating plant.

Assuming a width of bay of 20 ft. and a ground length of 120 ft., the approximate storage capacity for a height of 20 ft. would be 1000 tons. The ground area required would be 3 sq.ft. per ton of storage capacity. The cost of construction, roughly approximated and including all features except the central bridge and the gas system, would be $3400, or $3.40 per ton of storage. For a pile 40 ft. high, 2 sq.ft. ground area per ton of storage capacity, and a cost of $3.15 per ton of storage capacity, are obtained.

If an annual depreciation of 10 per cent. and an interest charge of 10 per cent. be assumed, the cost of

*From "Engineering and Mining Journal."

storage per year is estimated as follows for the 20 ft. pile:

Depreciation and interest	$0.68
Interest 10 per cent. on coal at $5 per year	0.50
Unloading and loading	0.30
Depreciation and interest on bridge	0.20
Land rental 10c. per sq. ft.	0.30
Total	$1.98

For a 40 ft. pile, the estimate is $1.58, including all of the items given in the estimate of the 20 ft. pile.

In gassing the pile, the bin would first be partly filled before the introduction of the gas. As the bin was filled, the gas could be gradually introduced. After completely filling, a top layer of fine coal would be spread evenly over the whole surface so as to prevent diffusion of the gas as much as possible. Over the top a waterproof tarpaulin or roofing felt could be securely placed. At intervals more gas could be forced into the pile, so as to compensate for losses.

In the estimate I have not included the cost of the top covering nor of the gas. The type of bin suggested would prevent leakage, and diffusion at the top would be greatly retarded. The top area of the bin for a 20 ft. pile would be 1.6 sq.ft. per ton of storage capacity and for a 40. ft. pile, 0.5 sq.ft. The superior advantages of the 40 ft. pile are obvious. The costs given are tentative only. I know of no example of the use of carbon dioxide in the way described and believe the plan to be feasible. There is an additional fact that makes the use of carbon dioxide as a submergence agent especially advantageous. Both oxygen and carbon dioxide are adsorbed by carbon, but the latter is more readily adsorbed and in greater relative quantity at a given temperature than the former. It can therefore be inferred that the carbon dioxide adsorbed by carbon would displace any adsorbed oxygen. Without much doubt adsorbed oxygen plays an important part in spontaneous combustion. Whether coal would be as energetic in adsorbing carbon dioxide as pure carbon must be experimentally determined.

Washing Furnace and Domestic Ash for Fuel Recovery

By Mark Meredith
Liverpool, England

In operating boiler and other coal furnaces there is a considerable loss of fuel through the grates as a general thing, while in the domestic ashes sent to the destructor there is possibly quite 25 per cent. of fuel that could be recovered. In some places both furnace and domestic waste is sorted by hand, and some fuel thus recovered, but of late years the chief object aimed at appears to have been to destroy everything but the ash and clinker, these being variously disposed of in the quickest way available. Possibly from many points of view this is advantageous, but none the less it is wasteful; and probably, when the present times of lavish expenditure have passed, some other method of dealing with waste will be adopted.

In dealing with ordinary furnace waste all hard clinker should be kept separate for road or concrete making and other purposes for which hard material is needed, while all fine dust passing a mesh of from $\frac{1}{8}$ to $\frac{1}{4}$ in. should be screened out, the coarser refuse being then treated to recover the actual fuel.

The solid waste from domestic collections should be similarly dealt with, although this would need more apparatus in the shape of screens to remove the light stuff, much of which has a commercial value, locality having much to do with this, however. In any case the fuel recovered would pay for all work undertaken in a business-like way, and for this reason it is practically certain that private enterprise would give better results than are usually obtained with municipal enterprises.

The principles of separation would be those used in jig washing. The crude material would be first sized and then passed through jigging machines. The fuel passing the machine could be elevated into hoppers for draining and delivery into wagons, the ash and dirt being deposited where desired.

The waste from the hutches, which would vary in size from a $\frac{3}{16}$ to 1 in., would be available for making tar-paving after it had been dried. It could be conveyed automatically to a convenient dumping place for use as required while, roughly, the only part of the solids which would pass to actual waste would be the fine ash and dirt, of which probably there would be a larger amount than could be put to practical use.

It is not a profitable proposition to handle small bulks in a plant costing from $7500 to $10,000, but anywhere up to, say, 100 cu.yd. per day of purely furnace refuse could be dealt with, and in domestic collections probably larger bulks could be readily secured in most places of any size. With domestic waste, however, all garden and other nonmineral refuse would have to be excluded.

To those who are interested in the utilization of domestic waste the municipal ash yards offer a good opening. Even after all of the larger pieces of metal and the few other things usually collected are taken out there is a large amount of valuable material left untouched, which either goes into the destructor or is hauled or barged away in the ash and waste. The money value thus lost is considerable. There should be no necessity to have fleets of barges to carry valuable waste products out to sea, and lose them by dumping, when they might be utilized if a little care was taken.

All combustible substances burn slowly in an atmosphere of highly diluted oxygen, but in the case of soot this slowness is much more pronounced. The reason for the very slow combustion of soot in highly diluted oxygen probably lies in its complex molecular structure. It is commonly supposed that a molecule of soot consists of a considerable number of atoms, and that a similarly large number of molecules of oxygen is required to come in contact with the molecule of soot before the latter can combine with the oxygen. The chances of the molecule of soot finding this large number of molecules of oxygen in the furnace gases are small, and hence the slow combustion. Thus assuming the molecule of soot to consist of 12 atoms and represented by the symbol C_{12}, there will be required 12 molecules of oxygen to burn the one of soot. The reaction for the combustion of the soot may be expressed by the formula $C_{12} + 12O_2 = 12\ CO_2$. For comparison the reaction for the combustion of CO is given in the following equation, $2\ CO + O_2 = 2\ CO_2$.—*Bureau of Mines Bulletin No. 135.*

Mine Trackage for Motor Haulage

By DEVER C. ASHMEAD
Tarrytown, N. Y.

SYNOPSIS — *The condition of the haulage tracks exerts a great influence on the operation of any coal mine. Frequently the proper or improper construction and maintenance of the tracks mean all the difference between profitable and unprofitable operation. Here, as elsewhere, certain maximum and minimum limits obtain. Crossing the maximum limit means unnecessary expense; crossing the minimum limit means trouble.*

THE successful operation of any kind of locomotive haulage—whether trolley, storage-battery, gasoline, steam or air—depends largely on the condition of the track. This is particularly true in a mine. No matter how perfect the locomotives may be, delays, wrecks and breakdowns will occur if the track conditions are poor.

Although the main features to be discussed in this article have been described again and again, they cannot be emphasized too often, as in more cases than one the failure of a mine can be traced directly to poor track. Labor troubles have also arisen from this same cause, when the men have not been able to get a proper turn owing to the inability of the locomotives to get the mine cars to the faces in sufficient number.

The first thing to be considered in mine haulage is the width of the headings in which the locomotives are to operate. These passages cannot, in an ordinary sense, be too wide. There must be sufficient space on each side of the locomotive to allow plenty of clearance, which should be enough to permit the moving locomotive to pass a man safely. There should be room enough in case of a wreck so that the men will not be crowded while working. For a 36-in. gage track the heading should be 10 ft. wide; for standard railroad gage the heading should be between 14 and 16 ft. in width.

Sometimes Profitable To Widen Headings

In many old mines the headings were driven only 7 ft. wide, and in one case of which I have knowledge only 6 ft. If motor haulage is to be employed in such a mine it may be necessary to widen the headings by slabbing. Whether or not this would pay depends largely on conditions, such as the cost of slabbing, the cost of changing timbers, the amount of coal recovered, and on what sum of money would the saving resulting from the installation of locomotives pay interest.

The second point to be considered is the material used in the construction of mine track. Here the kind of rail is of the utmost importance. If the rail is too light and the ties are spaced too far apart surface bends are likely to occur, making the track rough and "bouncy." A few rail size limits may be given for locomotives of different weights. For a 4-ton machine the rail should weigh between 16 and 20 lb. per yard, for a 6- or 8-ton motor from 20 to 30 lb., for a 10-ton motor between 25 and 40 lb., and for a 15-ton motor not less than 30 lb.

Of course, the heavier the rail employed the better will be the track, and some mines even use rail weighing as much as 80 lb. to the yard. This statement concerning rail weight is true with one exception, and that is on hauls where storage-battery locomotives are used. Here the rail should never exceed 45 lb. to the yard, for when sand is applied to such large rails the locomotive cannot slip its wheels readily and there is danger of the motor burning out. In order for the locomotive to slip its wheels a larger motor would be necessary, therefore a larger battery, which in turn would only increase the size of the locomotive and make it larger than would ordinarily be necessary to do the required work[1].

Next in order of importance come the ties. Outside of the average mine a visitor can usually see a pile of wood from 4½ to 7 ft. long, and he often wonders what use can be made of it. The sticks are too light to serve for props, and when he asks what it is for he is surprised to learn that it is a pile of ties. Ties should have two parallel sides and be reasonably straight, but the usual mine tie is triangular and crooked.

Some Hints On Spacing of Ties

A good tie should be from 4 to 6 in. thick and have a face from 6 to 8 in. wide. The two bearing sides should be parallel whether sawed or hewn, and the tie should be straight. It should be long enough to extend 1 ft. beyond the rail on each side of the track.

The correct spacing of ties is of great importance and will vary according to the size of the tie, the weight of the rail, the weight of the load to be hauled and the concentration of load on the driving wheels of the locomotive. Whatever spacing is adopted should be followed out. Ties should not be placed far apart in one place and close together in another.

Two methods for spacing the ties can be employed at joints. If the rail is light, it might be well to have one broad tie under the joint; but if the rail is heavy, two ordinary ties should be used so that they can be placed properly at the end of the fishplate. The placing of ties at joints in this manner lessens the liability of low joints and the wrecks that can be traced to them.

The subject of spikes is worthy of some consideration, as the selection of the wrong size of spike often leads to wrecks and wastage of material. There is no specific rule governing the selection of spikes, and this has to be left to the judgment of the user. Too small a spike will not have sufficient hold, and the rails are liable to spring loose and a spreading track result. Too large a spike is liable to split the tie and allow it to rot more rapidly and cause the same spreading of rail. In order to select a spike intelligently the following facts should be considered: The weight of rail, the size of tie, the kind of wood in the tie and the amount of traffic that will pass over the road.

[1]As considerable difference of opinion appears to exist on this subject among engineers, most men preferring as heavy a rail as possible, "Coal Age" would be glad to receive comments and discussion of the statements made in this paragraph.—Editor.

Many mine managers neglect to see that all fishplates are in place and bolted tight. Quite often when the tracklayer is building track he runs out of fishplates, and he does not bother to obtain more. Kinks are apt to appear wherever fishplates are omitted, and this means that there is a chance for the wheels to climb the rail or that the rail be shoved out of place. In either case a wreck may result.

More wrecks are likely to occur at the switches in a mine than at any other point, and in a large percentage of mines anything that a locomotive and cars can pass over serves as a switch or a frog. Many mines endeavor to make their own switch points, frogs and stands, but unless a fully equipped machine shop with a large-size planer is available this should never be attempted. No matter how skillful a blacksmith may be he cannot make these articles as well as they can be turned out in a machine shop or factory where the manufacture of this class of apparatus is a specialty.

Kind of Frogs and Switch Points to Use

A frog for mine work should preferably be of the riveted plate type, as this possesses the advantages of simplicity and strength. A frog with an angle greater than a No. 4 should not be used except in rare cases. Switch points ought not be less than 5 ft. long and should have two bridle bars. Switch stands should be used on all main-line switches, but they are not absolutely necessary at room switches. A switch stand sufficiently high and properly arranged so that it can be thrown by the motorman would be of great assistance at a room switch. It is advisable to place spring connecting-rods between the switch points and the switch stand. If these rods are used they will often prevent switches from breaking, as the motor can run through the switch when it is thrown the wrong way.

The time lost through a single wreck on a switch, not to mention the possible damage, will usually cost more than the purchase and installation of two or three switches. This can be well exemplified in the case of two plants in Illinois. These two mines were opened in the same bed of coal, at the same time, on adjoining properties. The shafts were the same depth. The coal was the same thickness. The equipment throughout was practically the same. The same mining system was used. One mine had an output of 5000 tons a day and the other but 2000 tons. The management in both cases was the best that could be procured, but the results obtained were hardly comparable. The management of the mine with the smaller output requested the other company to send its manager to examine the mine in order to determine if he could locate the cause of the small tonnage.

This man spent one week at the plant, and when he was through he made a report in which he stated that as far as he could see both mines were identical in every way except one, and that was that the mine with the smaller output had an abnormal amount of wrecks. These wrecks kept the output down and the cost up. The cause he attributed to the frogs and switches, which were homemade. The only recommendation he made was to replace these frogs and switches with manufactured ones. The company followed his recommendation and in a year's time its output had increased to 4000 tons a day.

Next to be considered are the curves. The curves from the main entry to the cross-entry and from the cross-entry to the butt-entry should be of as large a radius as possible. This should be 30 ft. or more, and in no case should it be less than 25 ft. Curves of these radii apply to all points where the locomotive travels at any considerable speed or around which it pulls or pushes a trip of cars. The greater the radius when pushing the better, particularly where double-bumper cars are used, as there is then less danger of the bumpers locking and causing wrecks.

The radii of room curves do not need to be as great as those mentioned above, but they should not be less than 20 ft. for a locomotive with a wheel base of 36 in. A larger radius should be employed for a larger wheel base. In every mine the entry and heading curves should be laid out by the engineer with a transit, the center line of the curve from which the trackman can take his points being marked on the roof.

The fourth consideration in the construction and maintenance of mine track is the alignment. The more straight and even a track is kept the less is the chance for wrecks. Some companies have their sights for driving the headings placed in the center. The engineers connect these points with a string and paint a white line on the roof above this string. This gives the trackman the center of his track. The careful following of this line, together with a close adherence to curves, will result in a properly located track.

The fifth consideration is the ballasting and drainage of the track. A track that is poorly ballasted will not keep good alignment; and one that will not keep alignment is one on which wrecks occur, since it gives points at which the flanges of the wheels can climb the rail.

Proper Ballasting Saves Mine Ties

The ballasting should be thick enough so that the ties will not rest on the bottom. The ties will thus be kept away from excessive moisture. If the mine is wet a good ditch should be provided and kept clean. This ditch should be deep enough to prevent the water in it from soaking the ballasting and should be on the trolley side of the track so that the men will walk on the opposite side away from the wire and its dangers.

The space between the ties and the rib on the opposite side from the ditch should be kept clean and free from loose coal and rock so that it can form a free and unobstructed man road. If the heading is the proper width this space between the ties and the rib will be from 3 to 4 ft. wide.

The sixth consideration regarding mine track—the elevation of the outer rail on the curves—has probably received the least attention. Most wrecks in mines occur at one of two points—the switches and the curves. The wrecks on curves can be eliminated almost entirely if their alignment is correct and if the outer rail is elevated to the proper height. This height depends on the speed at which the locomotive takes the curve. A number of tables given in various books on mine haulage tell what these elevations should be for the degree of curvature and the speed of travel. It will therefore be unnecessary to repeat such data here.

If a mine track meets the conditions stated above the danger from wrecks will largely disappear, haulage costs will be low and the output large.

It would probably surprise many operators to learn what a powerful influence the condition of mine track has on the labor situation, particularly as regards the miners who are paid by the ton. Remarks like the following are often heard as the miners leave the mine in the afternoon: "I could have loaded more coal if I had the cars"; "That motorman is as slow as molasses"; "I did not make enough to pay for the powder I use"; and so on *ad infinitum*.

Did you ever consider the cause of these remarks? If you did, how many times have you found that a wreck or two had stopped production from a heading for a couple of hours, preventing the men from receiving their proper turn? Did you ever investigate the cause of that wreck? If so, did you ever try to remedy the trouble?

Did you ever analyze the reason why the miners demand an increased wage? If you did, you would find that their demands do not always arise from the fact that they are not receiving enough for each ton mined, but because they are not able to mine enough tons. If the miners were supplied with steady work each day of the week and were given a sufficiently large turn each day they would have been able at their old wages to load a sufficient number of tons to give them a satisfactory week's pay. As they do not get this they are compelled to ask for sufficient wages per ton of coal so that the amount of coal mined will produce enough money to take care of their wants.

There are two ways in which operators can remedy this condition, but in this article we are interested only in one. If the operator can furnish his men with a good turn he will have partially remedied the situation, for the miner will realize that the operator is doing his part. The operator, in order to provide the better turn, should see to three things: (1) That the mine track is in proper condition, (2) that sufficient motive power is available and (3) that he has plenty of mine cars. Unless the track is good it does not make much difference about the other two items, for locomotives and cars cannot travel rapidly unless the track they traverse is maintained in proper condition.

Big Foreign Coal Trade After War Is Over*

By J. H. WHEELWRIGHT
President Consolidation Coal Co., Continental Building, Baltimore, Maryland

SYNOPSIS — *Importance of finding just what coal the purchaser's conditions demand and of being ready to enter the market when the war comes to an end so as to anticipate readjustments in European countries whereby American coal may be rendered unnecessary. The need for American shipping, for better maritime laws, for a readjustment of international credits, and for better banking facilities is given as reasons for our past restricted coal sales in Europe.*

WHEN the war is successfully concluded, there will be opened up to America a wonderful opportunity to further expand her exportations of coal. The splendid progress made in the early stages of the war in introducing American coal in foreign markets and the further extension and strengthening of its position in markets that had already been more or less established—now at a lull for reasons with which we are familiar—will give us an opportunity of pushing our coal. Our fuel is now beginning to be known in the markets of the world, and foreign buyers will not look upon it in the future as an experiment and often a costly experiment, but as a commodity having proved qualities particularly adapted to their requirements.

Many of the unfavorable conditions with which the American coal exporter had to contend will be removed or greatly remedied. A few of these may be enumerated: (1) Lack of knowledge of the quality and character of our coals by foreign buyers. (2) Lack of vessels under the American flag to transport our product. (3) Unfavorable maritime laws, making it impossible to construct or operate vessels in competition with vessels under foreign flags. (4) Adverse credit balances, and the absence of proper exchange facilities in the countries to which the coal is to be transported.

Great strides have been made in solving the first difficulty in the course of selling the large amount of coal exported early in the war, at a time when conditions made only American coal available to foreign consumers. Its quality, character and preparation fully and satisfactorily met the requirements of foreign countries whenever it was intelligently supplied. This latter feature should be jealously watched, and pains should be taken to ascertain from the buyer for just what purpose the coal is to be used, as the use of the wrong kind of coal is such a costly mistake as to make a customer reluctant again to give it a trial. This feature alone in many communities has given American coal a bad name such as it does not deserve.

The second unfavorable condition is being rapidly removed by the construction and acquisition of a large fleet of vessels by both our Government and individual capital.

The third incumbrance will doubtless be lifted when the crying necessity for an adequate merchant marine has been forcibly demonstrated and when, at the cessation of hostilities, we find a large investment of Government and private capital in vessel tonnage. Then surely a revision of the present laws will be made which will place our vessels where they can fairly compete with those under other flags.

The fourth difficulty has already been solved by the readjustment of international credits. This has gradually taken place during the progress of the war. Furthermore, banking facilities abroad have been established by our large fiscal institutions, and branch offices have been opened in the important centers of all foreign countries. This would appear to have placed us on an

*Paper read before the National Foreign Trade Council in Cincinnati at its meeting held on Apr. 18, 19 and 20.

equality with our competitors in the important item of credit and exchange.

With some of the obstacles removed, and with the entering wedge already made, we must be prompt to take advantage and make the most of the pioneer work already done the moment the opportunity presents itself. Immediately after the termination of the war I believe there will be a tremendous world-wide demand for coal, as most countries, including our own, have practically no stocks available. Unquestionably foreign trade will only be limited by the ability of the mines to produce coal, the ability of transportation facilities to deliver it and the ability of labor to mine it.

It looks as if we would have a ready export market during the period of reconstruction for all the coal we can ship, as the producing countries of Europe will feel the effects of depleted man power. In many sections, furthermore, it will take a long time to restore to anything approaching normal production the properties that have been devastated by the war.

By the time the war is successfully concluded this country should be in a position she has never been in before. She will have American vessels to carry coal and other exports to foreign countries and to bring back such of their products as we import. This will place us on a more favorable basis insofar as marine rates are concerned and, in addition, the experience we have had since the war began in the shipment of huge tonnages abroad will have taught us how they may best be handled, while adequate international banking facilities will enable us to handle them.

Indeed, the question in my mind is whether we will have at that time the production of coal sufficient to enable us to supply the demands made upon us by foreign countries. If we have not it would be a great misfortune; for, as I have said before, it is of the utmost importance that we should be prepared and prompt to supply any demand arising. Unless American coals are supplied immediately, and foreign nations are thus prevented from returning to their old sources of supply, it will be difficult to displace them.

The mines of America have the capacity to meet such an emergency, and it seems that the vessel tonnage will be available. Therefore, the question seems to resolve itself into our getting the coal loaded on cars and transported to tide—a matter of transportation and labor. The inadequacy of the railroads to handle the tonnage of coal which can be produced in this country has been strikingly demonstrated during the past year, and not only the Government but the people at large now realize a situation which has been known and proclaimed by the coal industry for years.

We have faith in our Government, however, that when a condition has been so fully demonstrated an effort will be made to remedy it. Already we find concerted effort to improve the railroad facilities of the country by a unification of systems and terminals, as well as by many new methods for the handling of such commodities as coal, the purpose being to improve the unfortunate situation that has so long existed. In all probability, at the end of the war, there will be a let-up in the home demand and many men who have left the coal-mining industry for work in munition and kindred employment will sooner or later be seeking their old vocation of coal mining.

Pittsburgh Coal Co. Report for 1917

The Pittsburgh Coal Co.—the premier miners and shippers of coal—reports in its last annual statement to its stockholders that "the year 1917 was disorganized throughout in demand, costs, prices and distribution. The light stocks carried over, general business activity, severe winter weather during the first quarter, followed by the entry of this country into the European war, together created an insistent demand from the beginning, largely added to cost of production, and raised general selling values to an unprecedented level. All these governing factors were aggravated by railway inability to render usual service caused by abnormal general traffic, preference movements and other adverse conditions, thereby reducing the output of the mines and work of its employees much below requirements of expectation and necessity after a large increase of plant facilities and unremitted effort on the part of the whole organization of the company."

The experience of the Pittsburgh Coal Co. as regards disturbance to the operation of its mines due to abnormal causes has been shared by most if not all coal companies, the most acute situation being reached when the railroad administration made contracts giving 100 per cent. car supply to certain mines in return for cheap coal, a practice resulting in unequal distribution of available cars, reduced production and labor unrest at mines where, through car shortage, working time was seriously diminished. In the face of great uncertainty, many of the big coal producers have adopted a policy of extension and are preparing for increase of tonnage over record production of 1917. Thus far coal shipments during 1918 have been less than for a similar period last year, owing to the failure of transportation.

This report of the Pittsburgh company was not published until about the first of March, and its comments on the situation of the first two months of this year are extremely interesting at this time. The report states: "So far this year (1918) company production has fallen off 20 per cent. below the same period of 1917, adding so much more to the existing general coal shortage to be made up with nothing more to depend upon but trust that conditions will turn more favorable in aid of strenuous efforts to effect it. The coal must come out and be moved nearer to the supply of the needs of the country for the remainder of the year or the distress and trade disturbance of 1917 will be increased under the record so far made."

Continuing, the Pittsburgh company says: "Increased coal prices, higher wages paid in other industries and increase in living expenses disturbed labor and made necessary two large advances to all employees within the year, and costs of material and supplies also sharply advanced. While 97⅝ per cent. of full productive capacity was kept in steady commission, actual output represented the use of but 50½ per cent. And while the working force was reduced about one-third in number on the average through the year, there was practically no labor shortage. Facilities were increased by the opening of two other mines. The plants and equipment everywhere have been maintained in an efficient condition and no serious accident has occurred."

The total tonnage produced and handled for 1917 was 18,388,739 net tons, a decrease under 1916 of 317,705 tons or 1.7 per cent. A greater unmined coal content remained at Dec. 31, 1917, than was owned on Jan. 1, 1916. A material addition to the coal reserves was made during the year by the purchase of 8042 acres of coal rights in excess of sales. This makes the total owned and leased acreage of unmined coal of the Pittsburgh Coal Co. amount to 237,800 acres. The report further states:

"There has been a large increase in personal injury payments since Jan. 1, 1916, when the Pennsylvania law became effective, as every accident becomes a claim for adjustment. To carry this risk and provide against extraordinary ones, a fund has been set aside out of earnings as of Jan. 1, 1916, based on the rate for such risks fixed by the Employees' Liability Insurance Department of the State of Pennsylvania."

"The [employees'] pension fund amounts to $197,706.13, of which $187,405.98 is invested in the preferred stock of the [Pittsburgh] company and United States bonds, and there are 100 men drawing pensions. Payments into and out of the fund were increased during the year [1917] and it is also on a satisfactory basis for the present." The report relative to the Pittsburgh company's Employees' Association is also interesting and at the same time a further illustration of the spirit of coöperation between employer and employee. "Since this association was formed there have been subscribed for, paid and delivered 4791 shares of preferred and 2236 shares of common stock; and there are now under subscription 7420 shares of preferred and 4724 shares of common, or a total of 19,171 shares of both classes from its inception."

"A revision of the contract with the United States Steel Corporation entered into Apr. 1, 1905, for a term of 25 years, and which had become during 1916 a source of loss to the company, was made effective Feb. 15, 1917, for the balance of the original contract period at prices and on conditions insuring more favorable results for the future . . . , and with the further result of influencing the revision of other term contracts." This establishes a precedent which may have an important bearing on many other cases needing adjustment, among which is the irreducible minimum royalty clause in some leases, if transportation is to continue as capricious during the remainder of the year. During times when coal is in such heavy demand it would not seem that a minimum royalty would come up for consideration. But mines cannot long work from one to two days a week without feeling it seriously, not to mention the feeling of unrest among the miners.

The Fireman's Dream

Written expressly for "Coal Age"

By BERTON BRALEY



"These are the firemen," said the devil

THE fireman slept and he dreamed a dream
Of going down where the hell-fires gleam
And the Devil said, when he met him there,
"Aha, my friend, you may now prepare
For a job to last through eternity
So just step lively and follow me."

HE SEIZED the fireman and rushed pell-mell
Down to the nethermost depths of hell,
Till he and his quaking captive came
To a pit that was full of smoke and flame;
And there, on a bed of glowing coals
Was a hopping, skipping band of souls,
Whose forms would bend and whose backs would crouch
As they picked the coals and bellowed "ouch,"
Blew on their fingers a bit and then
Went back to picking coals again.



He thinks of that bed of coals

"THESE," said the devil, "are firemen who
Were wasting fuel their whole lives through,
But here in Hades we kept account
Of every ounce of the whole amount
That went unutilized up the stack
Or mixed with ashes; and now that pack
Of careless spirits must snatch each bit
Of coal they wasted from out the pit.
Each lump or morsel or tiny grain
Whose heat was lost or was used in vain,
Must be extracted by wasteful souls
From the very heart of this bed of coals.

"SO NOW get busy," the devil said.
The fireman blinked at the fire so red,
But the first live coal that he reached to take
Stung him suddenly wide awake;
And he gave a yell as he left the spot
Where his hand had fondled a steam-pipe hot.
But whenever he looks in the boiler's glare
He thinks of that bed of coals down there
And his boss notes a fuel-saving clear
Of a couple of hundred bucks per year!

Economy in Power for the Mine

By C. M. GARLAND
Chicago, Ill.

UNTIL within the last few years the question of economy in power for the coal mine was, comparatively speaking, a question which had scarcely been considered. The attitude of the coal operator was to a certain extent justified in this respect, for with coal having a value of $1 a ton or under at the mine an investment in costly but efficient power equipment would hardly be warranted.

The result was that the operator, as a rule, bought the cheapest equipment obtainable. He could better have afforded to install equipment that would require 50 per cent. more coal to operate than highly efficient equipment, but he could not afford to install any equipment and operate it in such a manner that from two to five times as much coal was used as was actually required. This poor efficiency has resulted disastrously in more cases than one. There were in the past, undoubtedly, numerous mines that would have shown dividends instead of deficits if the power end of their operation had been properly handled.

Now that coal has reached a value of $2 a ton and upward at the mine, and shows every prospect of remaining at or near this figure, there can be no further justification for poor economy in power generation. In discussing this matter with the operators, the usual justification for poor economy is given as poor labor conditions. While the labor has something to do with the matter, it might be well to refer to Frederick W. Taylor's pioneer work on efficiency in industrial operation, in which he has pointed out that for an industrial organization of any kind to be efficient it is necessary that the management should know more about the work than the workers themselves.

Cause for Inefficient Power Generation

Herein to a large extent lies the cause for the inefficient power generation at the mine. The trouble is not so much in the labor as it is in the management. As a rule, firemen or engineers around the coal mines are on a par with the firemen or engineers around the average industrial plant. The real problem is to convince the management that a half dozen or more small hand-fired boilers connected up to a half mile or more of bare steam pipe is not an economical installation, or that a system of maintenance which permits repairs only when equipment has broken down and nothing more can be obtained from it is ruinous. "A stitch in time saves nine" is literally true in power-plant operation.

At the present time the use of central station power is becoming quite common, and properly so. The question as to whether it is more economical to purchase or to generate power is, however, a particularly complicated one for the mine plant. There are five elements entering into the problem which must receive consideration. The nature and magnitude of the load, cost and reliability of the purchased power, the status of the power equipment installed at the mine, the value of the coal and the amount of heating to be done in winter.

If the plant is a new one from the ground up, and the load is small or medium, it is probable that it will be more economical to purchase power and install the equipment accordingly. If, on the other hand, the plant is new and the load is sufficiently large, it may be more economical to generate power.

If an existing plant is being considered and the load is medium or large and the power-generating equipment installed is in fair condition, it is probable that by making suitable alterations it will be more economical to generate power. It is not possible, however, to make rules covering plants in general. Each plant is a problem in itself and must receive individual consideration.

In addition to the five principal points enumerated above, there are numerous minor details which may be combined to throw the decision either way. The following is a typical example: The plant consisted of an engine and boiler room adjoining. The boiler room contained twelve 72 in. by 18 ft. return-tubular hand-fired boilers and three, direct-acting steam pumps. Boiler settings were all in poor condition, the piping was without covering and numerous leaks around the flanges were discharging steam into the room. The water was bad and the boilers and pipe lines were filled with mud and scale. The engine room contained one 100-kw., one 200-kw. and one 300-kw., 250-volt, direct-current, high-speed engine generator, noncondensing.

In addition to the foregoing units there was a 24 x 36-in. hoisting engine. Outside of the engine room and located at a distance of from 50 to 500 ft. from the boiler room the following small engines were located: Three car puller engines, one sand dryer engine, three engines for conveyors, one fan engine, four small steam pumps, two engines for the repair shops and one shaker screen engine.

These engines were all connected up with piping ranging in size from 1 to 4 in. and having a total length of approximately 2000 ft. No covering was used and the lines were drained by bleeding into the atmosphere. The steam generated in the plant during a working period of 7½ hours was distributed approximately as follows:

	Lb. per Hour
Hoisting engine	18,000
Condensation in pipe lines	1,200
Leakage	1,200
Small engines and pumps	14,000
Engine generators	20,000
Total	54,400
Total for 7½ hours	408,000

During the nonworking period of 16½ hours, the following steam was used:

	Lb.
Condensation in lines	1,200
Leakage	2,000
Engine generator	5,400
Hoisting engine	6,000
Fan	1,500
Pumps	1,500
Total steam per hour	17,600
Total steam for 24 hours	698,000

Evaporation of steam per pound of coal was approximately 5 lb. About sixty-nine and eight-tenths tons of

coal were used per day and the annual coal bill was $44,400, of which no record was kept. Coal has a value of approximately $2 per ton under present conditions. The annual cost of power was as follows:

Coal	$44,400
Labor	21,600
Repairs	4,500
Oil and supplies	2,500
Total	$73,000

The following changes were recommended: Replacement of small engines with motors; the installation of a 750-kw. mixed-flow turbine with regenerator and condenser to operate on the exhaust from the hoisting engine; the replacement of the small boilers with three 400-hp. units equipped with mechanical stokers. If these changes were made the old engine-generator units would serve as emergency equipment while the steam turbine would normally carry the load. The electrical load, which formerly averaged 400 kw. per hour during the working period, would now average 550 kw. per hour. All of the small engines would be discarded.

Changes Brought About Large Saving

After the changes are made the following is the estimated steam consumption:

	Lb. per Hour
Hoisting engine	18,000
High pressure steam for turbine	7,370
High pressure steam for auxiliaries	4,500
Total	29,870
Radiation and leakage	787
Grand total	30,657

The steam required for the nonworking period of 16½ hours is as follows:

	Lb.
Hoisting engine	3,000
Auxiliaries	3,600
Generator	5,000
Total	11,600

The coal consumption for the 24-hour period is 32½ tons and the annual coal bill is $21,640. Under these conditions the annual cost of power would be as follows:

Coal	$21,640
Labor	10,600
Repairs	2,500
Supplies	1,500
Total	$36,240

The total investment required for the foregoing changes, including the overhauling of hoisting engine and engines and generators, would be $101,000. The fixed charges on this investment at 12½ per cent. would be $12,620. The annual cost of power is therefore $48,860 and the annual saving over the cost of power before the making of the changes $24,140.

The question next to arise is that of purchased power. In the event that power is purchased the hoisting engines will be discarded and an electric hoist installed. The total investment necessary is $52,000, and the fixed charges at 12½ per cent. are $6500 per annum.

With purchased power the average load for the working period is 775 kw. and for the nonworking period 120 kw. The power companies' rate for this load was 1.7c. per kw.-hr. The total estimated kilowatt-hour consumption per annum was 2,329,000, making the bill for current $39,500 yearly. The annual cost of power is estimated as follows:

Current	$39,500
Labor	6,000
Coal (for heating)	1,400
Repairs	1,500
Supplies	1,000
Total operating cost	$49,400
Fixed charges	6,500
Annual cost of power	$55,900

The saving in generated power over purchased power is $7,040.

A plant of this size would be classed as medium. Owing to the comparatively high figure of 1.7c. for the cost of current, it would be more economical to generate power with the improved equipment. In addition to this saving the item of spare equipment which makes shutdowns due to failure of the power equipment almost impossible, there is an additional item of saving which cannot well be estimated.

If the cost of current had been 1.5c. per kw., which would have been a more reasonable figure for the amount of current required, and if there had been no heating requirements, the cost of generated power and purchased power would have been approximately the same. The selection then should have been made on the basis of the reliability of the service.

If in the example above the amount of power required per annum had been from 25 to 50 per cent. greater, this additional power would be generated at approximately the cost of coal. There would then be little chance for purchased power even at the lower rate of 1.5c. per kw.-hr. Conversely, if the amount of power required had been from 25 to 50 per cent. under the actual demand, there would have been no economy in generating as the fixed charges and labor item would remain essentially the same.

Referring again to the original coal bill of $44,400, which was based on coal at $2 per ton, it will be noted that if the price of coal had been $1 per ton that the cost of power under these wasteful conditions would have been $50,800 per annum. This compares favorably with $48,860 as the cost of power generated with improved equipment and with purchased power at $55,900.

It will be noted also that the large saving effected by the improved equipment is not alone due to the decreased fuel consumption. The labor item about which there is so much complaint, which to a large extent is justified, is excessive and would never be tolerated in the average industrial installation. Small hand-fired boilers together with the large number of small engines makes an excessively large labor item, which can be reduced readily by anything like modern generating equipment.

Correction

In the explanation of the use of the diagram (Fig. 3) for finding the change in declination of the sun, in the article on "The Ross Meridiograph," in the last issue of *Coal Age*, a misstatement is made in the third paragraph on page 734. The last lines in this paragraph should read as follows: *Then, project this last point vertically onto the scale at the top or bottom of the diagram, as the case may be.*

Likewise, in the seventh line from the bottom of the same column, the words "whose intersection with" should read *and that point again projected vertically onto.* Also, the words, *corrected for refraction and declination* should be inserted after the words "sun at noon," in the last line, second paragraph, second column, page 732.

Fuel Mixing Plant at Hazleton, Penn.

An article appeared in the Mar. 9, issue of *Coal Age* on the "Utilization of Anthracite Culm," by M. S. Hachita, who describes a number of interesting experiments conducted by the Lehigh Valley Coal Co. on various mixtures of anthracite culm and bituminous coal. This matter has attracted so much attention that further information about the plant itself might be timely. Also the latest developments in the situation.

The utilization of hitherto practically waste fuel products, conveniently stored for use, serves various purposes: It is quickly available in considerable quantity, it releases other fuel which is in great demand, and valuable space around some breakers is not stored with what was previously an ever-increasing pile of culm.

Lehigh Valley Coal Co. in the Clearfield region of Pennsylvania, is dumped into the boot of the elevator *A*, from which it is elevated to the top of the structure. At the upper end of this conveyor line the coal passes over bars —the fine coal falling through goes direct to the bin *G* and the lumps are carried on to the rolls, which crush to about 1 in. The rolls have little work to perform, as the coal coming from the Snow Shoe mines is screened through 1¼-in. bars. The bin *G* has a capacity of about 85 tons. The culm bin *F* holds about 50 tons.

Coal feeds by gravity from the bins to the revolving tables *C* and *D;* the former has a peripheral speed of about 2½ ft. per min. and the table *D* of about 5 ft. per min. (See diagram below for details of these tables.) This arrangement tends to feed one volume of silt to two of bituminous coal to the mixing table *E*. A strip of sheet iron (12 in. wide) around the outer edge of the revolving table, but not attached to the table, keeps the

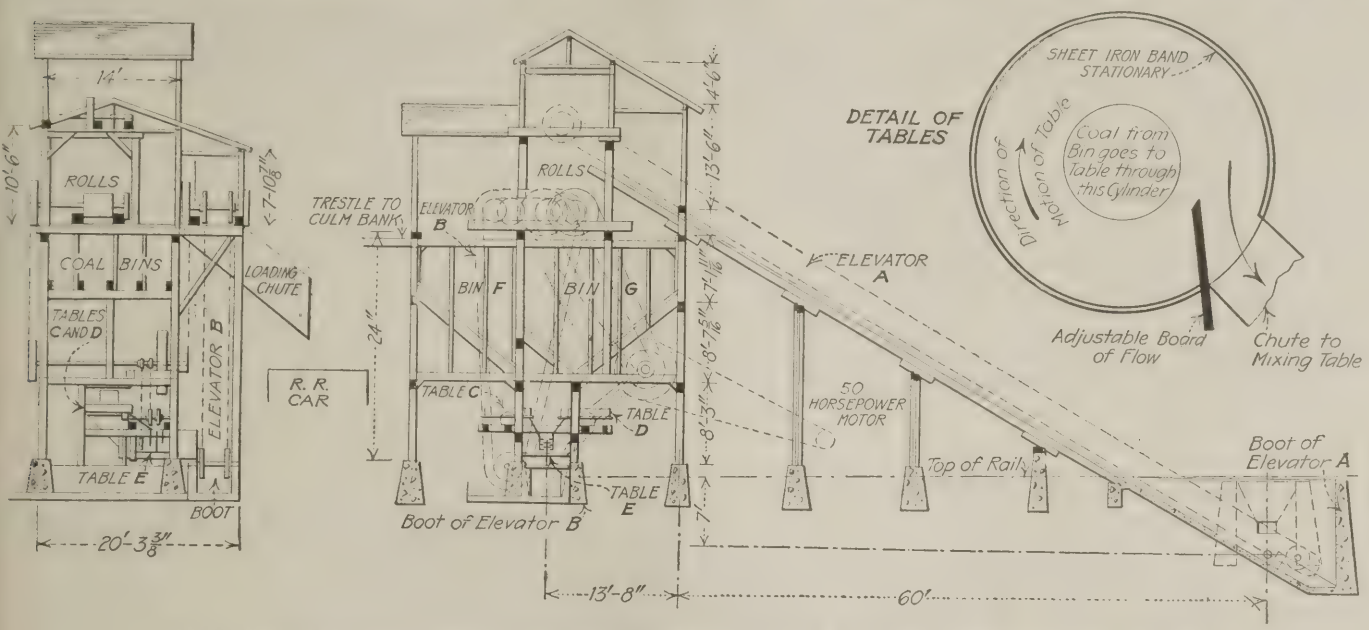


FIG. 1. LONGITUDINAL AND CROSS-SECTIONAL VIEWS OF MIXING PLANT AT HAZLETON

For many years the water used in preparing coal in the breakers in some sections of the anthracite field was conducted from the breaker by chutes to a settling pond, or allowed to spread out over territory adjacent to the breakers. This wash water generally, if not always, carried much fine coal. From the settling ponds the coal has been recovered and often stored in banks now generally available for use. In some other cases large areas carry culm beds several feet thick, where the silt was deposited when the transporting wash water spread out and drained slowly away to a stream in the vicinity. The wastes of yesterday are frequently the valuable byproducts of today.

The experimental mixing plant was located at Hazleton partly on account of the proximity of a large bank of culm to a site on the Lehigh Valley R.R. convenient for mixing and shipping the fuel. The external view of this plant is shown in an illustration accompanying the article referred to above—longitudinal and cross-sectional views of the structure are given in Fig. 1 herewith. The structure and its coal-handling apparatus are so simple as to need little explanation.

Bituminous coal from the Snow Shoe mines of the

coal on the table except at one point where it is scraped off into a chute by a board or plow. The coal feeding to the revolving tables through a central cylinder tends to spread out on the table due to the weight of the coal above and to centrifugal action. The tables are 5 ft. in diameter and are made of cast iron 1 in. in thickness.

The mixing table *E* mainly differs from the other two in one particular. Attached to the center of the table is a vertical shaft provided with several series of projecting arms. Other similar arms project from and are attached to the sides of the central stationary cylinder. The arms on the shaft revolve with the table and between the stationary arms. Coal passing through the cylinder is stirred up by the arms and mixed. From the table *E* the fuel goes to the boot of the elevator *B*, from which it is elevated to the top of the building and into a chute to railroad cars. It is expected shortly to about double the capacity of this Hazleton plant by arranging to dump more cars at one time into the boot of the elevator *A*. It is also planned to load the culm into the hopper cars, which transport it to the mixing plant, by a steam shovel instead of by hand as at present.

The Lehigh Valley R.R. at present uses about 7000

tons of coal a day on its engines—no small item. The present Hazleton mixing plant coals the locomotives on the Mahanoy & Hazleton division and also to Coxton. When the plant is enlarged to twice its capacity, the excess fuel will coal engines running to Lehighton and also to Wilkes-Barre. On the mountain divisions a mixture of one part culm to two parts bituminous coal is required, but for yard service a 50-50 mixture answers and saves money.

The Hazleton plant has proved to be such a success that another and larger mixing plant is well under way at Coxton. Part of the material for this new plant is on the ground and construction should proceed rapidly with good building weather. With the addition of the Coxton plant, the coaling service should extend to Manchester. It is expected that the new plant will use annually 250,000 tons of culm, which will come from the following collieries: Dorrance, Franklin, Mineral Spring, Exeter, Seneca and Heidleburg. These mines are operated by the Lehigh Valley Coal Co. and produce about 250,000 tons of culm a year, which will be used as made. If this supply from the Wilkes-Barre mines does not fill the requirements, then collieries of the Lehigh Valley company in other regions of the anthracite field will make up the deficiency. When new culm is used it will be necessary to filter it in centrifugal machines to remove the excess water.

It is safe to predict that collieries which have used this culm for filling old mine workings to support the top will likely store it for future use. At some of the collieries of the Lehigh Valley Coal Co. the slate or breaker refuse has been reduced to ¼ to ½ in. in size and flushed into their mines.

Drill Mounting for Drilling Coal

By B. B. Brewster

The use of the Sullivan rotator or other types of hand-feed, automatically rotated hammer drills has made much headway in the past year or two, for drilling shot holes in the coal face, when blasting is required after undercutting.

As a substitute for hand drilling, the rotator, driven by compressed air and weighing only 38 lb., is many times faster and is perfectly convenient to handle.

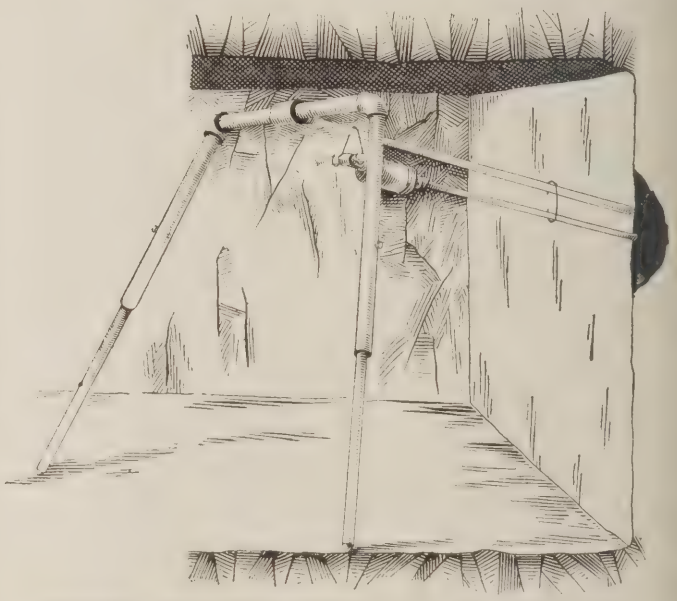
While the rotator, in coal drilling, is readily operated by one man, even on deep holes, a drilling gang frequently comprises two men. This is simply to provide for greater speed in handling the drill, steel, hose, etc., and in carrying them from room to room. In coal of ordinary height (6 ft. or less), and for holes of ordinary depth, the operator, either alone or with a helper, has no trouble in supporting the drill by hand. For deep holes or high coal, some form of simple mounting has been found desirable.

The accompanying illustration shows such a mounting, devised by the writer for this purpose, and used with success in at least two Utah coal mines. This consists of two rear legs or feet, joined at the top by a cross bar, having a tee in the center, in which is secured a horizontal bar or leg. The rear legs have a telescoping joint formed by drilling holes at regular intervals in the pipes, of two diameters, composing the leg and a pin inserted to hold the leg at the height desired.

This mounting is made of ordinary pipe, 1 in. or 1¼ in. in diameter, and fittings. It is set at the height desired, and the drill is hung under the horizontal bar or leg on two hooks, one on the drill handle, the other at the bit end of the steel. This makes it unnecessary to hold the steel while collaring the hole. The operator merely steadies the machine and thrusts it forward to its work.

In the setting shown, holes were put in about 6½ ft. above the floor, in 8-ft. coal, and the drilling was done rapidly and easily. In this mine, where the coal was fairly hard, miners with hand augers drilled about 10 holes per man per shift, the holes being 5 to 5½ ft. deep. It required two, four or even sometimes six hours to drill the holes for a single room.

In trying out the new mounting, several rooms were drilled. One of these will serve as an example of the



SIMPLE DRILL MOUNTING FOR DRILLING COAL

results secured. Five holes were drilled, or a total of 27.1 ft., in 13 min. 10 sec. drilling time, an average of 2.1 ft. per min. The drill and mounting were then pulled down, moved to a near-by crosscut, reset, and three holes drilled, or a total of 16.3 ft., in a total time of 17 min. The actual drilling time on these three holes was 8 min. 2 sec. The drill used was ⅞-in. hollow hexagon steel and "Z" bit. On the first hole two lengths of steel were used; on all others, one 6-ft. length only. The great time and labor economy of such a coal-drilling rig will at once be evident.—*Mine and Quarry.*

New Coal Mining Paper

A new coal mining paper, to be known as the *American Coal Miner*, has been started by K. C. Adams, formerly in charge of publicity for the United Mine Workers of America. The new publication will be a weekly digest of coal mining news, summarizing and briefing the best articles appearing in other coal mining papers. Mr. Adams is editor of the new paper, and he states that it will be a high grade publication throughout. It will doubtless be received with a great deal of interest by the industry.

Which?





Will you lend your money to fight the foe "Over There," or will you wait till they come "Over Here" before you are sufficiently aroused?

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Now!



New Coal Prices

New coal prices in the States of West Virginia, Kentucky, Missouri and Kansas, effective Apr. 20, were announced by the Fuel Administration last week as follows:

State or Field	Run-of-Mine	Prepared Sizes	Slack or Screenings
West Virginia:			
No. 10 district, Coal & Coke and Gauley districts; Taylor, Barbour, Lewis, Buckhannon, Randolph, Gilmer, Braxton, Webster and Greenbrier Counties; operations in Nicholas County east of the mouth of the Meadow branch of the Gauley River and Coal & Coke district in Kanawha and Clay Counties, north of Charleston	$2.30	$2.55	$2.05
Fairmont district; Monongalia, Marion and Harrison Counties	2.15	2.40	1.90
Thacker district, operations in McDowell County west of Panther on the Norfolk & Western and in Mingo County west along the Tug Fork of the Big Sandy River to Williamson on the Norfolk & Western	2.30	2.55	2.05
New River district; Fayette County south of Hawk's Nest on the Chesapeake & Ohio, Fayette and Raleigh Counties south of Paintsville on the Virginian R.R., Wyoming County north of Herndon on the Virginian Railroad	2.35	2.60	2.10
Logan district; Logan County and operations in Boone County south of Danville on the Chesapeake & Ohio, Lincoln County south of Gill on the Chesapeake & Ohio	2.15	2.40	1.90
Putnam County	2.50	2.75	2.25
Kenova district; operations on the watershed of the Tug Fork of the Big Sandy River west of Williamson on the Norfolk & Western and Wayne County	2.30	2.55	2.05
Kanawha district; Nicholas County west of the mouth of Meadow creek, Fayette County, west of Hawk's Nest and north of Paintsville and operations in Raleigh and Boone Counties on the watershed of the Clear Fork branch of Coal River, Boone County, north of Danville, Kanawha County south of Charleston and Lincoln County north of Gill	2.25	2.50	2.00
Kentucky:			
Thacker district; operations in Pike County on the watershed of the Tug Fork of the Big Sandy River east of Williamson	2.30	2.55	2.05
Kenova district; operations in Pike County and in Martin County on the watershed of the Tug Fork of the Big Sandy River west of Williamson	2.30	2.55	2.05
Missouri:			
District No. 1; Audrain Bates, Calloway, Henry, Johnson, Monroe, Randolph, Ralls, St. Clair, Schuyler, Vernon, Montgomery and Adair Counties, except operations of the Star Coal Co. and operation in Macon County east of New Cambria and mining operations not covered by other rulings	2.70	2.95	2.45
District No. 2; Boone, Clay, Cooper, Chariton, Carroll, Dade, Harrison, Linn, Lafayette, Putnam, Ray and Sullivan Counties and Macon County west of New Cambria and the long wall thin-seam mines in Randolph County	3.15	3.40	2.45
Grundy County; operations of the Star Coal Co. in Adair County; shaft workings on the upper thin vein in Barton, Bates and Vernon Counties	3.65	3.95	2.45
Platt County	3.40	3.65	2.45
Kansas:			
Cherokee and Crawford Counties, except shaft mines on the upper thin vein and any mining operations in the State not covered by other rulings	2.70	2.95	2.45
Shaft workings on the upper thin vein in Cherokee and Crawford Counties	3.65	3.95	2.45
Osage, Franklin and Linn Counties	3.50	4.50	2.80
Leavenworth County	3.40	3.65	2.90

The foregoing prices do not include the allowance of 45c. a ton to those operators who have complied with the Washington wage agreement.

Weekly Production Statistics

Bituminous coal production during the week ended Apr. 13 was 10,947,000 tons, an increase of nearly 18 per cent. over the preceding week. Anthracite forwardings were 37,760 cars during the week ended Apr. 13, an increase of nearly 6000 cars over the week ended Apr. 6. Beehive coke production for the week ended Apr. 13 aggregated 672,000 tons, an increase of 50,000 tons over the week preceding. Byproduct coke production for the week ended Apr. 13 was 469,561 tons, a very slight increase over the week preceding. The figures are estimates made by C. E. Lesher, the geologist in charge of coal statistics for the Geological Survey. Telegraphic advices to the Fuel Administration covering bituminous coal production during the week ended Apr. 20 indicate that a still further increase in production has been made.

An increase of 744,000 tons of bituminous coal over the production of the first three months of 1917 was attained in January, February and March of this year, Mr. Lesher estimates. This is equivalent to an increase of one-half of 1 per cent. over the corresponding period of 1917, but is slightly less than the coal mined during the first three months of 1916. March production, however, was greater in 1918 than in either 1917 or 1918.

Railroad Fuel Situation Not Yet Settled

While the railroad fuel situation, at this writing, is by no means settled, the advantage in the controversy has turned sharply to Dr. Garfield, the Fuel Administrator. In the hope of devising some means whereby the deadlock may be broken, Dr. Garfield has laid the entire matter before the Board of Directors of the National Coal Association. The advisability of making any concessions in an effort to do away with the present uncertainty is being discussed. If the amount of the concession from the price schedule could be turned directly into the treasury of the United States, it would come nearer meeting the approval of the Fuel Administration, it is understood.

The stumbling block in the whole negotiations has been John Skelton Williams, the director of purchases for the Railroad Administration. It is known that the President has the utmost confidence in Dr. Garfield's judgment. In the discussion of the railroad fuel situation with the President, it is said to have developed that the President has been embarrassed on a previous occasion when the advice of Mr. Williams was followed and, as a result, it is considered logical that he will

scrutinize any of Mr. Williams' recommendations with unusual care before allowing them to be carried into effect. The controversy already has interfered with production and distribution of coal to such an extent that it is believed a settlement of some sort must be reached promptly.

Retail Prices To Be Equalized

Retail prices of coal are to be made as near uniform as possible. To accomplish this end, the following message has been sent by the Fuel Administration to all its county chairmen: "No doubt the most perplexing problem confronting you and your committees has been the great variation between the costs of the different retailers in a given community. Some committees have not realized that the high cost of the inefficient retailers were abnormal costs; and they have so fixed the gross margins that even the dealer with the highest costs realized a substantial net profit. By regulation of retail prices and practices the Fuel Administration can encourage efficiency in handling and delivering coal."

Comparatively Few Licenses Requested

Fuel Administration officials apparently overestimated the number of licenses which would be asked in connection with the zoning plan. Instead of the flood of applications expected, comparatively few have been received. Information reaching the Fuel Administration shows that thousands of industries, which previously have been using coal from other zones, are placing orders and receiving their coal in the zone in which they are located.

In some cases, however, the Fuel Administration has learned that consumers are withholding their orders in the expectation that the zone of distribution may be altered in a way that will broaden their sources of supply. Such a policy is likely to prove unwise as the greater portion of modifications are certain to be in the direction of further restriction rather than enlarging sources of supply.

Domestic Consumers Must Fill Forms

Retail coal dealers in New Jersey are demanding from each applicant for coal for domestic use a signed statement as to the amount of coal in his possession and such other information as is required by the form reproduced herewith.

Name of dealer .....

City ..... State .....

In accordance with the order of the State Fuel Administrator in New Jersey, purchasers are required to make true declaration in answer to the following questions:

1. Amount and size of coal desired .....
2. To heat ..... rooms (not including bathrooms, pantries, etc.).
3. Size used last year .....
4. Approximate amount used last year .....
5. Coal on hand at present .....tons ..... size .....
6. Will last approximately ..... days.
7. Have you any unfilled orders with other dealers .....

I hereby certify that the above report is true to the best of my knowledge and belief.

Name .....

Address .....

Coal Brasses To Be Utilized in Making Sulphuric Acid

Coal brasses are being relied upon in estimates now being made to furnish a portion of the iron pyrites needed in the making of sulphuric acid. No less than 500,000 tons of coal brasses are available for this purpose, according to the Committee on Mineral Imports and Exports. While few coal companies are in a position to recover pyrites from this material, plans are now being worked out for the establishment of a number of central plants which will turn out the treated product. Efforts in this direction in the past have been looked into and found not to have been scientific, or to have been followed determinedly.

New Maximum Coke Prices

Smelting or furnace coke in Colorado may be sold at $8.50, according to a ruling by the Fuel Administration. Seventy-two-hour selected foundry may sell for $9.50.

Prices in Monongalia County, West Virginia, are $6.25 for blast-furnace grade and $7.25 for 72-hour selected foundry.

The price for 72-hour selected foundry made by the Empire Coal Co., at Empire, Ala., is $8.75.

No revision of prices for any district or field will be considered for at least ninety days after the date upon which a revision of prices for the field in question had been announced, a Fuel Administration order sets forth.



MAKE YOUR MONEY FIGHT. BUY LIBERTY BONDS.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

There are several items of more than ordinary interest —a settlement in Alabama, the promise of the Tennessee Coal, Iron and Railway Co. that it would enter into contractual relations with its men as have other Alabama operators, the decision of the central Pennsylvania mine workers to be content with their wages, the announcement by President Hayes that it was low-price railroad coal that worried him and not the alleged price tinkering of the Fuel Administration and the decision of the United Mine Workers to issue their journal semi-monthly and distribute it gratis to all members.

The anthracite mines are working well despite threats of strikes against Liberty-bond slackers. There have been, however, a few actual button strikes and a few mines closed down by flooding. Just recently there has been a gain in the mine forces, but the draft may well upset this favorable circumstance. Besides the gain is not in the coal getters. Miners in the anthracite region increased from Sept. 17 of last year to Feb. 13 of this year by 618, but miners' laborers in the same time decreased by 949. The main increases are in company men who handle the coal after it is mined, at mines and at culm piles, whereas the only really hopeful increase would be in men at the face. A table we publish elsewhere shows that this number has decreased by 331. The anthracite region needs 22,000 more men to be as well staffed as it was before the war started.

ANTIUNION DRIVE HAS SPENT ALL ITS STRENGTH

The drive against the union has reached its limit. Everybody now knows what it amounts to, and the panic is at an end. There are 40 local unions in the secession and, apparently, they are all in District No. 9. The leaders of the secession movement have called a meeting for the day on which this issue of *Coal Age* appears. They are not very sure of themselves and so have not signed their communication to the officers and members of the district, individually, but as a "committee." The notices are carboned in red—a fact somewhat symbolic of the affiliation of their issuers with those who use red as an emblem of their bloodthirsty purpose. President Hayes feels sure that the situation is well in hand.

In central Pennsylvania the delegates from District No. 2 met at their regular rendezvous, Du Bois, on Apr. 22. The policy committee reported to the delegates that the price set upon coal by the United States Fuel Administration did not contemplate or admit of an increase in wages. They recommended that there be no strike but urged that the Fuel Administration investigate wages in the district. In all of this the delegates somewhat ruefully concurred.

EVEN THEIR PATRIOTISM DID NOT SPARE THEM

The Pittsburgh district has its enemy-alien trouble like most other districts. Three Austrian mine workers were drafted before the United States went to war with Austria Hungary. With all loyalty and good will they went to camp. When war was declared with the Dual Monarchy they were compelled to return home. Two other Austrian miners who had volunteered before the draft, returned at the same time.

The mine workers at No. 2 mine of the Pittsburgh Coal Co., at Bishop, Penn., refused to work with these men. Vice-president Robert R. Gibbons of the Pittsburgh district, brought the mine workers' local committee down to see United States District Attorney E. Lowry Humes and he explained that the men were simply obeying military regulations and that the strike would serve no worthy cause. A meeting of the strikers followed. Gibbons warned that a riot would follow if he condemned the strike, but he took the hazard, and the strike ended after it had lasted a day.

The Maryland strike of which mention was made last week appears to have included all the mines in the Georges Creek and Upper Potomac field with but one exception, the Reilly-Peabody concern which operates the old Jackson workings. This is a New York City company and several weeks ago it had signed an agreement with its men.

About 900 mine workers employed on the Western Maryland R.R. between Shaw and Schell, W. Va., in the Elk Garden field stayed out longer than the other mine workers



AINT IT A GRAND AND GLORIOUS FEELING?

because, according to their own declaration, they were not notified to resume. They returned to work, however, Apr. 18, a day after their fellows in the adjacent fields.

This is the first serious strike the Georges Creek and Upper Potomac field has had for 18 years when, in 1900, William Warner, an organizer for the United Mine Workers, closed the mines for two months.

The Washington agreement not only established a penalty clause, but it put in operation a new schedule of wages. Those who comply with the agreement are allowed to charge 45c. a ton more than before. The union makes the assertion that in many nonunion regions the operators are dutifully adding 45c. to their price and forgetting to add the full increase to the wage paid their employees. The charge is no light one, and if the union can establish the facts by

the organizers they have sent into the nonunion fields they will do the industry no small service. Dr. Garfield has informed President Hayes, of the United Mine Workers of America, that by special investigators he will make careful inquiry of all the abuses of which Mr. Hayes has given him notice. These men will visit the mines and will enforce the provisions of the agreement.

War Reactions in Anthracite Region

The recent actions against enemy aliens in the anthracite region have been more reasonable than those in the past. For a while the mine workers, especially in the Panther Valley region, seemed determined to keep Germans and Austrians from working in the mines. The feeling was only sporadic, and did not seem, even where it appeared, to evidence an all-inclusive exception to all enemy aliens. Still it was menacing for it might have spread to all the mines of the anthracite region and have involved all those whose naturalization was still incomplete.

But no matter how strange and illogical it may seem the feeling existed nevertheless. The public had barely seen the matter settled satisfactorily by the exertions of the labor-union leaders, when it read in the papers that German prisoners in France were being compelled to work by American soldiers. It is the old story. Nobody seems to know what to do about the alien. He is damned if he does and he is damned if he doesn't. Today he must be compelled to work, tomorrow he must be forbidden; now he must be naturalized—this if he is not an enemy alien—then again he mustn't be allowed to accept naturalization.

More Excuse for Central Pennsylvanians

It must be admitted that there is some possible shadow of justification for the mine workers in central Pennsylvania when they proclaim that they will not let friendly "enemy aliens" share in a car service that is wholly inadequate even to keep native and naturalized citizens busy. The action of these mine workers is perhaps none too kindly when we consider that it denies a living to men who show their goodwill by their readiness to work, and often by their buying of Liberty Bonds and by their attempts to become soldiers in the United States army. In fact, unreasoning bitterness to them will not engender in them that spirit of Americanism which we want newly arrived Americans to share with us.

But the objections formerly raised to friendly "enemy aliens" in the anthracite region was more inexcusable, because men are scarce in that region and every man, native or foreign, has work every day. Some men are even complaining that the companies are insatiable in their demands on the workers for more coal and more shifts of labor.

However, as said, the refusal to let men work when they will not buy Liberty Bonds rests on a far better basis. All men whom America is aiding should do their part in return by subscribing to the Liberty Loan.

Must Buy Liberty Bonds or Leave the Job

At the Sandy Run mine, near Freeland, the mine workers have served notice that they will refuse to work with three pro-Germans who have refused to buy Liberty Bonds. A Hungarian and an Italian were discharged Apr. 18 from the Harleigh strippings of the Central Pennsylvania Stripping, Quarrying and Construction Co. because they made a similar refusal. Their fellow workers threatened to strike if these slackers were permitted to work, and for a while it appeared that a lynching was in prospect.

At the Lytle colliery five Austrians who refused to purchase Liberty Bonds were taken by the heels by the workmen and dipped into a steel tank where oil is heated for the colliery engines. The men are covered with an amber stain that will not easily be washed out. When they threatened suit against the ringleaders they were told that any such action would result in their being strung up. As a result on Apr. 18 all five men purchased Liberty Bonds, and decided to make no trouble for those who had been guilty of hazing them.

At Last, Alabama Wage Is Settled

On Saturday, Apr. 21, the wage scale of the Alabama region was settled after a long delay. It will be recalled that on Dec. 14, 1917, the Fuel Administration made certain recommendations to the mine workers and operators relative to an adjustment of working conditions in the Alabama coal field. In this document under section 7 it was provided that the readjustment of mining rates and wages be postponed until July 1, 1918.

However, the representatives of the Alabama coal operators and those of the mine workers in Alabama expressed a desire for an earlier adjustment and conferred with the Fuel Administration to that end, and in consequence it was decided that the following rates and wages should become effective May 15, 1918, and continue in effect and binding during the continuance of the war, but not longer than for two years from Apr. 1, 1918, should the war be protracted for a longer period of time.

New Day-Wage and Tonnage Scale Provided

Under the scale day labor will be paid as follows: Drivers, $3.44 per day; unclassified inside day labor, $3.20; unclassified outside day labor, $2.75; tipple men, $3.00; miners employed by the day, $3.84; trappers and other boys, 50c. per day advance.

All other classes of day labor employed in and around the mines to be advanced 75c. per day over present prices. But in no instance shall the rate paid exceed that paid for the same class of labor in the Tennessee and Kentucky scale which was approved by the Fuel Administrator Nov. 7, 1917. It is understood, however, that where day labor is now paid more than the Tennessee and Kentucky scale no reduction shall take place.

The pick-mining rate for run-of-mine coal is advanced 5c. per ton. The machine-coal loaders are to receive 4c. more per ton. Machine runners and helpers where employed by the day, ton or foot are to be advanced 10 per cent. Compensation for all yardage, room turning and dead work is to be increased 6¼ per cent. Miners when taken from the face to do company work shall receive the rate paid for that classification, but, in no instance, shall the rate be less than the rate paid for miners when employed by the day.

House-Coal Price Is Increased to Miners

Each operator affected by this agreement shall file with the umpire within two weeks after its formation (sic?) the scale of wages paid at each mine during March, 1918, for mining, yardage and dead work and day labor, also the scale of wages paid for the same work under this agreement. House coal shall be advanced 45c. per ton.

If any mine worker or group of mine workers in any way interrupt the operation of the mine or causes a strike, the operator shall deduct from the earnings of each employee, except those who continue at work, the sum of $1 per day for each day or fraction thereof that such mine worker fails to report for work.

If any mine is closed or the men locked out by an operator, without just cause, the umpire of the Alabama district will impose upon and collect from such operator the fine at the rate of $1 per day for each mine worker affected. All questions arising under the foregoing provisions are subject to review by the umpire of the Alabama district. All fines collected shall be paid to the American Red Cross. It is not the intention of this penalty clause that it shall apply to individuals who may temporarily absent themselves from work, but it is intended to insure maximum coal production and to compel operators and miners to submit their complaints to the proper tribunal for adjustment without strike or lockout. Any operator failing to collect the penalty as provided herein shall be penalized one dollar per day per man affected.

This agreement is signed by Rembrandt Peale and John P. White on behalf of the Fuel Administration and by G. B. McCormack and J. H. Bankhead on behalf of those operators who agreed to the recommendations dated Dec. 14, 1917, and by J. R. Kennamer, William Harrison and Adam Wilkinson on behalf of the Alabama Mine Workers.

EDITORIALS

To Have and To Hold

THERE is a little advantage in talking thrift to anyone. Probably no one ever saved because he was urged to save, at least not for long. Thrift is one of the negative virtues. There are no thrifty people. There *are* people, however, who like to spend. Even the miser does not really enjoy saving, but he puts away his pennies to *buy* gold so that he can gloat over it.

Most people are not satisfied with gold; for they need something less like money; but a bond or a war-saving stamp will satisfy their buying propensity. They will buy a bond, but they will not save the money which would purchase it. Any man with this objective can be turned into what looks like a thrifty man. He is not so much a self-denying fellow, however, as an acquisitive one. It is no good to tell him to save; tell him to buy a bond. He is approachable on a buying line, and on that only.

A spendthrift is a man who squanders his money on perishable things; a thrifty man is one who expends his money on less perishable things. Both are spenders; both are actuated by the desire to spend. All of them will buy a Liberty Bond, for all have the desire to purchase something, and there is no investment that is better than this one; for it brings a profit both to the buyer and to the nation.

Why This Is the Worker's Paradise

IT WAS generally conceded not so many years ago that nowhere in the world did the workingman have more comforts and privileges than in the United States. Of recent years, as a result of an assiduous campaign, a doubt has come into some minds. Germany, where the workman has been face to face with the most grinding poverty, has woven a spider web across the chasm of disaster to catch the workman when he fell. As shown editorially last week, the webs are too thin to do anything but mock the faller with their substanceless unreality. Yet Germany, we have been told, has a better civic life than we have.

It has been quite generally the opinion of our workingmen that wages were better than welfare provisions; that it was better to put money in a man's pocket and let him use his freeborn judgment on it than to dole it out to him and spend it for him. Perhaps that is not the correct view. But, at least, nations that give pensions and protection of various kinds must take that gift from wages, and it is quite clear that wages, pensions and other protection are alike inadequate in Germany, as we Americans rate adequacy.

The workingmen of America are fortunate in living in a country where the raw materials are in abundance and readily accessible, where the coal outcrops at the surface, where iron can be dug by steam shovel, where large cliffs of limestone are found, where the hills have been clothed with magnificent forests, where the oil springs from the ground as water alone rises in many countries, where the soil has, at least till recently, been unexhausted, and where there has always been room for expansion because the country is not nearly so close to its limit of population density as are other countries. Nevertheless, in comparing the United States and Germany, it must always be remembered that next to the United States there is no country so well favored as Germany in its natural resources.

Almost as important, however, as natural resources is the spirit of the workingman. There is no workman like the American. No one can avoid the impression that it is his genius and readiness for production that have made possible that large output which has been so liberally divided among American workingmen. His capacity for production is unexcelled. In no country has he obtained a larger percentage of the product of his labor; in none has the product been greater. No wonder his lot has been enviable.

In only a few instances have American workingmen felt that there was a limit to the annual consumption of mankind, and that therefore it was to their interest, to do as little as possible so as to provide the maximum hours of employment for the workingman. They have almost always been willing to do their level best, knowing that cheap goods make a brisk market and so promise as large an annual wage as dear goods and a sluggish market.

They have argued, when they cared to argue, that as their desire for the good things of life was unsatiated and insatiable, so was the desire of other people; and they felt assured therefore that in the long run the public would buy all that the public could and would produce. Work has never been to the eager American workingman a drudgery to be avoided, but a pleasure to be sought. Of course, there are exceptions—some, alas, in the coal industry—but they are not as numerous as in Europe.

A restless race of people, who left Europe because they wanted to progress and dared to try a new country in pursuit of that progress, the American people have always had a surplus of energy; and what they produced with their hands they used to build their homes and to clothe their bodies. What wonder then that the workingman lived in a home like a bourgeois, his good lady dressed like a burgomaster's wife and his children were educated like the sons of merchants. It had to be. They made the wealth, with their two hands and swaying bodies. They won it as by an incantation, and when it was won they could not fail to have it and to use it.

They have preached to us another workingman who would not work so happily—a workingman who gloried in low production. Let us never doubt that such a workman living in a land of low production will have but stinted product for his stinted labor. He will

try to rob his fellowman by half-hearted labor, and his fellowman will try to rob him by pouring water into the milk of his hourly endeavor, and all will starve.

"Product" should be our watchword—not to best the foreigner, but to better ourselves; not to prevent John Bull, Jean Crapaud or Johann Schmidt from serving us with goods that they can more cheaply and more easily produce and which, perhaps, in some instances they alone can produce, but so that we may have the material to buy and the product on which to live lustily and well.

Big Foreign Coal Trade After War is Over

UNDER this title appear some remarks by J. H. Wheelwright on the prospects of extending our coal trade after the war. It is cheering to find that such an undoubted expert looks so favorably on possibilities. It will be noted that the reasons he gives for our past failure to obtain entry into the European markets are those which have been quite generally advanced before. As they are largely superable by good salesmanship, reasonable legislation, favorable treaties and suitable banking facilities, it is heartening to note that Mr. Wheelwright recognizes no other difficulties. Surely, if these be all the hurdles, they can be taken in a run. As the French say, "We have arrived."

Mr. Wheelwright says that the larger death rate of those in European countries will make for greater trade. It is a mournful reason for an extension of commerce, but a mournful syllogism is about as apt to be true as a cheerful one. However, the killing of men never makes for trade. The less people in Europe, the less possibilities of trade there are. Moreover, as the producers of coal have been less generally drafted than the consumers of coal, it may possibly be that they have the higher death rate. That being so, the coal industry in Europe may find itself overstocked with men when the war is over. The importance as an essential product will have proved its buckler.

Credit balances, furthermore, are apt to be unfavorable after the war. The Allies have borrowed five billions of dollars. For their sakes we regret that they are likely to have to borrow much more. Suppose it is ten billions in all that they borrow. Roughly, they will be required to pay back in interest alone half a billion dollars a year, about the amount our Federal Government expended before the war. Anybody can see that debtors such as these will be sellers rather than buyers. They can only become extensive buyers by entering still further into our debt. This they may do for a few months or years after the war ends. But thereafter they will be less ready to purchase.

The future for the foreign coal trade is in South America. The most profitable and extensive trade is with those whose products are different from ours, and South America, being more tropical, furnishes that condition. There is some coal there, perhaps more than we think. Coal is so universal that its alleged absence from any large area argues rather imperfect investigation than anything else. Gradually we are getting to know of resources of coal in South America, but even if they are developed we shall ship coal to that region nevertheless.

Suppose the Argentine has a fine deposit easily available to the sea coast, with a good harbor, sufficient labor and favorable mining conditions, and it desires to ship to the Amazon region. Will it ship there? Hardly, for there being few people in the section with the coal mines there will be no return cargo, whereas the United States is a ready market for the products of the Amazon region—rubber and coffee and what not. The same is true of the United States of Colombia.

In the countries where the coal cannot be got to the coast readily, or where the coal so far discovered is of little value, we shall find a splendid market. The countries of South America have products which supplement our deficiencies, and ours will supplement theirs. Trade with South America is trade with the unlike and should always be brisk as far as the size of the populations of South America and the energies and resources of those populations will permit.

Capitalizing One's Inefficiency

WITH what effrontery the Government railroads have capitalized their inefficiency! One would think the railroads would be around apologizing to the operator and mine worker for their inability to supply cars. A proper spirit of public responsibility should lead them to go the length and breadth of the coal field, promising that what little service they could give would be rendered without discrimination. They would explain just why the service is slow, but assure the coal industry that the distribution, if inadequate, will always be just.

But this is not the attitude of the new railroad trust. The companies deliberately said to the operator: "We have fallen down on the job, we expect to continue to fall down on it, and we propose to profit by that fact. We will give any operator the cars which belong to his neighbor if he will give us coal at a low price. We have made up our minds that the railroads are not constructed to serve the public but to serve the railroads. We will give our cars only to those who will sell us coal for less than cost."

It is not necessary that we point out to our readers how the railroads could secure all the coal they need just as surely by distributing their orders pro rata among all or a large proportion of the coal mines as by confining their purchases to a few. There has been no need to secure that priority by giving all the cars to certain mines, letting the others go almost entirely unsupplied. By this action all the evils of discrimination in car supply have been renewed, this time under Government auspices.

Worse yet, it is reported even by the friends of the Railroad Administration that the railroads have been turning some of the coal over to munition plants; in what quantity is not known. Thus the inequality has been intensified. The ability of the railroads to ruin business has often been asserted, but its baleful influence was never so arrogantly used as it has been since the control fell into the hands of the Federal Government. However, we take no little pleasure in acknowledging that the railroads have been compelled by the strong hand of our national steersmen to promise a more equitable service to the industry in the future. A fair price is a desideratum, but a fair service is even more important. Surely we may look for this from the Railroad Administration.

DISCUSSION BY READERS

Safety in Shotfiring in Mines

Letter No. 2.—The danger that might arise, in the present war crisis, from the promiscuous handling of high explosives by unauthorized persons, was emphasized strongly by the order issued some time since by Fuel Administrator Garfield, requiring that this class of explosives should only be handled by persons who were licensed.

It is reasonable to suppose that there are working in our mines certain enemy aliens whose animosity would lead them to dangerous acts in retaliation for the attitude of our Government toward their country. It is not difficult to imagine the terrible results that would be caused by persons so disposed, loading out dynamite with their coal. The subject calls for more than passing thought and consideration.

Dynamite Found in Coal Shipments

Since the order requiring the licensing of persons handling high explosives was issued, there have been found quantities of dynamite cartridges in shipments of coal. It is only natural to believe that the explosive was placed in the coal willfully in hopes that it would effect its deadly purpose. We can readily picture to our minds the appalling sight of one of our transports bearing thousands of troops being blown up and brave lives sacrificed without a chance of escape.

It is possible, in the daily performance of work in mines where blasting is performed, that others than those duly authorized would have access to the cartridges of those who have been intrusted to use them. For example, an experienced miner who is a citizen of foreign birth may find it necessary to call for the assistance of his buddy who is an enemy alien. This man is only too glad to avail himself of the opportunity thus offered to get in possession of some of the high explosives used. To avoid such a chance the strictest regulations should be enforced in every mine, limiting the amount of explosives taken into the mine and taking account, at the beginning and close of each shift, of the number of shots fired by each miner.

Drastic Measures May Be Necessary

So serious is the aspect as to even warrant the prohibition of the use of high explosives in coal mining, except where specially authorized shotfirers are employed to load and fire all shots after the miners have left the mine, and who are held accountable for the cartridges, caps and fuse given in their charge. Where this is not done, it may be necessary to compel the breaking down of the coal by the use of hydraulic power, wedges and other means formerly employed, so as to eliminate from indiscriminate use anything in the nature of high explosives.

Where high explosives are used at mines, a system of accounting should be employed that would show every particle of explosive issued from the magazine and enable this amount to be checked with the number of shots fired in the mine. This would require a properly constructed form of blank that would be filled out and signed by the mine foreman each day.

In mines where the work of blasting is performed by shotfirers, the amount of explosives required each shift, in each section of the mine, should be determined by the mine foreman. The shotfirer should then be charged with this amount of explosives, which would be delivered to him. In case the shotfirer finds, in his judgment, that a less amount of explosive is required in any hole, than the amount allowed for by the foreman, he should return the unused balance and receive credit for the same.

One of the difficulties confronting the situation, however, is to get conscientious, law-abiding citizens who are capable of performing the duties of shotfirers, and others to be placed in charge of the magazines, so as to insure a true and accurate account of all explosives used in the mine. The duty of making this selection will naturally devolve upon the operator or mine superintendent, who should feel the responsibility resting on him in this regard and give the matter the attention its importance demands.

West Leisenring, Penn. R. W. LIGHTBURN.

Gathering Motors

Letter No. 1—Since the discussion on "Gathering Motors," which I remember took place in *Coal Age* about two years ago, great advance has been made in the improvement of different types of locomotives used in mines for the purpose of gathering cars at the face. At present, this subject is very interesting, on account of the increasing number of new mines that are being opened, and because of the fact that many of the old mines are improving their systems of gathering cars and installing different types of motors on the gathering hauls.

In the last eight or ten years, I have gathered coal with almost every type of motor used, and have observed motors working under widely different conditions. I am convinced that there is no one motor that will suit all of these conditions, which vary in different mines and, frequently, in different sections of the same mine, so as to require motors of different types adapted to meet the different conditions.

One instance that I recall just now and which proved a failure was the employment of the old "crab" type of motor. The conditions under which this machine was working, I described in *Coal Age*, Vol. 10, p. 227. As there stated, the rooms were driven 100 yd. deep, and it required much effort for a man to drag the crab cable back to the face of a room, where he would hook it to a loaded car, which was then pulled out of the room by the crab on the locomotive.

Most mining men know that this type of gathering

motor is only adapted to exceptional conditions where the rooms are driven to the dip and the loaded cars must be hauled from the face of the room to the entry by some mechanical means. Where the rooms are driven level to a great depth, or to the rise of the entry, the crab is liable to prove a failure, as it did in the case just mentioned.

Neither is it possible to use the trolley system in such cases, as this would require the wiring of each room to the face, which would make a costly proposition. Under these conditions, it is better to use what is known as the "cable-and-reel" motor. This is a type of gathering motor equipped with a reel on which is wound a light cable provided with a hook that enables the end of the cable to be attached to the trolley wire on the entry when it is necessary for the motor to be run to the face of a room.

Operation of the Cable-and-Reel Motor

The cable unwinds from the reel as the motor advances toward the face, and is again wound on the reel as it returns to the entry. Some motors of this type are provided with a friction clutch whereby the reel is thrown in or out of gear, while others are equipped with a separate motor that operates the reel when required. Where the tracks in the rooms are fishplated, it is seldom necessary to bond the rails.

The cable-and-reel motor is built very low so that it is able to haul coal from rooms that the smallest mule could not enter. This locomotive has the disadvantage that the cable is very apt to be injured when the reel is improperly handled, or by the cable catching in a track tie or other obstacle in its path and being broken or so badly injured that it must be repaired or replaced with a new one. These cable troubles often prove very expensive, in the cost of repairs and the time lost in making them.

I have seen a type of locomotive equipped with both the crab and the cable and reel. By the use of this machine it is possible to gather cars from the faces of rooms driven to the rise or the dip, and to avoid the necessity of the motor entering a room that is driven but a short distance, since it is easier to use the crab at such times. Also, cars can be lowered to the faces of rooms driven on the dip much more quickly by the use of the crab than when the motor is required to enter the room with the car.

A Successful Type of Gathering Motor

By far the most successful type of gathering motor is that known as the "storage-battery locomotive." This type of gathering motor is gaining in favor every day, as mining men learn more of its good features. The power, in this machine, is self-contained, which enables the locomotive to go anywhere where track is laid, without the necessity of stringing wires or bonding rails. The only objection to this type of motor has been the cost of the batteries, but this is not excessive when compared with the expense of wiring and bonding rails required in the use of another type.

I have found that the most successful storage-battery motor is that equipped with a pole for use on main haulage roads where a trolley system is installed. A little reflection will show the benefit to be derived by thus equipping a storage-battery locomotive with a pole. If operated at all on the main line, the power can be derived from the trolley wire, at which time the storage batteries are "boosting." Also, when standing on the siding, waiting for cars, the storage batteries can be boosted, which will be found a great advantage in the daily operation of this type of motor.

My experience is that when the charge of a storage-battery motor is about half exhausted, the drop is much more rapid in the latter half than the previous half of the shift. By the use of the pole, I have worked a storage-battery motor hard for a full shift, and have been able to maintain almost a full charge on the batteries to the end of the shift, by boosting them from time to time as opportunity offered. In this connection, it should be stated that when a storage-battery motor is equipped with a pole, it is possible to use a short-time battery, which means a great saving in the first cost of the battery. This alone is a feature well worthy of consideration.

In closing, let me say that the success or failure of any system of gathering haulage will depend much on the management of the means employed. Objection has been offered by the miners and their union, because they thought it was an effort, on the part of the company, to reduce the working force by cutting out the drivers employed in gathering coal. However this may be considered, the fact remains and it is my belief that the next five years will see this work performed by motors in all large mines.

MOTORMAN.

Herrin, Ill.

Opening New Mines

Letter No. 2—Reading the letter of J. L. Donahue, *Coal Age*, Mar. 16, p. 516, calls to mind the statement of Francis S. Peabody, which he made on this subject, in January, when called before the Senate Investigating Committee.

As everyone knows, Mr. Peabody is a thoroughly practical and experienced coal man and, to my mind, his remarks at that time corroborate substantially the argument of Mr. Donahue in urging the opening of new coal mines. Following is the question asked by Senator Reed and Mr. Peabody's reply:

Senator Reed—Is it not a fact that if there are good prices assured, that there would be new mines opened up and new companies organized, and is it absolutely essential that this should be done?

Mr. Peabody—It is absolutely essential that we should do so. There were 179 mines that went out of business or were exhausted in 1915. These mines produced approximately 18,000,000 tons of coal. During 1916, which was the best year the industry has ever had, there were 106 mines went out. None of these 106 mines that went out would have done so if they had not been exhausted or unable to continue profitably. Now, something must be done and other mines must take the place of these that went out.

If what Mr. Peabody says is true, that the opening and operating of new mines is an immediate necessity, there should certainly be more coöperation on the part of the railroads. One frequently observes that the time which elapses between the application to a railroad, asking them to lay a switch for a new operation, and the performance of the work by the railroad, appears to be unnecessarily long. The amount of red tape that must be gone through before this can be done is almost unbelievable. In many cases, the

mine will be in readiness to ship coal before a switch is placed. It is not uncommon for a period of six months to go before anything is done, and, in one instance, I knew a whole year to elapse before the switch was finally laid.

It is unquestionably true that a certain amount of form is necessary and agreements must be signed by both parties, but it does seem that this necessary procedure should be expedited and any unnecessary delay avoided, for the sake of expediency if for no other reason. In the present speeding up of the coal production, it is more than ever important that all work preliminary to the opening up of a new mine should be pushed forward as rapidly as possible.

Necessary Backing Often Difficult to Secure

Another hindrance to the development of new coal properties that are owned by men whose means are limited is the inability to secure a sufficient loan for the purpose. It is easier for larger operations to get the backing that they need; but banks hesitate to make a loan of sufficient size for the successful launching of a small property. It may be that the owner is a man of experience in coal mining and has operated properties for other companies successfully and is anxious, now, to run a mine of his own. His desire may come from patriotic or financial reasons.

The sum asked to enable an owner to open and equip a mine will generally seem exorbitant to a banker who is unfamiliar with mining requirements; and he makes the excuse that the unsettled condition of the coal business and the instability of market prices will hardly warrant advancing the money. In one instance that has come to my knowledge, a bank offered to advance the amount asked, provided they received a donation of one-fifth of the stock from the coal companies, which is clearly a high rate of interest to be paid for a loan.

In closing, allow me to ask why it would not be possible, during the period of the war, to establish a loan bank for the purpose of financing new operations, and conduct it on a plan similar to that of the "Farmers' Loan Bank," which has played such an important part in fostering agricultural growth in this country. Under such a provision, there would be no chance for profiteering, as the mine would be owned by the Government until the loan was satisfied. If the plan has worked well for the farmer, why has not the miner a right to an equal privilege? M. P. H.

——, W. Va.

Loading and Shipping Clean Coal

Letter No. 3—I have read with interest two editorials and several letters relating to the fuel situation and the need of securing good clean coal in the market, which has recently been flooded with impure coal. It seems to me that both the miner and the operator are equally to blame in this matter. They forget, apparently, that the shipping of a poor quality of coal will give the mine a bad reputation and injure both of them.

In every contract entered into between operators and the United Mine Workers of America, and in every district under the jurisdiction of that organization, provision is made penalizing the loading of dirty coal or any impurities that could, in reason, be kept out by the miners. The failure of the operators to impose those penalties when a miner loads dirty coal is a grave error.

To overcome this difficulty, a law should be adopted that would enforce punishment on both the miner and the operator for the shipment of coal without its first being properly cleaned at the mine. For the protection of the miner against persecution on the part of petty bosses, for personal reasons, or because of alleged activity in the union, there is a clause inserted in the contract, safeguarding the miner against unfair discrimination.

Honest and competent miners have absolutely no sympathy with a laborer that will load dirty coal; but the miner is often from 300 to 400 ft. away from where the laborer is loading cars. This is particularly true in pitching seams and, on this account, the miner cannot always be held responsible for the loading of impure coal. A good miner knows well that the desirability of the coal shipped to market depends largely on the care taken in its preparation. He recognizes that the shipment of a poor quality of coal is a menace to the mine, which cannot run regularly when the demand for coal slackens, unless the place has a reputation for putting out good coal.

The high wages paid for mining has attracted many men who know nothing of the requirements of coal mining. Such men care little what they load and are often unable to distinguish between bone and coal. Their chief aim is to draw big pay. They, as well as some old miners, think that, at this time, any kind of coal will have no difficulty in finding a market.

One Source of Impurities in Coal Shipments

Referring to the letter of W. R. Jones, *Coal Age*, Mar. 16, p. 513, it appears to me that he has overlooked some important reasons when he stated that "there are two responsible sources for the shipment of impure coal to market . . . (1) dishonest miners who will fully load slate and rock with their coal in order to increase their daily tonnage . . . (2) small mines that have no means of properly cleaning the coal, or that are compelled to work in seams of inferior quality."

Before the war most of the larger mines had erected washeries. The coal shipped from these mines was sold in two grades or classes; namely, "fresh-mined coal" and "washery coal," the latter being classified as "No. 2," in quality. Since the Government fixed the price of coal, the entire output of the mines is sold at the same figure, no distinction being made in the quality of the shipments.

Again, as is well known, there are different kinds of mechanical slate-pickers or separators, some depending on the difference of the specific gravity of rock, slate, bone and coal, and others depending on the difference of the form in which coal and slate breaks, and the difference in velocity with which coal, slate and bone slide down an incline chute. In the present hurried preparation of coal for market, these differences are not as effective in securing the separation of coal from its impurities.

Some time ago Inspector Ryan was called to Plymouth (Penn.) to inspect a shipment of washery coal billed as "fresh-mined coal," and found it to contain 60 per cent. of slate, there being more slate than coal.

The suggestion of Mr. Jones that the smaller mines, not having the same facilities for cleaning the coal as the larger mines, should be shut down, appeals to me as an unfair discrimination, since the smaller mines can still clean their coal by hand-picking, which has always been their method. I agree with him that those seams containing too high a percentage of ash and sulphur should not be worked. The same may be true also of seams having only a clay roof. However, as I have previously stated, if operators and miners alike will do their part there will be no difficulty in obtaining clean coal, now as before. FRED B. HICKS.

Kingston, Penn.

Letter No. 4—From every side, this subject calls for serious consideration. The difficulty experienced in many localities of securing the necessary labor has no doubt restricted the operation of mines and has had its effect in creating an unprecedented and urgent demand, and this condition has been offered as a possible excuse for the shipment of an inferior quality of coal. However, in my opinion, the situation is aggravated by the inadequate equipment of many mines that has made it practically impossible for them to meet the present demand made upon them. This and the inability of the railroads to furnish the necessary cars for shipment has made it impossible to operate the mines continuously.

Now, if these facts are true, there is no room for excuse for the shipment of impure coal because of the failure to properly clean the coal by separating the slate and other impurities when loading the cars at the working face. This is chiefly the result of laxity of supervision by mine officials.

MINERS HAD AMPLE TIME TO CLEAN THEIR COAL OWING TO SLACK CONDITIONS

The advent and continuance of a severe winter greatly hampered transportation. Rivers and lakes were frozen, and railroads were greatly impeded. Under these conditions, I repeat, that had mine officials, whose duty it was to see that the coal was properly cleaned, given this matter suitable attention, there would be no reason for complaint in regard to the quality of coal sent to market. My point is that the want of time to properly clean the coal cannot be urged as an excuse for this lack on the part of mine officials; there was plenty of time and only clean coal should have been loaded.

The present, it will be agreed, is no time for criticism of the past; but our efforts must now be exerted to rectify mistakes in the quickest manner possible and with the utmost forebearance. Reflecting on the recent demand of the President, that the head of each special department should use his utmost endeavor to straighten out business in his charge, one cannot help but feel that the same spirit should animate all mine officials, and that they should give unremitting attention to the loading of clean coal at their mines.

The loading of dirty coal is an old sore that for 20 or 30 years has troubled mine operators who have striven to gain a good reputation for the quality of coal sent to market from their mines. The study of the question shows that the trouble lies largely at the coal face, and that greedy miners, with little or no conscience, do not hesitate to load dirty coal if they can escape detection and avoid being docked. No miner, organized or unorganized, will deny the fact that the loading of a mixture of coal and slate is an injury to the mine.

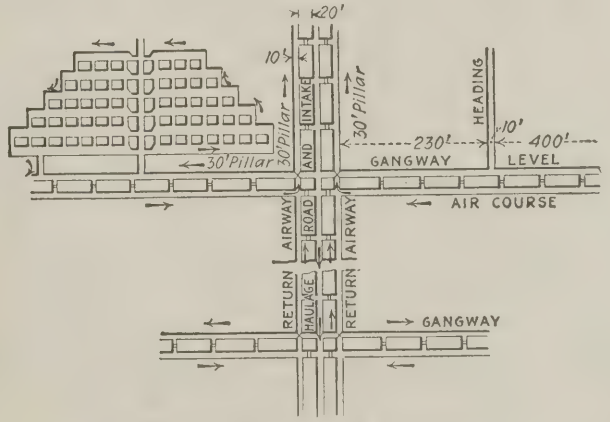
To realize the effect of this dishonest practice on the part of some miners, it is necessary to look at the situation broadly. For example, a train crew hauls a shipment of, say 30 cars of 50 tons capacity from a mine. When this coal has been bunkered, it matters not how or where, whether in the factory, on shipboard, or in domestic use, we will say that 30 tons of slate have to be thrown out from this shipment. In other words, 2 per cent. of the coal purchased cannot be burned, and the consumer is burdened with the expense of its disposal as refuse. What the dishonest miner has gained is paid for by the consumer. Let every miner strive to do his part and bear his share of the present burdens laid upon him by reason of the war.

West Leisenring, Penn. R. W. LIGHTBURN.

Working 10-Ft. Inclined Seam

Letter No. 1—In response to the request, *Coal Age*, Mar. 23, p. 561, asking for the best method to be employed in the working of an inclined coal seam, 10 ft. in thickness and overlaid with a soft sandy shale that makes a weak roof, permit me to offer the following method, which my experience recommends as particularly adapted to the working of this seam.

It is stated in the inquiry that the inclination of the seam is from 15 to 20 deg. and that it contains many irregularities faults and "pinchouts." The floor of



PROPOSED PLAN OF WORKING

the seam is said to be a sandy shale. In order to obtain the greatest possible extraction of coal at a minimum cost, under these conditions, I would drive three main slopes on the full dip of the seam. These slopes should be each 10 ft. wide and from 6½ to 7 ft. in height. They should be driven on the floor of the seam, leaving from 3 to 3½ ft. of roof coal above them and separated by 20-ft. pillars. Let me say, here, that the height of all slopes, cross-entries and headings should be varied so as to conform to any natural parting that may be present in the seam.

DESCRIPTION OF THE GENERAL PLAN OF WORKING

The accompanying figure shows the general plan of the workings. Cross-entries are driven in pairs to the right and left and at right angles to the main slopes at distances of 1000 ft. apart. These cross-entries are driven slightly above the level course so as to provide good drainage, which will also give a grade in favor

of the loaded cars. The cross-entries are separated by the same width of pillar as the main slopes.

In order to secure the best results and reduce the cost of timbering and the upkeep of roadways and secure a maximum of safety in the workings, about 6 ft. of coal should be taken out in the first working in the rooms, the remaining 4 ft. of coal being left for roof and taken down when drawing back the pillars.

Development of the Workings

When the main slopes and the first pair of cross-headings have been driven far enough, a heading is driven 10 ft. wide on the full pitch of the seam. As shown in the sketch, the first heading is started at a distance of 230 ft. from the main slope airway. This will provide for a solid pillar of coal 30 ft. wide flanking the main slopes and allow for the driving of rooms 200 ft. in length off the heading. Later in the development, a second heading is driven of the same width, at a distance of 400 ft. from the first, which will provide for rooms 200 ft. in length, to be driven on the strike of the seam to the right and left of each heading.

The rooms off the headings are driven 15 ft. wide, the first rooms being started at a distance of 30 ft. from the gangway, which leaves a 30-ft. pillar for the protection of the cross-entries, the same as on the main slopes. The rooms are driven on 30-ft. centers, which makes the room pillars 15 ft. in width. Breakthroughs or crosscuts are driven in the pillars every 15 ft. apart, as shown in the figure.

Drawing Back the Pillars or "Stumps"

This method provides a series of small stumps or pillars 15 ft. square, which can be taken out conveniently in retreating when the 4 ft. of roof coal is also taken down. The rooms being only 200 ft. deep minimizes the work of handling the coal from the face of the rooms to the heading, where self-acting jigs are employed to lower the cars to the gangway.

A system of endless rope haulage can be used on the main slope, the center slope being made the haulage road and intake airway. I should not recommend a double track slope, but would use one of the side slopes for returning the empties into the mine. The two side slopes serve as return airways for their respective sides of the mine.

The rooms should be timbered by a double row of posts staggered, while the track is laid along one rib.

South Burgettstown, Penn. Andrew Orr Bain.

First Aid to the Uninjured

Letter No. 4—The question of lending "First-Aid to the Uninjured" is so broad and involves so many features that one is led to ask, where shall we begin the discussion, and when it is finished will it have accomplished anything worth while? In other words, will mine officials feel any more deeply their responsibility for the safety and health of the men in their charge and be induced to give closer attention to making the mine safe and comfortable for work?

The records show that the greatest number of fatal and nonfatal accidents in mines are due to falls of rock, slate and coal. It is also well known that any able bodied man who is a member of the Miners' Union can get work at a coal mine, for the asking. If the man cannot drive a mule, run a motor, lay track, or set timbers, he is given a place to dig and load coal. No questions are asked regarding his ability to safeguard his life and the few instructions that he may receive are a poor sample of what can be classed as first aid to the uninjured. At the present time particularly, very much the same state of affairs exists at a nonunion mine.

While I am willing to admit that many inexperienced men must be employed to work in the mine, I am unwilling to be held responsible, as safety inspector for the lives of such men when they are permitted to work by themselves. Safety demands that an inexperienced man shall work with an experienced miner for a period of six months, or until he has learned how to protect himself from danger. If the two men earn, say $10 a day, the experienced miner should receive $5.50 and the inexperienced man, $4.50. By this means, there will be fewer accidents recorded from the fall of rock and coal.

Death Rate in Colorado Mines Reduced

An examination of the records of accidents in Colorado mines during 1915 and 1916 shows a reduction in the death rate in this state, in these two years, from 5.1 to 3.35, per thousand men employed. This is a creditable showing for the earnest activities of the deputy inspectors, in the enforcement of the timber agreement of 1916. The work of the deputies can rightly be called "First Aid to the Uninjured."

Let me say, here, that there is not sufficient thought and attention given to the employment of inexperienced men in the mines, and if we continue in this course it will be useless to write suggestions of first aid to the uninjured. However, let me suggest one means of giving this kind of first aid and reducing the number of accidents from falls of roof, slate and coal. It is as follows:

Enforce Strictly the Timber Agreement

Let the mine examiner (fireboss) examine each working place, in the morning, to see that the timbers are set in accordance with the timber agreement that I have mentioned. If he finds the timbers are not set as the agreement requires, let him notify the miner working in that place that he will lose his turn and no cars will be set in for him for 24 hours. The miner should then be instructed to reset the timbers to conform to the agreement and in the presence of a mine official. When this is done, the miner should be sent home unless there is good reason for his being excused for his neglect. For a second offense of the same kind, the miner should be discharged and his name reported to the state mine inspector for future reference.

By doing this, I believe that it may be possible for us to get somewhere in our efforts to give first aid to the uninjured. I am not in favor of blacklisting a man for his neglect or disobedience of orders. The record for the year 1917 shows clearly that eternal vigilance is the price that must be paid if we are to reduce still further our mine-accident rate.

Farr, Colo. Robert A. Marshall.

INQUIRIES OF GENERAL INTEREST

Cubic Contents per Ton of Coal

To settle a dispute that has arisen, kindly show how to calculate the weight of coal, in tons, and the amount, in bushels, that a wagon bed will hold whose dimensions are 10 ft. long, 3 ft. wide and 22 in. deep.

Grafton, W. Va. S. F. & V. N.

The cubic contents of this wagon bed is $3 \times 10 \times \frac{22}{12} = 55$ cu. ft. In estimating capacity, it is customary to allow 40 cu.ft. per short ton of bituminous run-of-mine coal. Hence, assuming that the wagon bed was loaded level full, the coal being 22 in. deep over the bed, the weight of coal in the wagon would be $55 \div 40 = 1\frac{3}{8}$ short tons.

The laws of West Virginia make the weight of a bushel of coal 80 lb., which gives 25 bu. in a short ton, and makes the amount of coal in the wagon when level full $1\frac{3}{8} \times 25 = 34\frac{3}{8}$ bu.

More briefly stated, the amount of bituminous coal in a bin or wagon, in bushels, is equal to $\frac{5}{8}$ of its volume in cubic feet, and the weight, in tons, is $\frac{1}{25}$ of the number of bushels. All of these rules are based on an average specific gravity of 1.3 for run-of-mine bituminous coal.

Gasoline Motors in Mines

We are installing a home-made gasoline haulage locomotive in our mines. The driver, or motorman, claims that when operating the locomotive on the last of the air, the fumes become very offensive. I am writing to ask if you, or any of the practical readers of *Coal Age*, can suggest some way of overcoming this objection.

H. N. ROGERS, Secy.

Coal City, Iowa. Southern Iowa C. & M. Co.

The use of gasoline locomotives in mines has frequently been referred to, in *Coal Age*, as being attended with danger. It has been stated that its use should be confined wholly to the intake airways, where there is a good current of air continually passing.

The deadly effect of the exhaust gases of a gasoline motor when used in the limited confines of a mine, or any other close place, has been fully discussed and was treated editorially in *Coal Age*, Vol. 10, p. 549, under the title "Petromortis." Particular attention was then drawn to the fact that the danger arising from the exhaust gases of this type of motor is greatly increased when its use is permitted where the air is stagnant, as in a pumproom or other closed place that is not thoroughly ventilated by a current of fresh air. The same is true when a gasoline locomotive is operated in a mine, on the last of the air, as in a return airway.

It was further stated, in the editorial just mentioned, that particular danger arises when such a locomotive is running with the air. Especially is this true when the machine is hauling a loaded trip upgrade and the engine is not in perfect order, since in that case the character of the exhaust gases is very apt to be more deadly than when the engine is working properly.

Again, when a locomotive is advancing with the air, the motorman is liable to be overcome with the gas, which then travels with about the same speed as the locomotive. This might result in a serious accident due to the motorman becoming unconscious and failing to control the movement of the trip. On page 552 of the volume of *Coal Age* just mentioned, an instance is given of the fatal results of operating the gasoline motor of an automobile, in a garage, causing the instant death of a man and his wife by breathing the deadly gases. On page 688, in the same volume, a correspondent has suggested that the exhaust gases of a gasoline motor may contain 1 per cent. of carbon monoxide, while 0.1 per cent. of this gas is fatal when breathed but a short time.

It is the deadly effect of the exhaust gases of a gasoline motor that renders its use in mine workings extremely hazardous. To our knowledge, there is no way of overcoming or preventing this effect and rendering the exhaust gases harmless, except by providing for their rapid diffusion in an ample air current; and, even then, danger may arise from unavoidable causes.

Notwithstanding this fact, however, there are numbers of gasoline locomotives in use in mines, in different localities. The advantage claimed for this type of locomotive is that its power is self-contained, which enables the locomotive to go anywhere where track is laid, without depending on a trolley system.

However, the more recent development of the storage-battery locomotive has given to the mining industry a machine that presents peculiar advantages and makes unnecessary the use of gasoline in the mine. There is no doubt that the gasoline locomotive reduces the cost of haulage wherever the conditions are favorable to its use.

The gasoline locomotive is particularly useful on long outside haulages, where the tipple is located at some distance from the mine entrance, which is the case in many mines where this type of locomotive is employed. There are, no doubt, particular instances where the machine can be employed without danger on the main haulage road of a mine when this is the main intake airway, and the volume of the current is such as to render practically harmless the almost inappreciable volume of the exhaust gases of the motor.

At times, it may be possible to arrange the ventilation so that the underground haulage, from the main parting to the tipple, is ventilated by a separate current of air, which is not permitted to pass into the mine but is conducted at once into the main return airway. In this case, the main intake airway supplying the circulation in the mine is not affected by the operation of a gasoline motor.

EXAMINATION QUESTIONS

Bituminous (Penn.) Mine Foremen's Examination, April 9-12, 1918

(Selected Questions)

Ques.—The rubbing surface of a square airway 4000 ft. long is 128,000 sq.ft. (a) What is the area and perimeter of the airway? (b) What is the velocity of an air current if its volume is 19,200 cu.ft. per min.?

Ans.—(a) The perimeter of an airway is found by dividing the rubbing surface by its length, which gives, in this case, 128,000 ÷ 4000 = 32 ft. Since this airway is square, the length of each side is 32 ÷ 4 = 8 ft. and the sectional area is, therefore, 8 × 8 = 64 sq.ft.

(b) The velocity is found by dividing the quantity of air in circulation by the sectional area of the airway, which gives, in this case, 19,200 ÷ 64 = 300 cu.ft. per min.

Ques.—Is an accurate mine map important? Why?

Ans.—In mining, it is of the utmost importance to make and maintain an accurate mine map, showing all the airways, haulage roads, travelingways, rooms and other openings, exactly as they exist in the mine. The map should also show the thickness and character of the coal, the inclination and direction of the dip of the seam and the elevation at different points in the workings, besides the position of the boundary lines and other surface features and improvements. The direction of the air currents in the mine should be clearly indicated and the position of all boreholes shown.

The purpose of an accurate mine map is to show the correct position of the workings with respect to the boundary lines and other surface features, and the relation of the several openings in the mine to each other, so as to avoid accidents from breaking into other workings or tapping dangerous accumulations of water or gas in adjoining mines, An accurate map also avoids the loss of much coal because insufficient pillars are left and rooms are permitted to break into each other, or a squeeze is started that crushes the pillar coal and prevents its removal. When a mine is abandoned, it is necessary to place on file an accurate map of the workings, as a safeguard of future operations.

Ques.—When do you consider a mine properly ventilated?

Ans.—A mine is properly ventilated when there is a sufficient quantity of air in circulation to comply with the requirements of the mining law, provided this air is properly distributed so as to ventilate each section of the mine separately and furnish each section with its proper proportion of air. The air current must also be conducted into each working place and made to sweep the face of the coal in sufficient volume and with sufficient velocity to prevent any accumulation of gas in those places.

It is also necessary that all abandoned and void places in the mine shall be properly ventilated and that mine stables be ventilated by a separate air split that passes directly into the return airway by which it is carried out of the mine. In any case, the volume and velocity of the air current in all portions of the mine must be sufficient to render the workings safe and keep them in a healthy condition.

Ques.—Do you consider the driving of places on sights important? If so, state why.

Ans.—It is important that each working place be driven on sights so that it will keep its proper direction and there will be no danger of leaving too thin pillars that will be hard to remove. Where the work ng places are not driven on sights properly established, it is difficult to maintain a uniform thickness of pillar between the adjoining rooms, and this will often cause heavy roof falls or induce a squeeze that will destroy the pillars and make it impossible to recover all the coal.

Ques.—An entry is driven 400 yd.; the cost per yard is $2; the drain alongside cost 15c. per ft. Ties spaced 2 ft. between centers cost 17c. each. The T iron for the road weighs 35 lb. per yd., is in 30 ft. lengths and costs $50 per gross ton. The spikes are worth 2c. each. Splice-bars cost 60c. per pair. What is the total cost of the headings?

Ans.—Following are the items of cost: Yardage, 400 × 2 = $800; drain, 400 × 3 × 0.15 = $180. There is 3 × 400 = 1200 ft. of track, which will require 1200 ÷ 2 = 600 ties, costing 600 × 0.17 = $102. The 400 yd. of track will require 800 yd. of rail. The weight of this rail is 800 × 25 ÷ 2000 = 10 tons, making the cost 10 × 50 = $500. Allowing four spikes to each tie will require 4 × 600 = 2400 spikes, at a cost of 2400 × 0.02 = $48. The length of each rail being 30 ft. or 10 yd., the number of rails required to lay this track is 800 ÷ 10 = 80, which will require 80 — 2 = 78 pairs of splice-bars, costing 78 × 0.60 = $46.80. The total cost of the heading with track all laid, exclusive of labor, is, therefore, the sum of these items, which is $1676.80.

Ques.—Given the dimensions of an arched airway as follows: 9 in. high to top of arch, the radius of the circle being 4 ft. 6 in. If the current of air is 450 ft. per minute and a half what is the total quantity of air passing per minute?

Ans.—The question probably intends to give the height to top of the arch is 9 ft. instead of 9 in. Taking this to be the case, the size of the rectangular portion of the cross-section, below the arch, is 9 ft. wide by 4½ ft. high, and its area is 9 × 4½ = 40.5 sq.ft. The area of the semicircular portion forming the arch is ½ (0.7854 × 9²) = 31.8 sq.ft. The total sectional area of the airway is, therefore, 40.5 + 31.8 = 72.3 sq.ft. If the average velocity of the air current is 450 ft. per min. the quantity of air passing in this airway is 450 × 72.3 = 32,535 cu.ft. per minute.

COAL AND COKE NEWS

Harrisburg, Penn.

Rumors are afloat that some of the bituminous operators were disobeying the regulations calling for clean coal by shipping poor fuel on the assumption that the Government would reject it and turn it over to the second-class bunker coal pool for ships at a price higher than that allowed for domestic purposes. "We are going to put a stop to this scheme," the state fuel administrator is quoted as saying. "We now have a general inspector who is active at destination. The demand that this practice be stopped is imperative."

Last year the Philadelphia & Reading Coal and Iron Co. expended $1,505,507 in improvements and developments of its collieries as compared with $867,665 for 1916. The production of anthracite from its coal properties was increased 1,577,482 tons to 12,818,706 tons.

That every effort is being made to increase the output of anthracite, even though there are 22,000 fewer mine-workers than in 1915, is shown by the fact that the Lehigh Coal and Navigation Co. has undertaken at an estimated cost of $1,500,000 additional mine developments including two modern steel breakers, one at Caska William, where an old colliery will be reopened; the other being at Rahn. Both should be in operation by next winter and will add from 2500 to 3000 tons of anthracite to the company's output, which now averages 18,000 tons a day. For 1917 this company increased its production by 34 per cent.

All mines in the anthracite region are working to maintain the record-breaking March output. Conservation of energy with additional results through electrical means is being worked out in all parts of the anthracite fields. The Mill Creek Coal Co. has just awarded a big $200,000 contract to the Scranton Construction Co. to install electrical appliances at its Morea colliery. The Eastern Pennsylvania Electric Light, Heat and Power Co., besides supplying the power, will also illuminate the interior of the mines and the outside plants. Steam hoists and boiler houses will be practically eliminated by the new power.

Seeking to conserve anthracite and also to hold down its locomotive fuel bill, the Lehigh Valley R.R. plans to install a big mixer plant at Ashmore, where the smallest size of anthracite byproduct—what is commonly termed silt or slush in the region—can be artificially mixed with bituminous. In that way both bituminous and anthracite can be saved.

Recognizing the great necessity for the largest possible output of coal while the nation is at war, F. M. Chase, vice president and general manager of the Lehigh Valley Coal Co., has issued a strong appeal to its employees to exert themselves to the utmost. His appeal follows:

"It must be a matter of gratification to all of us to know that the Lehigh Valley R.R., over which our output is shipped, stands No. 1 in point of anthracite tonnage transported, both for the month of March, 1918, and for the three months ending Mar. 31, 1918, showing a gratifying increase over the same period of last year.

"The country will undoubtedly need more coal during the war than can be mined even under the most favorable conditions. The industry has been, and will continue to be, affected by the loss of men who are 'called to the colors,' and there is no more practical way for those who stay behind to show their patriotism than to make the greatest possible effort to meet the demand for fuel, to keep our people warmed and fed and our industries in operation at full blast.

"Our boys 'over there' will be required to work every day; to put in long hours; to endure great hardships. It should be our personal effort to see that no time is wasted here; that our mines work full-handed every day. Show by example that there is no place in our ranks for the industrial 'slacker.' The individual who, in this critical time and crisis, fails to do his bit toward speeding up our vital industries is disloyal.

"Let us be able to look into the faces of the boys who return and honestly say: 'It was necessary for me to stay at home, but I did my best to maintain conditions which enabled the soldiers and sailors to be kept well armed, well clothed and well fed."

Fairmont, W. Va.

The car supply in the Fairmont region last Monday was the best since the war started. There were 1919 cars in the district on that day, although some of them did not get placed in time to be available for loading the same day. The number of empties sent to the Fairmont district Monday will reduce the regional car shortage something like 500 cars. Every mine in the region has its full rating.

If other regions were short in car supply Monday this abundance of cars is not gratifying, for the number was even greater than could be loaded. Until the coal operators of the Fairmont district can get their organization together it is impossible to load 2000 cars in a day, and it is argued that it is unfortunate if cars are sent here when other regions are short. The car supply for week of Apr. 15-20 averaged 1052 cars a day. Coal operators are saying this week that it is always a feast or a famine.

Morgantown, W. Va.

For several years the Mining Department of West Virginia University has offered a summer course in coal mining to the men engaged in the mining of coal. The course was originally started at the direct request of the mine operators of the state and has always received their hearty support as well as that of the miners themselves. The tuition is free to any resident of West Virginia, and there are no restrictions as to admission. Any one, old or young, no matter how much or how little schooling he may have had, will be welcomed and given every opportunity.

The Short Course will be held this year from June 17 to July 27, a period of six weeks. The work has been arranged so that those who cannot come for the full course can come for any period that is convenient to them. The following subjects will be given at the times indicated: June 17-29—Explosives, Timbering, Methods of Working, Prevention of Accidents, Mine Gases, First Aid and Mine Rescue Training. July 1-13—Mine Ventilation, Mine Explosions, Electricity in Mines, Hoisting and Haulage, Analysis of Mine Air and Safety Lamps; July 15-27—Mine Surveying, Mine Drainage, Mine Management, Geology and the Preparation and Uses of Coal.

The course is comprehensive and one well-calculated to improve a man's knowledge of the coal-mining industry and to put him in line for promotion. The men who have taken the work in past years have been enthusiastic in their reports of the benefits they have secured and the advancement which has resulted.

Prof. C. R. Jones, Dean of the College of Engineering, or Prof. A. C. Callen, head of the Mining Department, Morgantown, W. Va., will be glad to furnish any further information which may be desired.

Charleston, W. Va

A telegram has been received by an officer of the Central West Virginia Coal Operators' Association from Carl R. Gray, former president of the Western Maryland, now assistant to Director General McAdoo, stating that a special representative of the railroad administration would be sent to the Fairmont region to investigate the car situation there, which has become extremely serious, as will be evident when it is stated that so many of the miners have given up hope that there will ever be any improvement in the situation that they are leaving to secure employment elsewhere. A canvass of 82 out of 200 mines disclosed the fact that more than 700 miners have left.

The claim is made by operators in this section that though under Government control coal cars are supposed to be pooled for distribution to the various coal fields, and that though cars are ordered sent to West Virginia through the Federal pooling office at Pittsburgh, they are not being received in this part of the state, while on the other hand, the Ohio and Indiana fields receive more cars than they can load.

Speaking in opposition to the Government control of railways, Z. T. Vinson, coal operator and lawyer, in the course of a speech before the Rotary Club of Huntington, claimed that only 52 cars were furnished for every 100 car capacity produced. In Alabama he said the decrease in the supply of cars has been only 1 per cent.; in other words that there are 99 cars for every 100 cars of coal produced; in Oklahoma and Arkansas, 97 cars; southwestern Virginia, 89 cars; Illinois, 82 cars; Indiana, 80 cars; Ohio 75 cars; Pennsylvania, 80 cars; but in West Virginia, which he described as the greatest coal field in the world, there are only 52 cars for every 100 cars produced. Mr. Vinson also claimed the division of the market into zones was unfair to coal producers.

Following on the heels of the meeting of the American Mining Congress at Washington, Apr. 23, coal operators of the state will meet at Huntington on Friday, Apr. 26 to form a state coal operators' association. Interest taken by operators in the approaching meeting presages a very large attendance and the formation of a strong organization at the outset.

PENNSYLVANIA

Anthracite

Scranton—Under the terms of an agreement recently entered into between the New York, Susquehanna & Western R.R. and the Jermyn Coal Co., operating a mine at Old Forge, the latter promises to pay the owners 70c. a ton for all prepared sizes, while for the smaller sizes, including culm, dust and slush 50c. a ton must be paid. Compared with royalties of five years ago, the new agreement is a 100 per cent. jump. The fact that culm and slush are included is also something new.

Hazleton—New regulations to promote safety in and about the anthracite coal mines were suggested recently by officials of the Lehigh Valley Co. They are as follows: Men operating machinery should not wear flowing neckties, loose clothing or torn gloves. Men oiling machinery should not wear gloves along moving line shafts. Carpenters should not throw blocks on floors in workshops. Breaker employees should see that their shoes are tied before descending steps. Don't wear oily clothing while firing furnaces. Watch for protruding nails in timbers. Submit to surgical treatment for every injury regardless of its supposed minor character.

Special mention has been made by the Lehigh Valley Coal Co. of the record of William E. Hamor, veteran foreman of the Jeanesville colliery, where no fatalities have occurred within three years. It is said that few mines in the anthracite field can claim this distinction.

Millersburg—The McClellan coal storage yards, the largest in the country, closed down for an indefinite period on Apr. 20 because of lack of coal to store. The plant when running at full capacity employed from 50 to 100 men. The fires were withdrawn from under the nest of boilers and only about nine men will be retained, who will make extensive repairs to the plant during the summer. The yards are owned by the Susquehanna Collieries Company.

Tower City—A fire discovered in one of the breasts in the East Brookside colliery caused considerable excitement for a short time. Men were sent for at once and they worked for about 24 hours putting out the fire and beating back the gas to avoid an explosion.

Pittston Junction—Property owners who have suffered heavy damages from mine caves have banded together as the Pittston Surface Protective Association and have decided to start injunction proceedings against the White Coal Co. and others who are removing the supports from beneath Pittston homes, which is alleged to have caused thousands of dollars worth of damages. For the past three years there have been mine settlings in and around Pittston, but in the recent past the caves have become more numerous and far more disastrous. About 50 homes have been damaged.

Mt. Carmel—The Susquehanna Collieries Co. and the Philadelphia & Reading Coal and Iron Co. have been asked by the War Department to rush to Washington as speedily as possible the names of all miners and expert mechanics drafted for the army. The Government proposes to withdraw such experts from the infantry and assign them to specially organized units of engineers to be sent to France. Several hundred miners, laborers and mechanics have been sent out of this district through the draft and are in army camps or in France.

Tamaqua—It was announced during the week that Liberty Bond subscriptions at the Lehigh Coal and Navigation Co.'s Panther Creek Valley collieries had reached $383,000, about 94 per cent. of the employees having subscribed. An effort will be made to make it 100 per cent.

Hazleton—Two extensive contracts in the Hazleton region have been discontinued for the present. Dick & Co., contractors for the Lehigh & Wilkes-Barre Coal Co. at Audenried, are unable to work due to the scarcity of men. At Harleigh the strippings have been closed until labor conditions are better.

Upper Lehigh—The Upper Lehigh Coal Co. engineers are getting out the plans for a steel breaker to replace the present wooden structure, which will be continued in operation while the new breaker is in course of erection.

Bituminous

Punxsutawney—The Juneau Coal Mining Co., of this place, operating the Juneau mine on the Buffalo, Rochester & Pittsburgh Ry., near here, has sold the operation to the Empire Coke Co., of Geneva, N. Y. The entire production will be shipped to the byproduct ovens of the Empire company. The mine is being operated under the name of the Juneau Operating Company.

Johnstown—The attendance at the examination held by the various state mine inspectors of western Pennsylvania last week, for certificates of mine foremen and firebosses, was the smallest for years. The reason given in most cases was that the young men were in the Army. The average age of the applicants this year was considerably above that of previous years.

Indiana—Work has been started on the erection of the large repair shop of the Rochester & Pittsburgh Coal and Iron Co. here. It is located on Oakland Ave. at the corner of the Buffalo, Rochester & Pittsburgh Ry. All the mine cars, etc., for the various mines will be built here as well as the general repair work. It is also planned to cut the lumber for the houses at this plant, thus saving time and waste in putting the houses up at the mining towns.

Uniontown—J. H. Oilman, Jr., of Pittsburgh, recently closed a deal for two tracts of coal land in Luzerne township, representing an investment of over $90,000. Mr. Gilman purchased a two-third interest in the Henry Cox farm, consisting of 111 acres, at $792 an acre, and the coal underlying the farm of George Hibbs, comprising 90¾ acres, at $840 an acre.

Washington—The Lilley Coal and Coke Co., of West Brownsville, has purchased 200 acres of coal land east of Washington from the estate of John Shrontz. The purchase price was $65,000. The company had previously acquired several hundred acres in the immediate vicinity and is now preparing to sink a shaft.

Latrobe—Officials of the Greensburg-Eastern Coal Co. have purchased the Daily and Showalter tracts of coal, near this place, the consideration being $40,000.

WEST VIRGINIA

Bluefield—An epidemic of grip and measles throughout the Pocahontas coal fields has cut down coal production to less than 50 per cent. normal. During the past week operators say production was cut down 100,000 tons because of illness of miners. The epidemic came just at a time when the car supply was better than at any time during the past six months.

Newlyn—The Weewyn Coal Co., recently incorporated with a capital of $25,000, is now developing about 200 acres of coal lands at the mouth of Arbuckle Creek. The company is planning for additional development work. H. P. Thomas is president and manager; P. H. Henry is vice president.

Charleston—Examination for mine foremen and firebosses will take place at Charleston on May 21, 22 and 23; Fairmont, May 28, 29 and 30; Thomas, June 4, 5 and 6; Mount Hope, June 11, 12 and 13; Welch, June 18, 19 and 20; Logan, June 25, 26 and 27.

Charleston—There were 33 fatalities in West Virginia coal mines during the month of March, according to the monthly report of the State Department of Mines. Fourteen deaths were caused by roof and coal falls, ten by mine-car accidents, four by explosives, one by a motor accident, three from miscellaneous causes and one happened outside the mine workings.

Clarksburg—Though delayed by the failure to secure steel for its switch, the Bowery Coal Co., of Lost Creek, having completed the development work at its new plant, will be ready to ship coal just as soon as switching facilities are provided.

Madison—The Bradley Coal Co., recently chartered, has perfected an organization by electing S. E. Bradley as president, O. C. Chambers as secretary treasurer, and W. W. Bradley as superintendent. Construction of the company's plant has been under way for the last month and by July 1 the company believes it will be able to ship coal.

Grafton—Repairs are being made to the plant of the East Grafton Coal and Coke Co. at Thornton in the renewal of the sinking shaft and by the addition of several boilers to the power plant.

Philippi—The Philippi Gas Coal Co. expects to start shipping any time now. It is owned by Clarksburg capital.

Mannington—A tract of coal land, which includes 2419 acres in Mannington district, in Marion County, and Grant district, in Wetzel County, has been transferred and the transaction recorded in the county clerk's office, indicating early development. The tract lies just above the Rachel Gas Coal tract at Downs. Attorney Charles F. Kefover, of Uniontown, Penn., recorded the papers.

Fairmont—U. G. Wilkinson Co., of Pittsburgh, engaged on the transfer of the Empire tract (Davis and Elkins tract) to the New England Fuel and Transportation Company, since last August, complete their work here this week. The New England Fuel and Transportation Co. took over this big tract and resold a great deal of it.

Matoaka—The Wright Mining Co., a wagon mine, is engaged in shipping coal from the No. 3 Pocahontas seam. The capacity at present is two cars daily. R. T. Wright is manager. H. D. Harman and Lathrop O'Keefe are also interested.

The Pawama Coal and Coke Co. is doing its "bit," having produced a record tonnage for the month of March. The plant is newly painted, and six new houses have been completed. All the company's houses have recently been put in first-class condition and new miners are coming in for work daily. Superintendent Roy T. Wright is to be congratulated on these improvements.

KENTUCKY

Earlington—The St. Bernard Mining Co. has announced its intention of constructing a large power plant here to furnish power for all of its string of mines, including Morton's Gap, some 20 miles from the new plant, which will cost between a quarter and a half million dollars. Several of the contracts have been placed, the main electrical contract going to the Westinghouse company, and arranging for completion inside of seventeen months. The company recently lost its power plant at Shamrock by an explosion followed by fire, that having been the largest mine power plant in western Kentucky at the time.

Madisonville—The Sunset mine of the Coil Coal Co. has resumed operations after being down for several days as a result of a breakdown in the power plant, necessitating sending away for parts.

Harlan—The Wallins Creek Collieries Co., capital $500,000, has purchased the property of the Wallins Creek Coal Co., containing three equipped mines capable of producing 1500 tons daily. The new owners plan increasing the output to 2000 tons. Officers of the company are W. D. Boyer, Scranton, Penn., president; S. C. Boyer, Nashville, treasurer; W. J. Nixon, Chattanooga, general manager.

TENNESSEE

Harriman—S. P. Sparks, George W. Chandler and others interested in the ownership of the Babahatchie coal mines, on the Queen & Crescent R.R., near Harriman Junction, plan reopening the mines, which have been down for several years. Capt. A. W. Evans, an engineer, has been secured to supervise the reopening of the mines.

INDIANA

Petersburg—The Muren Coal Co., with a capital stock of $375,000, the directors being Clark Whitman, J. C. Muren and A. H. Taylor, was organized recently. The new company owns the Muren mine, along the Southern R.R., which employs 125 men.

Oakland City—E. Hacket, of Louisville, Ky., owner of a large mine near here, is making tests preparatory to the sinking of another shaft. The new mine is to be electrically equipped and will be capable of producing a large tonnage.

Bicknell—The Bicknell Coal and Mining Co. has started to sink a new mine in the Bunting addition which will give employment to about 500 men when completed. This is the fourth new mine to be sunk here in the last year.

Terre Haute—An explosion which fatally burned three men occurred in the shaft mine of the Deep Vein Coal Co. Tuesday, Apr. 23. Searchers are unable to penetrate far, owing to the accumulation of smoke, and the fate of the other men cannot be determined. The property loss will not be heavy, but the mine's production of coal will be halted several days.

ILLINOIS

Springfield—An agreement has been reached between employees of the Jones & Adams Coal Co. and the Illinois Traction Co. relative to improved passenger service between Springfield and the mine. The miners filed a petition some time ago with the State Public Service Commission for better service. This will now be withdrawn.

H. A. Converse, fuel administrator for Sangamon County, announces in a bulletin that the railroads have consented for discarded ties to be gathered for fuel, instead of being burned by the section men to get them out of the way, and persons living near the railroads are urged to arrange with local station agents for gathering them up and utilizing them as fuel.

Johnson City—Superintendent Ralph Mitchell and Mine Manager W. B. Miller have made the Ernest mine here a 100 per cent. mine by selling every man employed there one or more Liberty Bonds, making a total of $33,000.

Gillespie—Business men of Gillespie have organized a company and are sinking a mine just north of the town to avert the anachronism of a coal famine, which often occurs, in a town that is surrounded by some of the largest mines in the world. It has often happened that no coal could be obtained from the big mines for local use for a week at a time because the entire output was needed for filling orders. The new mine is intended to supply the local needs exclusively or to at least give them the preference.

Herrin—One of the largest sales in the past year in the southern Illinois field was that recently closed when the Chicago and Carterville Coal Co. sold its mines A and B near here, with the washer and dry screening plant, to the Chicago, Wilmington and Franklin Coal Co., for $1,500,000. Five thousand acres of coal and mining rights in Williamson and Franklin Counties, with 4000 acres of farming lands and valuable city property in Herrin is included. This is the largest single transaction ever made of Williamson County property. The new owners have two mines in Franklin County, one at Orient and one at Benton.

Foreign News

Montreal, Canada—Operators in the west of Canada say the output of coal the coming year will be much less than hoped for, especially in British Columbia. Labor supply has been limited since the war and is growing scarcer. Continued strikes have prevented anything like a proper production, but even with the strike situation eliminated, operators say individual miners are prepared to do only a certain amount of work each day and when they have accomplished their self-appointed quota refuse to work until the following day.

Victoria, B. C.—The Canadian Collieries (D). Ltd., has opened its No. 5 Mine, and D. Morton has been appointed overman. He was head overman at No. 4 Mine, Extension, which has been closed down.

In the reorganization of the Merritt Collieries under the firm name of the Fleming Coal Co., Joseph Graham has been appointed general manager; A. E. Smith, mine manager; and John Brown, overman. These mines under the Inland Coal and Coke Co. have produced as high as 15 000 tons a month. The new company is taking hold vigorously, as is shown by the fact that last month, although the work may be said to have just started, 4000 tons was produced.

Personals

Leroy Waldbridge, mining engineer with the Cranberry Creek Coal Co., at Hazleton, Penn., has been named to succeed **J. E. Anderson** as chief engineer.

Alex Sharp has been appointed mine manager of the Colman Collieries, Princeton, B.C., which have been reopened. It is understood that considerable development work is to be undertaken.

J. W Montgomery, formerly mine manager of No. 7, Canadian Collieries (D), Ltd., has assumed the duties of mine manager of Nos 5 and 6, while J. G. Quinn, formerly in charge of the two latter mines, has gone to No. 7.

T. B. Fisher, until recently mine foreman of mines at Twin Branch, W. Va., has been employed by the Pawama Coal and Coke Co. in same capacity. **R. Q. Mahoney** has resigned and will return to work for the Turkey Gap Coal and Coke Co., Dott. W. Va., No. 2 mine.

Edward Solomon, formerly in charge of the Solomon-Peabody mine south of Auburn, Ill., is to take charge of the new mine being sunk by the Panther Creek Coal Co., two miles north of Auburn. Mr. Solomon's successor at the Solomon-Peabody of mine is **C. C. Chadwick.**

Lloyd G. McCrum, of Somerset, Penn., general manager of the Victor Coal Mining Co., operating at Holsopple, Somerset County, Pennsylvania, on the Baltimore & Ohio R.R., was recently appointed Lieutenant-Colonel in charge of the United States Government arsenal at Rock Island, Illinois.

H. R. Bissell, of Independence, Preston County, West Virginia, has resigned as general superintendent of the Preston Coal Co. and as secretary and treasurer of the Grafton Coal Operators Association, effective Apr. 22, to accept the position of general superintendent of the Cambria Collieries Co., with headquarters at **Bellaire,** Ohio.

J. E. Anderson, who served with Pardee & Co., for many years as chief engineer at the Cranberry workings, and later with the Cranberry Creek Coal Co., of Hazleton, Penn., which now operates the mines, has resigned and will locate in the Wyoming Valley. During his stay at Cranberry the colliery has been completely electrified, saving in one portion of the workings the services of 20 mules.

George L. Fraser, for some time an employee of the Granby Consolidated Mining and Smelting Co., has been transferred from the company's smelting center at Anyox, B. C., and has taken over the duties of general manager of the company's new collieries on Vancouver Island. He will have associated with him as mine manager, **J. W. Powell,** late of the Canadian Consolidated Coal Co., of Kentucky.

C. W. Murphy has been appointed superintendent of the Weyanoke Coal and Coke Co., Lowe, W. Va. **W. A. Craven,** whom he succeeds, is appointed superintendent of the S. J. Patterson Pocahontas Co., a company composed of practically the same stockholders. **C. W. Connor,** who until recently was superintendent of the S. J. Patterson Pocahontas Co., has resigned to engage in the mining business.

Obituary

James Vincent, assistant manager of the Whitner-Kemmerer Co., of Pittsburgh, Penn., died Apr. 17 at his home in Pittsburgh. He was a well-known coal man and was formerly sales manager of the old Pittsburgh-Buffalo Co. in Pittsburgh He was buried in Alliance, Ohio, Apr. 19. He was aged 42 years and leaves his parents, two sisters and one brother.

Coming Meetings

Illinois and Wisconsin Retail Coal Dealers Association will hold its annual convention June 26 and 27, at Hotel Wisconsin, Milwaukee, Wis.

International Railway Fuel Association will hold a convention May 23 and 24, in Chicago, Ill., under the auspices of the United States Fuel Administration and the United States Railway Administration. Secretary, J. G. Crawford, 702 E. 51st St., Chicago, Ill.

American Institute of Chemical Engineers will hold its summer meeting June 19-22 at Berlin, N. H.

American Association of Engineers will hold its fourth annual convention May 14 in Chicago, Ill. Secretary, A. H. Krom, 29 South La Salle St., Chicago, Ill.

National Coal Association will hold a meeting May 8 at the Bellevue-Stratford, Philadelphia, Penn. Secretary, J. D. A. Morrow, 707 Southern Building, Washington, D. C.

Illinois Mining Institute will hold its next meeting May 23, 24 and 25, at **Peoria,** Ill. Secretary, Martin Bolt, Springfield, Ill.

American Institute of Electrical Engineers' annual convention June 26-28 at Atlantic City, N. J. Secretary, F. L. Hutchinson, 29 W. 39th St., New York City.

American Society of Mechanical Engineers will hold its spring meeting June 4-7, at Worcester, Mass. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

American Concrete Institute will hold its annual meeting June 24-26, at Atlantic City, N. J.

Industrial News

Frankfort, Ky.—Among the principal late incorporations of coal companies are: Harvey Jellico Co., Louisville, Ky.; capital $30,000, incorporators E. E. Lanning, J. M. Dougherty and Edward H. Niehaus. Virginia Mining Co., Allen, Ky.; capital $9000; W. G. Gray, R. L. Smythe and L. B. Harwell. Harlan-Peacock Coal Co., Pineville, Ky.; capital $24 000; E. L. Shell, Henry Broughton and J. M. Gilbert. Bull-Dog Coal Co., Calvin, Ky.; capital $10 000; E. W. Miracle, W. G. Cugg and R. W. Miracle. Cooper Fork Coal Co., Middlesboro, Ky.; capital $6000; James Richardson, H. B. Broughton and Edward Broughton.

Louisville, Ky.—The Louisville Board of Education is taking no chances with the coal supply this winter, and is spending about $10,000 in constructing coal-storage bins at a number of the public schools which have little storage space available. A contract has also been made with the Louisville Coal and Coke Co. for furnishing 5000 tons of western Kentucky mine-run coal at $2.40 a ton. Bids were rejected on 1000 tons of nut and slack, and will be readvertised. The board annually consumes about 8500 tons of coal but only has storage capacity for about 6000 tons.

Charleston, W. Va.—The largest coal company, when authorized capital is taken into consideration, ever incorporated, is the Federal Coal Company, which will have its main office here. The capital stock is $3,000,000. It will operate in Boone County. The incorporators are John E. McCully, of Philadelphia. Judson Harney, of Scranton, and H. R. Van Dusen, William W. Hall, and E. M. Johnson, of Charleston.

New York, N. Y.—Out of a quota of $25 000 000, the Coal Trade Committee of New York City announced on Apr. 23 that it had obtained subscriptions to the Third Liberty Loan amounting to $6 072,150. Of this sum the subcommittee, appointed by M. F. Burns, the chairman of the Coal Trade Committee, to solicit the wholesale trade has secured subscriptions amounting to $2,142,650.

The subscriptions secured by the various Borough Committees are as follows: The Bronx, $92,200; Brooklyn, $402,000; Manhattan, $3,350 100; Queens, $30,200, and Richmond, $13,950.

The individual subscriptions include the following: Williams & Peters, $200,000; Burns Brothers, $100,000; Delaware, Lackawanna & Western R.R., Coal Department, $2,000 000; Scranton & Lehigh Coal Co., $75 000; O. H. Perry & Co., $25,000; John E. Berwind, $100 000; E. J. Berwind, $200,000; Clinchfield Coal Corporation, $100,000; Warren Delano, $120 000; Texas & Pacific Coal Co., $100 000; Robert Gordon & Son, $15,000; New Central Coal Co., $50,000; M. F. Burns, $25,000; J. A. Renahan, $10,000; F. A. Potts & Co., $50,000; Weber-Bunke-Lange Coal Co. $10 000; O. J. Stephens, $10,000; James A. Hill, $10 000; Jagels & Bellis, $20,000; Dexter & Carpenter, $10,000; Vinton Colliery Co., $120,000; Pennsylvania Coal Co., $1,000 000; Pennsylvania Coal and Coke Corporation, $300,000; Sanders A. Wertheim, $25,000; American Coal Co. of Allegheny, $50,000; Meyer-Denker-Sinram Co., $10,000; Hencken & Willenbrock, and employees, $14,900; Madeira, Hill & Co., $25 000; West End Colliery Co., $40,000; R. C. Hill, $25,000; Price-Pancoast Coal Co., $40,000; Thomas Dickson & Co., $20 000; Rideewood Coal Co., $20 000; Heilner & Son, $10,000; Joseph B. Dickson, $50,000; Thomas Dickson, $10,000; Jesse L. Eddy, $25 000; J. Rheinfrank & Co., $10 000; Watkins Coal Co., $16,200; Thedford-Eltz Coal Co., $10 000; Willard-Sutherland & Co., $18,000; Pawama Coal and Coke Co., $10,000; F. R. Long & Co., $10,000; Adelphia Coal Co., $15 000; S. M. Schatzkin, $10 000; Bacon Coal Co., $20 000; Z. O. Nelson, $10,000; Richmond Coal Co., $10,000; Bulah Coal Mining Co., $11,500; S. Tuttle & Sons Co., $25,000; and Utah Fuel Co., $100,000.

St. Louis, Mo.—J. H. Anderson has organized the Reliance Coal and Supply Co. and will open an office at 718 Equitable Building and engage in the jobbing of coal.

Columbus, Ohio—The Daniel Boone Coal Co., which is a subsidiary of the Maynard Coal Co., of Columbus, is now operating the second opening in the Hazard district in eastern Kentucky. The first opening has been worked for more than a year. The second mine is fully equipped with shaker screens and conveyor and has a capacity of 2000 tons daily. The first mine has the same capacity. The Daniel Boone Coal Co. is busy on a third mine to be located in the Lots Creek district of Kentucky on a branch of the Louisville & Nashville now under construction. The third mine will be opened about Aug. 1.

Charleston, W. Va.—Thirty-three fatalities as results of accidents occurred in the mines of West Virginia in March, according to the report of Chief Earl Henry, of the State Department of Mines. They occurred in the following counties: Kanawha, two; Braxton, Brooke, Marion, Mercer, Putnam, Tucker and Wyoming one each; Fayette, three; Harrison, four; Logan, two; Marshall, two; McDowell, seven; Mingo, four, and Raleigh two.

Philadelphia, Penn.—The annual statement of the Philadelphia & Reading Coal and Iron Co. has created much interest in coal circles It is shown therein that the profit of the company for the year 1917 is approximately five and one-half million dollars, being an increase of nearly three million dollars over 1916. For over 40 years previous to the present boom in the anthracite industry this company, with the single exception of one year, has shown a deficit This loss has always been met by the holding concern, the Reading company, as it is known, accepting the bonds of the coal company to the extent of each year's loss. It was always claimed that this former annual deficit in operation of the premier anthracite company was due to the heavy capitalization incident to the purchase of the thousands of acres of virgin coal land during the McLeod régime in the Reading companies.

Baltimore, Md.—The United States Industrial Alcohol Co. has awarded a contract for the construction of its proposed new steel tipple at the Curtis Bay plant. The structure is estimated to cost about $100,000. The Ansonia Copper and Iron Works, Curtis Bay, is the contractor.

Cincinnati, Ohio—A general tie-up of coal and other traffic on the Ohio River was threatened for a few days last week, when engineers on towboats operating on the river caused a cessation of operations by refusing to run their boats until a demand for higher wages was met. The engineers asked an increase of $30 a month, making their pay $150 a month instead of $120, as formerly. The difficulty was settled amicably, however, by a conference held at Point Pleasant, W. Va., between representatives of the engineers and the transportation executives of several leading coal companies, and the advance asked was granted, at least by the Otto Marmet Co., the E. J. Hickey Co. and the Campbell's Creek Coal Co.

St. Louis, Mo.—The Coal Service Bureau has compiled the following items of increased cost in the distribution of coal this year as compared to last year: Drivers' wages, 22.8 per cent.; stablemen's wages, 33.7 per cent.; pay of weighers, 38.9 per cent.; pay of yardman, 10.3 per cent.; clerk hire, 20.2 per cent.; timothy hay, 60 per cent.; oats, 100 per cent.; mixed feed, 109 per cent.; lumber, 83 per cent.; car service, 300 per cent.; iron and steel, 75 to 100 per cent.; harness and leather, 200 per cent.

St. Louis, Mo.—Bids were opened Apr. 18 by United States engineers here for the construction of 13 steel barges for the conveyance of coal and other commodities on the Mississippi River. Three of the bids were in excess of the price limit. The other three were all close to $90,000 for each barge. The award has not been made

MARKET DEPARTMENT

Weekly Review

No Change in Coal Situation—Anthracite Production Affected Adversely by Labor Shortage—Bituminous Output Shows No Betterment—Mines Still Working Short Time—Lake Navigation Opens

NO CHANGE of any consequence can be noted in the coal situation this week. Shipments of anthracite show a slight improvement. Orders from domestic consumers are still piling up, and retail dealers continue to worry whether they will receive enough coal to take care of the orders now on their books. The scarcity of labor in the hard-coal regions prevents the mines from working to utmost capacity, and the draft is making still further inroads on the men who are left. The situation is serious.

The steam-coal market has tightened noticeably, and there is an urgent demand for practically all the smaller sizes. The Fuel Administration's order curtailing the supplies of coal to pottery and brick manufacturers would indicate that a sharper line will be drawn between so-called essential and nonessential industries.

The bituminous situation continues to preserve its demoralizing aspect. Inquiries for soft coal are many, with deliveries inadequate. Though production for the week ended Apr. 13 was 10,947,000 tons, an increase of nearly 18 per cent. over the output of the week preceding, it must be remembered that there was a decided falling off in production for the week ended Apr. 6. In order to avoid a coal shortage next winter the weekly output of soft coal should be over 11,500,000 tons. This average not been reached any week this year.

Reports show that there is no appreciable betterment in the car supply to the mines. Many operations are still working short time. The Fairmont region of West Virginia, however, was receiving a better supply of cars the early part of this week.

In spite of reports to the contrary, the question of what price the railroads are to pay for fuel has not been settled. The practice of assigning cars to certain mines at the expense of others is to be stopped, however, and will undoubtedly result in more even working time for all operations.

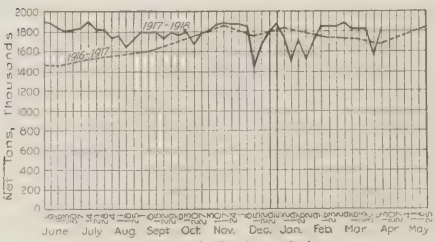
Distribution facilities this summer will not be materially enhanced either by the railroad administration's order for 100,000 coal and freight cars or the taking over of the Erie Canal. Intensive use of the canal waits on the building of barges, and it will be well along into the fall when the new freight cars are placed in service.

The coal-zoning plan is still undergoing changes. The consensus of opinion seems to be that it is working out well, in spite of the apparent hardships wrought by the system here and there.

The lake trade has opened, and coal is moving from Ohio, West Virginia and Pennsylvania to the lower lake ports. On the opening of navigation last year more coal was sent to the lake docks than the vessels could handle. This year shipments to the lakes should be made on a basis that would enable both the railroads and the lake vessels to handle it expeditiously and not overtax the available motive power.

COAL PRODUCTION

Production of bituminous coal increased 1,600,000 net tons or over 17 per cent., during week ended Apr. 13 compared with the preceding week. The total production of bituminous coal (including lignite and coal made into coke) is estimated at 10 947 000 net tons, an average production per working day of 1.824.000 net tons, compared with an average of 1.777,000 tons for the past year and 1,680 000 tons in April, 1917. Production for the first two weeks of April is estimated at 20,264,000 net tons, approx-



imately 19 per cent. below the production of the same period of March, 1918. The total production of beehive coke is estimated on the basis of railroad shipments at 672,000 net tons, an average per working day of 112,000 net tons compared with 103,000 for the week previous.

Anthracite shipments rose from 32,223 cars last week to 37,760, an increase of over 17 per cent.

Beehive Coke—The reports of conditions in the Connellsville and adjacent coke regions for the week ended Apr. 13 show slight improvement. Sixty-eight of the principal operators in the Connellsville, Greensburg and Latrobe districts reported production of 311,080 net tons, or 67.8 per cent. of their full-time capacity. Labor conditions improved, losses due thereto decreased from 15.4 per cent. last week to 13.7 per cent. Less coke cars were available than during the preceding week, losses due thereto amounting to 13.9 per cent. compared with 12.8 per cent. The same operators produced 162,300 net tons of coal.

Byproduct Coke—Performance of byproduct coke operators during the week ended Apr. 13 slightly exceeded that of the week of Apr. 6. The ratio of production to maximum capacity rose from 87.5 per cent. during the preceding week to 87.9 per cent. Out of 12.1 per cent. of maximum capacity which the byproduct plants of the country failed to realize in actual output, 5.5 per cent. was lost through lack of coal; 0.5 per cent. because of labor trouble; 5.2 per cent. on account of repairs to plant; 0 3 per cent. due to no market and 0.6 per cent. for all other causes. Operating conditions in the several states varied but little during the week ended Apr. 13. Kentucky was the only state to record a material increase. Maryland production of 100 per cent. week ended Apr. 6 decreased to 98.8 per cent. during the past week.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended: Mar. 23	Mar. 30	Apr. 6	Apr. 13
Bituminous shipments, 123 roads	191,127	189,546	160,178*	189,952†
Anthracite shipments, 9 roads	42,487	43,642	32,223*	37,760†
Beehive coke shipments, 4 roads	13,643	13,320	12,743*	13,801†

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Dry Goods Economist—This has been an eventful week in textile circles. Raw cotton dropped 6¼c. in six days, raw silk dropped 25 cents in Yokohama, but recovered slightly. Dealings in wool continue entirely suspended pending a definite statement of the Government's needs for army purposes. Announcement was made that British authorities have released some linens for export to this country.

Bradstreet's—Speeding up of war work, supplemented by continued heavy buying for Governmental account, excellent news regarding staple food crops, large purchases by country merchants, and improvements in transportation, stand out as the prominent currents in a rapidly moving stream. But the energies of the Government, with embargoes of preferences, make it difficult for merchants to get supplies, and at the same time further restrictions upon so-called nonessential industries operate to cut down outputs, which conditions in the aggregate militate against the freest movements in civilian lines.

Marshall Field & Co.—Current wholesale distribution of dry goods is ahead of the corresponding period of a year ago. Road sales for both immediate and future shipments show good increases over the same week in 1917. Merchants have been in to market in slightly smaller numbers. The market on domestic cotton goods continues strong. Collections are ahead.

Iron Age—Operating conditions at blast furnaces and steel works have improved steadily. The leading producer in the Pittsburgh district had 96 per cent. of its rated blast-furnace capacity active last week and 98 per cent. of its Bessemer and openhearth steel capacity. While all companies did not do so well, it is probable that April production of both pig iron and steel will exceed the excellent showing made in March. These results will attract more than usual attention now that the Government is calling for an increasing proportion of the output. The Carnegie Steel Co. is now giving war requirements practically 100 per cent. of its rolled product and at other Central Western plants 75 to 90 per cent. of the shipments are on Government account. Surprisingly little is heard of hardship to any metal-working industry because steel mills are paying small attention to ordinary trade. Stocks are playing a part now that will be missed later.

Atlantic Seaboard

BOSTON

Car shortage unrelieved. Assigned cars rapidly being abolished, including Storrow coal all-rail. Latter is likely now to be sent to Tidewater. Increasing tonnages for New York dumping and transshipment inland from sound ports. Apprehension over any plan to exclude all-rail shipments from Tidewater territory. Conference of all-rail shippers. Hampton Roads supply curtailed by car shortage. Anthracite shipments by water continue light.

Bituminous—At this writing the New England railroads are congested with engine fuel at their various depots. Appeals have even been made to the fuel authorities for disposition, such has been the accumulation of cars under load. It is not altogether so much a piling up of large reserves as a matter of labor and facilities for unloading. However, it is a sign that the roads are much easier for coal than six weeks ago.

The requisitioning of high-grade low volatiles from central Pennsylvania for bunker use is another subject that needs to be dealt with. So long as there is a chance of getting the bunker premium the operators will be disinclined to make commercial contracts. Car supply has been so poor the past month that the general situation has not been greatly affected by this one item, except psychologically, but when the car percentage increases it will doubtless be a lively factor. The car shortage is causing real alarm not only in this territory but in Pennsylvania itself. Again there are diversions in favor of Government industries and "contracts" made with New England consumers have so far shown a light yield. It is nothing unusual for a plant using 5000 tons monthly to have had but three or four cars shipped since Apr. 1.

It is understood that assigned cars are now in process of being wholly given up. If that proves to be the fact, in the judgment of many a real gain will have been made. For some time there has been a theory that to transship by water will mean economy of transportation, but the New York loading piers are in the midst of the most congested area anywhere; and if no improvement can be made in dumping coal the proposed expedient is likely to leave some of our industries high and dry.

Today it is apparently impossible by water to keep supplied those points in Connecticut, for instance, that have usually been regarded as tributary to New Haven and other rehandling piers. Delays are such that movement by that route is shown to be inadequate, and if now no emergency supply is allowed to come all-rail there are pretty sure to be shutdowns among important plants.

There is an increasing disposition on the part of fuel authorities to limit the area into which rail shipments should be sent. A good deal of hard work has been put into this question lately, and some of it was brought out in the conference of all-rail shippers called by Mr. Storrow on Apr. 22. It is clear that cars are coming through via the Boston & Maine and the Boston & Albany in eight or nine days now instead of thirty, yet there continues to be much talk about relieving congestion on the originating lines.

The Hampton Roads situation continues uneven. Some days there is more coal than there are bottoms waiting; other days conditions are reversed. The net recent result, however, is a 20 to 25 per cent. deficiency in tonnage brought to the piers on the three roads. Car supply and not labor shortage is the difficulty. The zoning system seems not yet in full operation and then again there is much complaint over the extent to which the Virginia railroads have had their equipment scattered. Norfolk & Western and Chesapeake & Ohio open-top cars have appeared in large numbers in New England, and it was only last week that railroads here like the Boston & Maine were ordered to return foreign cars. This was temporarily an embarrassment at the rehandling wharves for the reason that a large number of New England cars have been sent to the mines for railroad fuel when the roads were making great exertions to replenish their storage piles.

The normal route for at least 50 per cent. of New England's steam coal is by water, and the largest proportion of this tonnage should come from Hampton Roads. Could that be followed through it is probable that with an all-rail movement equal to 1917 all but the less essential industries would be cared for measurably well. At the same time the outlook is none too bright.

Anthracite—A recent announcement by the anthracite committee makes it clear there was no intention to limit the shipments to any consignee for any one month to the tonnage shipped the corresponding month in 1916. Some of the company sales agents were insisting upon such a provision, and it is a relief to know it was not authorized.

All-rail deliveries are coming through in good volume, but it should be noted they include a heavy tonnage of buckwheat and other substitutes for bituminous. Water shipments are still limited by lack of towing power, and although there are assurances of improvement there is as yet nothing visible. There are also questions of water freight to be worked out. At present there are wide variations in the cost alongside, and to such extent is this true that retail dealers in the same cities are allowed different selling prices based by local fuel boards on cost, the latter being dependent on the source of supply.

Present prices f.o.b. Port Richmond, Philadelphia, for New England shipment follow, this being the April schedule of the Philadelphia & Reading Coal and Iron Company.

	W. A.	R. A.	Lykens
Broken	$6 25	.....	$6 70
Egg	5 85	6 05	6 30
Stove	6 10	6 30	6 70
Chestnut	6 20	6 30	6 70
Pea	4 60	4 70	4 95

NEW YORK

Anthracite stocks far below demand, with consumers demanding their winter supplies. Retail dealers' books filled with orders. Miners appealed to by the companies to "do their bit" in producing coal. Car supply reported improved the first of the week.

Anthracite—Supplies here continue to be far below demand and dealers, who heretofore have insisted upon placing orders for and receiving only what they wanted, are now willing to take any of the larger sizes of coal. Consumers have religiously obeyed the mandates of the Fuel Administrators in placing their orders for the winter supply and are now urging the dealers to make the deliveries. As a result of this urgency the dealers have their books filled with orders sufficient to carry them throughout the summer and well into the fall, unless this market is able to secure larger shipments. As it is at present the trade fails to see any encouragement ahead and is fearful of a shortage next winter.

Reports from the mines are hopeful. Operations are on a full-time basis whenever possible, and reports for the week ended Apr. 13 show that shipments amounted to 37,760 cars, an increase of 5547 cars over the previous week, or 17 per cent. This makes a total of 69,983 cars for the first two weeks of the month as compared with 87,072 cars the first two weeks in March.

The benefit to be derived by the utilization of the Erie Canal recently taken under Government control, for the carrying of freight, including coal, has been a topic for discussion by the trade. It is expected that the transportation situation will be somewhat improved, but not to any great extent, pending the construction of barges.

Stocks at the loading docks are not large. For the seven days ending at 6 a.m. on Monday of this week reports show that but 6818 cars of anthracite had been dumped.

Buckwheat No. 1, which under ordinary conditions would at this time of the year be plentiful, is about as hard to get as either of the larger sizes. Rice, barley and culm are easier. The two latter are plentiful owing to the scarcity of bituminous with which they are mixed. Quotations for barley are slightly easier than they were a week ago.

Current quotations, per gross ton, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.15	$6.90
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	4.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—Operators report better car supply and that on Monday some mines which had been idle because of the absence of cars were that day receiving some.

The ruling of certain fuel administrators that no carload or bargeload lots should be delivered to individual consumers as they have been heretofore, unless permission shall have at first been obtained from the local fuel administrator, has been modified to the extent that where consumers have been accustomed to obtain their supply in this manner in the past they should be permitted to do so, unless there is some special reason to the contrary. The practice, however, should not be extended. This ruling, which was obtained by the Wholesale Coal Trade Association of this city, also applies to industrial or other concerns which supply their employees with coal for domestic purposes. Much objection had been made to the original ruling which deprived shippers who had served certain consumers in this way for several years from this business.

Car supply has continued poor and stocks at the local docks show no enlargement. Demand is heavy and consumers are anxious to stock up. While some contracts have been closed at the Government price, these are comparatively few. There is no free coals in this harbor, everything coming here either being on priority orders or purchased before shipment.

Local operators breathed a sigh of relief on Monday upon the receipt of information that the miners in the DuBois region had decided not to strike but had requested the Fuel Administration to investigate wage conditions. The employees had demanded an increase in wages on the ground that they should receive at least part of the recent increase granted in the Government price for coal. It was reported to the miners in convention that the increase did not allow for a wage increase.

The revision of coals of the smokeless variety suitable for bunkering purposes has not resulted in any more free coal in this market. It was reported early this week that some shippers who heretofore supplied bunkers but whose coals were not now included in the pools designated by the Government were offering their stocks at slightly lower prices. It was also reported that there was to be a further change in the pools.

BITUMINOUS PRICES

	F. o. b. New York Gross	Mine Price Net	Gross
Central Pennsylvania	$5.06	$3.05	$3.41
Maryland:			
Mine-run	4.84	2.85	3.19
Prepared	5.06	3.05	3.41
Screenings	4.50	2.55	2.85

PHILADELPHIA

Anthracite deliveries do not improve. Retail orders grow heavier. Public anxious for fuel. Conflict of opinion as to deliveries. Heavy tide shipments. Price rumors will not down. Labor troubles of retailers. Dissatisfaction with distribution plan. Coal now well prepared. Steam coals in heavy demand. Bituminous situation still serious. Car supply unimproved.

Anthracite—With orders piling up at an alarming rate, and no particularly great improvement in shipments, the dealers are growing restless. The urgent appeals to the public through the local fuel administration has caused the retailers to be flooded with business. It has been estimated that the orders now on file amount to 750,000 tons, being an increase of a quarter of a million tons over the preceding week. It would seem, however, that the dealers overlook the fact that they have 20 weeks before them in which to make the deliveries, and that probably the bulk of the spring and summer business has now been spoken for by the consumers.

There are some in the trade who continue to insist that all prices are likely to be revised by the authorities in Washington, and that action is sure to be taken before fall that will eliminate the individual differential of 75c., or at least bring all prices to the same basis. It is reported that some retailers who are entirely dependent upon shipments from individual shippers are experiencing some difficulty in inducing their customers to place orders. Many customers have refused to pay the higher retail price and have placed their business with dealers selling company coal. Even at that the retailers with the high-priced coal do not seem to have any difficulty in disposing of all the coal they can get, the only difference being that they are not so heavily booked for the future as their competitors; and some of them are just a little anxious on this account.

All shippers are not in harmony with the system of distribution based on the shipments to dealers during the period from April, 1916, to March, 1917, inclusive. It is becoming apparent that the officials purpose to control the distribution, despite the opposition that is being manifested. While most shippers have averaged their shipments for the foregoing period and ship accordingly, there were some concerns who started out earlier in the month to try to match the shipments month by month as

compared with the period of two years ago. It is understood now that they have also adopted the plan of averaging the shipments. Thus many customers who had not been taken on by these customers until late in the year 1916 have recently been receiving some coal. The National Fuel Administration has also notified the operators that while they may distribute any surplus tonnage over and above the period of two years ago to their customers, yet it must be considered that this tonnage is being held in reserve for the use of the Government, to be distributed later in the year, and that any portion of such surplus that is now distributed will be counted against the dealer's allotment later if it shall be necessary at that time for the authorities to call for coal for emergency use.

The steam coal market has noticeably tightened recently and many inquiries are received by the shippers for increased tonnages of practically all the smaller sizes. Recently the Fuel Administration sent out a circular notice to all operators asking them what tonnages of steam sizes they could ship to certain large plants working entirely on Government orders.

The prices per gross ton f.o.b. cars for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6 05	Buckwheat	$3.15	$3 75
Egg	4 50	5 70	Rice	2 65	3 65
Stove	4 75	6 05	Boiler	2 45	3 55
Nut	4 85	6 10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—The trade has lost none of the serious aspect created by the shortage of cars. It is not possible to report any improvement in the car allotment to the collieries, with the result that numerous operations are on short time. The calls for fuel are insistent, with deliveries inadequate. Yet it cannot be said that any plants hereabouts that are engaged in the manufacture of material vital to the Government have suffered.

The latest move in the zoning arrangement is the cutting off of Pennsylvania R.R. shipments into Baltimore territory. Hardly a week passes without some modification of the original zoning rules, and the general opinion seems to be that the system is working itself out along the lines of least resistance; or, in other words, shipments will, as they have in normal times, follow the lines of least resistance in a competitive sense.

Conditions among the jobbers do not seem to have changed much, although a number of them are receiving fair consignments from their shippers. Others are in a bad way and claim to be hardly making expenses on account of receiving such a small proportion of their former shipments.

BALTIMORE

Many changes under zoning system cause of some confusion in trade. The receipts of soft coal easier, but still short of local needs.

Bituminous—After several days' experience with the zoning system here, which prevents shipments of soft coal over the Pennsylvania into this territory, the trade feels that, while there are complications of a more or less serious nature, the move will probably prove of benefit to this section rather than otherwise. This view is based upon the belief that when coal begins to run better over the Baltimore & Ohio and Western Maryland, as compensation for cutting off Pennsylvania shipments, it will mean an increased dumping in this region. These two systems are so far not embargoed north. It is expected among other things that considerable coal originally marked for points north will be congested at junction points in the Cumberland gateway and will be diverted here to clean up the railroad jams. The past two weeks saw several hundred cars shifted to delivery here in order to lift congestion at Keyser, Cumberland, Hagerstown and Martinsburg.

There is some concern felt over the apparent Government plan to have Newport News and Norfolk handle all the all-water coal to New England, as much coal has been handled over the piers here for the east coast. Meanwhile the receipts over the Baltimore & Ohio have improved under a better car movement, although they are not sufficient to care for all wants at once.

Anthracite—While the Fuel Administration is urging consumers to get their anthracite supplies early, and while much business has been placed on the books, a large proportion is still out. The coal men have not been urging the taking of coal early, as receipts have not been of a nature to warrant it. The next month's deliveries here will set the pace for the retail trade in a large measure.

Lake Markets

PITTSBURGH

Coal in box cars. More Ohio than Pennsylvania coal offered. Little talk of lake shipments yet.

Coal loaded in box cars has been growing rather plentiful, at least for such an anomaly. In many cases the cars are destined to experience but one loading of coal, being intended for use in the West for grain loading, but they are permitted to carry coal to the zone limits. Box cars with Pittsburgh district coal are found only occasionally, but in Ohio they are much more numerous. Such coal usually requires a little argument in order to produce a sale, but brokers report they are generally able to move it, and collect the 15c. commission from consumers at the same time, an evidence that there remain consumers decidedly in need of coal.

Occasionally there are offerings of coal at less than the Government price, but the cases are not sufficiently common to be considered in quoting market figures, and, as a rule, they apply only to Ohio coal. Such offerings, however, are sufficient to show that the market is not altogether the one-sided affair that prevailed for so many months.

Practically nothing is being heard of lake coal, and it is evident that this movement will be taken up slowly, in accordance with the ability of the railroads and the lake vessels to get the coal through, once it leaves the mines. The common experience in the lake coal trade has been that of much more coal being sent to the lake ports, on the opening of navigation, than the vessels could handle, and nothing of that sort is to be permitted this year.

The market remains quotable at the set limits: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district. Brokers are permitted to charge 15c. brokerage to consumers and retail dealers, beyond the set prices.

BUFFALO

Car shortage not improving. Hard to get any bituminous, especially Pittsburgh. Much going to the lakes. Anthracite begins to move by lake. Local supply not large.

Bituminous—The jobber who is getting coal enough to supply any great part of his trade is hard to find. It is practically impossible to get any Pittsburgh coal, and certain of the Youghiogheny companies have notified their old customers that the zoning regulation has cut them out of this market. No more No. 8 will come here till that division is dropped. The lake trade is now taking a great amount of bituminous, and that reduces the supply for this section. It is already predicted that next winter's shortage will exceed any we have had so far.

At the same time certain parts of Canada are full of coal. Much demurrage has been assessed in Toronto and the surplus coal there is not out of the way yet. The reason for that is that the margin of profit allowed to jobbers is larger than it is here. Preparations are making for heavy water shipments down the St. Lawrence River as soon as the ice is out of the way, which will be in a few days. A water rate of $2.90 net has been paid on cargoes loading at Ohio for Montreal, though this does not appear to be fully established yet.

Such a rate is considerably higher than the all-rail rate, but it insures prompt movement; and that is much when everybody is eager to get a supply early. A large fleet of steamers that can pass through the Welland Canal will go into that trade. Buffalo does not ship bituminous by lake, the limit being Erie, Penn., and Toledo, both of which do a large business. The carferries across lake Erie are active, but those from Rochester to Canada are still hampered by ice.

Prices for bituminous coal remain at $4.45 for thin-vein Allegheny Valley, all sizes, and $4.25 for Pittsburgh lump, $4 for mine-run and $3.75 for slack, all per net ton, f.o.b. Buffalo; supply scant, demand good.

Anthracite—The demand exceeds the supply, though the distribution is said to be more than it was a year ago. At the same time the careful consumer, especially if he is located away from the source of quick supply, is buying a few tons of three-quarter bituminous, which he will mix in with the anthracite next winter and perhaps get along with little or no distress and anxiety as to his fuel supply. Buffalo will hardly do that generally, being so near the mines that enough ought to be obtainable if the winter is not too severe. It appears to be the idea that some sort of precaution is needed to make sure of plenty of fuel.

The lake season is at hand and two or three caroges have been loaded by one company, but no rate has been made and loading will not be general for some weeks yet. Steamboat fuel is not only scarce, but no price has been fixed for it and the coal shippers, who usually provide enough for the tonnage they take, are at a loss to know what to do about it. No very regular rate was made last season, but it seems to be necessary now.

DETROIT

Receipts of bituminous coal maintain good volume. Anthracite is not plentiful. Lake movement starts.

Bituminous—Shipments of bituminous coal are holding good proportions, the receipts providing comfortably for requirements of the Detroit market, which at present are chiefly from users of steam coal. The movement of bituminous is not unduly large, however, and it continues to be almost impossible to locate free coal on tracks in or around the city. The demand from manufacturing and industrial plants continues in a satisfactory degree, and buying proceeds with much regularity, maintaining a steady tone in the market.

The greater part of the coal apparently is going to steam plants, and a few are reported to have been moderately successful in accumulating reserve stocks. Many have no facilities for storing coal in quantity greater than is needed for a few days' supply, their requirements necessitating regular receipts to avoid suspension of operation.

Some of the retail dealers are reported also to have obtained a fair amount of bituminous for supplying needs of household consumers. The customers, however, are rather slow to place orders.

Anthracite—Household consumers are finding it difficult to get anthracite. The quantity of coal coming into Detroit is less than was expected, and few dealers have been able to fill orders as received. Some are declining to receive orders which they cannot fill immediately. With the market deprived of Pocahontas and New River coal, those who have been using smokeless stock are added to the number who rely on anthracite. The controversy between Detroit coal dealers and W. K. Prudden, Michigan fuel administrator, in reference to the amount of margin permissible on coal delivered to domestic consumers, continues unsettled and is said to be responsible for inactivity in the matter of providing for next winter's needs of household consumers.

Lake Trade—Ice is still blocking the St. Clair River. Considerable ice still remains in St. Marys River, while the Straits of Mackinac are clear. The movement of coal over the lake route has already started, and more than a half dozen freighters loaded at Lake Erie ports have arrived in the Detroit River, where they are awaiting the opening of the St. Clair River. No attempt will be made to force an opening, risk of damage to the ships being too great.

COLUMBUS

Domestic demand is strong in every section. Steam business is rather quiet as mine-run is still quite plentiful. The lake trade is opening in a burst of activity.

The coal trade in Ohio has been rather active during the past week. This is due primarily to the good demand for domestic sizes which is reported from every section. Consumers are taking the advice of operators and Federal and state officials and are laying in their fuel for the coming winter. Dealers have been doing a much larger business than usual during the month of April, and consequently there is an outlet for the total production. On the other hand steam business is rather quiet because of a large production of mine-run. The tone of the market is good and future prospects are bright.

The steam business is in a peculiar shape, which is somewhat unusual for this time of the year. Practically all large users have accumulated reserve stocks which exhaust their storage spaces. The smaller users are still buying from the open market, but their requirements are generally light. The railroads are also good purchasers as they are stocking up at every available point. But on the whole the large amount of mine-run on the market has become somewhat of a

drug and some is being sold at lower than the market price.

Retail trade is active in every way. Dealers have all available trucks and teams at work as domestic users are anxious to get in their next winter's stock of fuel. As a result the movement from the yards to the bins and cellars is exceedingly good. The greater bulk of the domestic trade is in Ohio-mined varieties from the Hocking Valley and Pomeroy Bend districts. Little Pocahontas is arriving in the local market. Anthracite is also a scarce article at this time. Retail prices are firm at the levels which have prevailed for some time.

The lake trade is now formally opened and coal is moving from Ohio and West Virginia districts to the lower lake ports. Quite a few vessels have been loaded and will be moved soon. Reports from the Northwest show that the docks are pretty well cleaned up with the exception of mine-run and slack. The Lake Pool will rush as large a tonnage to the upper lake region as possible.

Production in Ohio fields has not been up to the records of previous weeks. This is due largely to a shortage of cars. Strenuous efforts are now being made to get a better car supply, but so far have not met with success. In the Hocking Valley the output has averaged about 65 per cent. of normal and the same figures are reported from Pomeroy Bend. In eastern Ohio the output is still curtailed by shortage of transportation facilities.

CINCINNATI

Small deliveries, on account of car shortage, continue to worry trade, as demand is insistent and record-breaking spring business could be handled if coal were available.

The extreme car shortage at mines in West Virginia and eastern Kentucky continues at this writing, to the detriment of the entire trade and of consumers as well. With a car supply averaging only two or three days a week, mines cannot forward coal to take care of the demand which dealers and agents are receiving from all quarters, and the storage of coal, for which the public is ready, cannot therefore proceed as desired. Action by Federal authorities under which railroads will hereafter not be permitted to dictate coal prices in return for furnishing cars is expected to help the situation materially, by giving all mines participation in the supply of cars available; but so far this effect, resulting from a relief measure which should have been taken long ago, has not had time to make itself felt. In the meantime, with domestic and industrial consumers alike wanting coal both for immediate consumption and for storage, the trade is unable to supply the demand, on account of the non-arrival of fuel in anything like normal quantities for the spring season. The urgent advice of coal men and of the Fuel Administration to consumers to store coal against next winter's requirements has been taken fully to heart, and orders have been placed in unprecedented volume; but deliveries against these orders cannot be made in any quantity, for the reasons indicated.

LOUISVILLE

Domestic demand continues strong. Demand for steam coal checked somewhat. Buyers refusing contracts and buying on open market. Labor and car situations both bad.

There has been some slight improvement shown in the car supply in eastern Kentucky, which is now relatively 51 per cent. of requirements. However, mines are not operating more than about 40 per cent. capacity, and labor is much dissatisfied and shifting from place to place in an effort to secure steady employment. There is an active demand for domestic coal, but dealers are asking for 4-in. block and are refusing small coal, while in steam coal the demand is for clean run-of-mine. Steam coal is rather draggy and industrial plants are not laying in supplies.

The western Kentucky situation is almost the same, except that some of the small mines (wagon mines, etc.) have been having trouble in securing markets and have been selling some coal at less than the mine price in an effort to create business. The larger operators have not been having much difficulty in creating markets. However, contracts can only be offered at the same figures as upon the open market, and industrial consumers of steam coal are laying off for the present and refusing to sign up season contracts.

BIRMINGHAM

Domestic market strong and supply short and hard to obtain. Steam trade good, though the situation is somewhat easy, with consumption and production nearly on a parity. Production heavy, as a whole, but far below plant capacity.

There is strong and heavy demand for lump coal and other domestic sizes from every quarter of the Alabama zone. Dealers are having great difficulty in securing coal for stocking and are making slow progress along that line. Many yards in the district have only one or two cars on hand, and although householders are not showing much concern about laying in winter requirements sufficient orders are coming in to most of the dealers to prevent any accumulation. Dealers' prices as announced by the local fuel board allow a gross margin of $2.50 per net ton on mine prices plus freight and switching charges, retail prices ranging from $5.25 to $6.85 per ton.

The steam trade is holding up well and the demand is good, though the situation is characterized as easy, some instances being reported of deliveries being temporarily suspended by consumers. However, there is little chance for stock accumulation under existing operating conditions.

Complaint is general in regard to the indifference shown by mine workers to regular working schedules, and undoubtedly the bulk of the shortage in output in this field is attributable to this cause. Representatives of the Alabama operators are now in Washington in conference with the Fuel Administration in regard to a further readjustment of wages, but the consensus of opinion is that increased compensation will not serve to increase the production of coal; rather it will hinder it. Labor has registered no complaint against the present schedules.

Coke

CONNELLSVILLE

Car supplies continue irregular. No important improvement since early March. Vagaries in reporting car supplies.

Car supplies in the Connellsville coke region have continued irregular, being on some days approximately double the supplies of other days, and operators have a hard time maintaining their work. It is still necessary to hold coke in ovens longer than is good for it, with resultant deterioration of quality, but the situation is not altogether as bad as it was a month ago.

Of late the railroads have sometimes figured their car placements not against the full rating of the operation, but against the number of cars the operation could use. If, for instance, an operation running full is rated at 10 cars a day and it has half its ovens out, a five-car supply might be called "100 per cent." The divergence from the old method of figuring car supplies is not universal, but it has obtained often enough to confuse the figures. As a rule operators find that their loadings, averaged for a week, fall short of the reported "car supplies" on the individual days of the week, averaged together. This divergence the operators frequently have difficulty in impressing on their customers, and friction has resulted, blast furnaces feeling, on the basis of railroad reports as to car supplies, that they ought to be receiving more coke than the operators furnish.

On the whole it can hardly be said that car supplies have increased materially since early in March, and coke shipments are still 10 to 20 per cent. below the furnace requirements. There are not nearly so many furnaces banked as formerly, but many are gaited and are not turning out their maximum product. The Carnegie Steel Co. has put in operation all its banked furnaces, now operating 49 of its 59 stacks, but some of the 10 idle furnaces it would blow in if coke were available. A Valley interest has sought coke in the open market for more than a fortnight, to blow in an idle furnace, but has not accumulated enough to justify putting the stack in blast.

The market, such as there is, remains quotable at the set prices: Furnace, $6; 72-hour selected foundry, $7; crushed, over 1-in., $7.30, per net ton at ovens. The Fuel Administration in a recent ruling called attention to the fact that to be sold as "72-hour selected foundry" coke must really be selected according to the usual trade practice.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 13 at 334,291 tons, an increase of 1226 tons, and shipments at 314,376 tons, a decrease of 8022 tons. While there was a decrease in shipments, which were less than reported production, it was the week in which a "100 per cent. car supply" was reported for each of the first three days.

Buffalo—All coke is hard to get. The contracts of last year have mostly expired and cannot be renewed. At the same time the coke producers are handicapped by the scarcity of cars, while at the same time they must sell all their output at the Government prices of $6 or $7 at the ovens. Some of the furnace companies, directly or through auxiliary companies, make more coke than they need and are selling it to others. A residue of fine stuff, called "coke breeze," is obtained by jobbers, who sell it to consumers mostly for making steam, as it mixes well with coal for that purpose. It is practically impossible for jobbers to get beehive coke to sell.

Middle Western

GENERAL REVIEW

The general situation clarified by the ruling of Dr. Garfield on railroad coal.

Since Apr. 1 the situation in the Middle West has been in a turmoil because of the attitude of the railroads regarding their fuel supply for the coming year and has been instrumental in decreasing tonnage in this section. Evidences of discontent are noticeable among the miners. Many are changing from one mine to another; some are going to the farms, expecting to return to the mines in the fall; others want to work on the solid instead of in machine mines. In mines where they work on the solid they claim they can make more and easier money than by loading coal after it is machine-cut.

Working time during the past week did not exceed 60 per cent. full time, and many mines report that they only worked two days the past week, or 33 per cent., full time. During the week several large contracts were closed for southern Illinois coal which called for shipments to be made in the Chicago switching limits.

Market conditions are bullish on any good grade of well prepared size coal, but the slack and screenings market is stagnant. Few storage orders for fine coal have been placed as yet, and the situation is that of a begging market on the finer steam sizes. No doubt within the next few days this condition will be bettered, as it is expected there will be considerable buying by the railroads of fine coal as soon as they are thoroughly convinced they will be compelled to pay the Government price, which now seems almost certain.

MILWAUKEE

Dealers and consumers of coal anxious for more light in regard to orders for future delivery. First cargo expected within a few days.

Little new can be said of the coal situation at Milwaukee. At the present time there appears to be a surfeit of administration and a woeful lack of information. Consumers are being importuned to place their orders for coal at once if a coal famine is to be avoided next winter, and on the other hand dealers are being exhorted to speed up deliveries. The problem which faces the consumer is to know just what he can order. He has been told that there will only be a limited quantity of anthracite, that there will be no Pocahontas, and that he cannot get hard coal if he has been burning soft heretofore. The dealer is equally in the dark on these points and is puzzled to know how he can speed up deliveries when there is no coal to deliver. Authentic information regarding supply and price is needed to clarify the situation.

Scores of complaints have been registered that dealers are refusing to accept orders, not knowing how much coal they will be able to get and when they would receive it. Others refuse orders because the customers are slow in paying. To meet the latter objection a movement is on foot to help finance consumers who have not been able in the past to put in their entire fuel supply at one time.

Coal yards will be allowed to supply consumers who provide their own delivery conveyance provided the regulation questionnaire is filled out. Considerable coal is dispensed in this way.

The first cargo by lake is expected to reach port before the close of the month. All yards are making preparations as if a liberal supply of coal was expected at the start.

CHICAGO

Domestic trade is buying heavily. Movement of size coal to the consumer satisfactory.

Satisfactory conditions prevail among domestic dealers as far as their ability to get and deliver Illinois and Indiana coal is concerned. The present demand for well-prepared sizes is such that the yards are having all they want to do. No doubt the occasion for this unusual spring demand is the result of the campaign that has been waged by the state and local fuel administrators, urging the public to get its coal early and not be caught like last winter. Another helpful feature is the continued winter-like weather, necessitating more or less heat in all office and apartment buildings.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Smokeless					
	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Pocah. and W. Va.	Penna.	Hocking	West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

The supply of anthracite coal coming into the Chicago market is light. There is no other eastern coal whatever, due to the zoning system. It is generally understood that all the anthracite coming into this market will be via lake, and that system of transportation did not open until this week. Meanwhile the all-rail movement has been extremely light.

ST. LOUIS

Market continues weak on standard coal, both steam and domestic. In a general way conditions show some improvement, especially in high grade. Transportation has been extremely slow and discouraging and railroads show no inclination to speed up. Car supply still short. Railroads not buying and steam users are trying to drug the market. No outside coals.

The local situation is a peculiar one, inasmuch as it is impossible to get enough Carterville coal to take care of anywhere near the demand, even at the higher retail prices. The retail trade is not buying anything but the Carterville at the present time, with the exception of such anthracite as may come in. The great problem right now is to get Carterville in sufficient quantities to take care of the orders now on file, and everything indicates that the tonnage of this coal, small as it is now, will diminish as time goes on.

One of the greatest handicaps in the getting of Carterville coal is the unwarranted neglect to move that coal into the St. Louis market on the part of the carriers. It takes the Iron Mountain R. R. from two to three weeks to move a car of coal less than 100 miles. The Illinois Central is almost as bad, and in a general way indications are that the carriers in this section are not trying to do their best in the movement of fuel. Not only are the carriers that way, but the Terminal Association is not giving the service that it should under present conditions. The car supply in the Carterville field is extremely bad.

There is practically no coal coming into this market from the Duquoin district at the present time. The car supply is bad, but some railroad coal is going out.

In the Mt. Olive field conditions have improved the last week. Practically all the coal available is moving forward and finds a ready market at the maximum price, the same as the coals from the Carterville and Duquoin districts. The car supply and working conditions in this field are extremely good and there is nothing to complain of.

In the Standard field the same lagging conditions continue. The Missouri & Ohio and Illinois Central are in bad shape for car supply, giving the mines only two days a week, and the movement of this coal is not good.

Throughout the field there is a scarcity of orders and screenings have gone as low in this market as $1.65, with mine-run at $1.90 and lump coal as low as $2.25. This is principally for coal moving into St. Louis proper.

If the scarcity of Carterville continues then the market for Standard will improve, but there is little retail domestic demand for Standard coal. The steam condition here is one that would indicate that large buyers are playing the market for low prices by holding off buying for several days, thus forcing it down.

There is little anthracite moving in and practically no Arkansas.

The market here, with the exception as noted above, is about as follows:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@3.00	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@3.00	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 2 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 3 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 4 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 5 nut	2.15@2.40	2.15@2.40	2.15@2.40
2-in. screenings	2.15@2.40	2.15@2.40	2.15@2.40
2-in. lump	.....	.....	2.25@2.50
3-in. lump	.....	2.50@2.65	.....
Steam egg	.....	2.35@2.50	2.25@2.40
Mine-run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	2.65@3.00	2.65@3.00	2.65@3.00
No. 2	2.65@3.00	2.65@3.00	2.65@3.00
No. 3	2.65@3.00	2.65@3.00	2.65@3.00
No. 4	2.65@3.00	2.65@3.00	2.65@3.00
No. 5	2.15@2.30	2.15@2.30	2.15@2.30

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

HELENA, MONT.

Mine prices in Montana are reduced 30c. a ton on lump coal and 5c. a ton on mine-run. Trade confused by three price changes in one month.

Lump coal is now $3.75 a ton at the Montana mines. Run-of-mine is $3.10, while the price of slack remains unchanged at $1.95. This is a reduction of 30c. a ton on lump and 5c. a ton on mine-run, making the prices, including jobbers' commission: Lump coal, $3.90; mine-run, $3.25, and slack, $2.10 a ton. This change and the changes made in the Wyoming and Utah mines make the prices uniform in the three districts. Wyoming lump was lowered 20c. a ton and run-of-mine was increased 15c., while slack was increased 25c. Utah lump has been increased from $3.30 to $3.75; mine-run from $3.05 to $3.10, and slack has been cut from $2.80 to $1.95.

The Montana coal trade has been confused as a result of three orders from the National Fuel Administration since the first of March, changing the prices of coal. The first was a reduction of 15c. a ton paid the miner effective Mar. 1. The second was a reduction of 15c. effective Mar. 15, while the third was a further reduction of 15c. a ton to the consumer through the elimination of the jobber. In addition a fourth order was received on Apr. 5 which countermanded the third order

GREAT FALLS, MONT.

Retail prices lowered 10c. per ton.

An order issued by the Cascade County fuel committee reduces the price of coal to local consumers 10c. per ton. The dealers get an increase on the gross margin of profit, but the difference comes through the reduction of 30c at the mines. Following are the margins of profit allowed the dealers: Unforked, load lots or over, $1.75; less than load lots, $1.95 forked, load lots or over, $1.95; less than load lots, $2.20; mine-run, $1.50; steam coal, $1.40 per ton. Coal deliveries of less than one ton 25c. added in addition to the one-ton price. Retail prices are as follows. First figure is for unscreened coal, and the second figure for screened coal: Sand Coulee, $6.22—$6.42; Bear Creek, $8.07—$8.37; Wyoming, $8.44—$8.75; Owl Creek, $8.55—$8.85; Roundup, $7.71—$8.

SEATTLE

Retail coal prices in Seattle advance from 25c. to $1 a ton. New coke prices announced. Dealers overcharges of $7000 recovered.

Forty-four varieties of coal are listed in the new Seattle retail price list for coal just made public by the State Fuel Administrator, David Whitcomb. There are no decreases from the prices charged during the winter just past. Instead, increases range from 25c. to $1 a ton, depending upon the class of coal and the place of delivery. According to the district of delivery the prices are as follows:

Carbonado lump nut	$9.60@10.90
Hyde lump nut	9.60@10.90
National lump	9.35@10.65
National splint lump	8.60@ 9.90
Standard lump nut	9.60@10.90
Roslyn lump egg	8.15@ 9.45
Queen lump egg	8.15@ 9.45
Wellington Ladysmith lump	10.00@11.30
Wellington Ladysmith nut	9.00@10.30
Wellington Nanoose lump	10.10@11.40
Wellington South Wellington lump	10.45@11.75
Wellington South Wellington nut	9.70@11.00
Grand Ridge lump nut	8.00@ 9.30
Issaquah lump nut	8.35@ 9.65
Newcastle lump nut	8.35@ 9.65
Renton lump nut	8.40@ 9.70
Tono lump nut	7.45@ 8.75
Mendota lump nut	7.15@ 8.45
Diamond briquette	9.80@11.10
Black Diamond mixed steam	8.60@ 9.90
Carbonado mixed steam	8.75@10.05
Franklin mixed steam	8.60@ 9.30
Gale Creek mixed steam	8.75@10.05
South Prairie mixed steam	8.75@10.05
Standard mixed steam	8.75@10.05
Carbonado straight steam	8.30@ 9.60
Hyde straight steam	7.75@ 9.05
Navy straight steam	7.25@ 8.55
Kangley straight steam	7.50@ 8.80
Pocahontas straight steam	7.95@ 9.25
Standard straight steam	8.30@ 9.35
Wellington Ladysmith steam	7.65@ 8.95
Wellington Nanoose steam	7.25@ 8.55
Wellington South Wellington pea	8.30@ 9.60
Roslyn mine-run	7.75@ 9.05
Queen mine-run	7.75@ 9.05
Grand Ridge pea	5.45@ 6.75
Issaquah pea	6.50@ 7.80
Newcastle pea	6.50@ 7.80
Newcastle buckwheat	6.25@ 7.55
Issaquah buckwheat	6.25@ 7.55
Issaquah sludge	4.50@ 5.80
Newcastle sludge	4.50@ 5.80
Tono mine-run	6.35@ 7.65

Coke producers in this state have been permitted to charge $7.50 a ton for gas coke f.o.b. cars at ovens, $10 a ton for blast-furnace and smelting coke made in beehive or byproduct ovens, and $11 for 72-hr. selected foundry coke made in beehive ovens. These prices will result in an increase of 50c. a ton in the byproduct smelting coke, and a decrease of $1 to $2 a ton in the coke produced at the beehive ovens at Wilkeson, Carbonado and South Willis.

To date the state fuel administrator has recovered $7000 in overcharges made by coal dealers above the maximum prices set for coal by the National Fuel Administrator, and is being held by him for ultimate refunding to the consumer. Prosecutions under this recovery will not be undertaken, as many of the overcharges were made because changes in prices had not been given to many dealers. Violations by jobbers of the ruling which until Apr. 1 limited their gross profits to 15c. a ton appear also to be due to misunderstanding of the ruling. All violations hereafter will be prosecuted, however, the state administrator promises.

Six thousand tons of coal were recently purchased by the State Board of Control for its various institutions from the following companies: Roslyn Fuel Co., Roslyn Cascade Coal Co., South Willis Coal Co. and the Superior Coal Company.

COAL AGE

Volume 13 NEW YORK, MAY 4, 1918 Number 18

Hope Dawns

By Floyd W. Parsons

FOUR weeks ago there was a serious falling off in coal production. The outlook was dark. The following week, however, there was no "Liberty Loan" holiday and no "Mitchell" day, so the miners got back on the job and output increased 12 per cent. The next week output increased 4 per cent., and last week it showed a further increase of 5 per cent.

If the bituminous output of the last week in April—which was close to 12 million tons—is maintained, we will have a fighting chance to get across this year with our war and industrial programs. If an additional half million tons can be added to this most recent weekly output, the Nation will be out of the woods, and the fuel problem will be largely solved.

Notwithstanding the Railroad Administration's picayune policy of abolishing its statistical department on the plea of economy, the work of gathering figures of daily and weekly freight shipments will likely be continued at the expense of another Government department, whose conception of its duty does not begin and end with the production of favorable net earnings.

Little by little the people of the United States will force home the conviction that the present purpose of our Government is to win the war quickly. The President will be backed up in such a stand, and he will frown on those who persist in their adherence to certain practices and principles of economy that were fine in times of peace, but are false in wartime. What do we care if the railroads lose a half billion dollars under Government control, if thereby they are operated so effectively for war service that the conflict is shortened and American youth is conserved. This is no time to value lives in a measure of dollars.

The people have a right to know what is being done. If a statement of results reflects on someone, let it be so—no good is accomplished by hiding the truth. On the other hand, we are reaching a point where our industries must change. The man making scissors must manufacture only half as many, and must substitute trench knives or surgical instruments or rifle parts to make up for his curtailment. Our average American wants to know why he can't do business as usual, and the only way to make the point clear is to let him know the truth about the necessities of the situation, excluding only secret information of military value.

A greater accomplishment than winning an important battle in France was the creation of the President's War Cabinet. No longer can one department of the Government profit at the expense of another. No longer can any one branch of service extend itself out of all proportion to other coöperative lines. No longer will it be possible to locate new war plants, and certainly not peace industries, in regions where output is already limited by inadequate railroad gateways.

Back of the whole problem is fuel. More and more it will become evident that the coal mines must have a full car supply. Already it has been determined by the railroad administration that 50,000 of the 100,000 cars to be ordered immediately shall be coal cars. More than 1000 locomotives have been added to the Nation's transportation equipment since the first of this year. Two hundred and fifty of these locomotives were built for Russia; 100 were built for France and the remainder were in fulfillment of domestic orders. Such a helpful contribution to a serious situation is noteworthy and augurs well for future months.

The Railroad Administration appears confident, and although its optimism seems premature, we hope it will be justified by subsequent developments. Mr. McAdoo will be back in Washington next week, and that will mean the ending of the railroad-fuel controversy. This will undoubtedly bring a blessing in the form of equitable car distribution. However, this correction of a long-standing evil will likely come at the cost of a flat reduction in the price of all bituminous coal. If, added to this outcome, there also result adjustments of price inequalities that now exist in certain localities, of which Colorado is a good example, the coal industry will then at least know where it stands; and both producer and consumer can commence to do business with uncertainties removed.

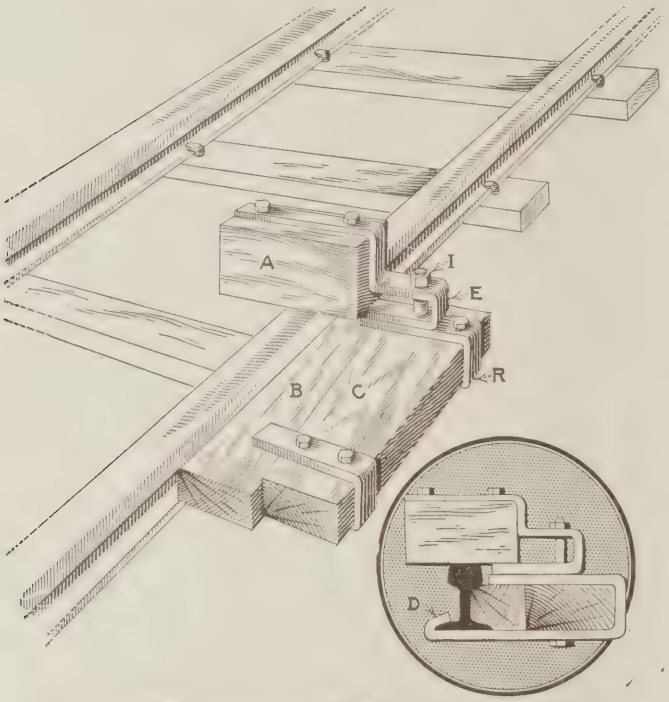
IDEAS AND SUGGESTIONS

Safety Block for Use Near the Face

BY J. REAY
Seanor, Penn.

The accompanying illustration shows a safety block, for use in coal mines, in rooms or on heading tracks, when going to the rise. It is simple to make and to use, and easy to move forward when this is required.

The block is made as follows: *C* is a plank 2 in. or more in thickness, according to the size of the rail used.



THE SAFETY RAIL BLOCK WEDGED TO THE RAIL

This plank is cut to make the wedge *B*. The straps *R* extend several inches over this wedge to hold it firmly in place. These straps *R* go under the plank and extend beyond it to the point *D*, where they are turned back so that they grasp and fit neatly the flange of the rail. When the block is put in place the wedge *B* is driven firmly against the rail. *A* is the block proper, which is made of a piece of 4 x 4-in. timber fastened to the strap *E*, through which a bolt is passed at *I*, thus allowing the block to swing as if on a hinge.

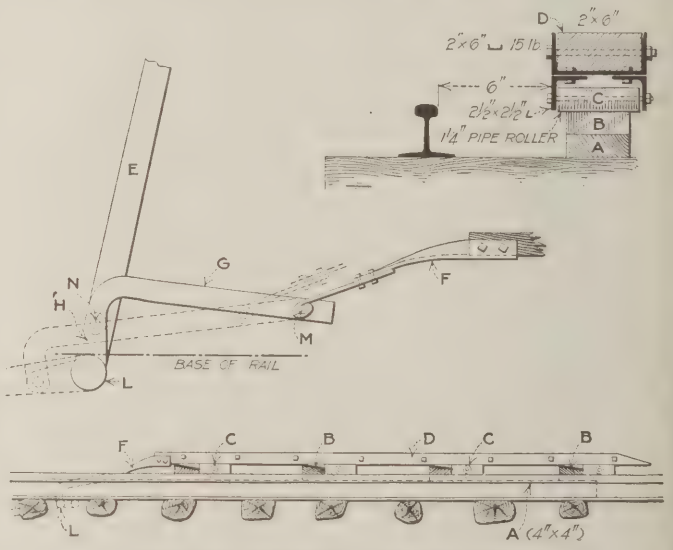
Readily Constructed Mine Car Retarder

At the Franklin colliery of the Lehigh Valley Coal Co., near Wilkes-Barre, Penn., there are a number of ingenious contrivances due to the foresight and energy of the outside foreman, James Piatt. Among such devices are two types of car retarders. One is in operation at the tower hoist of the breaker and the other is placed near the head of an outside slope near the breaker.

The former retarder handles the heavy work incident to the control of loaded trips at the foot of the car hoist; the latter device slows down more gradually the short trips of cars as they come over the knuckle of the slope.

The accompanying illustration shows the construction of the retarder at the head of the slope in question. Its operation is simple, and the spragger can readily be made at the colliery shop. Its construction is as follows: A 4 x 4-in. or a 4 x 6-in. timber (*A*) about 16 ft. long is drift-bolted to the track ties, leaving about 4 to 6 in. clearance from one rail—at the side of the track most easy to operate the device. On this foundation, at intervals, are placed the blocks *B*, so shaped as to form inclines on which the rollers *C* may run and thus raise the 2 x 6-in. timber *D*. This timber *D* constitutes the active member of the retarder, which rises when the lever *E* is thrown forward. As the timber *E* rises, the top engages the mine car journal and tends to lift the car. Thus friction gradually stops the car.

As to further details of the construction and operation of the retarder: The timber *D* is held in a 2 x 6-in., 15-lb. channel by horizontal bolts. At regular intervals, on the under side of this channel, are rollers journaled in 2½ x 2½-in. 8-lb. angles, which are bolted



DETAILS OF MINE CAR RETARDER

to the channel as shown in the illustration. The blocks *B* are shod with sheet iron and act as inclined planes for the rollers *C*.

The forward end of the timber *D* and its inclosing channel is connected with the hand lever *E* by the iron *F*, the bent link *G* and the short lever *H*. The short lever is mounted on the axle *L*, to which is attached the hand lever *E*. The extreme forward position of the lever *E* and connecting parts are shown dotted; the short lever is now on dead center and tends to resist backward movement until thrown back by the hand lever. The irons *F* and *G* are pivoted at *M* and *N* to permit of free motion.

The majority of the mine cars at the Franklin col-

liery lend themselves nicely to this method of spragging. The exceptions are a certain type of car having bolt heads on the under side of the journal. This bolt rips up the surface of the 2 x 6-in. timber as the car slides over the wood surface of the retarder—a plea for further standardization of equipment.

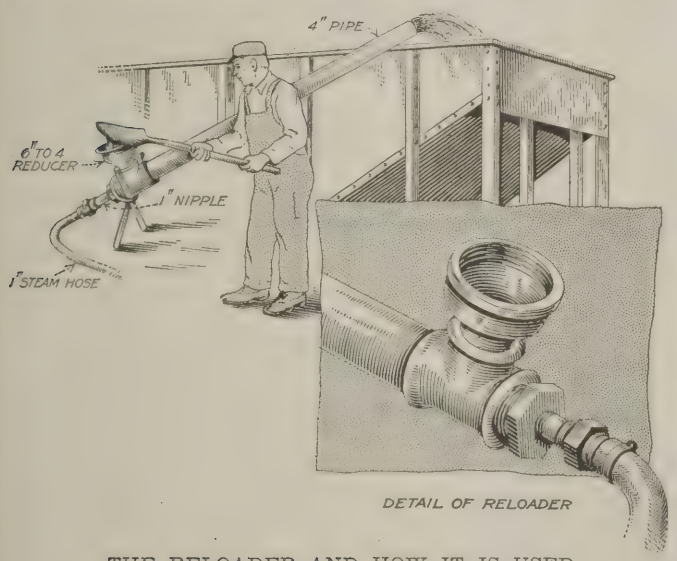
A Successful Reloader

By R. L. Sinyard
Summit Hill, Penn.

Truly, necessity is the mother of invention. The arrangement shown in the accompanying illustration resulted from the scarcity of labor and the ingenuity of the power-house foreman.

Prior to the last suspension, an anthracite coal company had quite a number of cars of power coal dumped at a point convenient to the boiler rooms, to be used in case of a strike. The favorable result of negotiations between miners and operators, however, involved the reloading of this coal into the railroad cars that it might be transported to the boiler rooms. Now as the coal had been unloaded on a slope it represented considerable labor to reload it, and here is where the power-house foreman solved the problem.

Securing a length of 4-in. pipe, long enough to reach from the coal pile over the side of the car, he fastened a tee to one end and screwed a 6 x 4-in. reducer in the outlet opening, reducing the other run opening of the tee with a bushing to 1 in. A nipple long enough to go halfway through the tee was screwed inside, while



THE RELOADER AND HOW IT IS USED

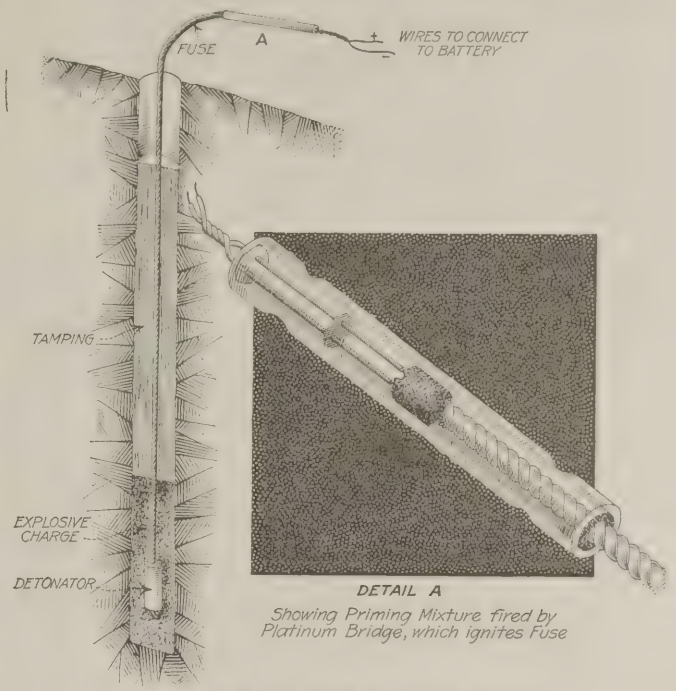
the outside was coupled up to take a 1-in. steam hose which was attached to a steam line run from the power plant.

The result surpassed all expectations. The steam end of the contraption was placed in the coal pile and two men shoveled the fine coal into the reducer and the steam jet did the rest. As a part of the coal pile disappeared the pipe was merely moved and the coal shoveled into the open end. It was estimated that two men with this steam reloader equaled the work of 12 or 15 men shoveling it directly into the cars. In the course of a short time, comparatively speaking, the coal was reloaded.

Delayed Action Fuses

By M. Cranston
Pocahontas, Alberta

In reviewing some of the contributions on safety contained in *Coal Age*, I thought it might interest some of its readers, who follow shaft sinking, or rock work, as a profession to learn of the following safety device in blasting. The procedure here described was adopted,



DETAILS OF THE SAFETY FUSE

after the occurrence of a fatal accident, in the course of sinking the Lewis Merthyr Colliery shafts at Ogmore Vale, Wales.

Where a round of, say, 10 shots are to be fired simultaneously, with an electric battery, it sometimes happens that one or more of the shots misfires or does not detonate, and the person doing the firing has no means of knowing this, except by going down the shaft (if such is the character of the work) and making an inspection. Sometimes the unfired shot is covered under débris, which hides the fact of its failure to explode until possibly the detonator is struck with some tool, with fatal results.

In the method submitted the time fuse is used in charging, and each fuse is cut 2 in. longer than its predecessor, the ends being connected to electrical detonators, as shown in the accompanying illustration. The electrical detonators are consequently all ignited at the same time, the difference in time of detonation between each shot being caused by the unequal length of fuses. This enables the shotfirer to count each detonation and satisfy himself that all shots have gone off. This arrangement was a "delayed action fuse."

Soot burns very slowly in the furnace gases because the oxygen is greatly rarefied, the gases containing only a few per cent. of free oxygen; it burns rapidly in the bomb calorimeter or in mixture with potassium chlorate because it is surrounded with highly concentrated oxygen ready to combine with it.—*Bureau of Mines Bulletin No. 135.*

Handling Material and Supplies at Coal Mines

By R. M. MAGRAW
General Superintendent United States Fuel Co., Hiawatha, Utah

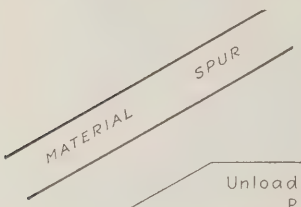
SYNOPSIS—*The cost of materials and supplies is an appreciable item in the total cost of producing coal. A centralized material storage wherein everything is kept strict account of is the only practical method of reducing so far as possible the expense for supplies and preventing either an excess stock or a scant one.*

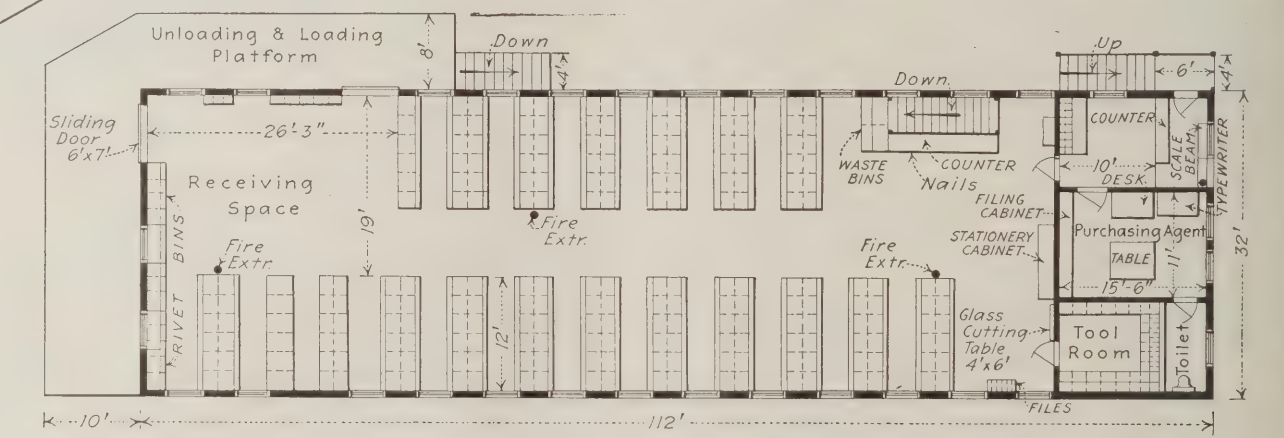
TO THE up-to-date coal-mine official the material and supply account, or as it is usually abbreviated, the "M. & S." account, presents features of vital interest, since it usually constitutes one of the principal charges entering into the cost of production. Consequently too much care cannot be exercised in purchasing, storing and issuing the material required by the operations. The foregoing statements, always true, have not always been practiced; consequently many otherwise capable officials have been discredited and their companies have lost much in the way of invested capital, as well as efficiency, as the direct result of carelessness or ignorance in the handling of supplies.

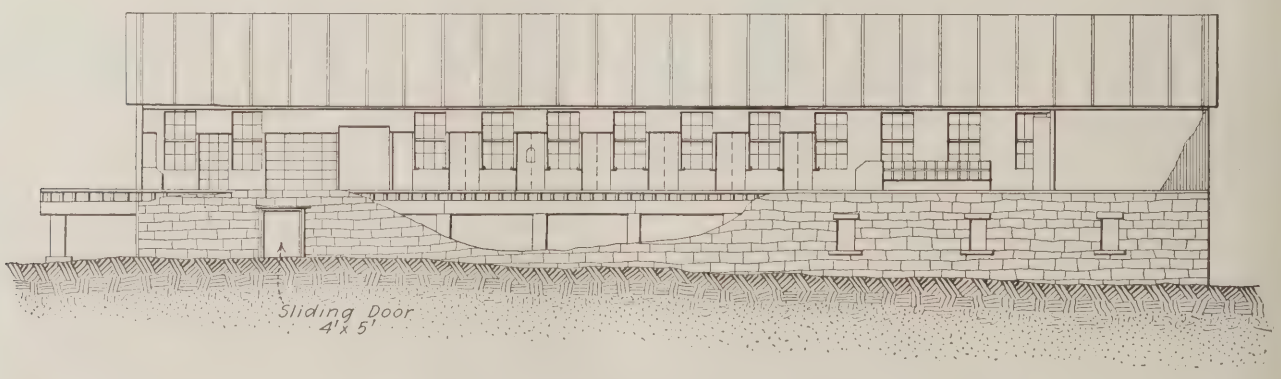
Extravagance is to be deplored at any time, but at present it is a crime hard to condone, since in the final analysis it means the deprivation of the necessities of life or even life itself to someone, somewhere.

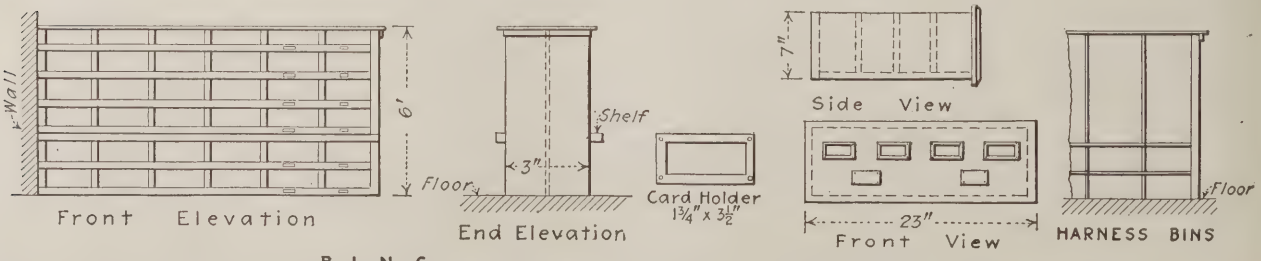
President Wilson has said that if this war will teach the American people economy that the result will justify all the cost in material things. However, from our standards these will constitute but a fraction of the cost.

The project on hand is the greatest that ever con-









FIGS. 1 AND DETAILS OF A CENTRALIZED MATERIAL STORAGE WAREHOUSE AND BIN SECTIONS

fronted us or any other people, and it is just as essential for those who stay at home to keep the wheels of industry moving smoothly and surely as it is for the men in the trenches to do that which we know they will do. Without our aid the others will make a useless sacrifice.

The wheels must not only run smoothly, but efficiently and economically; this latter term is used in its broader sense and is not meant to signify niggardliness. Wage increases have been necessary in practically all branches of industry, consequently the cost of production has risen in all lines, in many cases 100 per cent. or more, giving, if any specific excuse were necessary, an added argument in favor of economy.

Wages being fixed at coal mines, the only methods of reducing operating costs are by increasing the efficiency of the man-power employed and by the economical handling of supplies. It not being the purpose of this article to discuss the first of these methods, it may be passed over without further comment.

Many companies are deprived of the benefit of the latter method, due to false ideas of economy which prevent the erection of suitable storehouses; others with adequate housing facilities are handicapped by faulty interior arrangements; and still others fail through incomplete or careless accounting; and some through a combination of all three of these causes.

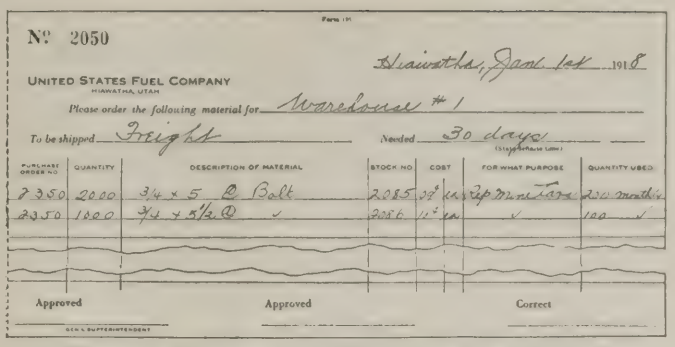
Few of the older generation of coal-mine superintendents had more than a perfunctory knowledge of accounting, consequently many of them looked with suspicion upon anything but the simplest forms and statements. This attitude was expressed succinctly by an oldtimer some years ago as follows: "They say figgers don't lie, but the bloody clark does." It is needless to say that the operations under this man's charge reflected his mental attitude.

At most small mines, and many of the larger ones, a few years ago, any abandoned shack, regardless of location or design, was considered as a satisfactory depository for whatever material absolutely had to be under cover. Consequently much time and no little material was lost, not to mention delays to the plant, through inability to locate repair parts that some one had mislaid.

The difficulties attending the maintenance of an adequate stock of supplies under conditions as they exist today are familiar to all. It is safe to say that most companies are carrying 100 per cent. more stock than they were two or three years ago, and it is also safe to say that unless warehouse facilities and accounting methods have kept pace with the increased stock much valuable time and material will be ultimately wasted through duplication of orders and failure to find material as and when it is needed.

The methods used by the United States Fuel Co. at its central warehouse at Hiawatha, Utah, while admittedly not perfect, are believed to embody features which may be of interest to many who are desirous of systematizing the handling of material.

The present warehouse building replaced several smaller structures, and when stock was finally got under one roof and an accurate inventory taken it was found that there was an overrun of something like $10,000, most of which was accounted for by the fact that previously no one had known just where to look for the stuff that was needed.



No 2050

Hiawatha, Jan. 1st 1918

UNITED STATES FUEL COMPANY
HIAWATHA, UTAH

Please order the following material for Warehouse #1

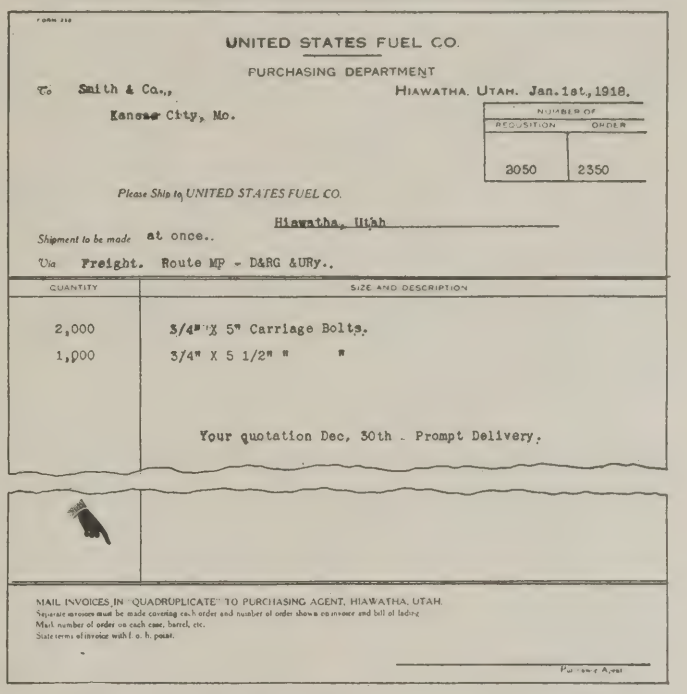
To be shipped Freight Needed 30 days

PURCHASE ORDER NO	QUANTITY	DESCRIPTION OF MATERIAL	STOCK NO	COST	FOR WHAT PURPOSE	QUANTITY USED
2350	2000	3/4 x 5 C. Bolt	2085	09¢ ea	Repairing Mine Cars	200 months
2350	1000	3/4 x 5 1/2 C. ✓	2086	12½ ea	✓	100 ✓

Approved — Approved — Correct

GEN'L SUPERINTENDENT

FIG. 3. FORM 195—REQUISITION FOR MATERIAL



UNITED STATES FUEL CO.

PURCHASING DEPARTMENT

To Smith & Co.,
Kansas City, Mo.

Hiawatha, Utah. Jan. 1st, 1918.

NUMBER OF REQUISITION	ORDER
2050	2350

Please Ship to UNITED STATES FUEL CO.
Hiawatha, Utah

Shipment to be made at once..

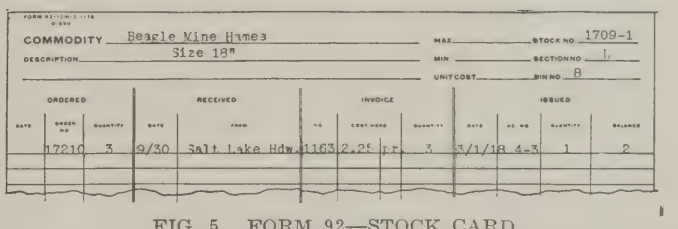
Via Freight. Route MP - D&RG &URy..

QUANTITY	SIZE AND DESCRIPTION
2,000	3/4" X 5" Carriage Bolts.
1,000	3/4" X 5 1/2" " "
	Your quotation Dec, 30th - Prompt Delivery.

MAIL INVOICES IN QUADRUPLICATE TO PURCHASING AGENT, HIAWATHA, UTAH.
Separate invoices must be made covering each order and number of order shown on invoice and bill of lading.
Mark number of order on each case, barrel, etc.
State terms of invoice with f. o. b. point.

Purchasing Agent

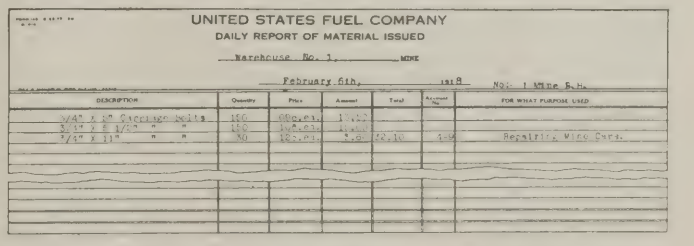
FIG. 4. FORM 213—CHECK ON GOODS RECEIVED



COMMODITY Beagle Mine Names — MAX — STOCK NO. 1709-1
DESCRIPTION Size 18" — MIN — SECTION NO L
UNIT COST — BIN NO 8

ORDERED			RECEIVED			INVOICE				ISSUED			
DATE	ORDER NO	QUANTITY	DATE	FROM	NO	COST HERE	QUANTITY	DATE	AC. NO	QUANTITY	BALANCE
	17210	3	9/30	Salt Lake Hdw.	1163	2.25	rr. 3	3/1/18	4-3	1	2

FIG. 5. FORM 92—STOCK CARD



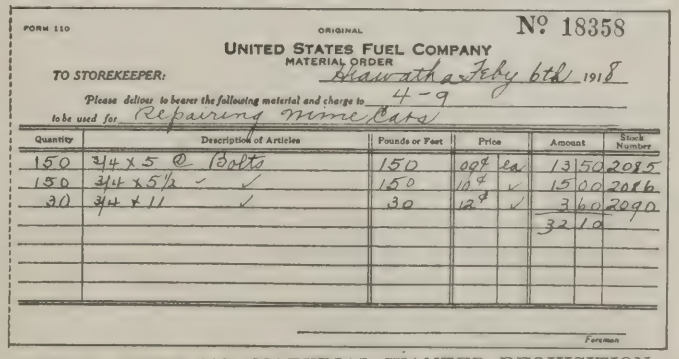
UNITED STATES FUEL COMPANY
DAILY REPORT OF MATERIAL ISSUED

Warehouse No. 1. MINE

February 6th, 1918 No. 1 Mine S.L.Co.

DESCRIPTION	Quantity	Price	Amount	Total	Account No.	FOR WHAT PURPOSE USED
3/4" x 5" Carriage Bolts	100	09¢ ea	1.50			
3/4" x 5 1/2" " "	150	10¢ ea	1.50			
3/4" x 11" " "	30	12¢ ea	3.60	12.10	1-9	Repairing Mine Cars.

FIG. 6. FORM 148—DAILY REPORT OF MATERIAL ISSUED



FORM 110 ORIGINAL

No 18358

UNITED STATES FUEL COMPANY
MATERIAL ORDER

TO STOREKEEPER: Hiawatha Feby 6th 1918

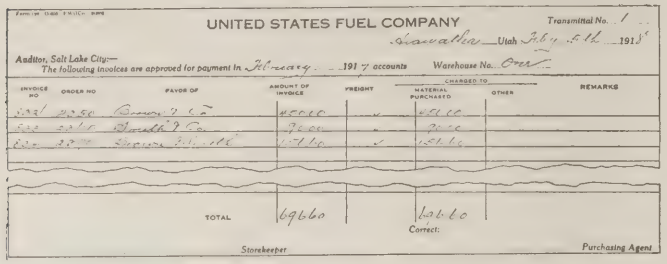
Please deliver to bearer the following material and charge to 4-9
to be used for Repairing Mine Cars

Quantity	Description of Articles	Pounds or Feet	Price		Amount		Stock Number
150	3/4 x 5 C. Bolts	150	09¢	ea	13	50	2085
150	3/4 x 5 1/2 ✓ ✓	150	10¢	✓	15	00	2086
30	3/4 x 11 ✓	30	12¢	✓	3	60	2090
					32	10	

Foreman

FIG. 7. FORM 110—MATERIAL WANTED REQUISITION

In demolishing a small shack, after all material had apparently been removed therefrom, the carpenter was much surprised when he pulled a board loose from the studding to be met with a rain of porcelain cleats and knob insulators, which had been boarded up between these uprights. The net result was about two barrels


UNITED STATES FUEL COMPANY

Transmitted No. 1

Auditor, Salt Lake City:—
The following invoices are approved for payment in February, 191 7 accounts Warehouse No. One

INVOICE NO	ORDER NO	PAYEE OF	AMOUNT OF INVOICE	FREIGHT	CHARGED TO MATERIAL PURCHASED	CHARGED TO OTHER	REMARKS
502	2250	Brown & Co	45.60	"	45.60		
503	2251	South & Co	7.00	"	7.00		
504	27	Stone & Co	1.16	"	1.16		
		TOTAL	49.60		49.60		

Correct:

Storekeeper Purchasing Agent

FIG. 8. FORM 192—FOR USE OF AUDITOR

full of insulators. Upon being asked as to how they came there, the mechanic in charge stated that he did not need them so had dumped them behind the partition to get them out of the way. Investigation disclosed the fact that the company was purchasing the same class of material right along, but no one in authority had known of this cache.

At another place several hundred twist drills were discovered which someone had ordered as a result of inexperience and which were found to be unsuited to the drill arbors in use. Consequently they were stored away for years, although they represented a total cost of several hundred dollars, and new arbors to fit the drill shanks could have been made or purchased for a few dollars apiece.

Examples similar to these could be cited indefinitely, and no doubt many of the readers of *Coal Age* have had personal experiences along the same lines.

The warehouse is built close to a spur railroad track, so that material can be handled from cars to platform without difficulty. The basement extends under the full length of the building, the doors being so arranged that incoming and outgoing material is handled with a minimum of effort.

Figs. 1 and 2 show the detailed arrangement of the main floor, which gives a maximum of storage room with a minimum floor space. The basement is used almost entirely for the storage of heavy articles, such as bare and insulated copper wire and cable, wire rope, nails, spikes, heavy fittings, spare machinery parts, etc. Iron and mild steel for use at the shops are stored in a rack between the material house and central shop. Pipe is also stored in a special rack outside of the building.

All tool steel and small tools carried in stock are kept in the warehouse. However, the tools are stored in a toolroom under separate lock from the main storeroom.

Lumber, ties and rails are stored in the yard surrounding the shop and material house. Hay and grain, of course, are stored at the various mine barns, a report covering quantities used being rendered by the barn boss at the end of each month. An approximate inventory of barn supplies is taken every three months by a man from the material house as a check against the barn boss' report, and an actual inventory is taken at the regular inventory period.

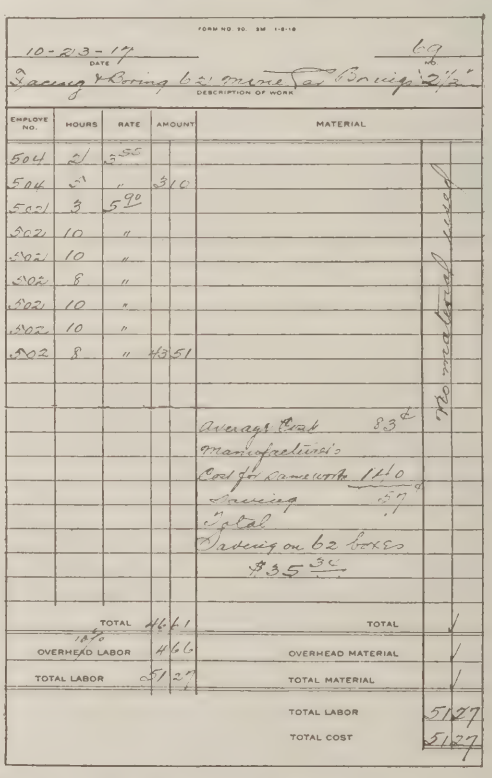
Separate buildings are maintained for storage of cement, lime, sand, oil, etc. Little oil is used as compared with former times, because all power is purchased, power plants having been dismantled and sold, thus eliminating the use of cylinder oil almost entirely. A hard grease is used for lubricating mine cars and consequently the demand for black oil is practically *nil.* What little oil is used is stored in iron barrels to prevent waste, but were the consumption of oil greater storage tanks would be essential.

A small warehouse, 20 x 40 ft., was moved to the material yard where it is utilized to store second-hand stuff which is of too great value to be scrapped. This building is equipped with bins similar to those in use in the larger warehouse, and material is sorted and stored until it is required.

The central warehouse carries the surplus stock for all mines and also takes the place of an individual warehouse for the Black Hawk mine. A limited stock of necessary repair parts and supplies is carried at the other mines in buildings arranged similarly to the larger establishment.

It was found, however, that by concentrating the bulk of the stock in one place it could be reduced from 30 to 40 per cent., for where from $80,000 to $90,000 was carried at one time, stock was reduced to between $50,000 and $60,000 without in any way interfering with the operations.

At the present time, owing to war conditions, stock has been increased until it has reached a total of over $100,000. The increase has been due, not only to the necessity of purchasing in larger quantities as a pre-


10-23-17 DATE — No. 69

Facing & Boring 6" Mine Car Bruce 2½" DESCRIPTION OF WORK

EMPLOYE NO.	HOURS	RATE	AMOUNT	MATERIAL
504	2	3.50		
504	5	"	3.10	
502	3	5.90		
502	10	"		
502	10	"		
502	8	"		
502	10	"		
502	10	"		
502	8	"	4.51	
				Average Cost 83¢
				Manufacturing
				Cost for same work 1.10
				Saving .27
				Total
				Facing on 62 boxes
				$35.34
	TOTAL		46.41	TOTAL
	10% OVERHEAD LABOR		4.66	OVERHEAD MATERIAL
	TOTAL LABOR		51.27	TOTAL MATERIAL
				TOTAL LABOR 51.27
				TOTAL COST 51.27

No material used

FIG. 9. FORM 20—USED IN MACHINE SHOP

cautionary measure against delays of various kinds, but to the higher price of all classes of material, in many cases the increase being 100 per cent. or more.

Many companies having ample storage room fail to reap full benefit therefrom because of lax methods of storing and issuing the supplies as required. In cases

of this kind the approach of the inventory period is fraught with anxiety for the mine superintendent and the material clerk, and it is a safe guess that their fears are well founded.

The system adopted by the United States Fuel Co. probably does not embody any new features, and it undoubtedly is susceptible to improvement, but since it has been in vogue it has worked out satisfactorily from every standpoint. There has been no shortage at any inventory period, and the little extra labor involved in handling the stock properly and in making up the various reports is counterbalanced many times by the economies effected.

Form No. 195, Fig. 3, shows a requisition for material not in stock, or for addition to stock. This is to be made out as required by mine superintendents, or heads of departments, giving quantity, description and for what purpose used. The columns, purchase order number, stock number, cost and quantity used are filled in by the purchasing department as part of its record. The requisition is then submitted to the general superintendent for approval, and if it runs the gantlet successfully, an order is made out on form No. 213 (Fig. 4). The duplicate is stamped and filed to be used as a check when goods are received. All incoming goods are checked against invoice and order.

Comprehensive Stock Card Is Used

After goods have been checked and stored, information from invoice is entered on form No. 92 (Fig. 5), which shows commodity or name, description, size, etc., maximum and minimum number it is desired to carry in stock at one time, stock number, section number or letter and bin number, date ordered, order number, quantity ordered, date received, from whom received, invoice number, cost, quantity invoiced, date issued, cost sheet account number to which chargeable, quantity issued and balance on hand. It will be noted that no valuation is shown on card covering material issued, this information being shown on the daily report of material issued.

Bin sections, as shown in Fig. 2, are 3 x 12 x 6 ft., subdivided longitudinally in the center. The transverse subdivisions are movable, so that storage space can be adapted to different articles. Several sections are equipped with drawers which are subdivided for storage of small bolts, screws, and other repair parts for mining machines, motors, pumps, etc. One section had longitudinal subdivision and shelving left out entirely, substantial hooks being fastened to the transverse subdivision to be used for storing harness. Thus storage, equal to 36 lin.ft. of wall space, was secured at the expense of 36 sq.ft. of floor space.

Bin sections are alphabetically arranged, and each individual compartment is numbered. Thus the first section to the left opposite the stairway is A, the left-hand side being A-1 and the right A-2, The compartments on each side are numbered consecutively, and are denoted on cards as A-1-1, A-1-2, A-2-1, A-2-2, etc. Each subdivision is equipped with a brass card holder and small card, on which is typewritten the name and dimension of the article, if this is essential, and the stock number corresponding to the number carried on form No. 92 for that particular article.

When material is wanted from the warehouse, requisition for it is made out on form No. 110 (Fig. 7). This is signed by someone duly authorized, quantity and description of article only being given. This form is filled in in triplicate, the original being presented at the warehouse, duplicate sent to the mine superintendent's office and the triplicate kept for reference. Columns giving price, amount, stock number, etc., are for

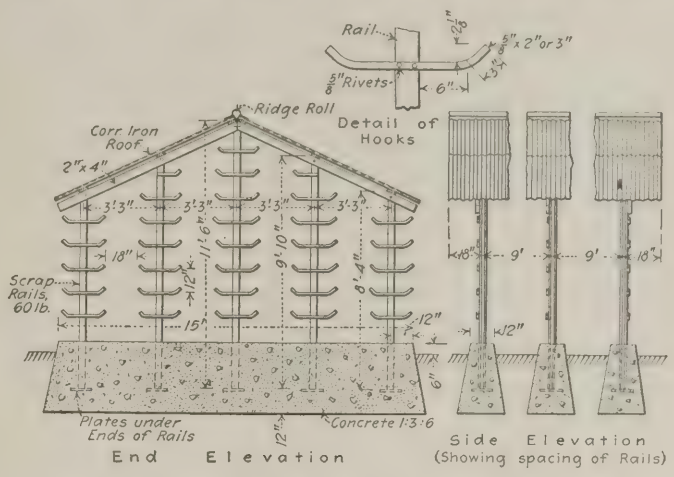


FIG. 10. STOCK RACK FOR BAR IRON AND PIPE

the convenience of the warehouse force. The requisition is presented at the warehouse, where the clerk refers to a card index, locates material by section letter and bin number, and issues the desired article with no loss of time or energy.

After issuing the requisitioned material the stock clerk enters the price and amount on the requisition, and at the end of each day all requisitions are tabulated on form No. 148 (Fig. 6), a report being made for each mine. This report is made out in triplicate, one copy for the mine superintendent, one for the auditor, and one for filing at the material house. The superintendent can see at the end of each day just what has been charged to his operations, and is thus in a position to govern his cost with no fear of a big charge coming in at the end of the month to upset his calculations.

The copy going to the auditor is checked as to calculations and total amount, and at the end of each month the total charge for each mine is computed, which figure must agree with those submitted by the supply department on a form, which is compiled from the daily reports and shows the total material charge for the month, subdivided according to cost sheet account numbers.

Account number 4 on the cost sheet is devoted to hauling, and has 19 sub-accounts. Consequently in charging the Beagle mine harness, shown on form No. 92, the clerk refers to cards, where he finds that this is chargeable to account 4, sub-account 1, or account hauling, sub-account harness and shoeing.

Forms 145-A and 145-B (not reproduced here) are the cost sheets used by the United States Fuel Co. Labor is charged direct from the payroll distribution sheet, which is somewhat similar to the form which is compiled from the daily reports. The voucher column is used to take care of indirect charges from the auditor's office, such as depreciation, power expense, etc.

Form No. 192 (Fig. 8) is used in transmitting invoices to the auditor, and shows the number of invoice,

number of order, to whom invoice is in favor, the amount of invoice, amount of freight charges, whether amount was charged to material purchased or to some construction or other account direct.

The foregoing constitute all the reports or forms used in connection with the storehouse, with the exception of the monthly trial balance rendered to the auditor's office, which must agree with figures on general books and job order cards, Fig. 20, used in connection with the central machine shop. The machine shop is engaged extensively in manufacturing frogs, switch points, etc., for the several mines, also in finishing various castings and other materials purchased in the rough. These items are all carried in material stock until released by proper requisition, hence it is necessary to have exact cost of machine work in order to keep records clear.

The job order card shown herewith was copied from one turned in upon the completion of 62 mine-car boxings, which were bored and faced. The saving shown is well worth while, and is only one of the many items proving the economic value of a well-equipped shop and material house.

Fatality Rates in Pennsylvania Mines

The accompanying tables compiled by Dr. Downey, special deputy of the Department of Insurance of Pennsylvania, cover fifteen years of experience in the anthracite and bituminous mines of the state. It is gratifying to note that whereas in the first five-year period 131,000 tons of coal were produced in anthracite mines for an ordinary fatal accident, in the last five years the production per ordinary fatal accident has increased to 157,000 tons. The bituminous mines have shown an even greater increase in safety from ordinary, as opposed to catastrophic, accidents. Whereas 276,000 tons was formerly mined for one ordinary accident, now

FATALITY RATES IN PENNSYLVANIA ANTHRACITE MINING

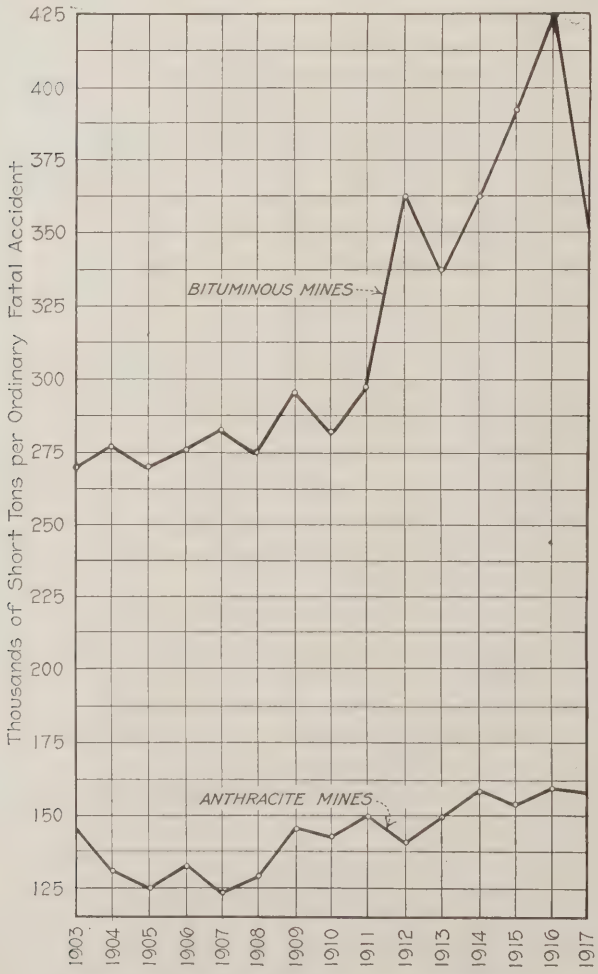
Year	Production Short Tons	Fatal Accidents: All	Fatal Accidents: Catastrophe	Fatal Accidents: Ordinary	Thousand Tons Per Ordinary Fatal Accident
1903–1917	1,257,272,825	9,130	335	8,795	143
1908–1917	871,602,929	6,104	251	5,853	149
1913–1917	448,807,814	2,958	98	2,860	157
1917	88,933,305	581	21	560	159
1916	87,680,198	565	19	546	161
1915	89,377,706	588	13	575	155
1914	91,189,641	600	26	574	159
1913	91,626,964	624	19	605	151
1908–1912	422,795,115	3,146	153	2,993	141
1912	84,426,869	601	6	595	142
1911	90,917,176	699	87	612	149
1910	83,683,994	601	14	587	143
1909	80,223,833	567	17	550	146
1908	83,543,243	678	29	649	129
1903–1907	385,669,896	3,026	84	2,942	131
1907	86,056,412	708	14	694	124
1906	72,139,510	557	13	544	133
1905	78,647,020	644	22	622	126
1904	73,594,369	599	35	564	131
1903	75,232,585	518	0	518	.145

FATALITY RATES IN PENNSYLVANIA BITUMINOUS MINING

Year	Production, Short Tons	Fatal Accidents: All	Fatal Accidents: Catastrophe	Fatal Accidents: Ordinary	Thousand Tons Per Ordinary Fatal Accident
1903–1917	2,120,304,750	7,678	967	6,711	316
1908–1917	1,518,537,051	4,978	451	4,527	335
1913–1917	815,603,302	2,386	183	2,203	370
1917	170,209,231	496	14	482	353
1916	169,123,814	433	35	398	425
1915	157,420,068	449	37	412	393
1914	145,884,530	408	0	408	363
1913	172,965,659	600	97	503	337
1908–1912	702,933,749	2,592	268	2,324	302
1912	160,830,492	460	18	442	364
1911	142,189,329	515	38	477	298
1910	148,770,858	539	12	527	282
1909	136,205,695	506	46	460	296
1908	114,937,375	572	154	418	275
1903–1907	601,767,699	2,700	516	2,184	276
1907	149,559,047	806	278	528	283
1906	129,532,989	477	7	470	276
1905	119,361,514	479	37	442	270
1904	99,600,167	536	177	359	277
1903	103,713,982	402	17	385	269

in the last five-year period there is an ordinary accident to every 370,000 tons of production. Thus the anthracite region has improved its record 20 per cent. and the bituminous region 34½ per cent.

While the catastrophic hazards in anthracite mines seem but little changed in the fifteen year period, the bituminous mines have clearly made progress. There were 516 catastrophic accidents in 1903-1907, whereas despite the large increase in production there were only 183 in 1913-1917. However, the general turn for the worse in the last year in all except the catastrophic bituminous figures is a real occasion for shame and regret after a season of such satisfactory progress. The chart is furnished as by Rush N. Hosler, supervisor of coal mine schedule rating at Harrisburg.



A FATALITY CHART IN WHICH CATASTROPHIC ACCIDENTS DO NOT ENTER

In general, it may be said that the more complex a molecule of combustible is, the slower is its combustion in any given concentration of oxygen.—*Bureau of Mines Bulletin No. 135.*

The Value of an Engineer to the Operator

Instead of Being Regarded as an Added Burden or a Necessary Evil, the Mine Engineer Should Be Considered One of the Valuable Assets of the Company

By "INSPECTOR"
Windber, Penn.

IT IS frequently difficult to convince the operator of a small mine or mines, and sometimes of a larger mine, of the importance of regular and accurate surveys of the mine workings. He usually considers the engineering only a bill of expense with no returns whatever. In other words, the cost of mining, haulage, power and other items is necessary to secure an income, but the engineer collects the money (usually about the time a new survey is required) and the operator receives nothing in return except a map which has no market value.

Article 2 of the bituminous mine law, approved June 11, 1911, requires that the operator or superintendent of any bituminous coal mine shall make or cause to be made by a competent mine engineer or surveyor an accurate map of the mine, on a scale of not less than 200 ft. to the inch, which map shall give the following information:

First, all the openings, excavations, shafts, slopes, drifts, tunnels, planes, main entries, cross-entries, rooms and the name and number of each.

Second, an accurate delineation of the boundary lines between the mine and adjoining mines or coal lands; the relation and proximity of the workings of the mine to all adjoining mines or coal lands; and also the direction of the air currents when requested by the mine inspector.

Third, the elevation above or below mean tide at Sandy Hook of the top and bottom of each shaft and slope, of all drifts, tunnels, planes, and of the face of entries, as found at each semi-annual survey, and in rooms and entries adjacent to boundary lines between such mine and any adjoining mine or mines at points not more than 300 ft. apart; also the number of last survey station and the date of such survey on the entry; the location of streams, rivers, lakes, dams or any other bodies of water on the surface, with their elevations plainly and accurately marked; the location and elevation of any body of water dammed or held back in any portion of the mine, giving the true area of said body of water, unless inaccessible before the passage of this act; the location of all boreholes penetrating the coal strata, and the location of all oil and gas wells, and all oil and gas pipe lines.

The map shall show such portions of any adjoining mine or mines which may be within 300 ft. of the boundary lines between the two properties. This map shall be brought up to date at least once every six months.

A plan shall be kept at the mine showing all stationary electrical apparatus in connection with the mine electrical system, including permanent cables, conductors, lights, switches and trolley lines. The scale of this plan shall not be less than 200 ft. per inch; shall state thereon the capacity in horsepower of each motor, in kilowatts of each generator or transformer, and the nature of its duty. This plan shall be corrected as often as necessary to keep it up to date, at intervals not exceeding six months.

In addition to these requirements a mine map should show all rock faults, clay veins, areas of bad roof, measurements of the coal seam at various points and projections of future development; all worked out and abandoned areas; all buildings, public roads, railroads, sidings, tipple and mine buildings, and the outcrop of the coal seam where known; preferably on a scale of 100 ft. per inch as this is the scale preferred by most mine foremen, owing to the ease with which it can be read and full data shown on it. A map drawn to a smaller scale is both harder to make and read. Many companies also have a map drawn to the scale of 400 ft. to the inch, showing all property lines, mine workings, contours and any other available information.

Comprehensive Mine Map Great Aid

If a mine foreman is furnished with maps showing the foregoing data, he is able to lay out his work systematically, keep informed as to the proximity of the mine workings to boundary lines and adjoining mine workings which may contain dangerous accumulations of water and gas, prevent any encroachment on other properties which may result in expensive litigation and settlements of damage claims, avoid the loss of coal caused by not driving the entire distance to the boundary lines, and avoid the loss of coal due to squeezes and creeps caused by cutting into other places not shown or not accurately shown on the mine map.

Some of the smaller companies, which cannot afford to employ an efficient engineer regularly, have their mines surveyed semi-annually merely to comply with the mining law, not taking into consideration the advantages and benefits to themselves both in increased and economical production and percentage of coal recovered either of which may be credited directly or indirectly to having proper surveys made. There are few mines so situated that they cannot arrange to secure the services of an independent or contracting engineer, as often as necessary to have their mine maps kept up to date. The interval between surveys should be governed by the size of the mine and property, number of men employed and amount of development being done, few mine maps being kept up to date properly with surveys over four months apart. At most mines where the surveys are made semi-annually, numerous rooms are driven to their destination and the work of drawing pillars started; or places not driven to their destination are abandoned for

different reasons and sometimes cave between the visits of the engineer. In the meantime probably some advance work has been held up because sights were not set.

When the engineer visits the mine after an absence of six months he must depend on the mine foreman for considerable information as to the pillars extracted since the last survey, distances of the unfinished and fallen places, etc. As he is not always correctly informed, on account of a change in mine foremen or the desire of the mine foreman to cover up negligent work, the map sometimes shows an area worked out when it may have been lost on account of a squeeze or creep or bad roof. In this case the mine map does not furnish a means of checking the efficiency of the mine management and no correct calculation of the percentage of the seam recovered can be determined.

The engineer, realizing the feelings of the operator in this matter, frequently does not spend enough time to get certain important data, not wishing to increase the expense of the survey any more than absolutely necessary. At the same time the survey is rushed through in the shortest time possible; and often an error is discovered after reaching the engineering office, which may be located some distance from the mine.

Surveys Should Be Made Each Year

A better plan is to arrange with a contracting engineer to make a certain number of surveys per year and depend on him to furnish a map to comply with the mine law in every respect. An additional day or so will be spent on the surveys when necessary. When new work of any kind is contemplated, arrangements can be made to have the regular engineer do the work or employ one making a specialty of the particular kind of work.

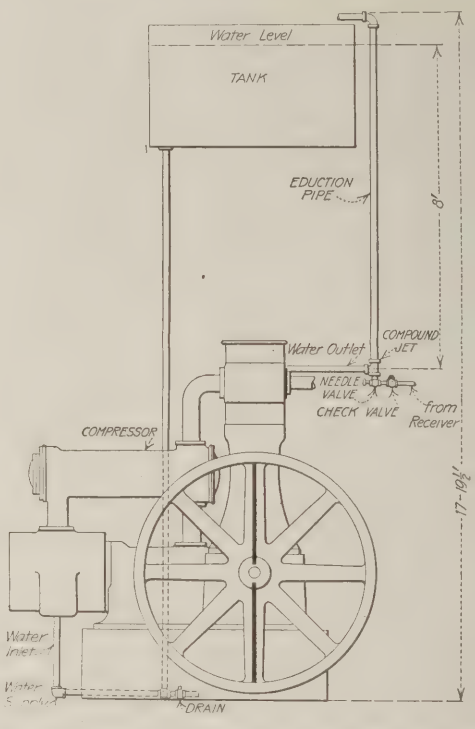
There are still operators who depend on the mine foreman to do their engineering. It is a great advantage to the mine foreman to have some knowledge of surveying; at least enough to enable him to read a map intelligently, use a scale and protractor, and calculate distances, elevations and grades.

When the mine foreman is required to set sights for entries and rooms he must neglect his regular duties to do so. This work is usually done with a compass and a loss of coal generally follows, owing to the inaccuracy of the work. On the other hand, a competent engineer, in addition to making the mine surveys correctly can frequently see ways to shorten the haulage; improve the ventilation; secure more effective drainage; increase the efficiency of the power and machinery and decrease the percentage of accidents, all of which leads to a lower cost of production. He also assures accuracy in installing new machinery, building miners' houses and other mine buildings, tipples and sidings.

If all of the coal companies had correct surveys made, it would undoubtedly reduce the amount of coal lost in mining, which at this time is the subject of much discussion. At the same time it would tend to reduce the cost of production in several ways; more coal would be recovered with the same yardage cost and new work started right would save the usual expense of groping in the dark. In short, proper surveys would cause: Greater efficiency in mine officials, less waste of coal in mining, less encroachments and fewer bad friends.

Circulating Jacket Water by Air Lift

The accompanying illustration shows how the air lift system of pumping can be utilized to form a simple and effective method of supplying cooling water to air compressor cylinder jackets. A small tank is placed about 8 ft. above the compressor, which gives sufficient height to permit the water to flow by gravity through the jackets. Instead of using a pump to elevate the water to the gravity tank again, a needle valve, or, still



CONNECTIONS FOR CIRCULATING WATER BY AIR LIFT

better, an air-lift mixing tube controlled by means of a pin valve, is placed at the base of the riser, just outside of the water jacket discharge. This valve is connected by a small pipe with the air receiver and a small amount of air is thus forced into the riser pipe, acting to carry the water from the cylinder jacket back to the elevated tank.

The amount of water required depends, of course, on the size of the compressor. Excellent results are secured and the heat in the water is reduced to a considerable extent by the expansion of air in the riser or eduction pipe.

The illustration shows the system as installed for a two-stage angle compound compressor. It is of course even simpler with a single-stage machine. In the installations thus far made no trouble whatever has arisen, and the system has kept the compressors properly cooled.—*Mine and Quarry.*

Nova Scotia's Strong Position

Coal fields are quite usually found inland. Those of the United States on the eastern coast are all a long way from the ocean. On the other hand the Nova Scotia coal is not only near the ocean, but under it, and it forms, as F. W. Gray remarks, the only deposit which may be correctly defined as being on the Atlantic Seaboard.

Byproduct Coke and Coking Operations*

BY
C. J. RAMSBURG †
AND
F. W. SPERR, Jr. ‡

Second Installment

COMING now to an examination of the natural surfaces of the blocks, we may, in the first place, disregard the color as being relatively unimportant. It depends largely upon the method of quenching, and, to some extent, on the quantity of the water used; the use of large amounts of water causing a dark color, while with the careful use of a minimum quantity of water a light gray color can always be preserved. The majority of cokes produced from the standard coking coals rich in hydrocarbon production and low in oxygen have close-textured, even surfaces, with possibly a few narrow, transverse zones of slightly larger cell openings interspersed between the two extremities. Many cokes from coals of the Connellsville (Penn.) type show the same silvery, glossy skin that used to be so much prized in beehive coke. This is probably indicative of a very heavy deposit of carbon, especially favored by slow and uniform evolution of a very rich gas.

Other cokes, fully equal in value to those just mentioned, are characterized by a peculiar shaggy appearance, as if they were covered with blotches of dark moss. This appearance is usually found in cokes produced from mixtures of eastern coking coals with the somewhat more highly oxygenated coals of the central field. Oddly enough, both types of coal usually make smooth coke if carbonized separately.

Certain cokes present transverse pebbly seams—usually not more than two or three. These seams are narrow and quite coherent, and may be shown to be composed of small globules of quite pure carbon, with no apparent cellular structure. This phenomenon again appears to be characteristic of the more highly oxygenated coals.

The surfaces always show more or less transverse and longitudinal cracks, significantly at right angles—either parallel or perpendicular to the wall of the oven. Naturally these are an element of weakness, and their presence to an excessive degree is one of the surest "first-hand" indications of an inferior grade of coke that we have. The amount of fracturing can be controlled to a surprising extent by proper method of heat treatment.

By breaking a piece of coke and examining the fresh surfaces we find revealed the cellular structure that is characteristic of all cokes and which cannot be seen in its true development simply by inspecting the dense natural surfaces. No definition of coke is complete that does not take this cellular structure into account.

The usual way—and the easiest—to examine the cell



FIG. 9. NO. 4 STRUCTURE COKE

*Presented by Mr. Ramsburg at a joint meeting of the Mechanical and Engineering Section and the American Society of Mechanical Engineers.

†Second vice president, the H. Koppers Co., Pittsburgh, Penn.

‡Chief chemist, the H. Koppers Co., Pittsburgh, Penn.

structure is to break a piece of coke crosswise and note the appearance of the fresh surfaces. Great care must, however, be taken, in comparing one coke with another by this method, to break the pieces at approximately the same distance from the wall end, since the size of the cells is apt to increase considerably from the wall to the center. Oddly enough, in many cokes there is a characteristic difference in the two surfaces of a break. No matter where the piece is fractured, the surface on the wall side has almost a granular appearance, with a steel-gray luster and well-defined cell openings. The opposite surface (that is, looking toward the center of the oven) has a characteristic graphitic luster, with the cell openings flatter and possibly not so sharply defined.

For any accurate comparison of the cell structure of different cokes we prefer to make longitudinal sections with a thin emery wheel—such sections as are shown in this article. If this is done, the danger of confusing

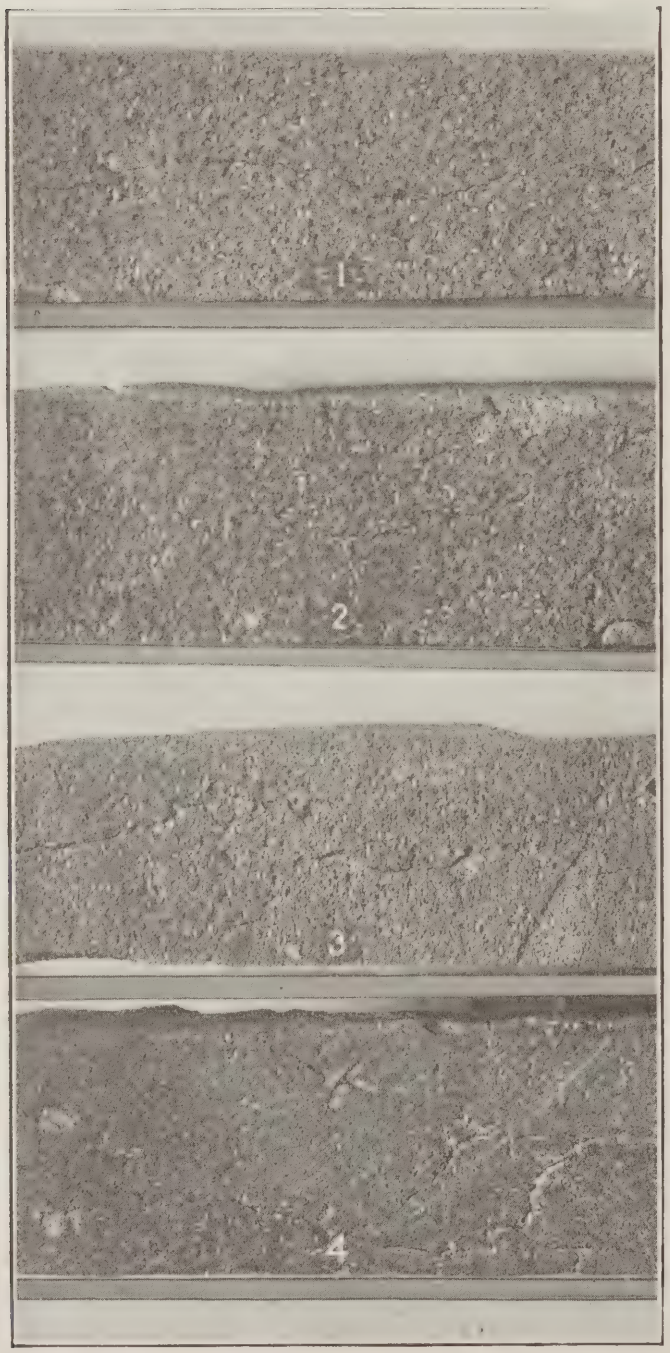


FIG. 10. STANDARDS FOR GAGING CELL STRUCTURE

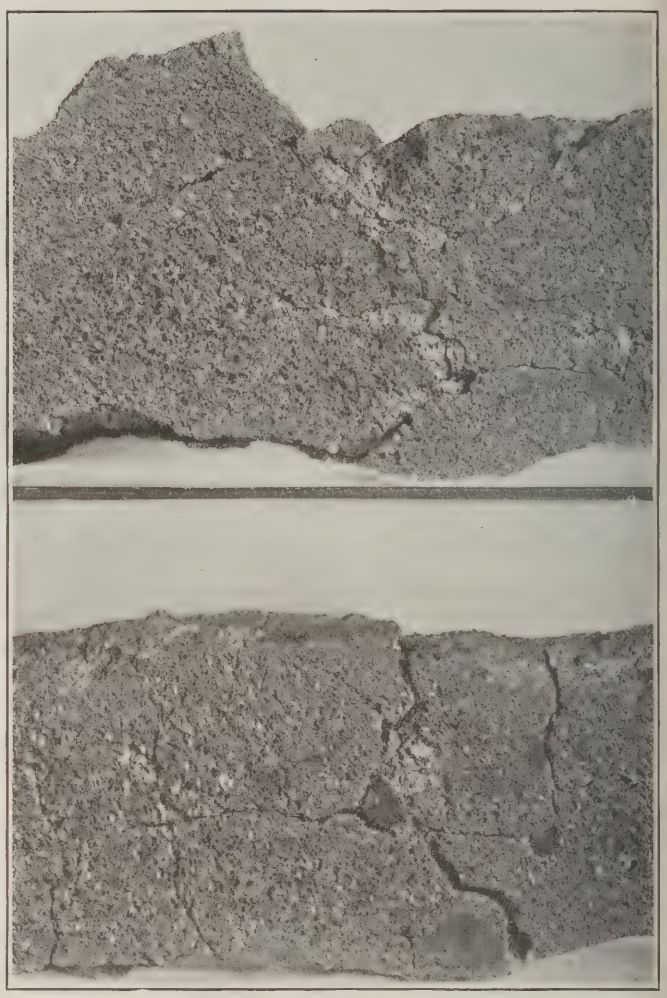


FIG. 11. NO. 1 STRUCTURE COKE

sections made at different distances from the wall will be largely eliminated. It must be mentioned that breaking a piece of coke longitudinally so as to reveal the real cell structure is a decidedly difficult matter. Almost always the break will be found to be made along the plane of a natural longitudinal fracture, and the exposed surfaces will be found to be covered with deposited carbon.

Great importance has been attributed to the cell structure of coke by all authorities on the subject, and especially by blast-furnace operators, and yet the subject is very poorly defined and no standards of comparison have been established. We have recently begun the use of a simple system, analogous to the scale of hardness used in the study of minerals, which we hope may come into general favor. At present we employ a set of our standards, shown in Fig. 10. These are all longitudinal sections, cut from blocks of typically different coke. The sections are the same length, and each is cut beginning 1½ in. from the wall end. The sections are numbered 1 to 4 in order of decreasing cell size. With such a set of standards it is easy to grade any coke according to its cell structure, and the grading will convey a much more definite idea than the loose terms of "dense," "close," "rather close," "fairly open," "medium," etc., that have hitherto been used. No term in our usual technical vocabularies has been so overworked as the word "medium," as applied to the cell structure of coke.

In addition to grading cokes according to the size of

the cells, we may also classify them as regular or irregular in cell structure. The standards would all be considered as regular in structure. This does not mean at all that the cells are of the same size, but their general arrangement gives an easily perceived impression of regularity. What we mean by irregular structure is well illustrated by the section shown in Fig. 9. This sort of coke has alternate patches of close and open texture, and is frequently produced by the more highly oxygenated class of coking coals, as well as by mixtures of coals having different characteristics.

It might possibly be thought now that an interesting table could be prepared grading the cell structure of cokes produced from various typical coals. Such a table would be well-nigh valueless, unless the data were carefully qualified by details regarding preliminary treatment of each coal, dimensions of ovens, temperatures, coking time, and several other factors, each of which plays a part in the development of cell structure. It may be more profitable to show a few sections of different cokes that have given successful results in blast-furnace and foundry practice in various parts of the country. Figs. 9, 11, 12 and 13 illustrate some specimens that have been carefully selected to be as representative as possible.

Sometimes too much reliance is placed in the determination of the specific gravity and porosity of coke. Figures as to porosity or the percentage of cell space in the total volume of coke are almost valueless, unless supplemented by an examination of the actual size of cells

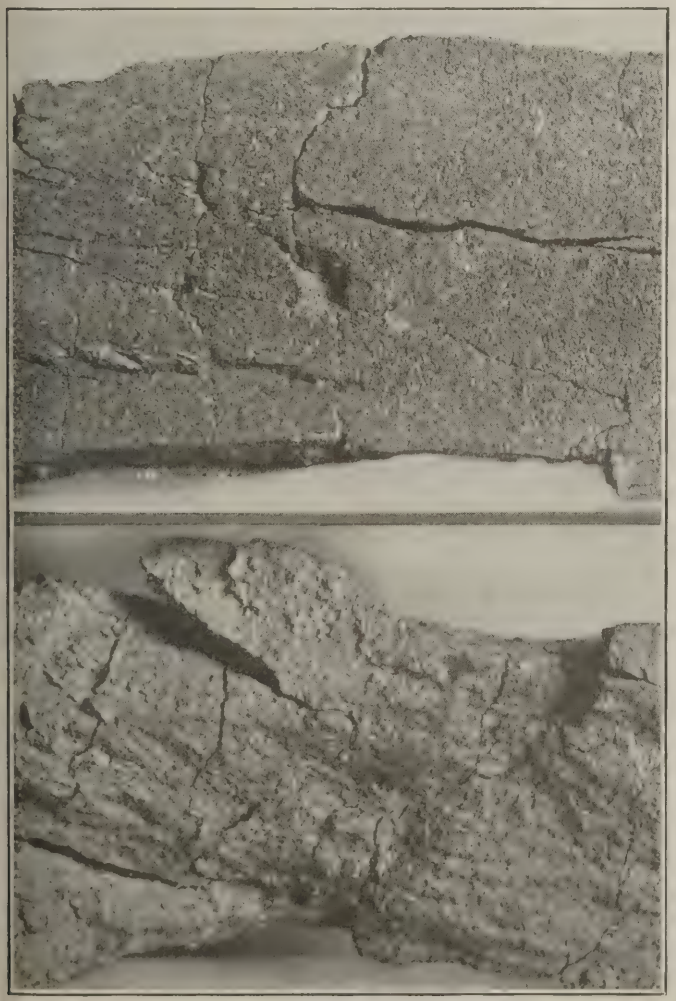


FIG. 12. NO. 3 STRUCTURE COKE



FIG. 13. NO. 2 STRUCTURE COKE

and thickness of cell walls. A coke of close texture and thin walls may have the same percentage of cell space as one having large cells and relatively thick walls. As John Fulton[1] the pioneer investigator of coke, said, 34 years ago: "Mere cellular space . . . cannot be used as an element in the practical determination of the value of cokes for blast-furnace use. Furnace gases cannot act on cell spaces; they can only act on exposed surfaces." It is the cell walls and surfaces that are the most important. Cell space and porosity, which is the measure of it, are merely incidental.

The following table of specific gravities and porosities of the coke specimens, some of which are illustrated in this paper, will show that there is really no relation between cell structure and porosity:

TABLE III. SPECIFIC GRAVITIES AND POROSITIES OF COKE SPECIMENS

Cell Grading	Figure	Apparent Specific Gravity	True Specific Gravity	Porosity
4 (Standard)	10	1.097	1.917	42.8
4	9	0.924	2.006	53.7
3 (Standard)	10	1.007	2.028	50.4
3	12	1.138	1.948	41.6
2 (Standard)	10	1.071	1.831	41.6
2	13	1.053	1.917	45.1
1 (Standard)	10	0.943	1.988	52.6
1	11	0.917	1.921	52.3

In passing from this subject of the examination of coke sections we should take occasion to point out the interesting field that is here open for the application of petrographic methods to an exhaustive investigation of the material. The actual chemical and physical state

[1]Trans. "Am. Inst. Min. Eng.," October, 1883.

of the carbon produced from various coals under various conditions is an important matter from a practical standpoint. Differences in the true specific gravity of coke are frequently found that cannot be explained by variation in the content of inorganic matter. The actual condition of this inorganic matter after carbonization, the amount of reduction of the various oxides, the possible effect of the finely disseminated mineral matter in strengthening or weakening the cell walls are all very important. Inorganic matter does not necessarily constitute an element of weakness. Large particles, especially if segregated, are injurious, but finely divided mineral matter may actually strengthen the cell walls. High-ash cokes are frequently stronger than low-ash cokes from the same kind of coal. Some experiments in washing and coking coals of moderate ash content have shown that where the original coal gave a strong coke, the washed coal gave a weaker coke, the difference being undoubtedly due, to some extent, to the removal of some of the mineral matter, although the high moisture content of the washed coal might have had some effect. Simmersbach gives some evidence to show that iron present in combination with carbon and silicon, and silicon present as a silicon carbide, may be the cause of the remarkable hardness of some coke.

(To be concluded)

Convention of the International Railway Fuel Association

The International Railway Fuel Association, an organization composed of the officers of American and Canadian railway fuel departments and coal operators, recently tendered its services to the Government to aid in the effort to stimulate coal production and to enhance economy in its use. This offer has been accepted by the United States Fuel Administration and by the United States Railroad Administration, and these two Government departments, in coöperation with the officers of the Fuel Association, have arranged for a convention to be held in Chicago on May 23 and 24, 1918. The tentative program for this convention is as follows:

1. Introductory Address—E. W. Pratt, President International Railway Fuel Association
2. The Fuel Problem in the War—H. A. Garfield, United States Fuel Administrator
3. The Railroads and Their Relation to the Fuel Problem—C. R. Gray, Director Division of Transportation, United States Railroad Administration
4. What Can Be Done for Our Northern Ally—Sir George Bury, Chairman Canadian Railways War Board
5. The Need for Fuel Conservation—P. B. Noyes, Director Conservation Division, United States Fuel Administration
6. The Coal Operator and His Responsibilities in the Fuel Situation—Edwin Ludlow, Vice-President Lehigh Coal and Navigation Co., Lansford, Penn.
7. What the Men on the Locomotives Can Do—W. S. Stone, Grand Chief, Brotherhood of Locomotive Engineers
8. What the Coal Miner Can Do to Help the Government, the Railroads, and the Men at the Front—John P. White, Labor Advisor, United States Fuel Administration
9. The Motive Power Department and Fuel Economy—R. Quayle, General Superintendent Motive Power and Car Department, Chicago & North Western Railway
10. What the Coal Operator Can Do to Help Win the War—H. N. Taylor, Vice-President Central Coal and Coke Co., Kansas City
11. The Railroad Industrial Army—A Component Part of the American Expeditionary Force and the Allied Armies—W. S. Carter, Director, Division of Labor, United States Railroad Administration
12. The Supply and Distribution of Fuel—J. D. A. Morrow, Director, Distribution Division, United States Fuel Administration
13. Relation of Locomotive Maintenance to Fuel Economy—Frank McManamy, Director, Division Locomotive Maintenance, United States Railroad Administration
14. The Transportation Department and Fuel Economy—E. H. De Groot, Jr., Assistant Manager, Car Service Section, Division of Transportation, United States Railroad Administration
15. More and Better Coal—Eugene McAuliffe, President Union Colliery Company, St. Louis

The two Government administrations and the officers of the Fuel Administration believe that this convention will provide an opportunity to arouse renewed interest in the fuel problem and to stimulate greater effort on the part of all concerned in the production and use of fuel; and they hope to attain these ends through a series of inspiring addresses by representatives of the various interests involved, which, by appeals to patriotism, shall seek to stimulate enthusiasm and to enlist coöperation. The speakers on this occasion are all men of national prominence, whose previous experience or present contact with the fuel situation will enable them to speak with authority to mine operators, mine workers, railway officers and railway employees. Through the coöperation of the two Government bureaus there is certain to be in attendance at this convention a large audience composed of men, who, in their daily work, can directly affect the production of coal, both as regards quality and amount and its economical use on the railways of the United States and Canada. The fact that the railways use nearly one-third of all the coal produced is, in itself, an earnest of the importance which the Government attaches to its conservation and to this convention.

The general arrangements for the convention are going forward under the direction of C. R. Gray, Director of the Division of Transportation, United States Railroad Administration, and P. B. Noyes, Director of Conservation Division, United States Fuel Administration. The details of the program are being arranged by a committee consisting of E. W. Pratt, President, International Railway Fuel Association; J. G. Crawford, Secretary of this Association; Eugene McAuliffe, President, Union Colliery Company, of St. Louis, Mo., representing the United States Railroad Administration; Major Edward C. Schmidt, representing the United States Fuel Administration, and Morgan K. Barnum, Assistant to the Vice President, Baltimore & Ohio Railroad.

To Test Explosibility of Coal Dust of Illinois Mines

The Government intends to conduct a demonstration of the explosibility of the coal dust of Franklin County, Illinois, on May 6 and 7, at the Government Experimental Mine, at Bruceton, Pennsylvania. The tests will be made under the direction of the Bureau of Mines.

Coal Industry of Vancouver Island

By ROBERT DUNN
Victoria, B. C.

THE coal industry of Vancouver Island, British Columbia, was never in a more flourishing condition than at the present time. From east to the west of Canada has gone forth the order "more and yet more coal," and the companies of this section are speeding up to an extent only limited by their ability to obtain equipment and men. The Canadian government has intimated that the western Provinces this year would be expected to produce two and one-half million tons more coal than in 1917, the object being to meet the local demands for fuel for industrial and domestic purposes as far as possible, if not entirely, from local supplies. Thus, it is hoped, Canada's present dependence on the United States, a condition which was very apparent last year at a time when the United States could least spare the coal, will be to some extent relieved.

With the situation as thus sketched before them the coal-mine operators of Vancouver Island, no doubt in common with those of all the western section of the Dominion, look upon themselves as in duty bound, from the viewpoint of the best interests of the British Empire and her Allies, apart from the question of whether it is or is not good business, to do their utmost to swell the monthly output. Last year there was an exceptional demand, and the Island collieries, rising to the occasion, marketed 1,698,235 tons in comparison with a total for 1916 of 1,492,761. But then there was not the special application of the spur that recently has been brought to bear upon them, with the result that the first three months of 1918 find practically every mine with returns considerably in excess of the corresponding periods of the previous year. And it may be said now with assurance that, at the pace set, 1918 will find the Vancouver Island output of coal much ahead of the past twelvemonth, while the same may be said with confidence, although the writer has not the figures before him to substantiate it, with regard to the combined totals of the collieries of the Province of British Columbia.

Record Made By Western Fuel Co.

The Western Fuel Co., one of the largest producing companies of the Island, established a record for the month of March of 70,000 tons, which is larger than that of any previous month in its fifty-year history of operation. One of its recent enterprises was the reopening of an abandoned mine known as the Harewood. It had been standing for several years, a former management having decided that it could not be expected to pay expenses. In March the Harewood's output ran up to the useful total of 19,000 tons. This, however, is not all. The company has possession of a considerable area of coal lands in what is known as the Nanaimo Coal Field, which is yet undeveloped. Coal being a national necessity under existing conditions, it has been decided to open up some of these areas and diamond drilling now is in progress with that end in view. The definite intention is to open two new mines and these, it is believed, will be producing coal before the end of 1918.

The Canadian Collieries (Dunsmuir) Ltd. is another company which is busily engaged in the extension of its operations. It is opening a new mine on the Douglas seam at South Wellington, a well-known coal mining center of the Island. Three parallel slopes are being driven to tap this area. A good substantial tipple is being built and a modern screening and cleaning plant is being installed. A large power house has been erected which contains three return tubular boilers of good steaming capacity, while compressors and dynamos for furnishing power for the mine have been installed. There are being laid out, besides, extensive sidings and yard room which will be connected with the Esquimalt & Nanaimo Ry. by a short spur. This will enable the coal to be shipped over the Esquimalt & Nanaimo to the company's wharves at Ladysmith, B. C., whence it may be distributed overseas to the local or foreign markets. Before the end of the year this mine should be one of the Island's large producers.

Further Development Work Going On

About three miles south of the foregoing operation, between Ladysmith and Nanaimo, B. C., is the center of another new and important development of the coal-mining industry of Vancouver Island. Here the Granby Consolidated Mining, Smelting and Power Co., Ltd., has secured, at an outlay of approximately $750,000, a considerable block of coal lands. The opening of a new mine, the installation of the necessary plant for the handling of the coal, the erection of buildings for the accommodation of employees, and the construction of wharves, etc., at a seaboard point known as Cassidy's Landing will involve a further expenditure of at least $500,000. This work is in progress, in fact it has made considerable headway. The company's plans, however, do not stop at this, it being proposed to install at Anyox, B. C., the company's mining and smelting center on the coast of the mainland of British Columbia, a byproduct coke-making plant at an estimated cost of $1,500,000. This will make it possible for the company to mine its own coal, transport it to Anyox for treatment, and thus secure the coke needed for the smelting of its large supply of copper ores.

In the opening of its new coal mine the company is driving three slopes, one of which is to be used as a main haulageway, another for ventilation and the third for a mainway. A large acreage has been cleared, graded and surveyed into lots for building houses; a spur has been constructed from the Esquimalt & Nanaimo Ry. into the mine site; sidings and yards are being laid out and a sawmill is being installed to cut timber for the company's use.

It may be said, with respect to this enterprise, one of the most notable in connection with the coal industry in western Canada for years, that it has been brought about largely because of the determination of the company to be as independent and as self-sustaining in its

operations as possible. It is easily the greatest producer of copper in British Columbia, the total production for the Province in 1917 being, roughly, 59,000,000 lb., to which the Granby company's contribution was, also in rough figures, 34,500,000 lb. In 1916, however, its output was 45,631,600 lb. The decrease is accounted for by the fact that last year, owing to the explosion at the Fernie Coal Mines, Coal Creek, and the ensuing strike, there was a period during which the usual source of coke was unavailable. With these facts in mind the chief object which the management of the company has in mind in its present program is apparent. It is not proposed, in the future, that the operations of the company's mines, its smelters at Anyox and Grand Forks, B. C., shall be interfered with by lack of fuel through industrial troubles for which it is in no way responsible and so can in no way control.

Incidentally at present, but a factor which may enter very largely into the Granby company's activities in the future, are the possibilities of the byproduct ovens and the recovery of those elements of the coal the importance of which has been so strongly emphasized as a result of the disorganization of the old commercial order by the war. Into this branch of industry the company proposes entering very thoroughly, and it is confidently believed that the outcome will be the development in western Canada of a number of profitable subsidiary industries.

The Granby company's coal mine, at the present rate of development, should be prominently on the list of producers before the end of the year.

Vancouver Island's annual production of coal for the past twenty years is shown by the following table:

	Tons		Tons
1917	1,698,235	1907	1,342,877
1916	1,492,761	1906	1,178,627
1915	1,020,942	1905	993,899
1914	1,072,314	1904	1,023,013
1913	973,495	1903	860,775
1912	1,558,207	1902	1,173,893
1911	1,625,122	1901	1,271,744
1910	1,625,930	1900	1,383,376
1909	1,187,985	1899	1,191,008
1908	1,022,673	1898	1,126,531

In the Nicola-Princeton district the output up to the end of February, in comparison with the same period last year, showed an improvement of 20,000 tons. Two collieries have been opened up again which had been closed for a considerable period. The Inland Coal and Coke Co. has been reorganized under the name of the Fleming Coal Co., and its mines at Merritt, B. C., have resumed operations after a suspension which dates back to the middle of the month of March, 1917. The Coalmont Colliery has been reopened after a period of idleness extending from the early part of 1915. The Middlesboro Collieries are the largest producers in this district, being engaged in the operation of three mines. The Princeton Collieries rank second in production but will have a keen rival for second place during the coming months in the Fleming Coal Company.

Since the taking over of control by the Dominion Government of the collieries of what is known as District 18 by the United Mine Workers of America, the mines of the Crow's Nest Field, B. C., which come within that section, have been making a good showing. The production thus far this year is considerably greater than that for the first two months of 1917, the tonnage produced by these mines for January and February, 1917, being 94,295 tons, while in the same period this year it reached 135,986 tons, an increase of 41,691 tons. It is reported that satisfactory progress had been made in cleaning up the mines which were wrecked by "bumps" and explosion last April, and these mines soon will be active producers again.

Legal Department

Effect of Iowa Compensation Act—When an Iowa coal operator sued for injury to an employee sustained in the course of employment has previously given notice of his election not to be bound by the provisions of the Iowa Workmen's Compensation Act, the burden rests upon the operator to affirmatively disprove negligence causing the injury sued on. This reverses the general rule of law under which plaintiff in a personal injury action has the burden to prove negligence. By further provision of the act, contributory negligence of the employee in such case does not release the defending operator from liability, unless it was due to willful misconduct or intoxication of the injured employee. The employee assumes no risks of injury traceable to the employer's negligence. In this case, involving liability for fatal injury to a miner who was struck by slate falling from a mine roof, the plaintiff was properly permitted to show that the roofs all along certain roadways and rooms were loose and drummy, as tending to charge defendant operator with knowledge of the existence of the dangerous condition resulting in this accident. That decedent was injured while attempting to temporarily timber a drummy roof in a roadway, after notifying the foreman of the need for timbering, did not constitute such contributory negligence as bars recovery under the Iowa law, although by statute it was decedent's duty to timber his working room and not the roadway, duty to timber that resting on the mine foreman. The accident must be attributed to the primary negligence of the operator in permitting the dangerous condition to remain. (Iowa Supreme Court, Mitchell vs. Sanwood Coal Co., 166 Northwestern Reporter, 391.)

Subleasing of Coal Lands—Complainant, having acquired a lease on Alabama coal lands under an agreement binding him to pay a royalty of 5c. per ton on coal produced, made a contract with one Ellis under which the latter was given the right for 13 years, a period less than the unexpired portion of complainant's lease with the landowners, to mine the coal, on an agreement that Ellis guaranteed a minimum royalty of 7c. on at least 50 tons per day, regardless of actual production, except as the coal might become exhausted before expiration of the 13 years. Ellis assigned his rights to defendant, and defendant, in turn, permitted the Gayosa Coal Co. to mine the property. Under these circumstances, the Alabama Supreme Court, in holding that complainant is entitled to compel the defendant and the Gayosa company to account for royalties to him under the original lease, said: "It is true that the coal companies were not parties to the lease between complainant and Mark Ellis, but the Bruce company admitted a transfer by Ellis to it, and that it undertook to operate the mine under said lease; and we do not see how it can be permitted to accept only so much thereof as it desires and reject such portions thereof favorable to the complainant and made for his protection. The lease provided a fixed price for the coal and for a minimum monthly royalty or rent, until the lease terminated, either upon the expiration of the time covered or until the coal was practically exhausted, and it of course became liable for such royalty or rent as was fixed by the lease. The Gayosa company did not claim to be the assignee of the lease from the Bruce company, but, being a large stockholder in the said company, it undertook to carry out the said lease, and proceeded to mine coal thereunder, and it too is estopped from accepting the benefits and rejecting the burdens. (Bibb vs. Bruce Coal Co., 77 Southern Reporter, 545.)

Water Transportation for Relieving Railroad Congestion

In the issue of *Coal Age* for Mar. 2, Mr. Wotherspoon has written an able article on the canal as a carrier of coal, showing how the new barge canal can be utilized for the distribution of both bituminous and anthracite in the parts of New York state reached by this canal.

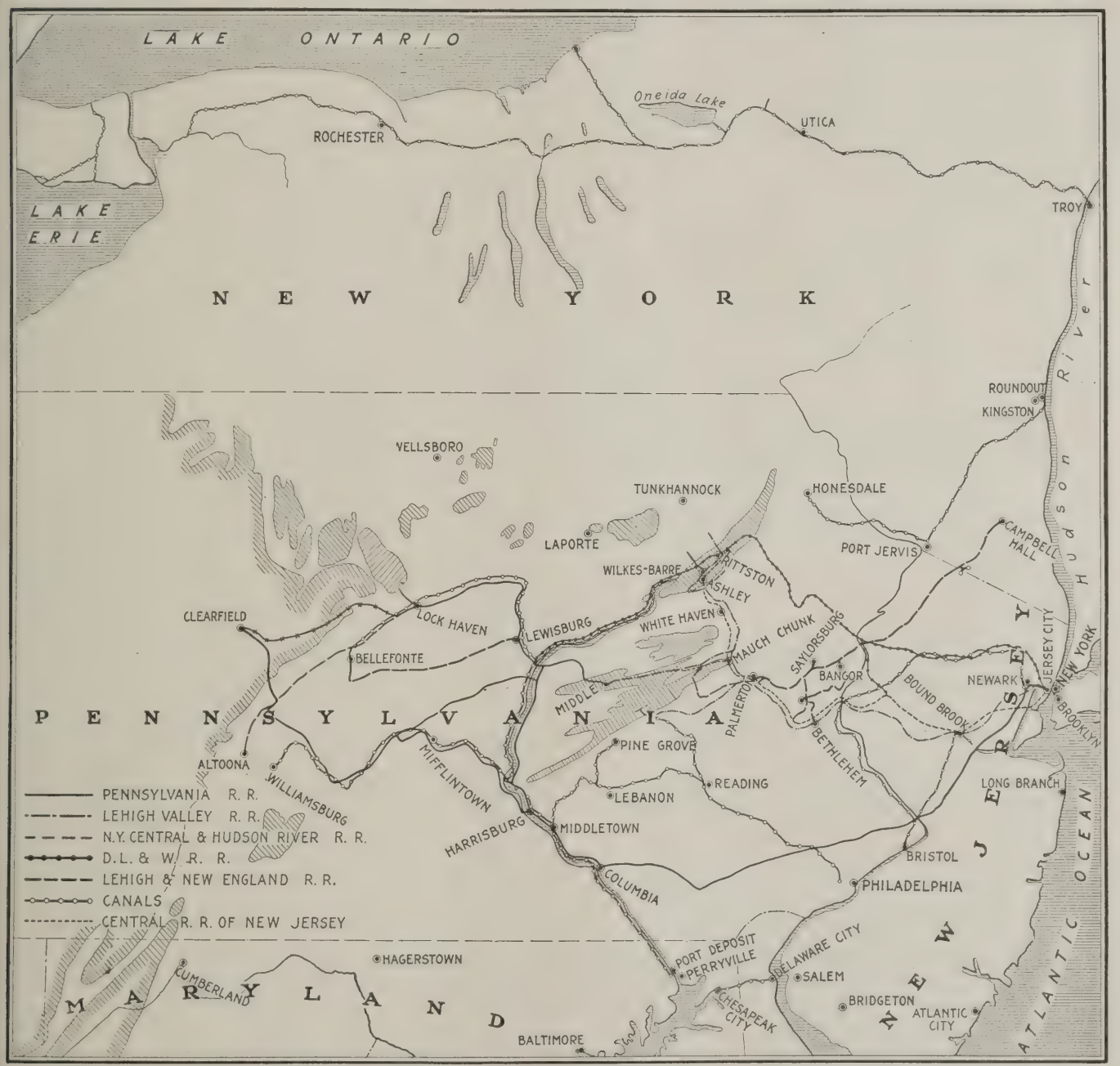
The great congestion, however, due to the war is at the large shipping ports, and this congestion is liable to increase rather than decrease, as our necessity for supplying food, munitions, etc., to Europe will continually grow with the increase of our own army on the other side.

The experience in European countries, especially such congested centers as Belgium, northern France and eastern Germany, has been that they have had to utilize the canals to their full limit for all slow-moving freight, in order to enable the railroads to handle the remaining traffic.

The experience in this country has been that the old canals, with their small locks, necessitating a limited capacity for each boat, have not been able to compete with the railroads in moving economically any class of material.

On the Ohio and Kanawha Rivers, however, the Government by putting in dams and creating slack-water navigation has been enabled to utilize the rivers for the shipment of a large proportion of the coal used at the towns along these waterways, even as far as New Orleans. These barges are made up in large flotillas and each is carried down by one steamer at a minimum of expense. The railroads have been thus relieved of this proportion of low-grade, slow-moving freight.

A study of the accompanying map shows that the principal railroads serving the anthracite region all



MAP SHOWING THE PRINCIPAL RAILROADS SERVING THE ANTHRACITE REGION

reach the Lehigh and Delaware Rivers at their junction at Easton. From Easton to Bordentown, a distance of 63 miles, there is still in service the Delaware Division Canal of the Lehigh Coal and Navigation Co. The locks on this canal are so small that the ordinary canal boat has to be made in two halves, one-half locked through at a time. It is impossible under such conditions to transport economically any large quantity of coal. Furthermore, the smallness of the canal necessitates mule haulage, which is both slow and expensive.

The United States Government, under the River and Harbor Bill, can make appropriations for the improvement of the Delaware River as far as Bordentown to enable boats to use the inside passage from Philadelphia to New York through the Delaware and Raritan Canal. An examination of the river shows that no engineering difficulties would be encountered in building dams that would produce slack-water navigation from Bordentown to Easton.

Should Build Coal Docks at Easton

If the railroads centering at Easton, consisting of the Delaware, Lackawanna & Western, Lehigh Valley and the Central Railroad of New Jersey, had coal docks at that point the coal could there be loaded into barges, transported in fleets by steamers in the same manner as on the Ohio and Kanawha Rivers, and these boats delivered in New York Harbor through the Delaware and Raritan Canal. From that point they could be taken to serve all the waterfront yards not only in New York Harbor, but up the Hudson and at points on Long Island Sound. There would be a further extension of this traffic down the Delaware River to Philadelphia and to the growing towns below Philadelphia, Chester and Wilmington, while through the Delaware and Chesapeake Canal at Delaware City inland water connection would be made with Baltimore and Washington.

This might be objected to for the reason that it may be thought impossible to build a fleet of barges at this time sufficient to handle so large a traffic as this would represent, but the experiments that have recently been made in reinforced-concrete construction have shown that it is possible not only to build barges such as have been in service in New York Harbor for some years, but to build ocean-going vessels of as high as 5000 tons capacity.

Easton is only a short distance from the great cement region of Pennsylvania and connected with it directly by rail. The improvement of the existing canal up the Lehigh River to Bethlehem, Allentown, Catasauqua and the cement and slate regions immediately above these points would bring in a large return freight in the way of iron ore to the Bethlehem Steel Co. and the other iron plants and also the shipment of cement, slate and fabricated iron that makes so large a proportion of the bulky freight now produced in that manufacturing region.

This route would also open up a direct line of communication between New York Harbor and the soft coal fields of central Pennsylvania. The Reading R.R., which reaches the Lehigh River at Allentown, carries as much bituminous coal as it does anthracite. The Lehigh Valley and Central Railroad of New Jersey are also large carriers of bituminous coal, and by making traffic arrangements the Pennsylvania could divert its soft-coal shipments for New York Harbor at Harrisburg and send them through to Allentown and Easton and relieve that part of the line which is most congested.

The advantages appear to be in favor of such a method of economical handling of the coal, especially anthracite, during the summer months; the cutting down of the railroad haul on this coal by more than half, the quick return of the cars to the mines and the relief of the congested conditions at all the ports in New York Harbor.

As the Delaware River is a dividing line between the states of New Jersey and Pennsylvania, work of this character is interstate and should be handled by the Government under its rivers and harbors appropriations.

Japan Has Good Metallurgic Coals

The following table, taken from the report of the Department of Commerce and rearranged according to percentages of fixed carbon, shows that Japan has excellent metallurgical coals. Overlooking five coals out of 25, it will be seen that the sulphur in the coal is remarkably low, varying in the 20 samples from 0.07 (an almost impossible figure) to 1.19. The ash is also quite low at times and at no time abnormally high. Most of the coals have the caking quality. Only one of the coals is really lignitic.

ANALYSES OF JAPANESE COALS ARRANGED IN ORDER OF THEIR PERCENTAGES OF FIXED CARBON

	Fixed Carbon	Volatile Matter	Moisture	Ash	Sulphur	British Thermal Units	Nature
Asahi	77.16	14.73	2.27	5.84	8.08	14,598	Caking
Hojo	65.38	26.98	2.42	5.22	0.37	13,068	.....
Otsuji	57.69	32.36	6.58	3.37	0.07	.....	Noncaking
Shimoyamada - Takeyabu	54.66	35.89	1.71	7.74	0.18	.....	Noncaking
Kanada	53.48	40.00	3.32	3.20	0.39	.....	Caking
Mineji	53.48	39.94	3.33	3.25	1.19	.....	Caking
Takashima	53.42	39.08	0.98	6.52	0.56	14,454	Caking
Arate	53.15	43.22	2.15	1.35	....	.....	Caking
Namadzuta-Chirimen	52.68	42.50	1.66	3.66	0.81	13,662	Caking
Tadakuma	52.37	42.50	1.37	3.76	0.69	11,819	Caking
Fukucka-Takata	51.86	40.24	2.40	5.50	0.72	13,464	Caking
Hokoku	50.76	45.67	1.70	1.87	0.36	14,256	Caking
Akaike	50.44	43.99	2.64	2.93	0.41	13,662	Caking
Hondo	49.31	46.21	3.16	2.32	0.44	14,112	Caking
Shagano	48.63	42.11	1.59	6.87	0.37	13,464	Caking
Meiji	48.23	38.21	2.28	11.28	0.79	13,068	Caking
Niinobu Kankan	48.11	41.93	0.75	9.21	5.94	.....	Caking
Noyama	46.70	46.30	3.10	3.90	0.76	13,266	Noncaking
Shin-nyu	44.60	41.70	2.00	11.70	0.62	12,276	Caking
Takao	44.30	43.80	1.50	10.40	3.40	12,276	.....
Arate Miyeda	44.10	43.70	5.60	6.60	2.53	11,880	Noncaking
Ida	40.43	51.93	1.96	5.68	0.39	13,212	Caking
Iriyama	30.12	43.15	12.89	13.84	0.37	.....	Noncaking
Onoda	27.72	58.08	4.92	9.28	....	.....	Caking
Okinoyama	23.59	49.37	9.39	17.65	3.14	.....	Noncaking

Better Light for the Mine Plant

"Laco-dalite" is the trade name of a new article for improving industrial lighting that has just been placed upon the market by the Laco-Philips Co., 131 Hudson St., New York. It consists simply of a special blue glass screen that is clamped over the bottom of the electric light reflector, thus inclosing the bulb. The light thus filtered through the special blue glass, it is claimed by the manufacturers, is equal to that obtained from the nitrogen lamp. It is said to be white and pure and the equivalent of daylight. The question of proper lighting is important in breakers and picking tables. Both here and in the drafting room, as well as in other places, a device of this sort might be worth a trial.

Coal Mining in Washington*

By F. A. HILL
Manager, Cokedale Coal Co., Sedro-Woolley, Wash.

SYNOPSIS—*The coals of Washington vary from brown lignite to anthracite and while low in sulphur are somewhat high in ash. As a result of the variety of conditions the output varies from 1.55 to 5.60 tons per employee.*

COAL mining in the State of Washington offers many interesting problems for the mining engineer, due to the variety of the physical conditions in the different fields, and often in the same mine. The several coal seams worked in the same mine commonly require different mining and transportation methods for economical operation. The coal measures have inclinations ranging from 5 deg. to vertical, and in the same mine the dip of the coal may vary from 30 deg. to 50 deg. In all fields, the seams are extensively faulted, folded, and sheared.

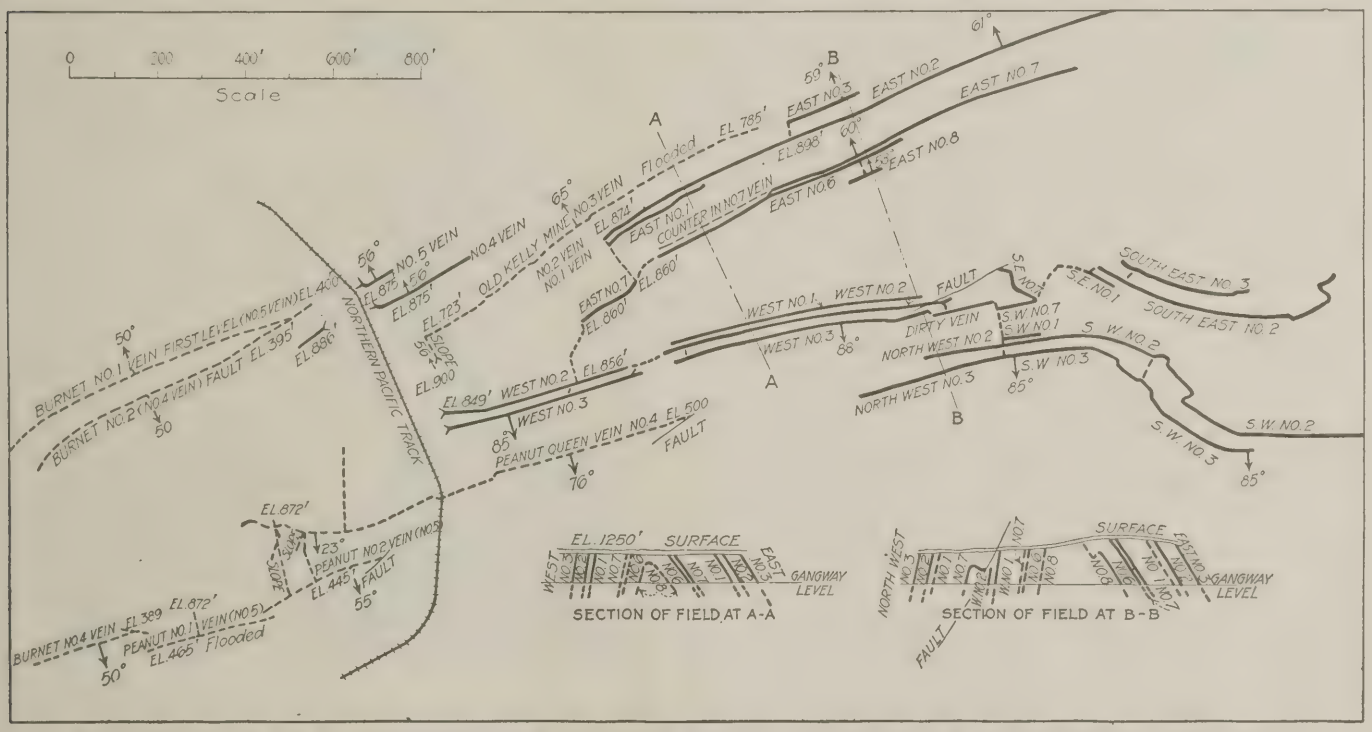
The quality of the coal produced ranges from brown lignite to bituminous coking coal, the following being typical analyses:

	Lignite	Sub-bituminous	Coking Coal
Moisture	23.5	14.30	0.57
Volatile hydrocarbon	31.0	33.03	23.57
Fixed carbon	37.4	41.30	65.55
Ash	8.1	11.37	10.31
	100.0	100.00	100.00

Little of the coal contains as much as 0.75 per cent. sulphur. The brown lignites occur mostly in Lewis and Thurston Counties, and as a rule are mined at low cost. This coal has been successfully used in locomotives of the Oregon & Washington R.R., when equipped with specially designed fireboxes.

The sub-bituminous coals occur in all the coal-mining counties. Their cost of production varies widely, according to the character of the formations, the pitch, and the wall conditions. They make a fairly good steam fuel. The lump coal is used mostly for domestic trade, when the coal is graded into lump, nut, and pea.

The coking coal is used for making coke, and for locomotive and other boiler fuel. It yields a strong metallurgical product, quite high in ash, but seldom containing over 18 per cent. of such impurity. Most of it would be susceptible to better cleaning than it now receives, but it will be difficult from any seams now known, to produce a coke containing less than 16 per cent. ash.



HEADING PLAN OF WASHINGTON MINE SHOWING TYPICAL DIFFICULTIES CONFRONTING OPERATION

Anthracite occurs in Whatcom County. The seams cannot be traced continuously for any great distance, although they outcrop here and there. These deposits lie on the edge of a carboniferous field, but no seams in which commercial mines could be opened have yet been found in that locality. West of that locality two seams have been worked; one has been closed for many years, and the other is producing a small amount of coal. In the Cowlitz Pass section of Lewis County, anthracite has also been found, but the field has not been thoroughly prospected, partly because it is remote from transportation.

With few exceptions, all the coal under 2 in. in size needs washing, and all over that size requires hand-picking to eliminate the rock and heavy bone. Many

*Article to be read at the Colorado meeting, American Institute of Mining Engineers, September, 1918.

of the mines yield as much as 30 per cent. waste, the heavy pitch of the seams precluding any separation of waste underground.

The coal has heretofore been graded as follows: Lump, over a 2-in. screen; nut, 2 in. to $\frac{5}{8}$ or $\frac{3}{4}$ in.; pea, $\frac{5}{8}$ or $\frac{3}{4}$ in. to $\frac{1}{8}$ in.; mine-run includes all but the lump. The coal under $\frac{1}{8}$ in. is called sludge, and its market has been irregular; it will form a satisfactory powdered fuel provided it is mechanically dried before leaving the mine. If wet, it will not run, but will stand vertically in bunkers or cars.

The output of coal per employee per shift ranges from 1.55 to 5.60 tons, in profitably operating mines, the brown lignites producing the highest and the coking coals the lowest amount per employee.

Methods of mining are varied; room-and-pillar, chute-and-crosscut, and an angle system which originated in Washington, are all used. In some cases planes are driven up the pitch, with room-and-pillar workings off the planes. Elsewhere, rooms are driven up the pitch in pairs, with gravity planes to handle the cars. Wherever a high percentage of lump coal is desired the methods followed are not always those producing the cheapest coal. Puncher machines are successfully used in a number of mines. They produce a greater amount of lump at a cost less than that incurred when coal is shot from the solid.

Lump coal has been selling at $3 to $5.50 per ton f.o.b. cars; nut from $2 to $3.75; pea from $0.75 to $1.10; and sludge for any price that could be obtained, some of the coking sludge, however, selling at $1.

Bailey Willis estimates the thickness of the coal measures in the Wilkeson field at 10,000 ft. There are many coal seams in that field; in one locality 10 different seams are being worked, and there are three more that could be profitably mined. One geologist estimates 90,000,000 tons of coal in one 640-acre section.

The main coal field of the state is 56 miles long from north to south, and six miles wide; a large part of it has never been properly prospected, owing to its inaccessibility, the heavy growth of timber, and insufficient demand for the coal.

The opening and equipping of a coal mine in Washington will cost from $2 to $10 per ton of annual output, depending largely upon the cost of development to produce the desired output. Unless the outcrop can be located by surface prospecting the cost of development is hard to determine, even by those best acquainted with the field.

During the past 10 years fuel oil has been selling at coast points from 65c. to 85c. per bbl. Oil has been supplemented by coal to the extent of about 2,000,000 tons annually; hence coal operators, except those producing coke and the better grades of domestic coal, have fared poorly. With fuel oil at $1.50 per bbl. no doubt more coal properties will be opened.

Obviously, mixing is an important factor in combustion. Merely an excess of air in the furnace is not enough; the air must be supplied as near to the surface of the fuel bed as practicable, and be thoroughly mixed with the combustible matter in order that the combustion may be completed in a short time and a small combustion space made effective.—*Bureau of Mines Bulletin No. 135.*

Who's Who In Coal Mining

W. E. E. Koepler

Announcement that W. E. E. Koepler had been elected to the secretaryship of the Pocahontas Operators' Association for the current year, with headquarters at Bluefield, W. Va., was received with pleasure by his many friends in the industry. His sterling personal qualities and unquestioned ability will undoubtedly enable him to carry on successfully the work of the association.

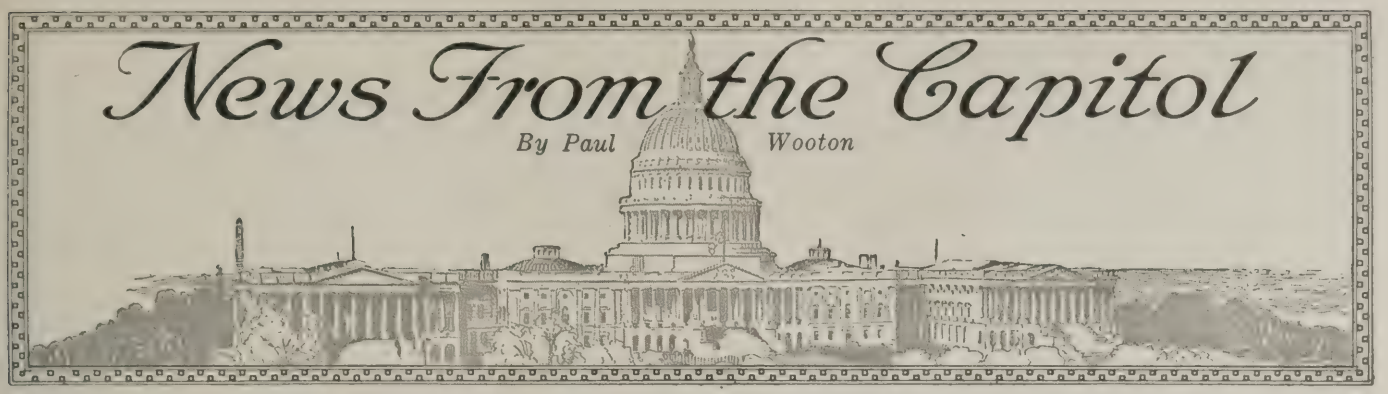
The Pocahontas Operators' Association is comprised of about 50 members and is concerned only with the mining of coal. Its chief object is to speed up production so that the Administration may be saved the embarrassment consequent upon a lack of fuel to coal vessels and run the nation's war industries.



W. E. E. KOEPLER
Secretary, Pocahontas Operators' Association

For the last two years Mr. Koepler has been in charge of financial and kindred advertising on the Philadelphia *Public Ledger*. Previous to that, for a total of about three years, he was with the *Colliery Engineer* and its successor, *Coal Age*. Before that, for a period of seven years, he was connected with *The Black Diamond*, first as advertising solicitor and then as manager and editorial assistant in Philadelphia.

Mr. Koepler was graduated from Westminster College, Fulton, Mo. He is 33 years of age, married, and has two children. Through his long experience among manufacturers of coal mining machinery and equipment, coupled with a fine knowledge of trade and economic conditions, Mr. Koepler is in a position to suggest new ways of winning the war via increased coal production.



Important Zone Modifications

Changes in the bituminous coal zones were made during the week ended April 27 as follows:

Zones A, G, H, N and P—Extension of territory so that producers of smithing coal may ship their product to greatly extended areas. Shipments may be made to all points in the United States west of the Mississippi River, except to North and South Dakota, Minnesota and Wisconsin, north of Zone A by the following mines on the Midland Valley R.R. in Zone A:

Porter, Arkansas Valley Coal Co., Hackett, Ark.; Jones, Backbone Coal Co., Excelsior, Ark.; McMillan, Peter McMillan Coal Co., Excelsior, Ark.; Bassinger, Bassinger Coal Co., Excelsior, Ark.; Hackett, Hackett, Excelsior Coal Co., Hackett, Ark.; Acme, Haskell Coal Mining Co., Stigler, Okla.

Shipments may be made to all points in the United States east of the Mississippi River and south of the northern boundaries of Tennessee and North Carolina and to all points in the United States west of the Mississippi River by the following mines in Zones G and H:

Brookwood, The Alabama Co., Birmingham, Ala.; Blue Creek 3, Tennessee Coal, Iron and Railroad Co., Birmingham, Ala.; Yolande 2 and 3, Yolande Coal and Coke Co., Birmingham, Ala.; Dixiana, Imperial Coal and Coke Co., Birmingham, Ala.; Bradford, Majestic Coal Co., Birmingham, Ala.; Dillworth, Sipsey Coal Mining Co., Empire, Ala.; Etna, New Etna Coal Co., Whiteside, Tenn.; Durham, Durham Coal and Iron Co., Chattanooga, Tenn.

Shipments may be made to all points in the United States requiring westbound movement, provided they are made in returning box or stock cars, by the following mines in Zone N:

Raleigh 3, Raleigh Coal and Coke Co., Cincinnati, Ohio; Winding Gulf 2, Winding Gulf Colliery Co., Cincinnati, Ohio; Cranberry, New River Co., Macdonald, W. Va.; Fire Creek, Fire Creek Coal and Coke Co., Staunton, Va.; Big Q, Quinnimont Coal Co., Quinnimont, W. Va.; Fayette, Fayette Smokeless Coal Co., Fayette, W. Va.; Tams, Gulf Smokeless Coal Co., Tams, W. Va.; Sun 1 and 2, Eccles 3, 5 and 6, New River Collieries Co., Sun, W. Va.; Graham, Tamroy, Oswald, McKell Coal and Coke Co., Glen Jean, W. Va.

Shipments may be made to all points in the United States requiring westbound movement, provided they are made in returning box or stock cars, by the following mines in Zone P:

Mines Nos. 1, 7 and 12, The Consolidation Coal Co., Baltimore, Md.; Kingsland, Maryland Coal Co., New York; 118 and 119, The Consolidation Coal Co., Baltimore, Md.; Jerome, United Coal Corporation, Pittsburgh, Penn.; Zimmerman 4 and 5, Quemahoning Coal Co., Somerset, Penn.; Douglas, Cumberland Coal Co., Baltimore, Md.; Coketon, Davis Coal and Coke Co., Baltimore, Md.; 1, 2 and 5, Blossburg Coal Co., Scranton, Penn.; Maple Hill, East 1, 2 and 3, West 1, 2, 3 and 4, O'Donnell Bros., Morris Run, Penn.; Sonman 2, W. H. Piper Co., Philadelphia, Penn.; Sonman Shaft, Sonman Slope 2, Thorne Neale & Co., Philadelphia, Penn.; Miller 1, Miller Coal Co., Philadelphia, Penn.; Hughes 1, W. H. Hughes & Co. and C. A. Hughes & Co., Altoona, Penn.; Maryland, Berwind-White Coal Mining Co., Philadelphia, Penn.; Henrietta 2, Henrietta Coal Mining Co., New York; Cammos 1, 2 and 3, Heverly Coal Co., Altoona, Penn.; Argyle 1, Argyle Coal Co., Greensburg, Penn.; Logan 4, Logan Coal Co., Philadelphia, Penn.; Lloydell 1, Dexter & Carpenter, New York; Leland 9 and 10, Dexter & Carpenter, New York; Loyal Hanna 6, Loyal Hanna Coal and Coke Co., Philadelphia, Penn.; Ehrenfeld 3, Pennsylvania Coal and Coke Corp., New York; Yellow Run, Mountain Coal Co., Greensburg, Penn.; Standard 1, Standard Coal Co., Altoona, Penn.; Rich Hill 1, Whitney & Kemmerer, Philadelphia, Penn.; Shade Creek, Shade Creek Coal Co., Johnstown, Penn.; Stineman 2, Stineman Coal and Coke Co., Philadelphia, Penn.; Stineman 1, Stineman Coal Mining Co., Philadelphia, Penn.; Bear Rock 1, Bear Rock Coal Co., Lilly, Penn.

Zone B—Extension of territory so that every shipper from Lake docks on the west of Lake Michigan in Wisconsin may ship smithing coal outside of the zone as follows:

That portion of the United States west of the western boundary of North Dakota and South Dakota but not south of the southern boundary of "Zone B," as described in order of March 27, 1918, or subsequent modification thereof.

Zone P—Extension of territory so that producers in northern West Virginia, Pennsylvania and Maryland on the Baltimore & Ohio; Western Maryland and Coal & Coke Ry. (east of Dundon) and their short line connections and all districts north of these lines may ship outside of the zone as follows:

1. Westbound to all points in the State of Ohio.

2. Westbound to all points reached via the carferries of the (a) Grand Trunk Ry., operating between Grand Haven, Mich., and Milwaukee, Wis. (b) Pere Marquette Ry., operating between Ludington, Mich., and Manitowoc, Wis., and between Ludington, Mich., and Milwaukee, Wis. (c) Ann Arbor Steamship Co., operating between Frankfort, Mich., and Manistique, Mich., between Frankfort, Mich., and Menominee, Mich.; between Frankfort, Mich., and Kewaunee, Wis.; and between Frankfort, Mich., and Manitowoc, Wis.

All shipments must be made in returning box or stock cars.

Zone D—Extension of territory so that producers in Indiana many ship outside of the zone as follows:

Westbound to all points reached via the carferries of the (a) Grand Trunk Ry., operating between Grand Haven, Mich., and Milwaukee, Wis. (b) Pere Marquette Ry., operating between Ludington, Mich., and Manitowoc, Wis., and between Ludington, Mich., and Milwaukee, Wis. (c) Ann Arbor Steamship Co., operating between Frankfort, Mich.,

and Manistique, Mich., between Frankfort, Mich., and Menominee, Mich.; between Frankfort, Mich., and Kewaunee, Wis., and between Frankfort, Mich., and Manitowoc, Wis.

Shipments are limited to those which can be made in returning box or stock cars.

Zone F—Extension of territory so that producers in Virginia along the Louisville & Nashville R.R. only; in eastern Kentucky along the Louisville & Nashville R.R. and the Cincinnati, New Orleans & Texas Pacific Ry. and their short line connections; and in Tennessee, along the Cumberland Valley Division of the Louisville & Nashville R.R. and along the Middlesborough R.R. may ship outside of the zone as follows:

Westbound to all points reached via the carferries of the (a) Grand Trunk Ry., operating between Grand Haven, Mich., and Milwaukee, Wis. (b) Pere Marquette Ry., operating between Ludington, Mich., and Manitowoc, Wis., and between Ludington, Mich., and Milwaukee, Wis. (c) Ann Arbor Steamship Co., operating between Frankfort, Mich., and Manistique, Mich.; between Frankfort, Mich., and Menominee, Mich.; between Frankfort, Mich., and Kewaunee, Wis.; and between Frankfort, Mich., and Manitowoc, Wis.

Shipments are limited to those which can be made in returning box or stock cars.

Zone N—Extension of territory, so that the producers in the Pocahontas, Tug River and New River low-volatile coal-producing districts of West Virginia and Virginia along the Norfolk & Western, Chesapeake & Ohio and Virginian railways, and their short line connections, in the Clinch Valley high-volatile coal-producing districts in Tazewell and eastern Russell Counties, Virginia, along the Norfolk & Western Ry., and in the high volatile district along the Virginian Ry. may ship outside of the zone as follows:

That portion of the States of Maryland and Delaware, located on and within the following boundary lines: On and south and east of a line coincident with the eastern and southern bank of the Chesapeake Bay and the Choptank River as far as Cambridge, Md.; thence coincident with the Philadelphia, Baltimore & Washington R.R. from Cambridge, Md., to Seaford, Del.; thence coincident with the Philadelphia, Baltimore & Washington R.R. from Georgetown, Del., through Lewes to Delaware Bay.

Extension of territory so that producers in the Pocahontas, Tug River and New River low-volatile coal-producing districts, in the States of West Virginia and Virginia along the Norfolk & Western, Chesapeake & Ohio and Virginian railways and their short line connections and in the Clinch Valley high-volatile coal-producing districts in Tazewell and eastern Russell Counties, Virginia, along the Norfolk & Western R.R. may ship outside of the zone, in returning box or stock cars, as follows:

Westbound to all points reached via the carferries of the (a) Grand Trunk Ry., operating between Grand Haven, Mich., and Milwaukee, Wis. (b) Pere Marquette Ry., operating between Ludington, Mich., and Manitowoc, Wis., and between Ludington, Mich., and Milwaukee, Wis. (c) Ann Arbor Steamship Co., operating between Frankfort, Mich., and Manistique, Mich.; between Frankfort, Mich., and Menominee, Mich.; between Frankfort, Mich., and Kewaunee, Wis.; and between Frankfort, Mich., and Manitowoc, Wis.

Zone L—Extension of territory so that producers in the State of West Virginia, along the Kanawha & Michigan, Kanawha & West Virginia, Coal & Coke (east of Dundon) railways and their short line connections may ship outside of the zone in returning box or stock cars as follows:

Westbound to all points reached via the carferries of the (a) Grand Trunk Ry., operating between Grand Haven, Mich., and Milwaukee, Wis. (b) Pere Marquette Ry., operating between Ludington, Mich., and Manitowoc, Wis., and between Ludington, Mich., and Milwaukee, Wis. (c) Ann Arbor Steamship Co., operating between Frankfort, Mich., and Manistique, Mich.; between Frankfort, Mich., and Menominee, Mich.; between Frankfort, Mich., and Kewaunee, Wis.; and between Frankfort, Mich., and Manitowoc, Wis.

Zone C—Extension of territory so that producers in Illinois, until Sept. 30, may ship outside of the zone as follows: To all points located on the line of the Minneapolis & St. Louis R.R. between Norwood, Minnesota and Minneapolis.

Extension of territory so that producers in Illinois may ship, from Oct. 1 to Mar. 31, outside of the zone as follows:

That portion of the States of South Dakota, Minnesota, Iowa and Wisconsin, located on and within the following described boundary lines: On and south and east of a line coincident with the Chicago, Milwaukee & St. Paul Ry., from Hudson, S. Dak., to Sioux Falls, S. Dak.; thence coincident with the Great Northern Ry., through Pipestone, Minn., to Granite Falls, Minn.; thence coincident with the Chicago, Milwaukee & St. Paul Ry., through Benton Junction to Norwood, Minn.; thence coincident with the Minneapolis & St. Louis Ry., to Minneapolis, Minn.; thence coincident with the Minneapolis, St. Paul & Sault Ste. Marie Ry., through Chippewa Falls and Abbottsford to Amherst Junction, Wis.; thence coincident with the Green Bay & Western RR., to Kewaunee, Wis.

From Oct. 1 to Mar. 31, producers in Vermilion County, Illinois, who are operating mines along the Wabash R.R., may ship outside of the zone as follows:

All stations and points of delivery located on the Wabash Ry. within the State of Indiana, including all points of delivery within switching limits on all other railway lines connecting therewith.

From Oct. 1 to Mar. 31, producers in Sangamon County, Illinois, having operations along the Cincinnati, Indianapolis & Western R.R. may ship outside of the zone as follows:

All stations and points of delivery located on the Cincinnati, Indianapolis & Western R.R. as far east in the State of Indiana as to and including Indianapolis, including all points of delivery within the switching limits of other railway lines connecting therewith.

The foregoing orders are not to apply to railroad fuel, to shipments to Canada or Mexico, or to shipments by inland waterways other than the Great Lakes.

Deadlock in Railroad Fuel Controversy

Until the Director General of Railroads has had an opportunity to go into the railroad fuel matter personally, there is every reason to believe that the deadlock which now exists will remain unchanged until that time. Like the situation on the western front, however, Fuel Administration officials feel that they are winning in being able to halt the ambitious plans of the railway purchasing agents and of their chief, John Skelton Williams. In case they should be compelled to pay the Government prices for coal, the railroads expect immediately to go before the Interstate Commerce Commission with a request that an increase be granted in freight rates.

Weekly Production Statistics

Bituminous coal production during the week ended Apr. 20 was 11,230,000 tons. This is an increase of 3.4 per cent. over the week preceding and brings production back to the normal level. Telegraphic advices covering the week ended Apr. 27 show that even a greater production was obtained during that week.

Anthracite forwardings for the week ended Apr. 20 were 39,147 cars, which is the best showing made in April. Beehive-coke production for the week under review was 655,000 tons, a decrease as compared with production in the week preceding. Byproduct coke production was 471,013 tons. Byproduct production was at 88 per cent. of the capacity of the ovens.

The figures given above are taken from estimates made by C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

Increase in Price on Export Coke

Authority to add 60c. to the Government's export price of coke has been granted by the Fuel Administration. The price is to apply on coke shipped to a possession or dependency of the United States. In addition to the 60c., the operator may add the cost of transportation from the ovens to ship side. No coke is to be exported, however, without special permit. Exports from the Pacific Coast of coke manufactured east of the Mississippi also take the 5 per cent. increase.

More Changes in Coke Prices

New coke prices have been announced by the Fuel Administration as follows: Made at Coalmont, Tenn.: Blast furnace, $7.25; 72-hour or selected foundry, $8.25.

Made from Pratt seam coal in Alabama: Blast furnace, $8; 72-hour selected foundry, $8.75.

Made in Marion and Harrison Counties, West Virginia: Blast furnace, $6.25; 72-hour selected foundry, $7.25.

Made in Barbour and Randolph Counties, West Virginia: Blast furnace, $6.75; 72-hour selected foundry, $7.75.

Made in New Mexico: Furnace and smelting, $8.50; 72-hour selected foundry, $9.50.

Railroad Administration Orders Discontinuation of Statistical Bureaus

By ordering discontinued the statistical bureaus of the various railroads, the Railroad Administration is taking a step which disorganizes the whole statistical system of the Fuel Administration. It is from these bureaus that much important statistical data are obtained on which the Government depends in compiling the figures which enable the public to know at all times the exact status of coal production and movement.

The order will abolish the Bureau of Railway Economics, the Bureau of Tidewater Coal Statistics, Ohio Bureau of Coal Statistics, Illinois-Indiana Coal Traffic Bureau, St. Louis Coal Traffic Bureau, Buffalo District Coal Traffic Bureau and others. Some of these bureaus have been in existence for 25 years.

Since it will be necessary for the Geological Survey or for the Fuel Administration to take over the statistical work which has been done by these bureaus, it would mean no saving in expense to the Government. It would, however, disrupt the work which has been carried on for many years in a very successful manner.

Price Changes for Virginia Mines

New prices for Virginia mines have been announced as follows: Mines in Lee County operated by the Darby Coal Mining Co.; Black Mountain Mining Co.; Virginia Lee Co.; Old Virginia Coal Co.; United Collieries Co.; Benedict Coal Corporation and the Imperial mine of the Virginia Iron, Coal and Coke Co.: Run-of-mine, $2.65; prepared sizes, $2.90; slack or screenings, $2.40.

Brief Washington Notes

D. C. Botting, of Seattle, has been appointed district representative of the Fuel Administration for the state of Washington.

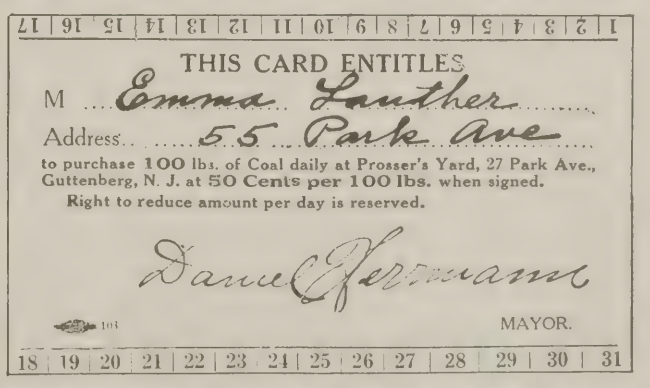
Formal denial has been made by Dr. Garfield of the report that the Fuel Administration was considering moving to Pittsburgh.

Representatives of the commercial florists of the country have agreed with the Fuel Administration to curtail their use of fuel by 50 per cent.

The lightless night order has been suspended until Sept. 1. The action was taken by Dr. Garfield, at the request of the Liberty Loan Committee. Since the change in time by the daylight saving law the use of electric signs has been for a shorter period and was an important factor in influencing the suspension order.

Coal Cards Used Near New York City

During this winter, Guttenberg, N. J., on the Hudson River cliffs just across that river from New York City, being extremely short of domestic fuel, distributed coal by the coal card, of which the following is a reproduction. The Mayor, Daniel Herrmann, for some time received four to eight tons of coal a day from


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

THIS CARD ENTITLES

M .... Emma Lauther

Address .... 55 Park Ave

to purchase 100 lbs. of Coal daily at Prosser's Yard, 27 Park Ave., Guttenberg, N. J. at 50 Cents per 100 lbs. when signed.

Right to reduce amount per day is reserved.

Daniel Herrmann

103 MAYOR.

18 19 20 21 22 23 24 25 26 27 28 29 30 31

Burns Bros. at the docks in West New York, formerly used by the Herbert Coal Co. It had been found that some persons came three and four times a day and so got more than their share, so the cards were adopted. Thus hoarding in the time of severe shortage was prevented. No back orders were filled, only 100 lb. being sold on any one card per day. The distributing times were so arranged that the men working at factories had ample time to get their share. Coal tickets could be purchased on the "workless" Mondays as the Mayor's office was kept open.

EDITORIALS

Placing Responsibility

IF THERE is a serious fuel situation in this country next winter, the public will immediately seek to place the blame upon someone. Last winter Dr. Garfield was the object of censure, and to him was attributed responsibility for all the sorrows of the consumer. Although he did not come into office until the end of August, when the most favorable season of the year for storing coal had already passed, the press of the country repeatedly carried the statement that the Fuel Administrator during the summer months had advised against storing coal.

Now that the Administration is urging all consumers to purchase as much coal as they can possibly secure to fill their requirements, and since attention is called to the fact that production so far this year is far less than the estimated needs, certain elements are already taking advantage of this situation and of these warnings to declare that the fuel administrators are seeking already to pave the way for the failure that they believe inevitable, and to shift the blame onto other shoulders.

Such critics assume that if we have a coal famine the fault must lie entirely with the Fuel Administration. They pretend to ignore what must be evident to everyone, that the Fuel Administrator and his associates do not control the railroads and have no power to purchase and place locomotives and cars in the coal fields where they are so badly needed. When the time arrives that empty cars are placed on the sidings at our mine tipples, and these cars are not loaded immediately with coal for prompt shipment to market, then the Fuel Administrator and the coal operators have failed and public condemnation of them is justified.

Let us briefly view the situation in the United States today as a whole. In the West the mines are not operating because in many districts they lack orders; the reason for this sorry situation is that the railroads refuse to commence now purchasing and storing coal for use next winter. The Fuel Administration has urged the necessity of the railroads making purchases now when the mines need such orders to keep them operating. But Mr. Williams says, "No, the situation is unsettled, we'll buy coal later," and in the meantime dozens of mines are idle, and the operators have the problem of their lives in retaining miners through this period of idleness. In the East many mines have been shut down during past weeks, because of a lack of transportation facilities. And here again the railroads are the transgressors. The time may come, and it may be soon, that the operators and the Fuel Administration will be to blame for failure to meet the situation, but so far that moment has not arrived; and whatever defeat we have met in carrying out our 1918 program up to the present time, has been due to the weak offensive and lack of coöperation on the part of our National transportation system.

One-third of the present year has passed, and the production of coal is 17,000,000 tons less than the output conservatively estimated as necessary to meet urgent requirements this year. During the remaining eight months of 1918 it will be necessary, therefore, to make up this shortage, and if we fail to accomplish this end, the curtailment of industrial activity next winter will be more severe than any contraction of effort that has so far occurred.

Give Away What They Can't Sell

THE *United Mine Workers Journal* is to be given to each of the 400,000 affiliated members of the union. It will thus have a wonderful circulation, and its power for good or evil will be immensely increased. Believing that the average union man still thinks well of his employer and does not like to see him scolded in every issue of his paper, we do not wonder that the *Journal* has not been a marked success.

The good-natured workingman has been a little troubled at the stand taken by his industrial organ. He likes, as we all do, to scold on occasion, and often he finds that occasion without much diligent hunting; for operators and their agents are both pleasantly and unpleasantly human. But on the whole the mine worker is a good-hearted fellow, and his soreness does not last very long. For this reason he does not like the paper of his leisure moments to be so full of bitterness and so sparing of facts. The union has a lot of correspondents available and, if it pleased, its summary of the recent labor events might be an unqualified treat. Furthermore, many a real inequity could be removed if conservatively presented and incisively analyzed.

We believe the mine workers should occasionally look at an operator's publication, and we are sure that operators should often look at the publications of mine workers; but we doubt if the *United Mine Workers Journal* has its due influence on the employer. He realizes that it has little else but criticism of him, and that it is unfair to his cause.

The union forgets, just as the operator too often forgets, that the majority of union men are the best type of red-blooded, hard-headed, honest chaps. They will stand by the right. They will applaud the truth. A few of the rabid who know nothing but vituperation will object to anything which verges on altruism appearing in the columns of the paper they read. But this is a new era. The employers' papers are being humanized, and it seems time for the workmen's papers to drift magnificently into the same current.

The editor of the *United Mine Workers Journal* has recently offered his body to Great Britain for service against the foes of America. When he returns, will he be any less courageous in the affairs of his mind? Will he continue to be a mere partisan after self-sacrificing work in the world army? We think not.

Merely as a business proposition it seems a mistake to continue on the old track in the publication of the organ of the mine workers. The paper will henceforth, so to speak, be a "house organ." No one will be able to tell whether it is really read and approved by those who receive it, for it will be delivered alike to the pleased and to the hostile. The members of the house will have to take it whether they want it or not. But this we do know. It has been run hitherto at a loss, which for 1915 alone reached $65,800. It has reached only one-tenth of the members of the union. Clearly there is something amiss in the editorial policy—not in editors, be it noted, but in their policy only.

Line up the *Journal* with the conscience of the union; line it with the sentiments and the actions of the principal labor leaders; line it with the trend of twentieth century thought and fill it with facts—and there would be no difficulty in trebling the circulation on sheer merit. The *Journal* has had a trend toward liberalism and education, but the trend has been slower than might have been hoped. Now is the time to accelerate that trend. We wager that the great conscience of the miners of America, whether in war or in peace, will respond with alacrity to the new and better spirit.

If our readers will bear with us, we will make a confession. We hope that we see in the appointment of Robert H. Harlin as acting editor a determination toward a more constructive policy. We wish to gain credit for suggesting that policy, but we cannot deny that we believe that Mr. Harlin "saw it first."

Relative Value of Labor and Capital

THE American laboring man, with his keen insight into matters, is little disposed to forget the part that capital has in promoting the service of labor. It is clear that though machinery cannot be run without labor, labor is at a loss to produce without machinery and that the designer of that machinery, and the man who supplies that machine, is worthy of his reward.

Labor might pile wood on its back and tie it with withes of stripped bark and carry it into market. It would be entitled to regard that as a service to which it exclusively contributed. It would be typical of the cruel and, as we now regard it, unnatural suffering which goes with such labor as is compelled to operate without the aid of capital. Such labor is full of pain, sweat and inadequate accomplishment. When capital arrives, it smoothes the road, it supplies rails and cars to carry the burden, furnishes a locomotive to pull it, and the draft on labor is reduced. Who shall say that, in such an example as this, capital has not performed even the greater part of the service? While a human hand turns the throttle, it is the unseen steam that moves the engine.

We are learning gradually that reconstruction, no matter how radical, cannot mean the extinguishment of capital. It will at most only involve an end of private ownership. The workman will never be allowed to use all he produces. Some part of his work will have to be diverted to the development of the means for new and advanced methods of production, such as will make labor in the future more effective.

Profits are the seed corn of labor. There can be no progress without them. The workman dresses himself, steps on the car, or the train, in the morning and comes to his home at night and says labor has provided all these things. But capital has coöperated more than labor. Were it not for capital, labor would be living like a cave bear, and surely no one would be willing to go back to that state of affairs. We shall always be obliged to put by and put by, or we shall cease to progress.

Had we put by more in the past our feet would not have been so terribly entangled by our limitations as we now find them to be. To many of us it has always seemed our duty to spend as much as we made. Everyone was entitled, we declared, to receive and expend all that his hands produced. As a result there has been a limitation of development, waste and inefficiency. We have not measured up to our capabilities, partly because our labor is untrained to the point desired and partly because our capital savings have not been large enough to provide the necessary tools for our hands.

The Corporate and the Aggregate Ego

THE GOVERNMENT of the United States represents the corporate action of its citizens. It is said that prices made to this corporate ego should be reasonable, presumably because it is corporate. On the other hand, there is no tendency to regulate nearly so closely the profits on goods sold to the individual, and in many cases prices are not regulated at all.

It seems quite reasonable to declare that where prices are regulated they shall be the same to the corporate ego as to the aggregate ego. The same people pay that price either corporately or in the aggregate. If a certain price is the right price for the individual to pay it is the right price for the Government railroads to pay. If the buying of the individual is to be speeded the buying of the Government railroads should likewise be undelayed. If the individual should be patriotic, then the Government should not be lacking in patriotism.

A fair price should not cause the Government railroads to balk and the Government should not grant privileges as part compensation for paying an unfair price. The aggregate ego gets no consideration in most of its purchases. The price of dry goods, for instance, is entirely unregulated. The stores mark these goods upward continually. The same goods remaining unsold at the end of one day are marked up before they are placed on sale the next. The aggregate ego has to pay the bill. But the corporate ego is balking at paying prices which that same corporate ego has already declared are reasonable and necessary for the maintenance of production. No one can see why this should be.

The railroad administration (the corporate ego) is utterly indifferent to the true interest of the people (the aggregate ego). The railroads can always get coal winter and summer. All that it is necessary to do is to seize the fuel on the tracks. Next winter the aggregate ego may go cold, the factories of the aggregate ego may be closed, but the corporate ego will be warmed and be active, being supplied with fuel by its unlimited powers of condemnation.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The world is at war; therefore this is no time for domestic readjustments. With this in ever present view we have repeatedly spoken about the evils of the attempted unionization of nonunion territory at this crucial period. We have regretted that the union did not everywhere show an accommodating spirit, worthy of the occasion, such as would be exhibited if it forbore strife wherever nonunion mines are operating.

On the other hand, fairness would have caused us to express opposition to any change in attitude toward "ironclad" contracts. These documents forbid unionization to employees who sign them to such an extent that union leaders who permit locals to be formed where such contracts have been signed subject themselves to imprisonment. But as the matter was at issue before the courts it seemed well to say nothing.

HITCHMAN COAL AND COKE CO. WITHDRAWS SUIT

We cannot forbear, however, from expressing ourselves as greatly pleased that the Hitchman Coal and Coke Co., probably by reason of patriotism, has decided to withdraw its long-drawn injunction suit against the union. We congratulate the Hitchman officials on their decision. A long and expensive action had been taken, and success appeared likely to be secured. No one knows better than those who conduct such proceedings how the striving for success becomes almost a greater incentive for continuance of effort than the object aimed at.

It is the more to the credit of the Hitchman Coal and Coke Co., therefore, that on Apr. 23, after long and diligent striving, that company decided to discontinue its action, an action older by far than our entry into the war. May the union learn moderation from the considerate action of its most bitter opponent. The world is at war, and it is time for a profound peace behind the battling lines.

AND ALL IS PEACE BEHIND THE BATTLING LINES

The anthracite region is wrapped in an industrious silence broken only by the rattling of the coal in the spirals and the slate pickers and by the sound of the plunging of the jigs. The operators are said to be planning to stimulate the patriotism of the mine workers, if possible, to even greater degree by a lecturing campaign in which the cruelty of the Germans and the rapacious purposes of the German government will be laid bare. The anthracite region is the abode of a fervent patriotism already. Those who direct the campaign will do well to avoid inflaming the people beyond control, for while some need the excitement of such a recital, others rather require a reasoned appeal for moderation.

Central and western Pennsylvania have no labor troubles outside of some action, as in Johnstown, against those who will not buy Liberty Bonds. West Virginia has only a small strike to report. It took place at Brown, in Harrison County, a point which might be described as in the Clarksburg field, though a little remote from that city. It arose from dissatisfaction with the scales at the mine and was of only short duration.

In our issue of Mar. 9, page 464, appeared an account of the demands of the miners in Belmont, Harrison and Jefferson Counties for a differential for those who were working in the rider of the No. 8, or Pittsburgh seam. Because of the thinness of that measure, which is known as the No. 8A, the miners thought that a better rate per ton should be granted.

Consequently, on Apr. 24 a joint conference was held in Bridgeport between the operators and the officials of subdistricts Nos. 5 and 6, the meeting being convened in the offices of the United Mine Workers. The operators took the stand that the matter must be submitted to President Wilson for decision. However, on Apr. 25, John Moore, the president of United Mine Workers in Ohio, announced that a satisfactory wage scale had been arranged, but that the terms were being kept secret, as to reveal it "would only stir up dissatisfaction among the other men."

In Alabama the unionization of the coal mines is spreading to the iron mines, where the conditions of operation are not at all dissimilar from those in coal mines. The unionization there also caused strikes and threatened more. At one time six companies were fearing a suspension of operations. Wage increases have been granted.



WHY WE ARE ALL BUYING LIBERTY BONDS

Illinois is beginning at last to realize that we must beware of trying to fight the Germans here instead of "over there." The measure of peace and order here is likely to be the measure of success in France. Only by quietly and industriously working here can we put arms into the hands of our boys in the trenches. Reference is made in another column of this department to the developments in the Prager case and to idling at the "Old Ben" mine and to the appropriate action taken by the Federal authorities.

In Washington State, Sam Caddy has been elected district member of the international board of the United Mine Workers of America, and Ben Farrimond becomes vice president of the district. The vacancy which Caddy fills arises from the appointment—an admirable appointment in our

belief—of Robert H. Harlin to be international statistician of the United Mine Workers and also acting editor of the *United Mine Workers' Journal*. Farrimond fills the unexpired term of Ernest Newsham, who retired from the vice presidency to become secretary-treasurer of the district when William Short resigned to become president of the Washington State Federation of Labor. A regular election will be held next November to fill all district offices.

The suspicions of the Nova Scotia mine workers have been aroused and they are willing to believe anything about their employers. As we recorded they first believed that the operators were deliberately subsidizing local papers to tell about an Allied retreat in France which these mine workers, alone of all the world's population, refused to accept as true. Now they claim that the labor embargo in Newfoundland is being supported by their employers with the idea of making the necessity for importing coolie labor appear more imperative. Reference is made to this in another part of this department.

Labor Shortage at Hard Coal Mines

The unfriendly attitude toward foreigners in the anthracite region in relation to the purchase of Liberty Bonds was discussed last week in this department at some length. This attitude is highly important because of the extreme shortness of labor in which not only the coal operators, but the boards of trade also, are interested. The industrial bureau of the Scranton Board of Trade recently passed a resolution asking that steps be taken to secure the release of 16,000 Italian anthracite miners fighting on the Italian front on condition that they would return to America and dig coal. It was suggested that an equal number of Americans might be sent over to Italy to fight in the Italian lines, in this manner testifying to the Italian people our hearty coöperation with them in their efforts to keep their hearths and homes inviolate from the foreign foe.

The bureau condemned the misleading advertising of the outside employment agencies, and moved that the local newspapers refuse to print advertising which had for its purpose the depletion of the scant labor of the anthracite region.

However there has been some improvement in the number of men employed in the anthracite mines, though the numbers are far below the 177,000 who were working before the war first commenced. The anthracite region has done more than its share in supplying men to the army, in fact to all the many armies. Enlisting freely, so freely in places that more men enlisted than the quota of the region required, the draft nevertheless took more men away. Thus it has been that the anthracite region which might have been, and indeed should have been, spared did more than twice its share. However, active colonization work and increased wages have improved matters a little as the table shows:

Occupations	—Men Employed— Sept. 17, 1917	Feb. 18, 1918	Change
Miners	42,020	42,638	Increase 618
Miners' laborers	23,018	22,069	Decrease 949
Company men (inside)	40,427	42,695	Increase 2,268
Company men (outside)	40,940	42,483	Increase 1,543
All other employees at collieries	5,671	5,289	Decrease 382
Total	152,076	155,174	Increase 3,098

The Liberty Loan situation does not appear to have occasioned any actual strikes, although such strikes have often been threatened. The attempt to secure an adherence to the union somewhat similar to the adherence demanded to the nation did, however, cause the Luke Fidler colliery to close down. Here not more than half the men had paid their monthly dues and a strike was entered into to bring the delinquents into line. On two occasions in the week before last the Mammoth Locust Gap colliery belonging to the Philadelphia & Reading Coal and Iron Co. was closed by button strikes, and several independent collieries were similarly laid idle.

The mine workers appear to think that the operating concerns are becoming more favorable to the institution of the check-off which would make the nonpayment of dues at least less frequent. Many a man would hesitate to notify the company employing him that he would not authorize it any longer to contribute part of his pay to the union, whereas he would think less of omitting to make payment of his dues. However, the idea of the mine workers is a check-off system which would contain closed-shop provisions. The leaders of the mine workers have been urging their members to compel or urge solidarity in union support in some other way than by button strikes, for striking reduces the output of coal.

Bloomer Girls Appear at Mines

Several graduates of the Nesquehoning High School on Apr. 23 took positions at the mines of the Lehigh Coal and Navigation Co., purposing to act as timekeepers, weigh-scale tenders, switchtenders and in other capacities. They wore bloomer uniforms and middy blouses, while caps covered their hair, the outfit being supplied by the company.

Apparently the union objected to women thus assisting in the mine work, despite the shortage of mine workers in the anthracite region, for Thomas Kennedy, president of the United Mine Workers of America in the Seventh district, has announced that S. E. Button, the chief of the Pennsylvania Department of Mines, agreed Apr. 27 to issue orders against the employment of girls in and around anthracite mines.

Lackawanna Gives Bond Bonuses

The Delaware, Lackawanna & Western R. R. Co. has been distributing Liberty-Bond bonuses to all its employees who are on a monthly salary and who receive less than $3000 a year. This is in accord with an arrangement made last December. The whole distribution amounts to $625,000. Employees receiving $600 a year and less get a $50 bond; from $601 to $1200 a year, a $100 bond; from $1201 to $2000 a year $150 of bonds; from $2001 to $3000 $200 of bonds. The bonds given are of the second 4 per cent. issue.

It will be noted that this increase is given to salaried men only, who have probably not prospered as greatly in recent months as have the day workers and miners. As a proof that miners in general are doing well it is recorded that Schuylkill County has been divided into five sections for internal-revenue collection. It used to form a single district, but the number of miner taxables has made it necessary to make this more minute division.

Lack of Safety Used as Strike Excuse

The "Old Ben" mine, No. 11, at Christopher, had an explosion on Nov. 29 in which 17 men were killed. The men complained that there was a lack of safety appliances and demanded the installation of several devices. These were provided by the company, and on Feb. 1 the inspectors and Federal officials announced that the mine was in condition for a resumption of work. But the mine workers refused to return to work, giving excuses that the Government investigators declare "trifling and frivolous."

On Monday, Apr. 15, Robert Childs, a special assistant of the United States Attorney-General, and Assistant District Attorney McCawley Baird of East St. Louis went to Christopher and a mass meeting was held Tuesday night, and an appeal was made to the men, on patriotic grounds, to return to work, but no satisfactory assurances were received. Another meeting was held on the night of Apr. 25 and the miners were given plainly to understand that they would be tried immediately for conspiracy to diminish the fuel supply unless they returned to work. Next morning they resumed.

The mine normally employs about 500 men and is a thoroughly well-equipped operation, the property of the Old Ben Coal Corporation. With an adequate mining force it would easily produce 4500 tons a day. Recently there have been a number of "loyalty" demonstrations at Christopher and adjacent mining towns, which were said to have

been made by idle Christopher men. The so-called "loyalty" outbreaks are just now under suspicion. Much of the loyalty in southern Illinois is mere hoodlumism such as Samuel Johnson knew so well how to stigmatize.

Mine No. 3, Edwardsville, Madison County, has been closed for several days as there are differences between the owners and the operators. The miners are willing to continue at work if their wages are guaranteed.

Illinois Becomes Less Rabid

Illinois is recovering from its rabid attitude toward alien enemies. The state is not going to allow race riots against foreigners, or negroes either, for that matter. Brigadier-General Wells of the Illinois National Guard and two members of his staff have just completed a tour of inspection through the southern Illinois coal fields, and Wells assured the officials of the various counties that troops would be sent into the district if there were any further disturbances.

The Madison County grand jury has shown that it has no sympathy with lynching by returning 12 indictments charging murder and four indictments charging malfeasance. Of the 12 men charged with the murder of Prager eight are mine workers. Of the four Collinsville policemen charged with malfeasance three were at one time similarly engaged.

Five of the men charged with murder were held by the coroner's jury and have been in jail since the inquest. They are Joseph Riegel, Wesley Beaver, William Brockmeier, Richard Dukes, Jr., and Enid Elmore. Six others were arrested under the indictments: John Hallsworth, Calvin Gilmore, Charles Cranmer, Frank Flannery, James de Mattias and Cecil Larremore. The twelfth man had not yet been arrested at last reports from our correspondent. The four policemen are Fred Frost, Martin Futcheck, Harry Stephens and John Tobnick. Tobnick has resigned from the force, but the other three, after capiases were served on them, gave bond and were allowed to remain on duty.

Moses Johnson, subdistrict board member of the United Mine Workers, who has charged that Prager was disloyal, but has failed to substantiate his charge, conferred with the miners after they were arrested and promised to obtain bond for them. Though warrants for the arrest of the mine workers were placed in the hands of deputy sheriffs on Liberty Day, the authorities did not take action as they feared there would be a riot should the men be arrested during the patriotic celebration. It appears that the authorities are still somewhat afraid to take appropriate action. Perhaps they are not to be blamed, but certainly the spirit of the citizenry of Collinsville is subject to the gravest of criticism.

While the grand jury was still investigating the Robert P. Prager lynching, the local union, unabashed at the crime committed, met and fined John Tonso, Paul Schrieber and Joseph Robino $50 each because they indorsed the application of Prager when he applied for membership in the union. The specific charge was that they had violated the constitution of the Illinois branch of the United Mine Workers by certifying that Prager was an experienced miner though he had only had 28 days experience in the mines. One would have imagined that these Collinsville mine workers would have tried to forget the horrible tragedy except insofar as they combined with the authorities to bring to justice all those whom they knew were guilty of that highly criminal offense.

It seems like a gruesome joke to fine anyone for assisting a postulant to gain admission to such an unworthy local union, membership in which could scarcely be regarded as a privilege or an honor. The local belatedly has arrived at some niceness in its selection among postulants, though the choice is apparently not one based on moral qualifications. If this local had been as precise at an earlier date in demanding moral qualifications as it is now in requiring experience, Prager would not have lacked defenders when the assault was made on him in the village streets of Collinsville.

Tennessee Company Submits to Pressure

The Tennessee Coal, Iron and Railroad Co., believing in running a nonunion operation, has strenuously refused till recently to accept the recommendation of the United States Fuel Administration, because it regarded that document as tantamount to a recognition of the union. The company argues that it has always been a good employer, that in the matter of providing good homes, healthy conditions and safety it has set the pace in the South, just as the H. C. Frick Coke Co. and the United States Coal and Coke Co., its related concerns, have set the pace in the North.

But the union has pressed for the coöperative bargain and the Fuel Administration has granted it, not indeed to the union as a whole, but to the men employed at any one plant. These men when organized by the United Mine Workers of America and financed by them are not to be distinguished from that organization. They are Company J, let us say, of the United Mine Workers industrial army. The union does not disguise it and the T. C. & I. is not to be blamed for realizing that in recognizing their men they really recognize the union in which their men belong.

The Tennessee company therefore for a long time refused to submit to the recommendation. Now they accept it without signing it. They merely promise compliance. One might suggest that as their word is as good as their bond, they might just as well have signed as have refused to do so. Probably, however, they hoped that their compliance would not be recorded and that it would be for them merely a matter between Dr. Garfield and themselves. However pressed by George Huddleston, the representative in Congress from the Ninth Alabama District, which covers Jefferson County, Dr. Garfield, about Apr. 17, revealed that the Tennessee company was committed to the Fuel Administration's recommendation. The difficulties between the company and its employees will in future be arbitrable by Judge H. C. Selheimer, of Birmingham.

The terms of the recommendation to which the company adheres, and which were published in our issue of Jan. 19, were as follows, the last item being finally determined by the agreement of Apr. 20 recorded last week in this department:

The right of employees to belong to any union without discrimination being used against them by the employer. Reëmployment of men discharged for joining the union. Recognition of mine committees. Right of men to join in peaceful assembly. Creation of tribunals for the adjustment of disputes. Right of men to place checkweighman on tipples and right to have wage of said checkweighman collected in manner prescribed by employees. Establishment of the eight-hour workday. Readjustment of tonnage and yardage rates July 1, 1918.

Nova Scotia Miners Fear Coolie Labor

An order in council has been passed by the government of Newfoundland forbidding unmarried men between the ages of 20 and 35 from leaving that "Ancient Colony." This seems an appropriate way of conserving for war service the man power of the colony, but it so happened that when it was passed a number of agents of the Amalgamated Mine Workers of Nova Scotia were busy recruiting men for the mines in that province of the Dominion of Canada. The order in council appeared, and may possibly have been, directed at these labor emissaries.

It seems, however, that the "Amalgamated" saw in the action of the council the long arm and hand of the Dominion Coal Co. Could it be possible, they declared, that the Dominion Coal Co., anxious to secure coolie labor, is unwilling that its needs should be supplied by our kindred in Newfoundland? Is the Dominion Coal Co. seeking to embargo Newfoundlanders so as to make the introduction of Chinese the only possible alternative? The suspicious mine workers suspect some such explanation is back of Newfoundland's action. Yet what is more natural than that a government like Newfoundland, which is establishing conscription should prohibit the migration of its citizens even to the provinces of an allied government.

DISCUSSION BY READERS

Buying Liberty Bonds

Letter No. 1—Reading the editorial entitled "Do We Really Want to Win the War?" *Coal Age*, Mar. 30, p. 596, set me to thinking; and I wondered how many of us, here in America, are in dead earnest and willing to make the sacrifices that the occasion demands. Many have sent their sons to the war with the strong expectation that they may not see them again. That is real sacrifice; but, beyond this, few of us are feeling the burden of the war.

It is no material sacrifice for a man to buy Liberty Bonds, which is a good and safe investment; and, yet, we find many men in our mining camps who refuse to buy a Liberty Bond and offer the excuse that it helps to kill their sons and brothers.

One cannot but sympathize with the foreigner who has left his wife and family in the old country and come to this land seeking a fortune, in the hope of going back to his homeland with means sufficient to buy a farm. As the war goes on, however, this excuse grows less acceptable every day.

In the selling of the first Liberty Bonds, I took an active part. Judging from my own experience in this work, there are scores of foreign-speaking men who refuse to buy a bond, but who have laid by thousands of dollars earned in this country. While, formerly, such were quite generally excused by reason of their attachment to their homeland, it is time now that that excuse be brushed aside and the foreigners living and working in this country make a just return for the privileges that they have enjoyed since they came here.

FACTS AND FIGURES—THE PRICE OF LIBERTY

The writer of the editorial to which I have referred estimates that the raising of $5,000,000,000 would mean the giving of $250 by each family in this country. While I would not be willing to say that every family could lay by $5 a week to make up this amount in a year, I am sure that there are thousands of families among our miners who are able to make this contribution toward the cause.

Wages have never been so high as at present. Indeed, a mine foreman cannot interest the miner whom he wants to hire, unless he can show him a place where he can make $6 or $7 a day; and it is no sacrifice for such a one to put by $5 a week to assist in maintaining the liberties he enjoys.

In the present campaign for the Third Liberty Loan I believe that justice alone demands that every foreign-speaking man, regardless of his nationality, be expected to subscribe his share in the undertaking.

The argument that "this is a free country and every man can do as he pleases with his own," cannot apply when that freedom is at stake and looks to every loyal citizen for its support. This campaign should be general and all companies should coöperate. Every employee who subscribes to a bond should have a button and that button should be his passport or recommendation for employment wherever he goes among the mines. Without it, his chances should be slim.

While I realize that many will shake their heads in disapproval of such action, it appeals to me as justifiable, under the conditions that bind all freedom-loving people together by a common yoke. We should all pull together and work for the success of what will insure to us a free country to live in. THOMAS HOGARTH.

Heilwood, Penn.

Coal Production and Booze

Letter No. 9—Whether coal miners are more addicted to the use of strong drink than workmen employed in other industries is uncertain. That many of them have inherited a great thirst for drink from which it is almost impossible for them to break away cannot be denied. The charge, coming from many quarters, that coal miners are indulging in strong drink to the extent that they neglect their work and the production of coal is thereby shortened seems to be true.

When miners go on a strike over what may prove to be a trivial disagreement with the management, the production of coal is naturally cut off for a time. In that case, however, there would appear to be a shadow of an excuse, justifying their act in closing down the mine. But, for miners to stay out of the mine for no other purpose than to satisfy their thirst for drink, at a time when the nation needs every ton of coal it can get for the successful prosecution of the war, there is no justification. Such an act on the part of any miner can only be regarded as next to treason to his country.

I was forcibly struck with the statement of John Buggy, in his letter, *Coal Age*, Feb. 9, p. 300, that in his town of 375 persons there is consumed 200 gal. of intoxicating drink a week. This would average more than two gallons a month for every man, woman and child in the town, and, yet, Mr. Buggy adds, "all the men in the place are not confirmed drinkers." It is certain, then, that those who do indulge are heavy drinkers. If the cost of liquor is as high in that town as it is here ($6 to $10 per qt.) the habit must cost the drinker a large amount.

WHERE THE SALOON IS EXCLUDED

The town in which I am living has a population of about 2000, and I feel safe in saying that 200 gal. of intoxicating drink is not brought into the place in a year. A few years ago the saloons were voted out of town. Previous to that time, I have known miners to draw over a hundred dollars on payday and blow it all in at the saloons in two or three days.

The exit of the saloon, however, has brought a great change and taken the boozers to other places. You never see a miner here under the influence of drink and

one seldom hears it mentioned. Since the saloons disappeared, the town has had better schools, better streets and better people.

The suggestion that the Government limit the amount of liquor a miner should drink in a given time does not appeal to me as a means of curtailing the drink habit among miners. Allowing that coal production is as great a factor in winning the war as claimed, it would seem that if the supply of coal is being curtailed through the drink habit of miners, *the Government would be amply justified in taking the liquor question in hand and settling it for all time, by prohibiting the manufacture and sale of intoxicating drink throughout the length and breadth of the land.* To my mind, that would be the surest way of dealing with the matter.

Government regulation has been exercised in respect to other industries where such action was necessary to avoid interference with the prosecution of the war. Why, then, should not the manufacture of intoxicating liquor be dealt with in the same emphatic manner.

It is said that the Government must rely upon its army of miners as certainly as upon its army of soldiers, the one fighting at home and the other fighting at the front. But, drunken soldiers are worthless, and a drinking miner cannot perform his part in the great struggle. There is every reason, therefore, for the Government to take a hand and eliminate this greatest evil of the times.

In another letter, Feb. 2, p. 259, under the caption "Miners and the War," a miner has drawn a picture of schools in the heart of the anthracite coal field being closed down to save fuel, depriving the children of needed education, while their fathers are grouped around a hot stove in a bar-room, unfitting themselves for the work of producing coal.

Let the Government Answer

The question comes home to us, *Why does our Government permit the heating of saloons when the schools are closed to save fuel? Why are the people rationed on bread when bushels of grain are being converted into liquor in the breweries?* These questions cannot be answered without revealing facts that are a burning shame to any honest government.

The statement made in the same letter that "the saloon is the last thing the miner sees in the morning when going to work and the first thing he strikes on his return from the mine" reveals a deplorable state of affairs in the mining town or camp to which it refers. But, miners who are true and loyal to their country's interest will not spend their time and money in the saloons when their services are needed in the mines; and the men referred to by this writer are surely not American miners.

In conclusion, let me say that it is encouraging to note the rapid growth of sentiment for national prohibition, among the better element of miners of all nationalities. The patriotic and sober miner is disgusted with his fellow worker who indulges in strong drink and absents himself from the mine where he is needed. Miners are making good money and the opportunity is afforded them by the Government to invest it at a good rate of interest where it will be safely kept against the time of need.

It is always a sad sight to see an old miner, who has passed his sixtieth year, and whose head is gray and form bent under the burden of his years, still digging coal as the only means of obtaining a living. In his younger days he has made good money and regrets now that he did not lay it aside for the future, instead of spending it in a way that did him more harm than good. Let every young miner, today, take this to heart and resolve that such will not be his condition later in life.

John Rose.

Dayton, Tenn.

Storage-Battery Locomotives

Letter No. 2—I was interested in reading the letter of "Engineer," *Coal Age*, Mar. 16, p. 513, in which he alludes to the great advance the storage-battery locomotive has made since it was first introduced in mining a few years ago. The following items may be of interest in this connection:

There are, today, several types of storage-battery mine locomotives in use. I believe I have the honor of being one of the first to adopt this type of locomotive for use in the mines, in this particular field, having employed them during the past four years.

The first locomotive of this kind introduced into our mine was a 5½-ton machine equipped with 48 lead-battery cells. This locomotive was used for one year in the work of gathering coal from rooms and delivering it to the tipple, with an average length of haul of 3500 ft. In some places there was a 3 per cent. grade against the load. The locomotive hauled 125 cars, in a 9-hour shift. The loaded cars weighed 4 tons, gross, apiece and were equipped with roller bearings.

After working this machine one year on the long haul mentioned, it was used six months longer for gathering cars from the rooms and placing them on the main line switch, and the life of the battery then expired. During this period of 18 months, this locomotive had taken the place of four mules and three drivers and had operated continuously with a total cost for repairs of $86.45 exclusive of replacing exhausted cells by new ones.

Advantage of Improved Types

Storage-battery locomotives are very simple to operate, and it is my opinion that the many late improvements in respect to durability and the recharging of the battery have earned for it a permanent place in the gathering of coal in mines. A battery is now being placed on the market having a 10-year guarantee. This battery can be fully recharged in 3½ hour, for an 8-hour shift, which overcomes the necessity of operating the power plant and employing a man to watch the locomotive at night. The arrangement is such that the battery is automatically cut out as soon as it is fully charged and retains its full capacity of power.

Storage-battery locomotives possess many advantages over the trolley-and-reel locomotives. The necessity of installing a trolley wire and bonding the track is eliminated. One advantage worthy of consideration is that the motorman, not having to divide his attention between the trolley pole and the reel is in a position to watch his helper more closely, whereby many accidents are avoided.

Another consideration is the fact that where mines are supplied with power from a central station, it fre-

quently happens that the power is cut off at intervals, which renders the trolley locomotive helpless on the main road. When this happens it is possible to run the storage-battery locomotive out on the main line and thus keep the coal running to the bottom of the shaft.

Sovereign, W. Va. SUPERINTENDENT.

Mine Cars

Letter No. 7—As may appear from a previous letter of mine published in *Coal Age*, Mar. 9, p. 468, asking for accurate information on mining equipment of different kinds, I have been deeply interested in the letters relating to this subject.

My attention has been particularly drawn to a letter signed "Experience," Mar. 16, p. 514, in which the writer attempted to give the comparative costs of lubricating plain- and flexible-bearing mine cars. His estimate of $16.64 per car as the total yearly cost for oiling plain-bearing cars leads me to think that he has not based his calculations on actual facts; but has, like the small boy, "thunk them all out of his own head."

Kindly permit me, then, to present a few actual figures based on carefully kept cost-records of the past year. The prices of oil and grease quoted are the war-time prices in this district, and the labor is according to the latest wage scale. While very few mines run 300 days in the year, I will use that figure for the sake of convenience.

Estimated Cost Based on Practice

In our mine we have 420 cars in use and permit none of them to remain idle except when laid up for repairs in the shop. Our cars average a run of 12 miles per car, per day. The records show that we use an average of 2 bbl. of oil in three days when the mine is running. Estimating on operating 300 days in the year, this would mean two hundred 50-gal. barrels of oil, costing, at 12c. per gal., $1200 a year; or $1200 \div 420 = \$2.86$ per car, per year.

We pay our oiler $4.36 per day, which would amount to $1308 a year of 300 working days. This would show a labor cost for oiling, $1308 \div 420 = \$3.11$ per car, per year. The total cost for oil and labor would, therefore, be $\$2.86 + \$3.11 = \$5.97$ per car, per year.

Now, by way of comparison, it will be observed that "Experience" gives the total cost of oiling roller-bearing cars, per year, as $1.60 per car; and deducting the 40c. given as the cost of labor leaves $1.20 as the price of the grease used per car, per year, which he quotes at 10c. per lb. From this, I assume that he estimates 12 lb. of grease per car, per year. But, at the present price of 16c. per lb., this would make an expenditure of $12 \times 16 = \$1.92$ per car, per year, for grease.

From information at hand, I estimate the labor of greasing would be 35c. per car, per year, which would make the total cost of greasing, including labor, $\$1.92 + \$0.35 = \$2.27$ per car, per year. This shows a difference in favor of flexible roller-bearings of $\$5.97 - \$2.27 = \$3.70$ per car, per year.

However, inquiry shows that it will cost about $50 per car to make the change from plain to flexible roller-bearings. That being the case, the advisability of making such a change will depend on what other savings can be realized by the use of roller bearings.

The user of mine equipment of any description must always be on his guard against misleading statements, and claims made by manufacturers of different types of the same kind of equipment. As in the case to which I have referred, the statistics given are frequently based on inaccurate information. Actual working conditions soon prove the fallacy of accepting these claims and statements as gospel truths. To illustrate this point, allow me to cite a single instance, which I believe most mining men will agree was a greatly exaggerated statement on the part of the manufacturer.

In a display advertisement of a leading firm, exploiting a new device for the handling of cars on the shaft bottom, the statement was made that after said device had been adapted to the style of mine cars in use, one of the items saved would be a 50-per cent. reduction in the labor required at the bottom of the shaft. It is difficult to understand how from 700 to 1200 cars a day can be hoisted in a single shaft and avoid the employment of from five to seven men.

Statistics of Actual Performance Wanted

It might be assumed that I am not supporting the use of up-to-date mining equipment. But on the contrary, I am a firm believer that both the flexible roller bearing for mine cars and the storage battery motor for gathering coal at the face, as well as many other types of improved mine equipment, have come to stay. The point I wish to emphasize, however, is that what the operator needs and must have, before installing new equipment, is reliable information giving actual statistics in respect to the durability and upkeep.

Some operations may be nearing completion and will not warrant replacing the old equipment with improved types. At the same time, the operators may have future plans in view, and it behooves all mining men to keep posted on the latest mining methods and equipment. This is all the more important, because in a few years competition will be close and costs will be the main topic among operators.

Allow me to say, in closing, that our cars are kept well oiled and dry wheels are practically unknown in our mines. I believe that the time to oil an old-fashioned wheel is every time you look at it. In our mines, this work is not left to half-grown boys, but is in charge of a responsible man, who has other duties to perform, such as coupling cars and assisting in the general work on the shaft bottom. J. S. GELSTON.

Nobleston, Penn.

Removing Worn Locomotive Tires

Letter No. 1—In looking over a recent number of *Coal Age*, my eye rested on an article entitled "Retiring Mine Locomotive Trucks," by J. L. Ball, in the issue, Mar. 23, p. 530.

In that article, Mr. Ball describes his method of removing wornout tires from locomotive trucks, by boring a ¾-in. hole entirely through the center of the tire to be removed, and then expanding the tire, so that it can be slipped off from the truck, by inserting a drift in the hole and driving it in with a sledge until the tire is loosened.

While this method described by Mr. Ball can be used to remove tires that are too badly worn for

further use, it is clear that it cannot be employed to remove tires that are to be turned down and used again. We all know the life of locomotive tires can be greatly extended by turning down worn tires; and it may be possible to do this, at times, without removing the tires from their trucks.

Where the arrangement in the shop is such that the tire must be removed from its truck before it can be turned down, the usual method to employ is to expand the tire by heat, until it is sufficiently loose to drop off when struck with a sledge.

In order to remove a tire by expanding it by heating, the truck is turned up on end and supported, in a vertical position, on bricks in a mound of earth so arranged that the entire center of the wheel is protected and the tire alone exposed to the heat of the fire, which is then built around it. Wet mud is filled in between the spokes and above the center, so as to fully protect that portion of the wheel from the heat of the fire.

Care must be taken to apply a fairly moderate heat, distributed uniformly over the whole surface of the tire. As the iron warms, the tire expands and a few blows from a sledge will soon cause it to drop from the truck, which must be at once removed from the fire. The success of the operation depends largely on building a quick wood fire, by which the heat will be applied more uniformly to the tire without reaching the wheel.

It sometimes happens that after turning down the tires, the locomotive sits too low on the track. To overcome that difficulty, it is necessary to block up the body of the machine under the springs. In heating new tires that are to be shrunk on the wheel, do not place two tires together, but separate them by putting bricks between, which will enable the heat to be applied more uniformly and give better results.

B. SHELL, Vice-Pres. and Sec'y,
Logan, W Va. Guyan Machine Shop.

Safety in Shotfiring in Mines

Letter No. 3.—In the Foreword of *Coal Age*, Feb. 23, there appears this statement, "Recently sticks of dynamite have been found mixed with coal in several coal cars. Investigation has shown that the explosives were placed in the cars at the mines." Permit me to express the opinion that most of this is due to carelessness on the part of some miners, rather than any intent of alien miners to destroy life or property.

There are employed in the mines at this time many careless and inexperienced men who are handling explosives, and it should not be thought strange if occasionally one or more sticks of dynamite are found mixed with the coal. I have seen as much as a whole stick of a poor grade of dynamite that had failed to explode, mixed with the coal at the face, and I have heard other miners say that they have seen the same thing, but in loading the coal into the cars most generally but not always the miner sees them and throws them out.

In this time of war, we are all on the lookout for the enemy everywhere, and the finding of an unexploded stick of a poor grade of permissible explosive in a car of coal receives more attention now than in a time of peace. I have known, personally, more than one instance where miners have failed to take a keg of powder out of the car, before loading the car at the face, and the powder was hauled out of the mine and dumped into the chute.

One instance occurred where the coal was loaded into a car on top of dynamite and the whole was tipped into the chute. On another occasion the coal was loaded into a car that was more than half-full of props and coal and props all went into the chute. I mention these instances to show to what an extent the carelessness of miners prevails in loading their cars.

At the present time, every safety measure possible should be adopted and strictly practiced in mining, in order to prevent alien enemies from getting explosives in their possession. I fully agree with the suggestion made in the Foreword to which I have referred that the appointment of shotfirers who merely ignite the shots loaded by miners, would not prevent alien enemies from getting hold of explosives.

Present Custom an Unsafe Practice

As long as the present custom of permitting all miners to handle explosives continues, there will always be many opportunities for aliens to get possession of the dangerous stuff. As a protection to life and property, and a safe guard against the placing of explosives in coal cars and other places for destructive purposes, as suggested in the Foreword, all shots in all mines should be fired by shotfirers, who must be competent, careful, honest, sober and practical miners and have in their charge all explosives.

The miners should be required to bore their holes, prepare the tamping material and have it at the place; but the shotfirers must place the charge, tamp and light the shots. Under such a system, no doubt many badly located holes would be left uncharged and unfired, but in the end this would have a good effect, as it would tend to make the miner use the pick more, and be more careful in arranging his shots.

Shotfirers Should Be Employed in All Mines

At first, the employment of shotfirers may appear to be unnecessary and expensive in the opinion of many operators; but, after a little careful figuring it will be found less expensive in the end, than for miners to prepare and fire their own shots. As suggested in the Foreword, there would be a reduction in the number of accidents caused by the careless use of explosives by inexperienced miners, and there would be fewer damage suits to be settled in the courts.

With practical shotfirers the number of shots to be fired would be reduced, and the amount of coal broken down increased. The amount of explosives used would thus be materially lessened and there would be fewer overcharged shots. There is no question but what many miners to-day are not using the pick sufficiently and giving their shots enough clearance, but are depending upon excessive charges of exposives.

I think the mining departments of the several states should take this matter in hand and enforce such regulations as will be effective in preventing alien-enemy miners from handling explosives in and about coal mines. There seems to be a strong tendency on the part of some inspectors to have all mines put on shotfirers. Where the authority is not already given

by law to do this, the inspector himself should require that it be done.

The district and assistant mine inspectors of the states are more interested in the safety of miners in their territories than any one else; and the question of the employment of shotfirers, as a means of safety to miners and to prevent alien-enemy miners from handling explosives in and about mines, should be turned over to the mining departments. As suggested, "This is not a time for halfway measures."

Dayton, Tenn. SAFETY FIRST.

Straightening Brittle Mine Rails

Letter No. 1—When reading a back number of *Coal Age*, a short time since, I came across an inquiry asking for the best method to be used in straightening brittle rails in mines [Vol. 10, p. 613]. It was explained that the rails had become crystallized, and were so brittle that when an attempt was made to straighten them the iron would break.

In the reply given to this inquiry, the crystallization was attributed to the pounding and vibration to which the rails are subjected in motor haulage. It was recommended that such rails should be annealed, for which purpose they would have to be heated and that required taking them out of the mine.

I want to suggest that such a proceeding is not necessary, as the rails can be straightened without heat and without being broken. The process is a very simple one, the only cost of the operation being the wages of the man doing the work.

The scheme is, I believe, quite well known to the majority of miners and it will hardly be necessary to more than refer to it, by way of drawing attention to the lack of necessity for taking the rails out of the mine. If desired, however, I can describe the method, or someone else can do so if they choose.

——, Penn. MECHANIC.

[*Coal Age* and its readers will be glad to have this correspondent describe the method of straightening brittle rails, in mines, without breaking them and without resorting to the usual process of annealing the iron to make it more pliable.—Editor.]

Working 10-Ft. Inclined Seam

Letter No. 2—I was interested in the inquiry of "Superintendent," *Coal Age*, Mar. 23, p. 561. In answer to his request for suggestions as to the best method of working a 10-ft. inclined seam under a weak roof, kindly permit me to submit the following:

This seam, outcropping on the surface, should be opened by two separate slopes driven on the floor of the seam 100 ft. apart. These slopes should be 9 ft. wide. Owing to the height of this seam and the weak roof overlying it, at least 3 ft. of the coal should be left up, which will make a fairly good roof.

Steel timbers should be used at the opening, and, if necessary, steel crossbars should be used on the main haulage road. Owing to the short period of time the cross-entries will be kept open, wooden crossbars can be employed, and these should be hitched at least 9 in. into the coal on each rib. Under the conditions named, it is important to protect all entries by leaving ample pillars; and I would suggest the use of 60-ft. center pillars and 100-ft. barrier pillars on all entries. Owing to the great thickness of entry pillars, it may be possible to drive the crosscuts 100 ft. apart.

The cross-entries should be driven on the strike of the seam, in pairs, 400 ft. apart. Rooms should be turned on 40-ft. centers to the rise of each pair of cross-entries. The room necks should be driven 9 ft. wide for a distance of 20 yd., where the room is widened to 15 ft., leaving pillars 25 ft. wide between adjoining rooms. The rooms are driven up a length of 100 yd., which will leave a barrier pillar 100 ft. wide between the face of the rooms and the pair of cross-entries above them.

Owing to the softness of the sandy shale forming the floor of the seam, a systematic method of timbering should be adopted. Props should be set not over 4 ft. apart and crossbars used over the roads in each room. Other props should have a broad cap piece and foot board, which will afford a better support for the roof coal. Pillars should be drawn back to within 60 ft. of the entry and the entry pillars and stumps withdrawn when the rooms are finished. A large percentage of the roof coal can be recovered when drawing back the pillars.

IMPORTANT PRACTICAL CONSIDERATIONS

It is very important that this mine be kept well drained. All rooms and entries should be driven on sights established by competent engineers. An accurate map of the mine should be made and kept up to date by frequent surveys. Besides the entries and rooms that form the mine workings, the map should show all surface features such as streams, rivers and other bodies of water, besides all buildings and other improvements. A map of this kind will give the mine foreman valuable information when robbing the pillars.

It is my opinion that punching machines will be found best adapted to the mining of this coal. These machines provide a good undercut from 12 to 16 in. in height at the face of the coal, which will be found a great advantage when the coal is blasted, as it will assist in keeping the roof strong. I would suggest taking out this coal in two benches, each 3½ ft. thick, making a total height of 7 ft. to be extracted in the first working.

Motor haulage could be used to good advantage in this mine. The trolley wire can be carried on one side of the entry, which is high enough to insure safety from the accidental contact of men and animals with the wire. There should be maintained a clearance of 2½ ft. on one side of the road, with shelter holes every 45 ft. on the same continuous side of the entry. This will provide ample safety for persons traveling the haulage roads when the motor is in operation.

The mine should be ventilated by a fan, and the air current directed to the face of the workings, by building good concrete, brick or tile stoppings in the breakthroughs, and using brattice cloth in the rooms when this is necessary to cause the air to sweep the face of the coal. The split system of ventilation should be employed, which will give each district its own supply of fresh air and provide the greatest safety.

Dubois, Penn. ROBERT WILLIAMS.

INQUIRIES OF GENERAL INTEREST

Measuring Air Velocity in Mines

Kindly permit me to ask, What is considered the most accurate method of measuring the velocity of air currents in mine airways? Is the velocity at the center of the airway generally accepted in practice, or is an average velocity obtained by taking readings at different points in the cross-section of the airway, such as at the sides, roof, bottom and center; and would this average more correctly represent flow of air for the entire sectional area of the airway? Also, kindly state what make of anemometer is the most reliable for taking velocity readings varying from 50 to 5000 ft. per minute.

Coral, Penn. INQUIRER.

The measurement of the quantity of air passing in a mine airway, by taking velocity readings at a given point in the airway is attended with numerous difficulties that render the results obtained more or less approximate. There are many conditions that make it practically impossible to determine accurately what is the average velocity of the air current in a mine airway.

As is well known, a straight airway that is unobstructed, permitting a uniform flow of air through it, will not give the same velocity readings in close proximity to the sides, top and bottom of the airway as at the center. The friction between the passing air and the rubbing surface of the airway acts to retard the flow of the air in contact with that surface.

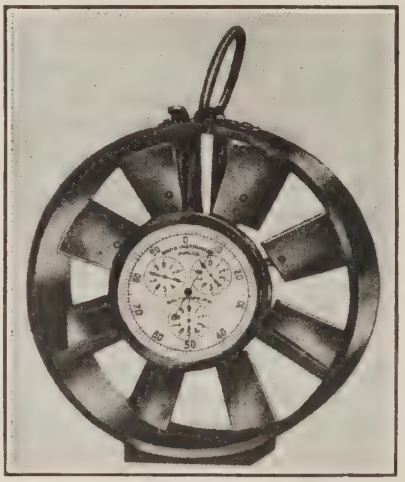
Again, where bends occur much of the air is deflected from its course in the airway, and crowds the outer curve of the bend where the velocity will be the greatest. Owing to the same cause, the velocity at the inner curve of the bend will be less than at any other point of the airway.

Again, because of a difference in temperature or gaseous condition of the air passing into the mine and that filling the workings and many void and abandoned places, the warmer or lighter air will crowd the roof of the airway, while the cooler or heavier air travels along the floor. This may give a different velocity of the air current at the roof and the floor. The same effect is observed in dips and rises in the airway, where the bulk of the air may crowd the roof or the floor of the passage as the case may be.

An important factor to be considered, in taking measurements of the velocity of air in an airway, is the obstruction that the observer's body presents to the even flow of the air. It is impossible to make any accurate allowance for this obstruction, which always acts to increase the reading of velocity, but not in proportion to the decrease in sectional area by reason of the observer's body.

Not infrequently has it happened that a crafty mine foreman, knowing that his mine was short of air, would affect to be much interested in the readings taken by the mine inspector, hoping that the inspector would not realize that his presence in the airway would give a higher reading, which was his real intent and purpose.

Notwithstanding these practical conditions that affect the accuracy of velocity readings in airways, the prevailing practice is to measure the volume of air passing by taking anemometer readings at a selected point in the airway, where the sectional area has been carefully measured, using for that purpose the Biram anemometer shown in the accompanying figure. In my opinion, the chief point to be considered is that these readings should always be taken at the same point in the airway and under similar conditions, so that the comparison of the readings taken from time to time will be of greater value than if these readings had been taken at different points and under varying conditions.



THE BIRAM ANEMOMETER

When taking the velocity readings the observer should stand facing a rib of the airway, with his back against or near the opposite rib. He should hold the anemometer at arm's length, say a foot or so beyond the center of the airway. It is well to take a one-minute reading, say 2 ft. above the bottom and another like reading 2 or 3 ft. below the roof. We would suggest that an attempt to obtain an average reading by moving the anemometer about in the airway, except under particularly favorable conditions, is not generally satisfactory.

In closing, *Coal Age* would recommend, in general mining practice, the use of a reliable Biram anemometer such as shown in the figure to which we have already referred. An instrument of this kind is manufactured by the Davis Instrument Mfg. Co., Baltimore, Md. The 5-in. Biram anemometer is made to register a velocity up to 10,000 ft. per min. In this connection, we would refer to a description of this instrument and its use that appeared in *Coal Age*, Vol. 4, p. 655.

While the readings of the anemometer, taken with proper care, are generally accepted in the measurement of air volumes, in common mining practice, when greater accuracy is required engineers employ a Pitot tube, which is an instrument designed to measure the velocity of air in a conduit, as determined by the pressure head producing such velocity. This instrument is not adapted to general use in mines, however, and requires more skill than average mining men possess.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—An airway is 4 x 4 ft. in section and passes 9000 cu.ft. of air per min.; what would an airway 9 x 9 ft. in section pass, if the length and pressure are the same in each of these airways?

Ans.—For the same length and pressure, the quantity of air passing in an airway is directly proportional to the square root of the cube of the area and inversely proportional to the square root of the perimeter of the airway. In other words, the quantity of air passing is proportional to the potential factor $a\sqrt{\frac{a}{o}}$, in which a equals the sectional area and o equals the perimeter of the airway. Finding the value of this potential factor for each of the airways given, we have as follows:

First airway,

$$a = 4 \times 4 = 16\ sq.ft.;\ o = 4 \times 4 = 16\ ft.$$

Second airway,

$$a = 9 \times 9 = 81\ sq.ft.;\ o = 4 \times 9 = 36\ ft.$$

The value of the potential of each of these airways is then,

First airway,

$$a\sqrt{\frac{a}{o}} = 16\sqrt{\frac{16}{16}} = 16$$

Second airway,

$$a\sqrt{\frac{a}{o}} = 81\sqrt{\frac{81}{36}} = 81 \times \frac{9}{6} = 121.5$$

Therefore, letting x denote the required quantity of air circulating in the second airway, under the same pressure that passes 9000 cu.ft. in the first airway, and making the quantity ratio equal to the potential ratio, we have

$$\frac{x}{9000} = \frac{121.5}{16};\ \text{and}\ x = \frac{9000 \times 121.5}{16} = 68{,}343+\ ft.\ per\ min.$$

Ques.—Four airways, A, B, C and D have the following respective lengths: A = 200 yd.; B = 400 yd.; C = 600 yd.; D = 800 yd. Taking the sectional area of A as 50 sq.ft., find the respective areas of the other three airways such that each of the four airways will pass 50,000 cu.ft. of air per min., under the same unit pressure.

Ans.—Assuming a square cross-section for each of the four airways A, B, C and D, for the same pressure and quantity of air passing, the sectional area in each airway will vary as the fifth root of the square of its length. In other words, the ratio of the sectional area of each of the airways B, C and D to that of the first airway A, will be equal to the fifth root of the square of the ratio of the length of said airway to that of the first airway.

In the use of ratios, the solution is much shortened by taking the relative lengths of these airways as 1, 2, 3 and 4, instead of their actual lengths. Doing this, the respective areas of the airways B, C and D are found as follows:

B, $\frac{x}{50} = \sqrt[5]{\left(\frac{2}{1}\right)^2}$; and $x = 50\sqrt[5]{2^2} = 66\ sq.ft.$

C, $x = 50\sqrt[5]{3^2} = 77.6\ sq.ft.$

D, $x = 50\sqrt[5]{4^2} = 87\ sq.ft.$

Ques.—A direct-current motor takes 40 amp. at 500 volts pressure for 100 hours; what horsepower does it consume?

Ans.—The horsepower that will produce a current of 40 amp. under a pressure of 500 volts is

$$H = \frac{EC}{746} = \frac{500 \times 40}{746} = 26.8\ hp.$$

Ques.—Assuming an air shaft 5 x 5 ft. in section and 200 ft. deep, passing 20,000 cu.ft. of air per min. under a 2-in. water gage, how much would this shaft have to be enlarged to reduce the power one-half?

Ans.—In answering this question, what applies to the enlargement of the shaft will apply to a similar enlargement of the airways; and neither the depth of the shaft nor length of the airways enter the solution. For a square cross-section and a constant length of air passage and quantity of air in circulation, the sectional area of the passage will vary inversely as the fifth root of the square of the power on the air. In other words, under the conditions named, the area ratio is equal to the fifth root of the square of the inverse power ratio. Thus, the original sectional area being $5 \times 5 = 25$ sq.ft., and calling the required sectional area x,

$$\frac{x}{25} = \sqrt[5]{\left(\frac{1}{0.5}\right)^2} = \sqrt[5]{2^2} = \sqrt[5]{4}$$

$$x = 25\sqrt[5]{4} = 25 \times 1.32 = 33\ sq.ft.$$

Since $\sqrt[5]{33} = 5.74$, or say 5 ft. 9 in., this shaft would have to be enlarged 9 in. on each side, in order to pass the same quantity of air under one-half the power.

Ques.—When, if necessary, is it advisable to change from animal to a mechanical system of haulage?

Ans.—Animal haulage should be replaced by a suitable system of mechanical haulage as early as the development of the mine will permit. The distance of haul from the inside parting to the shaft bottom should be at least 400 or 500 yd., and the daily output sufficient to keep the system running.

NOTE—In the fifth question, on page 806 of the last issue of *Coal Age*, the weight of the T iron should be 25 lb., instead of 35 lb. per yd.; and the cost, in the answer, should be estimated on "gross tons" (2240 lb.), instead of short tons (2000 lb.); thus, $800 \times 25 \div 2240 = 3.928$ gross tons, making the cost $8.928 \times 50 = \$446.40$.

In the sixth question, the velocity being given as "450 ft. per minute and a half," the quantity of air passing should be estimated, in the answer as $\frac{2}{3}(450 \times 72.3) = 21{,}690$ cu.ft. per minute.

COAL AND COKE NEWS

Harrisburg, Penn.

Shipments of anthracite to 19 states are now barred by order of the Federal Fuel Administration, according to a statement put out on Apr. 26 by the anthracite operators' committee, with headquarters in Philadelphia. These states are forbidden to draw on the anthracite supplies to protect the supply of the Middle Atlantic and New England States, which particularly require and are the greatest normal users of anthracite. Continuing, the statement says: "The states to which no anthracite may now be shipped either directly or indirectly are Alabama, Arkansas, California, Colorado, Florida, Georgia, Idaho, Kentucky, Louisiana, Montana, Mississippi, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Washington and Wyoming."

Two hundred and fifty coal operators have formed the Central Pennsylvania Bituminous Producers' Association, J. P. Cameron, district fuel representative, announced on Apr. 26. The organization will keep the members informed on matters of importance in the coal industry, and an executive secretary will have offices in Altoona. Harry Boulton, Clearfield, was elected president, and John Lloyd, Jr., Altoona, vice president and secretary-treasurer. T. H. Watkins, New York, chairman of the executive committee, will conduct all negotiations between the Government and the association.

The cause of the discontent among the miners of District No. 2, central Pennsylvania, is a shortage of cars. There are approximately 40,000 members of the miners' organization and about 30,000 nonunion members in the district. In many of the mines, it is said, the men are given only seven or eight hours' work a week because there are no cars in which to load the coal. If it were possible for the men to be assured of five or even four days' work weekly, there would have been no demand at the Dubois convention last month for an increase in the price paid per ton for mining and the day wage scale. There seems to be an actual inability on the part of the railroads to handle the traffic, although there are plenty of miners who openly accuse the railroads of deliberately tieing things up in order to convince the public that the Government is not capable of conducting the railroad business of the country. No matter how that may be, one thing is certain. The mining question would be solved in central Pennsylvania if there were plenty of cars for all mines.

Among the operators there is a great deal of dissatisfaction over the placing of box-cars at mines where they must be loaded by hand. The added labor cost per ton is extremely heavy, and the Fuel Administration has declined point blank to make any allowance for the extra expense of loading. Besides, in the central Pennsylvania district these box cars, when loaded, can be shipped only in a westerly direction and cannot go beyond the limits of the zone. In other words, that coal must be sold in a field, like Pittsburgh and eastern Ohio, where there is plenty of native coal.

Scarcity of mining timber is a serious problem that confronts the anthracite industry. Intensive methods are being used to husband every foot of wood, for practically all the mountains in the anthracite region have been stripped of their young growth and cut to meet the demand. The cost of mine timber has steadily advanced, and the coal companies are ready to pay any reasonable market price for the needed timbers.

Shipments of heavy gangway, slope and shaft timber for general uses from the South have been largely cut off by the huge Government demands for lumber, and, in many instances, timber shipped from Georgia consigned to the mines has been commandeered by the Government, which is also taking lumber from retail yards. Throughout central Pennsylvania contractors are cutting every available stick of timber, and fabulous sums are asked for what useful tracts remain. These are generally held by estates.

Despite the report of the United States Forest Service that forty billion feet of lumber, enough to build 2,000,000 bungalows, was produced in this country during 1917, lumber is scarce. This preliminary estimate is based on the reports of 17,000 mills to the Government. It is significant to note that the reports of 700 mills—whose production is almost equal to the aggregate production of the remaining 49,000 other mills—show that the total of lumber cut by these mills in 1917 was 600,000,000 ft. less than the total shipped. High labor costs and transportation congestion have been chief factors in curtailing production of lumber, plus the prices fixed by the Government for its supply.

Birmingham, Ala.

As a result of the readjustment of wages announced for May 15, conditions in the mining districts of Alabama today present a most serene appearance. Under the new arrangement day labor at the mines will receive better pay, and as a result of the marked spirit of contentment that has settled upon this section a maximum production of coal at all mines is expected.

The Alabama coal mines are doing their share toward a material increase in production urged upon the mining centers of the country, according to figures compiled by the United States Geological Survey. These figures for the second week in April, just made public, show that the increase of bituminous mines in this country was 1,630,000 net tons, or more than 17 per cent. over the production of the previous week. The total production for the week ending Apr. 13 was 10,947,000, as compared with 9,317,000 for the previous week.

Coke production is also being maintained along most encouraging lines. Coke ovens at Jasper, in Walker County, and at Trussville will soon be operating under capacity restriction, but little of this added production is expected to reach the open market as the demand already passes the probable output. More than 1000 tons of coke could be handled were its manufacture possible, and until more ovens are in operation there is little possibility of much overflow into the open market.

As is the case in the pig-iron market, the limit in coke making has been reached in Alabama. This is the spur that is speeding up construction of the 154 byproduct coke ovens of the Tennessee Coal, Iron and Railroad Co. at Fairfield, and has led to the prediction that developments along the same lines will be announced by two and probably three other companies within the next 15 days.

Alabama added another coal company to its list of industries during the week, the newcomer being the Donaldson-Stobert Coal Co. capitalized at $25,000, and which filed its papers of incorporation in the Probate Office recently. The company is now developing coal lands in the vicinity of Henry-Ellen and Leeds, in the northeastern section of Jefferson County. A large mine will be producing coal in that vicinity within the next few months, the company announces. J. M. Donaldson is president of the new company, Thomas Berry, vice president, and Tom Stobert, secretary-treasurer. The company will maintain its general offices at Henry-Ellen.

Fairmont, W. Va.

It was feared for a few days that the railroads had determined to show up the coal operators in the Fairmont district by putting a bigger car supply in the region than it was possible to load, labor having been depleted by the poor car supply of recent months. On Monday and Tuesday of last week the cars furnished tested the capacity of the mines, but the plentiful car supply was shortlived. On Wednesday it fell down, and on Thursday there was a still greater scarcity of cars, the week finishing with only two really big days.

The car supply in the Pocahontas field has been greater than could be loaded since Apr. 1, and that condition is assigned to the labor shortage as well as to an epidemic of measles and grip. These were the only districts in the state that had more cars some days last week than could be loaded.

The Fairmont district has waged a bitter war for cars through the Central West Virginia Coal Operators' Association, and it was embarrassing when the empties began to come to the region in greater numbers than it was possible to load under existing circumstances.

A condition exists in Bluefield, W. Va., which is probably without duplication in the country. Bluefield, a city of 20,000, is located at the very mouth of the most important coal producing region in the country in war times, and yet there is a scarcity of coal imminent through a peculiar combination of circumstances.

A ruling of the Fuel Administration provides that in case of necessity the County Fuel Administration may divert cars "consigned to any point within the state." This does not solve the problem at Bluefield, however, for the coal produced in the Pocahontas field is consigned altogether to points outside of the state, Bluefield being in one corner of the commonwealth and having more direct relations with Virginia than with West Virginia, in which it is situated.

The consequences have been that Bluefield has needed coal when demands for consumption greatly exceeded production, and F. J. Howe, the district representative of the Fuel Administration, has had instructions day after day to get every car possible to the Navy or to other points where the demand seemed to be most imperative. The local dealers, not being familiar with the manner in which fuel matters were being handled, appealed to the county coal committee, making the contention that Bluefield faced a coal famine.

J. Walter Barnes, federal fuel administrator, was appealed to and found that it required special effort on the part of dealers and domestic consumers, and coöperation with the district representative of the Fuel Administration, to supply the local needs. There had been one embargo lasting from Mar. 29 until Apr. 25, which was lifted on the very day that the federal fuel administrator arrived at Bluefield. This made it possible to secure coal if orders for it had been entered in advance.

It was emphasized that it was just as necessary for industrial and domestic consumers in Bluefield to buy coal early as those who were located at points distant from the coal fields, and that Bluefield consumers, like those elsewhere, could not be particular regarding the kind of coal they could obtain, but were to consider themselves lucky to be served at a time when smokeless coal was in great demand by the Government.

The new executive committee of the West Virginia Coal Association will meet at the Frederick Hotel on Saturday afternoon, June 1, in accordance with the decision reached at a mass meeting of coal operators of West Virginia held at Huntington Friday afternoon and night of last week. At this meeting it was also decided to perpetuate the state organization and name a new executive board, which is to consist of a member from every coal district, to be selected by the district association between now and June 1.

C. H. Jenkins, president of the Central West Virginia Coal Operators' Association, of the Fairmont district, vice president of the West Virginia Coal Association, presided at the meeting as Col. T. F. Houston, the president, could not attend. W. H. Cunningham, the present secretary of the organization, read the call determined upon at a meeting of the executive committee held Apr. 12 in New York. A committee on resolutions consisting of Quin Morton, of Charleston; A. Brooks Fleming, Jr., of Fairmont, and Capt. D. H. Barger, of Bluefield, condemned as untrue a statement given to the press by ex-Gov. W. A. MacCorkle, chairman of the Third Liberty Loan in West Virginia, in which the latter charged that the coal operators were "passive" regarding the loan.

A meeting earlier last week called for Washington, to consider a state organization as a part of the American Mining Congress, did not attract wide representation and it was decided there to postpone action until the Huntington mass meeting. The question of affiliating with the American Mining Congress did not come up here.

although the opinion prevailed that co-operation with that organization was likely to come about; but not in such a way that the same cooperation could not be given the National Coal Association, the splendid work of which was praised by nearly every speaker who has been in touch with its work.

Charleston, W. Va.

Little or no relief has been secured from the dearth of coal cars in this district as a result of the visit of local coal operators to Washington last week. John L. Dickinson and others held a conference with Director General McAdoo and other Government officials, but were unable to secure any promises of a definite nature. It was explained to them that lack of shipping facilities at Tidewater, where thousands of cars are tied up, and the tardiness of manufacturers despite high demurrage rates, in unloading cars on their sidings, was chiefly responsible for the car shortage in this and other regions.

Coal operators in the Kanawha district are in a quandary as to what other steps to take to improve the car situation. Cars are as scarce in this section this week as they were a week and a fortnight ago, causing a material curtailment of production, some of the mines, it being asserted, only being able to mine coal for two and a half days a week. Approximately 250 operations are affected by the car shortage, which has been averaging for the last few weeks only about 50 per cent. of the normal supply; and a large proportion of the cars received are for preferential shipments. Kanawha district operators contend that car supply conditions are worse than in any other section of the state at the present time.

The Supreme Court of the state has reversed the decision of the Logan Circuit Court which found for the defendant in the case of the Producers Coal Co. against the Mifflin Coal Mining Co. and has remanded the case, holding, among other things, that the general manager of a coal-mining corporation is a general agent and has implied authority to bind his principal by such contracts and modifications thereof as are reasonably necessary in conducting the business of mining and selling coal. The suit was for the breach of an alleged contract of sale to the Producers company of the output of the Mifflin company's mine for a year, beginning Apr. 1, and ending Apr. 1, 1917, the Mifflin company having as successor to the Mifflin Coal Co. taken over a four-year contract under which it was to pay 10 per cent. commission to the Producers company for selling the coal. The contract was changed as of Apr. 1, 1916, being signed by the general managers of the two companies, and under the terms of that contract the Mifflin company agreed to dispose of its output to the plaintiff at $1 per ton. Directors of the company contended that its general manager had no authority to enter into such a contract.

Holdings of the Consolidated Coal Co., in Harrison County, were increased last week when that company, for the sum of $259,249, paid in royalties, secured from the Monongahela River Railroad Co. 516 acres of coal lands on the waters of the West Fork. Title to the property was acquired under the terms of a lease by which the coal company paid royalties of 6c. a ton on 4,319,150 tons of coal mined.

Columbus, Ohio

A most important order emanating from Director General of Railroads McAdoo, has been received by Ohio coal carrying roads, which effectually puts a stop to the development of new mining concerns in all sections. The order, which was dated Mar. 2, was received by the T. & O. C. R. R. only recently, and no explanation was received why the order was delayed so long from the date of issue. The order which was signed by A. H. Smith, regional director, is as follows:

"Under existing conditions, it is felt that the expenditure of money and labor is inadvisable for the construction of branch lines for the opening of new coal mines, in view of the necessary unproductive work incident to such undertakings; unless there is some special reasons other than those generally applicable to such cases, in which event the matter should be submitted to this office, with full information, in order that proper investigation may be made to determine if the proposed development is in keeping with the general policy of the Director General."

This ruling comes as a complete surprise and disappointment to operating interests in Ohio, as it was believed that Federal officials were encouraging new operations, especially the opening of mines which would be capable of producing large tonnages. Many new operations in Ohio which were under way except where switches had not been constructed, are effectually stopped.

An important ruling has been received by Ohio coal operators from the Director General of Railroads relative to the payment for spurs and switches built to coal mines. Under the practice which has prevailed for some time, the operating interests were compelled to pay for the materials and work of construction of all spurs, and the property on the right-of-way of the railroad company reverted to the railroad. In other words, the railroads got the benefit of the construction, and if dismantled the value of the materials, including ties, rails, frogs and all other property. Under the recent ruling the railroad is compelled to construct and maintain the track as long as it uses the right-of-way of the railroad company and the operating interests construct and maintain the track when off the right-of-way.

H. S. McCauley has been appointed inspector for Southern Ohio, Pomeroy Bend and Mason County, W. Va., by W. D. McKinney, a representative of the Federal Fuel Administration in Ohio. Mr. McCauley was formerly in charge of the Ohio mine car and was actively engaged in putting out mine fires. He is a practical miner. His duties will be to inspect all coal produced from the mines in his territory in the interest of clean coal, which is being pushed by the Southern Ohio Coal Exchange.

Toronto, Canada

An important conference of coal operators, representatives of coal miners and railroads and government officials was held at Ottawa, Apr. 17 and 18. Sir George Foster, Canadian Minister of Trade and Commerce, presiding. Among those in attendance were Mr. Neale, representing the United States Fuel Administration; C. A. Magrath, Canadian Fuel Controller; W. H. Armstrong, director of Coal Mining Operations at Calgary; H. P. McCue, Assistant Fuel Controller for Canada at Pittsburgh; Hon. T. W. Crothers, Canadian Minister of Labor, and W. P. Hinton, representing the railroad companies.

The conference was private, but at its close Fuel Controller Magrath submitted a memorandum covering the chief developments. It contained the important statement that information had been furnished by the United States Fuel Controller to the effect that anthracite coal supplies to points in western Canada will be materially restricted, rendering it safe to predict that no American anthracite will be available for shipment to points west of Winnipeg. It is also proposed to restrict shipments of anthracite to Canadian lake ports during the early part of the present season, and the public must be given to understand distinctly that conservation of coal must be practiced to the utmost extent.

The memorandum further stated that Sir George Foster had been able to announce that the attitude of the United States Fuel Administration was that Canada would receive precisely the same treatment as the states of the Union. The Western states had been given to understand that they must use the softer coal of the West, and that the available anthracite would have to be conserved for the supply of the Eastern states and the provinces of Ontario and Quebec.

A memorandum from the Western mine operators stated their ability to increase the production of coal by 1,280,000 tons, and of lignite coal by 1,225,000 tons. These increases would represent the amount of coal that could have been mined during the time the mines were idle last year owing to strikes and want of railway transportation. The figures given would not hold good unless the same amount of labor was available as last year, and unless the railways were able to furnish the transportation required. The operators urged that dealers and the public take a large portion of their supply during the summer months, when the railroads are in a position to handle it.

A memorandum presented by the Nova Scotia operators stated that the production of the mines of that province had been estimated at 5,950,000 tons, but the production actually attained was 5,660,000 tons. They reported considerable improvement in transportation facilities and pointed out that scarcity of labor had been the main factor in the curtailment of output. The suggestion was made that the government should ask J. C. Walters, president of the Dominion Trades and Labor Council, to visit the mining centers and appeal to workmen for the greatest possible production. It is estimated that the output in 1918 will be 230,000 tons less than the production of 1917.

In outlining what could be expected of the transportation companies, W. P. Hinton stated that provided that the coal mines started shipping immediately and continued to ship uniformly until Sept. 30, the railways are prepared to haul to the different points from Winnipeg west 50 per cent. or more of the actual amount required. Under similar conditions, subject to ordinary circumstances, the railways will be prepared to handle the balance of the coal required after Oct. 1, and throughout the winter. He emphasized the necessity of a start being made at once and not at a later period in the summer.

PENNSYLVANIA

Anthracite

Nesquehoning—The town of Little Italy, near here, with 900 inhabitants, is being gradually moved to New Columbus, across the Nesquehoning Creek in Packer township. All the houses in the new town are occupied, and new buildings are going up right along. Little Italy is underlaid with coal, which will be mined by the Lehigh Coal and Navigation Co. as soon as the entire town has been moved to its new site.

Dickson City—The Delaware, Lackawanna & Western R. R., Coal Department, is contemplating the erection of a new breaker at the Storrs colliery. The breaker, it is said, will cost in the neighborhood of $250,000 and will be all concrete and steel construction.

Wilkes-Barre—At the spring meeting of the Carnegie hero fund held on Apr. 26, among those cited for heroism, were two coal miners, whose families have been awarded bronze medals and cash. David A. Cadwalder, deceased, bronze medal and $10 a month to the widow, with $5 a month additional for each of four children. Cadwalder, a laborer, died attempting to save Leroy D. Winters from suffocation at the Wilkes-Barre Colliery Co. mine, Oct. 17, 1917. An explosion of firedamp occurred, and the two men and others hurried from the face of the tunnel to seek safety. John Harry, the other miner, was awarded a bronze medal for attempting to save Winters from suffocation, but was overcome with gas and was forced by other rescuers to go to the surface.

Bituminous

Uniontown—Morgantown interests have bought the mine and plant of the Johnson Fuel Co., at Percy, for $100,000. The tract consists of 324 acres of coal land in the Sewickley seam. J. L. Hatfield and R. L. Morris are among those interested in the new company.

Connellsville—An item appearing under this head, in the April 13 issue relative to the 15 per cent. increase granted by the H. C. Frick Coke Co. to its employees, did not apply to this company, as erroneously stated, but only to the United States Steel Corporation.

WEST VIRGINIA

Clarksburg—Abandoning the use of compressed air, the J. W. McDonald Coal Co. is having all its mines in the vicinity of Rosebud electrically equipped.

Fayetteville—With the installation of new motors, coal loading has been commenced at the Price Hill mines in this county, with Sam Dixon in charge of the operation.

Beckley—Beckley Coal Co. has purchased 550 acres of coal land on the Baltimore & Ohio between Weston and Hornor, from T. S. Stalnaker and Thomas E. Miles, of Hornor, and will arrange to develop the property at once.

Logan—Extensive improvements are contemplated by the Main Island Creek Coal Co. at its Logan County mines. Three large twin tipples will be erected at Littles Creek and 50 houses will be built.

One hundred new houses will be built for miners of the Amherst Coal Co. on Buffalo Creek in Logan County, the contract having been let to the Diamond Construction Co. of Huntington.

With the tipple at its mine at Wilbour on the Guyan River nearing completion, the Guyan Mining Co. expects to begin shipping coal early in May.

Fairmont—A shaft is being sunk by the Helens Run Coal Co., near this city, to develop a 300-acre tract of Pittsburgh coal.

Stotesbury—Included in the equipment recently added to the plant of the E. E. White Coal Co. is one 10-ton mainline and

three 6½-ton gathering locomotives, and 50 more mine cars to handle the increased number of men and tonnages.

Glen White—The present tipple at the Glen White plant of the E. E. White Coal Co. will be removed to make way for a new steel tipple, the contract for the erection of which has been awarded. The new structure will cost $150,000. It is possible, however, that no attempt will be made to build the new tipple until the end of the war.

Charleston—A large new tipple is to be built by the Mallory Coal Co. at its No. 2 mine on the Guyan Valley Division of the Chesapeake & Ohio.

Fifty new houses will be built by the Loraine Coal and Dock Co. at its Lorando plant in Logan County.

Two tipples will be erected in the near future by the Moyer Purseglove Co., of Cleveland, at its mines at Chauncey, where grading is being done for a new siding.

The Huff Mining Co. plans to begin shipping coal from its mine in the Guyan valley territory early in May, a new headhouse and tipple now nearing completion.

Two new electrically driven mining machines will be placed in the mines of the Wyatt Coal Co. at Sharon on Cabin Creek.

INDIANA

Terre Haute—The Eureka Block Coal Co. has sold the Dixie Bee coal mine, 12 miles south of this city, to Edward Shirkie, of Terre Haute, and C. A. Bicket, of Chicago, owners of the Bicket Coal and Coke Co., of Chicago. The purchase price was $400,000. The mine production will be increased from 400 to 2000 tons a day.

Sullivan—W. H. McGrew has leased the Klondyke mine, west of the city, to W. C. Brown, a Chicago capitalist, who will make extensive improvements and sink a new air shaft. He expects to employ a number of pick miners. He has leased the mine for seven years.

ILLINOIS

Schopen—A new coal mining town, to be called Standard, has been platted adjacent to the new Standard Oil mines near here. The real-estate operations are being promoted by D. K. Rice, of Gillespie, and F. M. Davis, of Alton. Mr. Rice promoted a similar town called Wilson near the new mine of the Northwestern Railroad Co., in the Gillespie neighborhood.

Freeburg—A thin partition between two rooms in the St. Clair mine near here is alleged to have been the cause of the death of one miner and the injury of another on April 20. The two men were shotfirers. They had touched off the fuses in one room and had gone to another when the shot in the first room blew the partition in on them.

OHIO

Beaumont—The Beaumont Coal Co. will soon start loading at its mine at this place, located on the Hocking Valley R. R. The mine is a shaft operation and its capacity will be in the neighborhood of 1200 tons daily when all equipment is installed. The property consists of 400 acres of No. 6 seam. The product will be sold through the Ajax Block Coal Co., of Columbus. W. T. Fassig is president; J. R. Schwartz, vice president, and T. C. Collins, secretary and treasurer.

Athens—The L. D. Poston Coal Co., chartered recently with a capital of $100,000, has taken over mines on the T. & O. C. R.R. at Millfield, which is nine miles west of Athens. Extensive improvements are contemplated, and it is desired to bring the daily capacity up to 1500 tons. The guiding spirit in the new mine is L. D. Poston, a grandson of the late L. D. Poston, who operated the first coal mine in the Hocking Valley district.

KENTUCKY

Providence—The Tax Supervisors of Hopkins County have handed the coal operators something of a jolt in assessing the mine property of the county, a number of big raises in the tax assessments having been made. The St. Bernard Mining Co. was raised $537,000; the Carbondale Coal Co., $42,000; Norton Coal Co., $49,000; Reinecke Coal Co., $80,000; Sunset Coal Co., $39,000; Coil Coal Co., $29,000; Rose Creek Coal Co., $57,000; Circle City, $27,500; and the Crabtree Coal Co., $29,000.

Nortonville—The high prices now being paid by coal-mine operators for labor is shown in the offers made by the Norton Coal Mining Co., which has been endeavoring to obtain men for loading coal. The company offers to men who have never been inside a mine $4 to $6 a day. The inside wage scale includes $4 a day to drivers; machine cutting, 10c. per foot, breast; 9c. per foot continuous; track layers, $4.25 a day; track helpers, $3.75; loaders, 40c. per car, No. 11; 35c. per car, No. 9; pumpers, $3.75 a day; timber men, $4 a day. These wages would be high for steady employment, and in fact are high in any event; but even at such wages it is a hard problem to hold men unless the mines can secure full supplies of cars, or at least better than a 50 per cent. supply.

Jackson—The Buckhorn Coal and Lumber Co., recently incorporated with a capital of $150,000, plans the development of 6000 acres of land on Middle Fork River. This land is covered with white oak timber, which the company proposes to cut mainly into railroad ties, some of which will be utilized in laying railroad lines in to get at the coal.

Middlesboro—J. T. Franklin, president of the United States Coal and Coke Co., was recently in Middlesboro, en route to Knoxville. Mr. Franklin stated that the company had increased its capacity to 30 cars a day, and expected to get the production up to 60 cars before long.

Personals

Lieut.-Col. Warren R. Roberts, president of the Roberts & Schaefer Co., engineers and contractors, of Chicago, Ill., is executive officer in charge of the construction branch of the "Construction Division" of the United States Army. This division does all the construction work in the United States and its possessions for all other divisions or



LIEUT.-COL. WARREN R. ROBERTS

bureaus of the army. Lieut.-Col. Roberts has been in engineering and construction work for 30 years. Some 20 years ago he organized the Roberts & Schaefer Co., which has since gained national prominence in the designing and building of all kinds of coal-handling plants, including coal-mining plants, coal washeries, locomotive coaling stations and coal dock bridges. Although Lieut.-Col. Roberts has been in the Government service since October, 1917, he still retains his office as president of the Roberts & Schaefer Company.

E. J. Payne of Charleston, W. Va., has been made sales manager for the Main Island Creek Coal Co. Mr. Payne was formerly with the E. J. Payne Coal Co. and was also connected with the Amherst Fuel Co. His headquarters will be at Huntington.

R. E. Almstead, of Huntington, W. Va., has been appointed as fuel inspector of the northeastern fuel administration district of Kentucky. He will have under his jurisdiction the counties of Boyd, Carter, Johnson, Lawrence, Floyd, Pike and Letcher. Mr. Olmstead has been an inspector of railroad fuel.

W. J. Heatherman, of Maxine, Boone County, West Virginia, has been appointed chief of the State Department of Mines, to succeed Earl A. Henry, whose term expired on Apr. 30. Mr. Heatherman has filled practically every position in the mines. He has been superintendent of the Island Creek Coal Co., in Logan County, and superintendent of the various mines of the Clinchfield Coal Corporation, in Virginia. He is 36 years old.

Obituary

Patrick Dougherty, a member of the mine inspectors' examining board for Luzerne and Carbon Counties, Pennsylvania, died on Apr. 23, after a few days' illness of pneumonia.

George Davis, of Drifton, Penn., one of the first and oldest miners of the Lehigh region, died on Apr. 26, at his home. Up to a few years ago, when he was compelled to retire on account of infirmities he had charge of the coal preparation department of Coxe Bros. Co., and was considered an authority on breaker construction.

Gustav Boehmer, president of the Boehmer Coal Co., who had been in the coal business in St. Louis, Mo., for 30 years as operator and distributor, died Saturday night, April 20, at his home, 5322 Von Versen Avenue, in that city. He was 69 years old. He had been in ill health since he sustained a stroke of paralysis three years ago.

Publications Received

Accidents at Metallurgical Works in the United States During the Calendar Year 1916. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Technical Paper 201. Unillustrated, 17 pp., 6x9 inches.

Technology of Salt Making in the United States. By W. C. Phalen. Department of the Interior, Bureau of Mines. Bulletin 146. Mineral Technology 20. Illustrated, 141 pp., 6x9 inches.

Coal-Mine Fatalities in the United States, 1917. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, 35 pp., 6x9 inches.

Nineteenth Annual Report of the Mining Industry of Idaho. For the year 1917. Robert N. Bell, state mine inspector. Illustrated, 129 pp., 6x9 inches.

Fifth Annual Report of the State Inspector of Coal Mines, Colorado, 1917. State Department of Mines, James Dalrymple, Chief Inspector. Unillustrated, 96 pp., 6¼ x 9¼ in.

Annual Report of Coal Mines for the Year Ending Dec. 31, 1917. State of Washington. By James Bagley, State Mine Inspector. Seattle. Unillustrated, 53 pp., 6 x 9 in.

Handbook of Instruction for Operating Ironton Storage Battery Locomotives. Ironton Engine Co., Ironton, Ohio. Illustrated, 32 pp., 3½ x 6½ in. Though intended primarily for those who are operating the types A, D and E Ironton storage-battery locomotives, this compact vest pocket handbook contains information that will prove of undoubted benefit to any one operating any type of locomotive. The company states that it will gladly send copies of this book to anyone using electric storage-battery locomotives, whether or not they are Irontons.

Trade Catalogs

Sirocco Mine Fans. American Blower Co., Detroit, Mich. Catalog. Pp. 56; 8½x11 in.; illustrated. Contains valuable data for mine owners and engineers, and includes complete information on mine ventilation, consisting of diagrams, typical arrangements, methods of calculating fan requirements and additional engineering data. It is in reality a textbook on the subject of mine ventilation and will suggest ways of handling particular problems.

Keeping Your Trucks in Service. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Folder. Pp. 6; 8½x11 in.; illustrated. Describes C-H sectional battery charging

equipment for battery locomotives and industrial electric trucks. Two pages are devoted to illustrating a number of large and small equipments in industrial establishments, piers and railroad terminals.

Mack Motor Trucks. International Motor Co., New York City. Catalog No. 33. Pp. 66; 8½x12 in.; illustrated. Describes Mack Model "AB" trucks of 1, 1½ and 2 ton capacities, with worm or chain drive.

Levin Oxygen and Hydrogen Generator. Electrolytic Oxy-Hydrogen Laboratories, Inc., 15 William St., New York. Bulletin G. Illustrated, 4 pp., 8½ x11 in. Describes a small, compact generator of the unit type and enumerates its advantages over other types.

Mack Trucking Among the Clouds. International Motor Co., New York City. Catalog No. 6. Pp. 70.; 8½x12 in.; illustrated. Contains specfications of the new model "AC" Mack chain driven, heavy duty motor trucks, which are built in three capacities—3½, 5½ and 7½ tons, with wheelbases of 156, 168 and 180 in. in each capacity.

Supplement No. 1 to General Catalog No. 16. Ohio Brass Co., Mansfield, Ohio. Pp. 51; 5⅜x8⅜ in.; illustrated. This catalog contains additions and improvements to the O-B materials listed in the company's large catalog, which describes overhead materials, rail bonds, car equipment, specialties and high tension porcelain insulators.

C-H Pendent Switches. Cutler-Hammer Manufacturing Co., Milwauke, Wis. Folder. Illustrated, 4pp., 3½ x 6 in. A two-color envelope folder which illustrates and describes both single and two circuit brass shell and all porcelain pendent switches. The operating push buttons are a part of the mechanism and do not loosen up, twist or become lost.

Industrial News

New York, N. Y.—The Porto Rico Coal Co., 1 Broadway, has filed notice of an increase in its capital from $250,000 to $750,000.

Shamokin, Penn.—The E. C. Jones Coal Co., 40 North Seventh Street, has taken bids for the construction of a new one-story coal washery at its plant near Shamokin to cost about $20,000.

Baltimore, Md.—In connection with other extensive improvements, the Wright & Gibson Co., of Pittsburgh, Penn., is planning for the construction of a new tipple at its local plant.

Buffalo, N. Y.—The Seneca Coal Mining Co. announces that after May 1 its general offices will be located at 708-712 Fidelity Building. The need for additional space was responsible for the change.

Middlesboro, Ky.—The Hawley Coal Co., which recently increased its capital to $50,000, is now developing approximately 100 acres of coal lands, having a daily output of about 100 tons.

Wilkes-Barre, Penn.—The George F. Lee Coal Co., Miners Bank Building, has completed plans for the construction of a new one-story coal breaker, to have a capacity of 500 tons. Frank B. Davenport, Coal Exchange Building, is engineer.

Pittsburgh, Penn.—The Pittsburgh Coal Co. has contracted with the Roberts and Schaefer Co., of Chicago, for the installation of Marcus picking table screens in its Moon Run and Partridge tipples, in Pennsylvania.

Gormania, W. Va.—The Cover Coal Co., Piedmont, recently incorporated with a capital of $20,000, is planning for the immediate development of about 500 acres of coal lands near Gormania, to have a daily output of about 300 tons.

Fairpoint, Ohio—The Clarkson Coal Mining Co., of St. Paul, Minn., has contracted with the Roberts and Schaefer Co., Chicago, for a large storage plant for run-of-mine coal at Fairpoint. The plant is now under construction.

Clearfield, Penn.—The Potts Run Land Co., miners and shippers of bituminous coal, announces that it has changed its name to the Potts Run Coal Co. The corporation is to continue under the same management as heretofore.

Norton, Va.—The Hurt Coal Co. has completed its organization plans and will commence work at once on the development of 35 acres of coal lands, to have an initial capacity of about 50 tons daily. T. V. Hurt is president and manager.

Jefferson City, Mo.—Wallace Crossley, Missouri fuel administrator, has issued an order prohibiting the shipping of coal in carload lots to persons other than licensed wholesale and retail dealers. The order is intended to check snowbirding.

Whitesburg, Ky.—The Elkhorn Superior Block Coal Co., which recently increased its capital from $35,000 to $100,000, is planning for the installation of new electrical equipment in its plant in connection with other extensive improvements and additions.

Lynchburg, Va.—The Chesapeake & Virginian Coal Co., Inc., Agent, has removed its Huntington, W. Va., office from the Day and Night Bank Building to Rooms 210-211 Robson-Prichard Building. Joseph Maloney is the company's Huntington field agent.

Knoxville, Tenn.—Myers-Whaley Co., manufacturers of shoveling machines for underground and surface work, announces that it has appointed J. P. Cotter, Post Office Box 584, Sydney, Nova Scotia, as agent for its machines in Nova Scotia and Newfoundland.

Chicago, Ill.—The Paragon Electric Co., formerly located at 9 South Clinton St., has moved to larger quarters in the Old Colony Building, 37 Van Buren St. The concern, among a number of other specialties, manufactures "Ironite," which is said to be the strongest wire for mine telephones.

New York, N. Y.—The Bureau of Construction and Repair of the Navy Department has awarded contract to the Amburson Construction Co., 61 Broadway, for the construction of four reinforced-concrete fuel oil and coal barges to be used in New York harbor. Each barge is to have a hold capacity of 800 tons.

St. Louis, Mo.—The St. Louis Coal Committee is sending out license applications to all retailers in St. Louis. Secretary Perrow estimates that 80 dealers with tracks and 400 without tracks will be required to take out licenses. No plan has been worked out here yet for supervision of the dealers in less than wagon-load lots, who are said to number about 800.

Columbus, Ohio—When George A. Borden, president of the Columbus Board of Purchases, went to open bids on approximately 30,000 tons of coal for various city departments, Apr. 2, it was found that none had been submitted. Coal producers and jobbers were loath to bid under present unsettled conditions. It was announced that the city will buy from the open market for the time being.

Charleston, W. Va.—The Federal Coal Co. has been incorporated by E. M. Johnson, of Charleston; John E. McCully, of Philadelphia; Judson E. Harney, of Scranton, and others, with a capital stock of $3,000,000, to operate mines in the Sherman section of Boone County, with offices in Charleston. The company owns a large acreage of land, much of which has valuable coal deposits on it.

Springfield, Ill.—The Springfield Terminal Railroad Co. has filed a petition with the Illinois Public Utilities Commission asking permission to construct an extension of its line to the site of the Clear Lake mine and to cross the Illinois traction system at grade. The object of the extension will be the transportation of coal from the mine to the Chicago & Alton, C. P. & St. L., and other connecting railroads in Springfield.

St. Louis, Mo.—The first annual meeting of the Missouri State Retail Coal Merchants' Association will be held at Jefferson City, Mo., on Thursday and Friday, May 9 and 10. Lieut.-Gov. Wallace Crossley, Federal Fuel Administrator for Missouri, will talk to the dealers, and T. Percy Bryan, of Kansas City, will discuss the retailers' problems. The speaker for the second day will be K. P. Gregg, of Gregg & Co., industrial engineers, who will talk on the matter of trade surveys.

Huntington, W. Va.—The Peter Cave Coal Co. was organized here and will operate on Horse Creek in Lincoln County, with offices here. I. J. Harshbarger is president, B. Pauler is vice-president, L. J. Corbly is secretary and Julius Broh is treasurer. D. J. Pancake will be general manager and Frank Kerns superintendent. All of these, with J. A. Baird, will make up the board of directors. The company has 500 acres of coal, with a 6-ft. vein, and expects to be mining it by June 1.

Ithaca, N. Y.—Federal control of the New York State barge canal may mean the establishment of a terminal at Ithaca, N. Y., for the transshipment of anthracite coal from the Pennsylvania mining region to the main canal line. This waterways system will be operated to relieve the traffic congestion on the railroads, and Ithaca is the logical connecting link between the railroads leading from the mines and the barge canal. Thus coal shipped over the Lehigh Valley and Lackawanna lines to Ithaca may be sent east, either to the New England industrial centers or New York City, or to points west.

St. Louis, Mo.—St. Louis retailers, at a conference with the St. Louis Fuel Committee, asked that action be taken to discourage manufacturers from buying coal in quantity and distributing it among their employees. They argued that it was unfair for the manufacturers to sell to their employees at a considerably cheaper price than the prevailing retail price during the summer months and when coal is scarce in the winter to call on the coal men to supply their needs. They urged that an order be issued requiring domestic consumers to buy from the dealers. The committee has the request under consideration.

Cincinnati, Ohio—At a meeting of bondholders of the Marmet Coal Co., held in Cincinnati a few days ago, a committee representing the majority indicated its willingness to accept an offer of $250,000 made by eastern interests for the company's coal, gas and railroad properties at Butler, W. Va. J. Kapfer, secretary of the committee, will receive the assent of other bondholders up to July 15, after which steps will be taken to wind up the company's affairs. All indebtedness has been liquidated except the bonds, and the company's properties can now be sold to good advantage, their total value being about $1,000,000.

Dallas, Tex.—Wiley Blair, Federal Fuel Administrator for Texas, has issued an order regulating the retail distribution of coal and coke in Texas, and designed to insure a fair and equitable distribution of fuel to domestic users in Texas. The text of the orders follows: "By virtue of authority vested in me by H. A. Garfield, United States Fuel Administrator, it is hereby ordered that carload shipments of coal shall not be sold either directly or indirectly by coal operators, producers, jobbers, commission merchants or retail coal dealers to individuals, firms or corporations, for domestic use, either for themselves or for distribution to one or more domestic customers."

Pittsburgh, Penn.—Effective May 1, 1918, the name of the Asbestos Protected Metal Co., of Pittsburgh, was changed to Aspromet Co. When this company was established in 1905, its sole product was asbestos protected metal. The initial product met with universal favor and resulted in the company complementing the same by adding to its line other building materials that were used and bought by the same people who use and buy asbestos protected metal. Now the company has a complete line of building material specialties, many of which contain neither asbestos nor metal in their make-up. Thus the descriptive name "Asbestos Protected Metal Co.," which originally served so well became restrictive to the point of being misleading; hence the change.

Milwaukee, Wis.—The Wisconsin Coal and Dock Co. is improving its dock near the harbor entrance. By straightening the harbor line about half an acre of storage space is gained. Concrete revetment and new unloading bridges are features of the enterprise, which will consume $100,000 or more. The new dock of the Milwaukee-Western Fuel Co. is almost completed. It extends from Muskego Ave. to Sixteenth St. on the Menomonee River, and is one of the finest receiving yards in the Northwest. It has capacity for storing 200,000 tons. It is equipped with an 8-ton man-trolley bridge capable of unloading 500 tons per hour. Nothing has been done as yet to restore the buildings and machinery in the yard of the Kanawha Fuel Co. at Sixteenth St. bridge, which were burned during the winter.

Columbus, Mo.—Dean E. J. McCausland, of the University of Missouri, has issued a statement, based on experiments at the university to determine the keeping quality of Missouri coal, that deterioration of stored coal is negligible and that there is practically no danger of spontaneous combustion. "The ordinary grades of coal used for domestic purposes," he says, "lose very little in fuel value by storage of a few months. Furthermore, dry coal placed in storage in quantities usually needed for the individual householder is not likely to be subject to spontaneous combustion. The coal should not be sprinkled when it is placed in the bins, nor should it be sprinkled during the season of storage to keep down the dust. Better a little dust than take any chances of reducing fuel value or causing combustion of the fuel."

MARKET DEPARTMENT

Weekly Review

Poor Outlook for Next Winter's Coal—Domestic Orders Plentiful—No Great Demand for Steam Sizes—Car Shortage As Bad As Ever—Bituminous Mines Still Working Short Time

THERE is as yet no good reason to change the view that this country will be faced with a fuel shortage next winter. Only a very rapid and a very material betterment in car service can prevent what now seems inevitable. The Fuel Administration is disturbed because its eyes are focused on next winter; the Railroad Administration appears serene and seems to be happy in the fact there is no crisis today.

Statistics have been compiled to show that record tonnages of anthracite are being produced, but the consumer is anxious to know what has become of the coal. He cannot burn statistics, though he is being furnished with statistics to burn. The dealer is reluctant to accept any more orders, for he is already at his wits' end to know how he is to make deliveries from the meager stocks in his yard. In the meantime the public in most eastern states has responded to the "order your coal early" pleas of the authorities, and then has had to wait, like Micawber, for "something to turn up"; hoping that the "something" will be a plentiful supply of coal before next winter's frosts. In the West many mines are idle because John Skelton Williams refuses to purchase and store coal for the railroads.

Business in the steam sizes of anthracite is quiet, though here and there a little contract activity in these grades is reported. When the railroads begin to buy soft coal, and when the difficulty of procuring bituminous coal becomes more evident, it is believed there will again be interest in the steam sizes.

In an effort to protect the supply of anthracite to the Middle Atlantic and New England States, the zoning plan was further tightened this week by an order from the Fuel Administration barring the shipments of hard coal to the South without special permit.

The users of soft coal are up against it, too. Bituminous mines will never be able to work to full capacity under existing conditions. More engines and more cars are needed. The fact that this has been known for some time makes it all the more regrettable that a remedy has not been applied before now. Right at this time, when every bituminous mine in the country should be working at full blast, operators from a number of districts are reporting that their men are disgusted with working only one or two days a week and are leaving for other parts and other jobs.

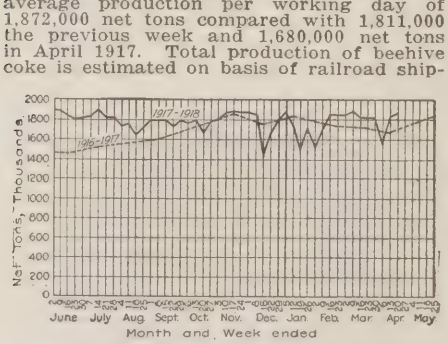
The question of the price to be paid for railroad fuel is still unsettled, and this, too, is having an adverse effect on production. Lack of ships at tidewater, where thousands of cars are tied up, and the tardiness of manufacturers despite high demurrage rates to unload cars on their sidings, furnish additional reasons for railroad congestion and car shortage.

The Government has already recognized that a radical readjustment of transportation facilities is necessary to the speed-up program of our war industries. The Pennsylvania R.R. and the Baltimore & Ohio, which serve the most important eastern coal fields, have practically given over their eastern divisions to the hauling of coal, coke, steel and munitions originating on their own lines. The long-haul business to Chicago has been eliminated.

The large tonnage of coal that must be rushed to the lake ports for transshipment to the Northwest will undoubtedly have its effect on the quantity of coal available for storage in many parts of the East, and it is not likely that much coal will be stored until the lake season closes. This will be sometime during the latter part of October or early in November.

COAL PRODUCTION

The output of bituminous coal increased 366,000 net tons, or 3.4 per cent., during the week ended Apr. 20, compared with the week previous. Total production (including lignite and coal made into coke) is estimated at 11,230,000 net tons, an average production per working day of 1,872,000 net tons compared with 1,811,000 the previous week and 1,680,000 net tons in April 1917. Total production of beehive coke is estimated on basis of railroad shipments at 655,000 net tons, an average per working day of 109,000 net tons compared with 112,000 net tons for the week previous.



Beehive Coke—The 63 operators reporting produced 318.465 net tons of coke during the week ended Apr. 20. The ratio of production to capacity increased from 67.8 per cent. during the week previous to 71.6 per cent. The improvement was made possible by an improved supply of cars, losses attributed thereto amounting to 10.9 per cent. of full-time capacity compared with 13.9 per cent. for the preceding week. The same operators shipped 154.650 tons of coal, or 37.7 per cent. of their capacity.

Byproduct Coke—Byproduct coke operators for the week of Apr. 20 slightly exceeded their performance of the week previous. Production by these operators was equivalent to 88 per cent. of their full-time capacity. Losses attributed to lack of coal rose slightly from 5.5 per cent. the week of Apr. 13 to 5.7 per cent.; losses attributed to labor trouble declined from 0.5 per cent. to 0.1 per cent; losses attributed to repairs to plant declined from 5.2 per cent. to 4.5 per cent; no market losses remained the same as the week previous, 0.3 per cent., and losses attributed to all other causes rose from 0.6 per cent. to 1.4 per cent.

Material increase in production is reported by New Jersey and Pennsylvania. Ratio of production to full-time capacity of New Jersey operators rose from 81.0 per cent. the week of Apr. 13 to 84.7 per cent.; increased production being attributed to improved supply of coal. The ratio of production to full-time capacity of Pennsylvania operators rose from 79.4 per cent. to 81.7 per cent.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended			
	Mar. 30	Apr. 6	Apr. 13	Apr. 20
Bituminous shipments, 123 roads.	189,546	160,178	188,311*	195,868†
Anthracite shipments' 9 roads...	43,642	32,223	37,760*	39,147†
Beehive coke shipments, 4 roads...	13,320	12,743	13,791*	13,455†

* Revised from last report. † Subject to revision.

BUSINESS OPINIONS

Dry Goods Economist—Prices for cotton fabrics do not seem likely to recede, and, in fact, may go higher. This is due to the fact that cotton for all, or nearly all, current manufacturing has been purchased at market prices and the cost of yarns is therefore established for some time to come. It seems assured that the cost of production will be increased in many cotton goods mills. Bleaching and finishing, too, will cost more next season than it did last.

Wool and Cotton Reporter—The woolen goods market is becoming more conservative in distributing goods at prevailing prices and in regard to the buying power of the ultimate consumer. Whether price regulation is near or far off is not apparent, but a development is expected whereby any accumulations will largely be disposed of. Standardization is believed to be one of the problems which are being worked out, and which require time.

Bradstreet's—While grain crop news continues favorable, low temperatures have deterred farm work and prevented crops already seeded from taking on growth. Further cuts in the output of pleasure automobiles have been ordered, flour milling is below normal owing to lack of materials, and launching of new enterprises of a miscellaneous character are held in check either by war restrictions, fear of being placed in the non-essential class or possible credit restrictions. Labor is in short supply, and further drafts for the respective militant forces tend to further deplete the number of available workers.

Marshall Field & Co.—Current wholesale distribution of dry goods is well ahead of

the corresponding period of a year ago. Road sales for both immediate and future shipments show good increases over the same week in 1917. Merchants have been in to market in about the same numbers. Collections are ahead.

Atlantic Seaboard

BOSTON

Situation drifts without material change. Railroad fuel situation still somewhat mixed. Government requisitions on operators continue for large tonnages. More "contracts" have been made, but there are many steam-users as yet uncovered. Hampton Roads show slight improvement. New River differential not a good sign. Much anxiety over outlook and fuel authorities beset with inquiries. Anthracite deliveries by water gradually increase.

Bituminous—While there is talk of "priority lists" and shipments that are to be ordered from Washington, the volume of coal into New England shows a steady loss as compared with receipts a year ago. There are nearly as many emergency cases presented to the fuel authorities from day to day as there were in January, and with relatively few exceptions industrial plants are forced to run on a hand-to-mouth basis. Shipments of water coal are somewhat larger than a month ago, but there is not the improvement that is necessary to insure the continuous supplies our essential activities will require. The situation is drifting along and already one of the normally heavy months for coastwise shipment has passed.

Assigned cars seem generally abolished, but apparently the railroad fuel problem is not so far advanced toward settlement as was generally supposed. It develops that because of the refusal of railroad purchasers to pay the commission legally established coal factors are busy placing tonnage that heretofore went to railroads, and sundry industrials are the beneficiaries. Some operators have of course been ordered to furnish a large proportion of output for engine fuel, but it is felt that this whole subject will soon be straightened out.

Bunker and other requisitions through Washington continue perplexing. Operators are not free to make commercial contracts to anything like the extent that was hoped and the result is a disappointment to many large buyers and a rather feverish effort on their part to get into line for water-borne coal. Undoubtedly the West Virginia factors are closing up more tonnage than they are likely to have, but the "contracts" are so full of holes that the shippers will suffer only in the opinion of those whom they will be unable to serve. Through Washington a large number of requisitions are being made upon the district representatives in behalf of various industries which are presumably without any contracts that yield shipments in sufficient volume. These orders are apparently rated as "Government" business and are, in fact, intended to be confined to those activities on the list of priorities recently issued under the authority of the War Industries Board. Inequalities in such a system are bound to creep in, and some better coördination should be devised than the routine that is now followed. The tonnages are heavy in the aggregate and, considering the number now on file, it is no wonder that operators are shy of closing contracts with New England plants, whether entitled to priority or not. The great effort now is for consumers to get on the priority list, and unless the latter is dealt with intelligently there is more than a chance there will be a repetition of the priority orders that worked such havoc last fall.

Meanwhile "contracts" are being made, sometimes with factors who really have a chance of securing coal but often with "purchasing agents" whose assurances are based largely on hope. In any case all arrangements are subject to Government orders and the seller assumes little obligation. The curious thing is that a lot of large buyers already feel so optimistic over current receipts, usually by water, that they promptly cease their purchasing of the steam sizes of anthracite or even the less desirable grades of bituminous. New England manufacturers are notoriously sensitive to "weak spots," and more than likely we shall have a period of light buying some time during the summer, notwithstanding the signs multiply daily that next fall and winter will see a much worse condition than last season. There are yet a great many plants that are not "covered," and these are regularly calling upon the fuel authorities for assistance from week to week. The number is larger than might be supposed, and to these should be added those who are relying upon shipments from the Baltimore & Ohio and Western Maryland railroads, where car supply shows regularly a shortage of more than 40 per cent. It is surprising how many New England buyers have put their faith in deliveries from the region tributary to those roads when they have been constantly warned to the contrary. Under present conditions it is hardly a natural all-rail movement to this territory.

The Hampton Roads piers show somewhat increased dumpings as compared with a week ago, but much more will have to be done before results can be regarded with any satisfaction. The New York piers also need radical treatment, and it is one of the hopeful signs that an official will be given the general supervision of dumping at the New York terminals. Tonnage over the Virginia piers is still affected by slow movement to tide and the generally poor car-supply, resulting in much curtailed operations.

The new $2.80 price per net ton f.o.b. mines for New River confers a differential of 35c. and almost the story of the balance of the year can now be written so far as concerns the smokeless coals. The Government departments will certainly bring pressure to bear on the shippers of the lower-priced output, the operators will be more or less indifferent because they cannot help themselves as to price, and generally there will be a heavy loss in tonnage. The big market for prepared sizes is much reduced through Federal regulations, and now through the same agency the New River operators partly because of heavy interest charges are handed a price that makes all the difference between narrow margin and handsome profit. The price will probably not be corrected until the months of heavy output are passed.

Anthracite—Receipts by water are gradually increasing, due more than anything else to the better movement of tows. The settled weather contributes to this result, and with many of the mines on a 90 per cent. output the outlook is a bit more encouraging. Rail deliveries have slackened again because of embargoes, but it is apparent the latter will be only of short duration.

NEW YORK

Shipments far below normal and dealers frantic because they cannot supply the demand. Weather conditions favorable for heavy consumption and next winter's supplies are being used. Public awake to the situation. Mayor Hylan providing for the poor. Bituminous for bunkers shows slight increase in supply. Commercial coal scarce.

Anthracite—The first week of the second month of the coal year finds the situation serious. Stocks are low and the demand for coal continues far above normal. Weather conditions remain unseasonable and favorable for heavy consumption, with the result that coal that should be used next winter is being consumed now. Production is far below what it should be to meet the demand, and operators realize that they could dispose of twice as much coal if they had it.

The public is thoroughly aroused to the situation and there is a fear that the country may be facing a coal famine next winter. They realize that the only salvation lies in the solution of the transportation problem and, having already placed their orders for next winter's supply, are now urging delivery on the retail dealer, while the latter is keeping the shipper hustling. The wholesale offices are thronged with dealers from early until late, all anxious for shipments of any sizes down to and including pea.

Some slight improvement is expected in the situation as a result of the order of the Anthracite Distribution Committee that 19 states are excluded from shipments of anthracite. The statement accompanying the order says that the situation is so grave in New England and the Middle Atlantic States that liberal shipments must be made into this territory, even though such shipments curtail the amount of coal that producers and distributors desire to send into the West.

There was an increase of 1387 in the number of cars shipped during the week ended Apr. 20 over the previous week, according to Government reports. Distribution is being made as equitably as possible under the supervision of the Anthracite Distribution Committee.

Mayor Hylan of this city, in order to prevent a repetition of last winter's situation, when the poorer class could not obtain coal for heating purposes, has directed certain of his department heads to provide for storing not less than 300,000 tons of coal. He says he has been promised the coöperation of the Greater New York Retail Coal Dealers Association, claiming a membership of 3000 coal peddlers.

Efforts to contract for the steam sizes are being made by most large consumers, but shippers are not inclined to sign up; for shipments, which, unless there is a decided improvement in transportation facilities, will be uncertain. Wherever it is possible buckwheat No. 1 is being stored. Rice and barley are free, the latter particularly so.

Current quotations, per gross ton, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.15	$6.90
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	4.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—The only bright spot in the situation here is in the slightly increased quantity of coal available for bunkering purposes. Commercial coal is scarce, and the situation remains serious. Car supply on most lines indicates a slight improvement but Tidewater receipts are about on a level with the previous week.

The trade is anxiously awaiting a decision from Washington with reference to the railroad fuel situation. In the meantime some of the mines have been receiving no cars at all, while others are better favored.

Large consumers are showing a desire to lay in stocks for the coming winter, but are meeting with no success owing to the bad shipping facilities and the fact that most of the coal is either taken by the railroads or by priority orders.

Conditions at the mines, from a labor standpoint, are serious. The miners are disgruntled because of the lack of work and every day it is reported many seek employment elsewhere. Along the Baltimore & Ohio some of the mines reported having received about 40 per cent. of their car requirements last week. This is a slight improvement over the previous week.

The zoning system has not made any material difference in stocks here. Free coals are scarce, while contract holders are not receiving anything like their full requirements.

BITUMINOUS PRICES

	F. o. b. New York Gross	Mine Price Net	Gross
Central Pennsylvania	$5.06	$3.05	$3.41
Maryland:			
Mine-run	4.84	2.85	3.19
Prepared	5.06	3.05	3.41
Screenings	4.50	2.55	2.85

PHILADELPHIA

Anthracite deliveries continue light. Dealers loath to book additional orders. Retailers quizzed again. Rail deliveries held back. Customers anxious for coal. Retail zone plan rumored again. Heavy tide shipments. Culm question up. Bituminous situation unchanged. Lack of cars makes situation most serious.

Anthracite—Conditions as to deliveries show no signs of improvement and the dealers are growing discouraged. On account of the continued dearth of receipts the dealers are showing little incentive to book additional business, which is in somewhat sharp contrast to a few weeks since, when certain dealers made strong efforts to book orders from new customers. It now looks as if the near future will see the dealers holding themselves strictly to the business of their old customers. This was emphasized at a recent meeting of the Philadelphia Coal Exchange, which was addressed by Chairman Lewis of the local fuel administration. Mr. Lewis suggested to the dealers that as he saw the situation it was really useless for them to try to gain each other's customers. He assured them that from his knowledge of the situation every dealer would need all the coal he could obtain for his own customers, and it was for this reason that earlier in the season Mr. Lewis had discouraged any new dealers from engaging in the retail trade. It can be said that the dealers have given full weight to Mr. Lewis' advice, as the trade has a growing high regard for him, as is shown by the increasing number of members in the coal exchange. Adopting his suggestion that he considered it wisdom

under the circumstances to join Philadelphia's representative body of retail coal men, 24 firms presented their names for membership at this week's meeting. This makes a total of 42 within a month.

That the fuel administration is alarmed over the present state of affairs is shown by a recent questionnaire issued from that office. Detailed information is asked for as to April shipments in sizes, unfilled orders in sizes, the names of the delinquent shippers, etc. This refers to domestic coal and it has been made known that strenuous efforts are to be made to induce the shippers to increase this city's quota by at least 10 per cent. over last year. The dealers are also called upon to furnish lists of plants to which they furnished buckwheat coal where bituminous might be utilized. It is also understood they will be forbidden to deliver pea coal to small heating plants for private homes in lieu of No. 1 buckwheat. Last winter, when buckwheat was almost as high in price as pea coal, and sometimes even higher, the dealers were called upon for the latter size and now in many cases it is preferred. The dealers are giving the information as promptly and as thoroughly as possible, yet they are wondering where the buckwheat coal is to come from, as in their previous inquiries to the producing companies they were informed that all this coal was needed for the regular steam trade. For this reason it is not at all likely that the dealers will be able to procure any of this size for domestic use, unless the administration should order it diverted to them.

The dealers are seriously handicapped by the slow delivery of what little coal has been consigned to them. In many cases shipments made in the latter part of March are undelivered, and most dealers have coal outstanding for two and three weeks. One seldom hears of rail embargoes these days, and it is known that the railroads are not tied with coal en route. It is believed that owing to a congestion of general freight coal shipments in this direction are being greatly restricted. It is also known that tide shipments to coastwise points continue especially heavy via the local piers.

Recently the fuel administration announced it was their earnest intention, if possible, to have at least 60 per cent. of this city's family coal for next fall and winter's consumption delivered before the first of October. This is a lengthening of the period, as originally announced, by one month. The public has responded and filed their orders as requested, but the deliveries for April have fallen far short of the proportion as planned by the dealers. One cause for this was the cold and stormy weather that made necessary the delivery of coal in small quantities for immediate use. The fact remains that one valuable month's time has passed with little progress having been made in storing coal. Teams are standing idle, all the costs such as feed, labor and equipment are mounting and the shippers, apparently, are not sufficiently optimistic to quiet the fears of the dealers. Many of the retail customers, now that they have had their orders placed for several weeks, are becoming anxious because no deliveries are being made to them. Since they became impressed with the importance of ordering early they are now becoming insistent that they be given coal. Their anxiety is only increased by the reports in the papers of the record production of anthracite at the mines in March and with promises of even better in April, and when the dealers here say they are not getting the coal they cannot understand it.

We have learned that for several weeks past the fuel administration has been working on a new scheme of distribution for this city. It seems that the city has been divided into zones and it is the intention to call upon the shippers to consign the required tonnage into each zone. It is claimed this will overcome the grievous errors of the past winter when sections of the city with a much smaller population than others, but with a greater number of dealers, received more coal on the latter account.

With the tonnages of soft coal cut by the authorities for the use of florists and breweries the anthracite shippers interested in culm have raised the question whether they will be allowed to offer this material to the above industries. At present there seems to be some hitch, but the culm shippers take the stand that there is an unlimited amount of this fuel to be had, and its sale to the restricted industries can in no way affect the general situation except favorably. The only objection that could be raised would be that of taking cars from other sizes.

The anthracite steam business is practically all sold up and despite numerous inquiries there is no free coal of any size to be had, unless possibly barley coal.

The prices per gross ton f.o.b. cars for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5.70	Rice	2.65	3.65
Stove	4.75	6.05	Boiler	2.45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—Some operators are willing to concede that there has been a slight improvement during the past week, due principally to a better car distribution. Certainly any improvement that has been felt is only slight, as reports continue to come in from mines working hardly more than half time for lack of cars. It is freely predicted that the production for April will even be lower than that for March. Despite the fact that the promise was made that the practice of assigning cars for definite loading would be discontinued, quite a fair proportion of empties sent in for loading this week were so designated, although it must be said the number is decreasing. The box-car question continues to agitate shippers, as quite a number of these cars were allotted this week, with instructions still holding that they can only be shipped westward.

BALTIMORE

Big boost in orders for anthracite despite warmer weather. Dealers complain of inability to get shipments. Soft coal supply easier.

Anthracite—Dealers over the city for the most part report a new rush of orders for hard coal deliveries over the summer months. Many of those ordering are urging immediate deliveries, apparently under the impression that they may not be able to get even two-thirds of their needs later. The activity, which has come despite the fact that warmer weather has set in, is undoubtedly due to the several public utterances of State Fuel Administrator Meyer that he would advise consumers to get their fuel supplies as early as possible. On the part of the dealers there is considerable complaint that there is not nearly enough coal coming through to take care of the more urgent of their customers. They rather discount the idea of urging consumers at this time, as it leads to complaint from those who place their orders and who do not see the coal coming through at once. Explanations that the coal will be delivered in the weeks to come and long before it is needed do not satisfy many people. Under this rush coal men can afford to be discriminating as to their deliveries, and in cases of poor pay are requiring checks or money with orders before they are definitely booked for early delivery.

Bituminous—The soft coal situation here eased up under diversions of considerable extent from coal congested at the Philadelphia & Reading connections, and which was originally destined north. This coal came through in large quantity to aid coastwise and export loading, and a considerable amount was also diverted for local harbor and line delivery. This diversion enabled the local fuel administration to care for a number of small canning and packing establishments that were without coal at the start of the food conservation season, and also to take care of those factories on the Pennsylvania R. R. lines which have been cut off from coal from long established mine connections on those roads by reason of the zone embargo. Much coal was loaded on small bay sailing and motor craft to be delivered at packing houses on the eastern shore of Maryland. It cannot be said that there is any surplus coal here, but the recent arrivals have enabled several important industries which were near the danger line to get in a little reserve stock. It is too early just now to predict just how the zone plan is to work out, especially as it is understood that certain railroad and consuming interests are working for modifications, in whole or in part.

Lake Markets

PITTSBURGH

Car shortage more pronounced. Fuel Administration orders get satisfactory preference. Lake shipments light.

There is still more complaint of car shortage at Pittsburgh district mines, and on the whole conditions instead of improving in the past week or two have really grown worse. It is clear that the railroads are quite unable to furnish the amount of transportation service required. They have shown at the same time that they have some measure of control over the situation in that they have been giving almost full car supplies to the mines that are working on Fuel Administration orders whether for munition plants or for railroad fuel; but the extra supplies given such mines simply come out of the general store and leave the mines operating on ordinary commercial orders with correspondingly fewer cars.

There continue to be small offerings in the market of coal loaded in box-cars, but as formerly these are chiefly of Ohio coal. There is hardly any Pittsburgh district coal offered in any kind of cars. The market remains quotable at the set limits, $2.20 for slack, $2.45 for mine-run and $2.70 for screened coal, per net ton at mine, Pittsburgh district, with an allowable 15c brokerage in addition under certain regulations.

Thus far shipments of Lake coal have been light, although there has been a little movement for two or three weeks past merely to cargo some of the vessels for their first trip up the Lakes. The regular vessel movement will not amount to much for several weeks, and meanwhile little coal will be shipped to docks.

TORONTO

Shipments less since opening of navigation. Consumers ordering largely, but deliveries restricted. Conference of retail dealers urged to prepare for shortage.

Receipts of coal from the mines have fallen off since opening of navigation, as much is being shipped by water to the upper lakes. The public generally are acting on the advice of the Fuel Controller and placing their orders early, but dealers as a rule are only supplying 1½-ton lots for immediate requirements. A conference of the Canadian Retail Coal Association held on Apr. 26, and attended by about 300 dealers, was addressed by R. C. Harris, Ontario Fuel Controller, who urged them to prepare for a shortage next winter by placing orders as soon as possible wherever they would be accepted.

Quotations per short ton for best grades are as follows: Retail anthracite, egg, stove, nut and grate, $10; pea, $9; bituminous steam, $9; slack, $8 to $8.50; domestic lump, $10; cannel, $11. Wholesale f.o.b. cars at destination, prices as fixed by Government: Three-quarter lump, unprepared, $6.11; prepared, $6.31; slack, $5.18.

BUFFALO

Coal situation little changed. Bituminous still plentier than anthracite. City distribution said to be better than in former years, but demand is greater. Loading for Lakes under way.

Bituminous—The situation does not change much. Coal is fairly plenty and promises to continue so, though the car supply is not good. Where there are cars in plenty the coal is in sufficient quantity. There are opinions given out by coal men that if cars were plenty a shortage of labor would be apparent, but so long as the labor supply is in excess of transportation it is a matter of doubt. As it is the men are often idle in the mines, waiting for cars.

Little or no surplus of bituminous has been reported, but some easily reached centers in Canada, as for instance Toronto are piled full of it. The reason is that the larger margin of profit given to jobbers there has sent many of them across the border, where they are doing much more business than they have done here since the price regulation was established. It is quite the common idea that the jobber is shelved here, unless he has some very close connections with good mines, which is something that most jobbers are unable to get. A few of them have formed such connections and are selling considerable coal, but that is far from being the rule. Even these say that it is hard to make a fair profit. They add that if what is expended in regulating the trade was turned in to the jobbers' profits the situation would be improved.

Apprehension centers on the situation as it seems likely to appear next fall. If all coal is taken up now as fast as it is offered, what will be the situation then, with the recollection of such a winter as the last one still fresh in our memories?

Bituminous prices continue at Government figures as follows: Thin-vein Allegheny Valley, all sizes, $4.45; Pittsburgh lump, $4.25; Pittsburgh mine-run, $4; Pittsburgh slack, $3.75; all per net ton, f.o.b., Buffalo.

Anthracite—The consumer complains as usual that his orders are not filled, or that at the best only a ton or two can be obtained. His applications are filed away and he must wait till his turn comes. One thing is in his favor. The price is expected to continue without change all summer, so that coal ordered now will not be anywhere up to 50c. a ton higher when he gets it. The shipping agents say that they are

distributing fully as much coal to the city trestles as formerly, and some of them even more than ever before; so they are not disturbed over the situation.

The effort of the consumers to lay in more coal than he needs seems likely to be given up. It was more or less common last year, but the heavy fines, that certain city merchants, mostly in the grocery trade, have been made to pay lately have set the householders to thinking. They do not really care to come under the same sort of regulation. At the same time the fear of running short of supplies is anything but easy to bear, so that the buyer as well as the seller is in a great quandary.

The Lake trade is not active yet. One company has loaded seven cargoes, of which 3200 tons has cleared for Chicago and 1440 tons for Milwaukee. The steamers began to leave here for the Upper Lakes on Apr. 27, a report having been received that the jam in St. Clair River was gone and the entire Lake route was open. The opening is late, but only one other shipping company is as yet ready to load water coal, which it will begin to do at once. The other agencies expect coal soon and are wondering where the newly-mined coal is going, as they should have a surplus here by this time.

DETROIT

Diversion to Lakes reduces movement of bituminous coal somewhat. Anthracite scarcity is not relieved. Much coal loaded on boats.

Bituminous—While the movement of bituminous coal into Detroit continues in considerable volume, jobbers say there is apparently some diminishing of shipments, which is accounted for by the requirements of Lake shippers and is also the result of the demands on transportation companies to supply car and motive power in handling coal from the mines to loading docks on the Lakes. The present supply, however, seems to meet needs of consumers for present consumption, though creating less favorable conditions for stocking up reserves.

Quite a number of large industrial consumers and public utility companies operating in this locality are reported to have made some progress toward acquiring stocks for future use. The circumstance that many of the manufacturing plants are without space available for storing coal in quantities larger than is needed to provide for a few days ahead necessitates maintaining shipments in rather steady volume, especially in view of the fact that nearly all factories and steam plants are being operated at approximately capacity in turning out work for the Government or products necessary for the completion of such work.

The users of steam coal show a well-sustained demand which, in the case of slack, the jobbers at times find it difficult to meet. Household consumers seem not especially eager to stock up with bituminous coal at present. Many of the retail yards have been able to acquire a good supply. The insistence of the state fuel administrator that no higher margin than $2.25 a ton is justified on deliveries to domestic consumers seems to be exerting a deterrent influence on distribution.

Anthracite—Household consumers are waiting for a more liberal supply of anthracite. With continued low temperatures thus far, the amount received has done little more than supply present needs, and dealers have been able to fill few of the orders received for next winter's supply.

Lake Trade—About 25 Lake freighters, many of them coal laden and all icebound, were held, some as long as 10 days, in Detroit River waiting for tugs to break through the ice blocking St. Clair River. The coal is badly needed at some of the upper Lake docks. It is estimated 600,000 tons were afloat May 1.

COLUMBUS

With the Lake trade slow in starting, and steam demand not as good as formerly, the coal trade in Ohio is not as active as in some former weeks. Domestic trade is active.

A state of uncertainty pervades the coal trade in Ohio. With the railroad fuel question partially reopened by John Skelton Williams, purchasing agent for the railroads, operators are at a loss to proceed. One of the effects of the reopening of the railroad fuel question is the backwardness of certain large consumers to place contracts, believing that lower prices may maintain. As a result things are uncertain and the total production is falling off, especially in certain sections.

The domestic trade is still the best feature of the business. Householders are taking the advice of the Fuel Administration and state officials, and many are laying in their coal supply for the coming winter. Dealers are good customers and are buying actively. A large percentage of the orders are for immediate shipment. Retail stocks are fairly large, but buying is continuing as many are desirous of having adequate stocks to take care of the rushing business. Retail prices are steady at the levels which have maintained for some time. Considerable Pocahontas is now finding its way into the local market.

The steam business is quiet, although there is a considerable tonnage moving. Stocks in the hands of the larger users are now adequate, and the smaller users are not anxious to increase supplies. Railroads are only taking fuel for current needs, as the railroad fuel question is still "up in the air." Few steam contracts are being closed at this time.

The Lake trade is also lagging because of ice in the upper Lake regions. Quite a few vessels have been loaded and have started, but most are held up at Detroit. Delay in starting the Lake trade is also caused by slowness in issuing permits by the Lake pool. Mine-run permits are only issued after an inspection of the mine. Thus practically no mine-run permits have yet been issued.

The output in Ohio fields has not been large. This is due largely to a car shortage which apparently is getting worse instead of better. Empties are slow in being returned to the mines. As a result the output in the Hocking field is estimated at 65 to 70 per cent. and about the same in the Pomeroy Bend field. In eastern Ohio car shortage is still bad, and the output is estimated at about 45 to 50 per cent.

Prices of short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	East Ohio
Sized grades	$2.70	$3.05	$2.70
Mine-run	2.45	2.80	2.45
Screenings	2.20	2.45	2.20

CINCINNATI

Cool weather has kept consumption by domestic trade up, and demand for storage also continues strong. Slight improvement in car situation is noted.

Cold and rainy weather has prevailed in this section during the past week, serving to force into the market many domestic consumers who had used their winter's coal supply, and also accentuating the continued demand from those who are making an effort to secure coal for next season. The retail trade is not able to secure any supplies in excess of current deliveries, and the problem of the jobbers and operators also is that of getting enough cars moved to take care of current requirements. Great efforts are apparently being made by the Government authorities in charge of the railroads to improve the car supply at the mines, and incidentally to improve conditions at Cincinnati and other terminal points; but the confusion incident to the change of authority has not yet been straightened out, and this seems to be one of the principal causes for the difficulty in getting empty cars back to the mines. It is believed by operators and railroad men that by early summer there will be a greatly improved condition in transportation, but until the Federal railroad administration gets matters thoroughly into its hands not much relief is expected.

LOUISVILLE

Demand for domestic coal picking up, with consumers stocking much more freely and contracts from steam users showing much more activity. Conditions at mines practically unchanged.

Weather conditions have been such that domestic consumers have been burning fuel coal to a much greater extent than usual for April. However, the demand for immediate consumption is not so great. There is a heavy demand coming from residents, churches, schools, stores, etc., for stocking purposes. In steam coal more activity is being shown, and consumers who had been holding back have been signing up contracts in a lively manner during the past week. While little coal has been yarded by the retailers, indications are somewhat better than they have been. There has been a slight surplus of mine-run on the market within the past few days, most of this coal coming from wagon mines in western Kentucky, which have no open market for their output. In western Kentucky the labor situation is about the same as it has been, while the car supply is estimated at forty to forty-five per cent. of requirements.

The general rumor in Louisville, and one that has been accepted by both eastern Kentucky and western Kentucky dealers and operators, is to the effect that all Harlan and Straight Creek district coal will shortly be taken out of the Louisville market and diverted to the byproducts plants, which will leave Louisville dependent entirely on Jellico and western Kentucky mines. A prominent Harlan operator stated that while no formal action had been taken as yet, he felt assured that it would be forthcoming within a few days.

BIRMINGHAM

Local market active in both domestic and steam channels. Supply of both grades inadequate, and nonessential industries are feeling the shortage in steam fuel. Output improving slightly. Car supply as a whole continues good and adequate.

A strong and steady demand for both domestic and steam grades obtains in this market. Domestic dealers are exercising all diligence to secure every car of coal that they can get hands on, and at that are not making much progress in stocking their yards. There is a serious shortage in the supply of coal from the domestic mines, and unless production is materially speeded up retailers will not be able to secure anything like their winter requirements through the spring and summer months.

Only about three producers have taken the necessary steps to secure the additional 20c. per ton allowed by the Government for extra clean coal. According to the ruling of the Fuel Administration the retailer cannot add this 20c. per ton to his retail price without a permit from Washington. In furtherance of the step taken by the Administration to stimulate the production of clean coal, E. A. Holmes, district representative, has announced the appointment of J. deB. Hooper as chief coal inspector for Alabama, effective May 1.

Preferential shipments of steam coal are being made to essential industries as classified by the Government, and as a result, other classes of users are receiving the residue, the amount of such tonnage being uncertain and inadequate. The free coal supply has been further reduced by a heavy increase in priority requirements of the Southern Ry. during the past week.

This district is not suffering so far from the car shortage prevailing in other fields, and only a few isolated complaints have been reported. An increase in the price of cutting coal and in the wage schedule of mine workers will be placed in effect at all commercial operations May 15.

Coke

CONNELLSVILLE

Car supplies uncertain and no definite improvement recorded. Better supplies of byproduct coke, so that furnaces fare slightly better than in March.

While slightly better car supplies for the Connellsville region are reported in the past few days, the situation in general continues decidedly unsatisfactory. The general judgment is that April as a whole has shown no improvement over March. It is assumed by those familiar with both coke and coal conditions that the railroads are really doing considerable toward carrying out the Fuel Administration's instructions to provide the coke works with cars, in order to stimulate iron and steel production, but this conclusion is reached, not by observing the coke-car supplies by comparison with the requirements, but by observing that they are much better than the supplies furnished the coal mines in this territory, as coal-car conditions are much worse than coke-car conditions.

Taking the blast furnaces of the Central West as a whole, they have suffered less from coke shortage in the past two or three weeks than in March, but the improvement in their position, and only a small one at that, is credited to the production of more byproduct coke. In some cases byproduct operations have had a surplus over the requirements of their attendant blast furnaces, which they were built to serve, and in a modest way they have helped out a few furnaces that normally depend entirely on Connellsville coke.

There are scarcely any market transactions. The set prices remain: Furnace coke, $6; 72-hour selected foundry, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Apr. 20 at 336,876 tons, an increase of 2585 tons, and shipments at 303,932 tons, a decrease of 10,444 tons.

Birmingham—The local coke market continues strong and the demand for both furnace and foundry coke is far in excess of the supply. The fuel administration has

announced a price of $8 per net ton ovens for Pratt beehive coke for furnace use, and $8.75 for 72-hour foundry product. The Blue Creek, Black Creek and Brookwood schedule is $8.75 per net ton ovens for foundry use. Production is still below normal, output being considerably crippled by shortage of coke labor. An increased labor schedule will be effective at all commercial ovens May 15, the furnace producing companies having already granted the increase. Coke is moving better with an improved supply of box-car equipment.

Buffalo—The situation does not improve, especially as complaint continues that the regular ovens are turning out a scant supply on account of lack of cars to carry coal from the mines. This turns the furnace demand to the byproduct plants, and those in this vicinity are producing all the coke possible in order to meet the demand.

Middle Western

GENERAL REVIEW.

The demand for size coal continues to grow, while slack, screenings and washed No. 5 drags.

So far as actual market conditions are concerned, there is a growing feeling that the shortage of size coal is increasing. At the same time fine coal, such as is used by almost all the large consumers, is plentiful on account of the failure of the railroads to start their buying. Some operators report that their business is becoming lopsided, and that they are now declining to accept any order for lump, egg or nut unless such an order is accompanied with an order for fine coal. In some northern Illinois districts operators are piling their fine coal on the ground in order to permit their mines to operate and ship domestic sizes. Maximum production has not been attained in any locality. In some instances tonnage has been curtailed due to the failure of the Central Illinois Public Service Co. to furnish power to the many mines with which it has long-time contracts to furnish electric power for cutting and hauling purposes.

By far one of the largest mining property deals of the year was consummated this week. The entire holdings of the Chicago & Carterville Coal Co., with two large producing mines at Herrin, Ill., was sold to the Chicago, Wilmington and Franklin Coal Co., of Chicago. The purchase price was $1,500,000. The acreage consisted of 5000 acres in Williamson and Franklin Counties, of which more than 4000 acres is farm land.

CHICAGO

Illinois and Indiana lump, egg and nut in demand; fine coal plentiful and sluggish.

Little can be said about Chicago market conditions. It has recently dawned on the public that if they are to be kept warm the coming winter it behooves them to get all the Illinois and Indiana coal they possibly can; therefore no difficulty is had in disposing of anything that is prepared in this market.

The hard coal situation here is not different from that existing in other western cities. Only about one tenth enough is arriving to take care of the requests. Eastern bituminous and Kentucky soft coal is not obtainable. The fine coal market continues to be dull. This is best explained by the fact that many of the large fine coal users have during the past year purchased mines and are producing their own coal.

Quotations in the Chicago market are as below, per net ton f.o.b. cart at mines:

MILWAUKEE

Anthracite advanced 80c. per ton. A liberal supply expected during May. Bituminous being delivered freely at $7.25. Illinois coal zone extended.

The Federal Fuel Administrator has advanced anthracite coal 80c. per ton in the Milwaukee district. Egg is now $10; stove, $10.25; and nut, $10.35, with the usual charge of 50c. per ton for carrying in. Coke is being delivered in one-ton lots at $9.75, carried. Bituminous for steaming purposes is in good supply at $7.65. Hard coal can only be obtained in small quantities at present, but liberal receipts by Lake are expected during May. Consumers who order now are promised deliveries in June and July. A shortage of Pocahontas is expected, especially at the start of the shipping season.

An important readjustment of zone boundaries in Wisconsin has been ordered. It means that Illinois and Indiana coal may be shipped all the year round as far north as a line crossing the state from Kewaunee, on Lake Michigan, through Amherst Junction, Abbotsford and Chippewa Falls to Minneapolis. Formerly the boundary line extended from Milwaukee through Madison to Prairie du Chien. The interlying district heretofore has had to rely upon coal supplies coming via Lake ports Eastern fields.

Advices from the interior of the state represent that the wood-burning movement is spreading, with the result that coal consumption will be materially reduced in many districts.

Fuel Administrator Fitzgerald has been requested by the Washington office to importune the Wisconsin Railway Commission to grant street-car companies in Wisconsin cities the right to reduce the number of stops in order that fuel may be conserved. It is figured that nearly 10,000 tons of coal can be saved in this manner.

ST. LOUIS

An unusual market, with no Carterville available and a demand far exceeding supply. The market is picking up and looks encouraging on other coals, except steam. Car shortage prevalent and movement slow. Domestic business extraordinarily good. No Eastern or Arkansas coals.

The situation locally is more than satisfactory from the viewpoint of the retailer, except that not more than one-half the supply of Carterville coal is available for the demand. The domestic orders on Carterville have piled up so that there is two months' business ahead of the retailers at the present time, and the demand continues. The call for Mt. Olive is fairly good, with that for Standard rather weak as yet.

The call for steam coal is exceptionally slow, with the result that the steam sizes are dragging. Some mines have had to suspend operations on account of their inability to move the screenings.

There are indications, however, that there will be immediate improvement; and this is on account of railroad coal coming in. This will take mine-run and will eliminate the making of domestic sizes.

Conditions in the Carterville field are not good. The car supply is unusually poor and the movement of coal is slow. The slow movement prevents a rapid return of empties, and this is going to be a great factor in the efforts to make a big production this year. It will be the failure of the railroads to properly handle this tonnage.

Apparently, from the layman's point of view, no special efforts are being made by most of the carriers to expedite the movement of coal. Poor wages and inefficient help among the unorganized employees are perhaps the principal factors in this failure.

Somewhat similar conditions prevail in the Duquoin field, with a ready market for everything produced. This also describes the situation in the Mt. Olive field, with the exception that at these mines there were several hundred cars of screenings unbilled that caused a let-up in the tonnage on account of the tracks being congested with unbilled cars. There is a ready market for all the domestic sizes, but steam coal hangs heavily, with no place to put it.

In all of these fields the domestic sizes are bringing the full circular price.

In the Standard field there is a peculiar situation. Screenings have gone as low as $1.40 and lump coal as low as $2.15, for apparently no other reason than that the operators are not making a concentrated effort to produce and market their coal systematically. Even with the restricted zone the proper distribution would prevent a congestion of coal in some sections and a scarcity in others. The pooling methods in use in the East might be used to advantage in the handling of Standard coal here, for the reason that big users play against the market and force some mines to remain idle while they are beating the price down, whereas the maximum tonnage should be produced and a place found for it.

There is a scarcity of cars on the Missouri & Ohio and Illinois Central, and on the Illinois Central the movement is exceptionally poor. The other roads have a fairly good supply of equipment and the movement is almost normal.

Many mines in the Standard field have been idle on account of their failure to move screenings. During the past week something like 2000 cars of mine-run have been sold to railroads at prices ranging from $1.90 to $2.15. Many railroads are still in the market for coal, but feel that they can buy it at a lower price than the operators are now asking, for some operators are asking the full mine-run price, contending that if they do not get it they are going to market their coal for domestic and steam. The conditions in this field are going to be better, and good improvement is in prospect for the next week or ten days.

There is no anthracite coming in from the East, no smokeless, and practically nothing from the Arkansas district.

The circular here is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@3.00	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@3.00	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 2 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 3 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 4 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 5 nut	2.15@2.40	2.15@2.40	2.15@2.40
2-in. scrgs	2.15@2.40	2.15@2.40	2.15@2.40
2-in. lump	.....	.....	2.25@2.50
3-in. lump	.....	2.50@2.65	.....
Steam egg	.....	2.35@2.50	2.25@2.40
Mine run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	2.65@3.00	2.65@3.00	2.65@3.00
No. 2	2.65@3.00	2.65@3.00	2.65@3.00
No. 3	2.65@3.00	2.65@3.00	2.65@3.00
No. 4	2.65@3.00	2.65@3.00	2.65@3.00
No. 5	2.15@2.30	2.15@2.30	2.15@2.30

Williamson and Franklin County rate is 87½c.; other fields, 72½c.

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La. Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky	Smokeless: Pocah. and W. Va.	Smokeless: Penna.	Hocking	West Va. Splint
Dom. lump	$2.65@2.80	$2.65@2.80	$3.10@3.25	$2.60@2.75	$2.70@2.85	$3.05@3.20	$2.85@3.00
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Egg	2.65@2.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Small egg or nut	2.65@3.80	2.65@2.80	3.10@3.25	2.60@2.75	2.70@2.85	3.05@3.20	2.85@3.00
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00	2.45@2.60	2.45@2.60	2.70@2.85	2.60@2.75
Screenings	2.15@2.30	2.15@2.30	2.60@2.75	2.10@2.25	2.10@2.25	2.55@2.70	2.35@2.50

General Statistics

NORFOLK & WESTERN

Below is given a statement of the coal tonnage from mines on the Norfolk & Western Ry., and from other railroads, for the month of March, 1918:

From:	Net Tons
Pocahontas field	1,437,933
Tug River field	306,743
Thacker field	268,007
Kenova field	98,665
Clinch Valley field	148,463
Other Northern and Western fields	11,169
Total Northern and Western fields	2,270,980
Williamson & Pond Creek R.R.	180,044
Tug River & Kentucky R.R.	52,363
All other railroads	99,118
Grand total	2,602,505

COAL AGE

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Employment of Women in Mining

By Floyd W. Parsons

NEXT to transportation the serious problem in coal mining is the provision of an adequate supply of labor. Approximately 30 per cent. of the male workers in the United States are now engaged in work that was not a part of our industrial effort previous to the entry of this country into the world war. No stretching of the imagination is necessary, therefore, to realize that this shifting of man power must disturb the usual course of business and make it difficult for the Nation to maintain on a normal basis even the production of essential products.

The anthracite coal industry has been hard hit by the voluntary enlistment of its workers and the later drafting of miners into the military service. One partial solution of the problem seemed to be the greater employment of women in various positions above ground. In line with this thought one of the larger companies moved the younger men employed around the jigs in the breakers to work which they could do at and in the mines. The positions vacated by these men were applied for by hundreds of girls when it became known that women would be used. Arrangements were made at each colliery for rest rooms, etc., to give these girls every reasonable comfort and protection. None of them was to replace any boy who could not be moved into a position that would pay him better.

The work that the girls were called on to perform was neither arduous nor dangerous; in fact it was less dangerous than the work in the silk mills, where a large number of them had been employed formerly. The girls were particularly pleased and were glad of the opportunity to make the additional wages that the coal companies paid for this work of running the jigs. The plan gave promise that the coal corporations, with this new help, would be able to provide a sufficient force of jig-runners to prepare the coal on the basis of pre-war standards, which the Fuel Administration now requires, and which it is difficult to obtain with only a 50 per cent. force.

This hopeful outcome, however, has been prevented by the action of certain labor leaders, who have invoked an old law passed in 1891 which prohibits the employment of women at or around the mines for anything except clerical work. This law has been superseded in practically all of its parts by more recent legislation, but unfortunately the old law was never repealed in its entirety, and this clause concerning the employment of women still remains. The attention of the chief mine inspector of Pennsylvania was called to the law, and he was obliged to issue orders for the suspension of the girls until such time as a ruling on the matter can be obtained from the state's legal department.

The disagreeable phase of the matter is the exultation of a certain element of labor over this outcome. One labor organ calls it a victory, and in this assertion it is correct; for it is a victory—for the Huns. It is a victory for our enemies because, if the jigs in the breakers are not operated fully and effectively, the output of the collieries will not be clean coal; and hundreds of railroad cars will be utilized in the useless work of carrying refuse to market instead of fuel.

The anthracite labor force is so depleted that it will be almost impossible to maintain our last year's output of fresh-mined coal. This recent action, springing from animus and suspicion, was certainly an unnecessary interference with the attempts of the companies to maintain their working forces. It has prevented the use of girls in a class of employment, light in character and carried on under the best of hygienic conditions. It was also a work about which they were enthusiastic, and which they were loath to discontinue. It is fortunate that this local trouble does not typify the attitude of labor throughout the Nation. However, it is deplorable that such selfish and unpatriotic action should have occurred in connection with work so vital just now as the production of anthracite coal.

IDEAS AND SUGGESTIONS

An Improved Jack or Rail Bender

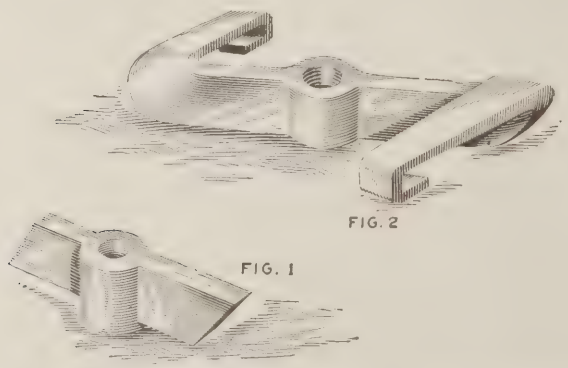
BY F. C. J.

The accompanying illustrations show a rail jack or bender—a tool in common use about the coal mines. Referring to the drawing, rail jacks at one time were made in the following manner: A block of iron was first forged into the shape shown in Fig. 1. Then this was chucked in a lathe, the punched hole trued up, and a square thread of about 3 to 4 threads per 1 inch cut. This made the nut part of the jack. The horns, or arms, were then welded to the nut and shaped up in the usual manner. The same operations were gone through when the thread was stripped. The arms were cut off, the nut part was chucked in a lathe, the thread bored out and a new thread cut if sufficient stock remained after boring. If not, a new nut was forged and machined.

The difficulty with this method was that quite often the thread became deformed from the welding and the job was a failure. To overcome this the jack was heated at the bend of the arm and the arm bent backward and inward toward the nut, as in Fig. 2. This made it possible to machine the whole jack, for the arms laid flat on the chuck of the faceplate and did not stick out.

The cutting of a thread in a jack presents many disadvantages, for such jacks often crack or break close to the nut or near the weld. If the former happens, it entails a difficult weld in order to keep from spoiling the nut. Sometimes the nut strips or the thread bar strips as both wear, and it is then necessary to do the expensive forging and machining all over again.

To overcome these defects the jack shown in Fig. 3 was evolved. The jack proper was forged from a solid billet of machinery steel and a 2½-in. hole punched and



FIGS. 1 AND 2. ORDINARY METHOD OF MAKING A JACK

drifted in place of the threaded nut hole. A bar of 3¼ in. diameter machinery steel was then bored and threaded on the inside for the thread bar of the jack. This bar was then turned down on the outside to 2¾ in. in diameter, leaving a head on one end of the original 3¼ in. diameter. A fine pitch thread was cut on the other end for a retaining nut. A ⅜-in. keyway was then cut on this threaded bushing and also in the drifted hole in the jack. The bushing was then placed in the hole and keyed in place, and the retaining nut screwed up tight. The jack was then ready for the thread bar. The advantages of this jack are at once apparent to all

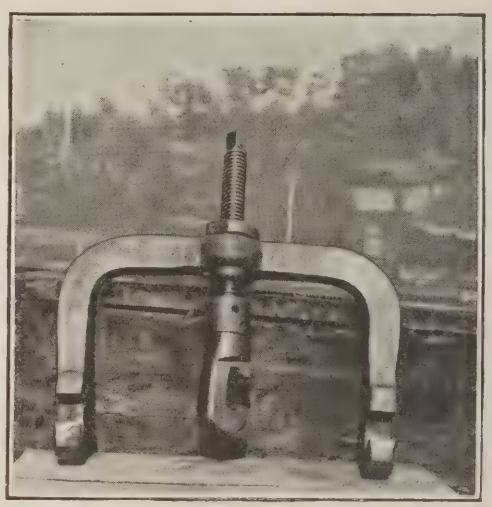


FIG. 3. THE COMPLETED JACK

trackmen. When the thread bar or the bushing strips or becomes worn they are simply taken out and a new part or parts put in place. If the jack should break, the machined parts can be removed and the repairs made without spoiling anything.

Fabric Belt Formula

BY W. F. SCHAPHORST
New York City

The rules as ordinarily given for fabric belts made up in plies are something like this: "A 4-ply stitched canvas belt is equivalent to a single leather belt; an 8-ply belt is equivalent to a double leather belt," and so on. Then, after knowing the equivalent, we have to hunt up the rules of thumb for leather belts before being able to decide on a width necessary for a given drive.

I have hashed over these rules and equivalents and have hit upon a formula that gives a direct result without mentioning leather at all. The formula applies to most ordinary belts made up in plies such as rubber, stitched canvas and balata. It is as follows:

$$\frac{WS}{\frac{2640}{P} + 136} = horsepower = H$$

where

W = Width of belt in inches;
S = Speed of belt in feet per minute;
P = Number of plies;
H = Horsepower.

For example, what horsepower may be transmitted by

a 10-ply balata belt the width of which is 6 in. and whose speed is 4000 feet per minute? Substituting in the formula we get:

$$\frac{\frac{6 \times 4000}{2640}}{10} + 136 = 60\ hp.$$

Thrown into other forms for the determination of either W, S, or P this formula becomes:

$$W = \frac{H}{S}\left(\frac{2640}{P} + 136\right)$$

$$S = \frac{H}{W}\left(\frac{2640}{P} + 136\right)$$

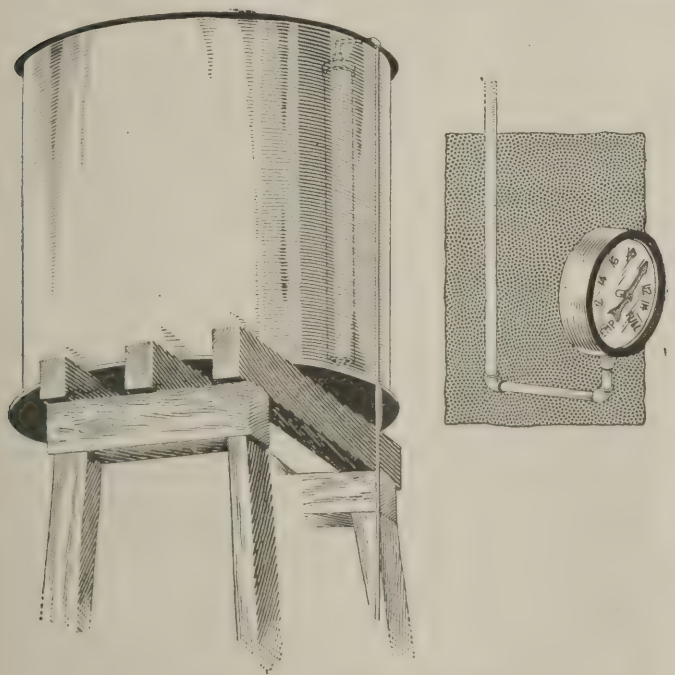
$$P = \frac{2640}{\frac{WS}{H} - 136}$$

Valveless Tank Indicator

By L. V. Lauther

Guttenberg, N. J.

A convenient water-level indicator for a remote water tank can be made as shown in the accompanying illustration. A 4-in. pipe is vertically installed in the tank, on top of which is screwed a 4 x ⅛-in. reducer, the bottom end of the pipe being left open and supported about an inch from the bottom of the tank. A line of ⅛-in. pipe is run to a convenient point and an old pressure gage attached to it. As the tank fills it is evident that the air entrapped in the 4-in. pipe cannot escape, hence it must undergo compression. As the amount of this compression depends on the height of the water



TANK INDICATOR AND GAGE

level in the tank, the gage reading will thus increase as the water rises in the tank. A dial was placed on the old gage, and by experiment various heights in the tank are marked upon it as determined by trial.

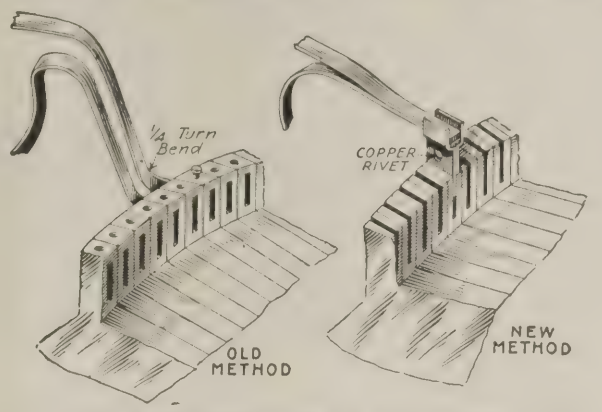
Where the tank is far from the gage, it is better to incline the big pipe in the tank, so that a greater volume of air is entrapped, thus making up for any drop in the small pipe line. Of course, it is a good plan to go up in the tank once a season and check up on the gage.

Improving the Coil Attachment

By John J. Nolan

Linton, Ind.

The accompanying illustrations show an improvement to prevent the armature leads of certain mining-machine motors from breaking. This is a frequent occurrence on certain types of armatures, especially



OLD AND NEW METHODS OF ATTACHING COILS

when the wire becomes crystallized after considerable use or the commutator or shaft is loose, causing the leads to break when a bend and one-fourth turn are close together. I have known as high as 30 hook splices being made temporarily by the machine man or electrician before the armature was changed. In most such cases a new commutator is needed.

The company with which I am connected has equipped approximately 12 armatures in the manner shown and has proved them a success. Flat copper ribbon is used, just thick enough to fill the old slot and about ½ in. wide, and extending 1¾ in. above the riser opened just enough at the top to receive the coil flatwise. The extension riser is double and is riveted near the top, the lower end or single thickness being soldered in the commutator. Under the old method the coil was set on edge and held with a screw. A saving of about 7 lb. of copper is accomplished by this method.

Difficulty in burning bituminous coal in industrial furnaces is due almost entirely to the volatile matter, because this leaves the fuel bed as gases and tars and must be burned in the combustion space of the furnace. Unless enough air is introduced immediately at the surface of the fuel bed and thoroughly mixed with the volatile combustible, the tars and the more complex combustible gases are quickly decomposed or "cracked" into soot and simple gases. The soot thus formed is difficult to burn in the rarefied furnace atmosphere and is apt to pass out of the furnace as black smoke, particularly if the furnace is hand-fired. To prevent smoke and its accompanying heat losses, a considerable excess of air must be used and the furnace must have a large combustion space containing gas-mixing devices. The fixed carbon is easy to burn because it stays on the grade. It burns partly to CO_2 and partly to CO, which in turn can be burned to CO_2, with the additional air introduced above the fuel bed. Practically complete combustion of CO is easily obtained because of its simple molecular structure.—*Bureau of Mines Bulletin No. 135.*



Unit-Built Concrete Dwellings at Youngstown, Ohio*

BY HARVEY WHIPPLE
Detroit, Mich

FORTY acres of fireproof houses and community buildings, in a hill-top setting that has been worked out with an eye as well for attractiveness as utility, are included in the housing scheme of the Youngstown Sheet and Tube Co., East Youngstown, Ohio.

The initial contract was given to the Unit Construction Co., St. Louis, for terraces and double houses, with walls, partitions, floors and chimneys of precast concrete units, to include apartments for 146 families. The work is well under way at this time—begun in July, 1917—with buildings already near completion, having ten apartments, and the "parts" cast and in the yard, practically ready for setting up 50 more dwellings. It is proposed to complete the work now under contract in the coming summer.

While the unit method of construction has been successfully applied to industrial structures, to train sheds and in varied applications of the principle, to railway bridges and numerous other works, the Youngstown enterprise is the first use of the Unit Construction Co.'s patents and methods in dwelling house construction.

The first of the Youngstown unit-built houses—the one nearest completion—is shown in the headpiece. Other apartment groups well under way are shown in other illustrations. Fig. 3 shows, in rough outline only, the scheme of this housing development of buildings now under contract to house 146 families. Fig. 4 shows three typical plans.

The Youngstown Sheet and Tube Co.'s operations are large; great numbers of its employees are not thoroughly Americanized; their living conditions are not always conducive either to working efficiency or to the best citizenship. Many of them have to go too far to and from work; many are in crowded quarters, where houses are so planned as to inflict the necessity—due to their traditional standards of living—of a horde of boarders, to the great detriment of the best domestic development.

To remedy these conditions—to bring the workers closer to their work, to house them comfortably and economically, and under such an arrangement as to minimize the tendency toward overcrowding; to induce a more nearly normal, a more American recreational expansion of the individual, to inculcate a sense of appreciation of the better things in home and community life—with no less ambitious an idea, the problem was



FIGS. 1 AND 2. MIXING PLANT AND CASTING BEDS

*Reprinted from "Concrete," January, 1918, issue.

undertaken by the Youngstown Sheet and Tube Company.

The Buckeye Land Co. was organized; a farm about four miles out from the center of Youngstown was purchased and work was begun. Streets were first laid out, curbed and macadamized, but left without final surface treatment until construction is complete. Sewers were put in, water supply provided. The site is at the top of and on the side of a commanding hill. Grades, therefore, complicated the problem, but they add the feature that must ultimately contribute largely to the attractiveness of the community, in obviating monotony. The variety is enhanced by the irregularity also of the streets, as shown in Fig. 3. While the plans of individual apartments keep very close to the standards shown in Fig. 4, these occur as double houses and as terraces of various lengths, interspersed and not always in a straight line, but with offsets or steps in the front and back line. The variety is still further enhanced by the grades encountered so that in a row of six terraces, floor and roof lines step up 3 ft. for every second house in a row, and with all this variety the units necessary for the construction of the houses are fairly standardized with a very large duplication to

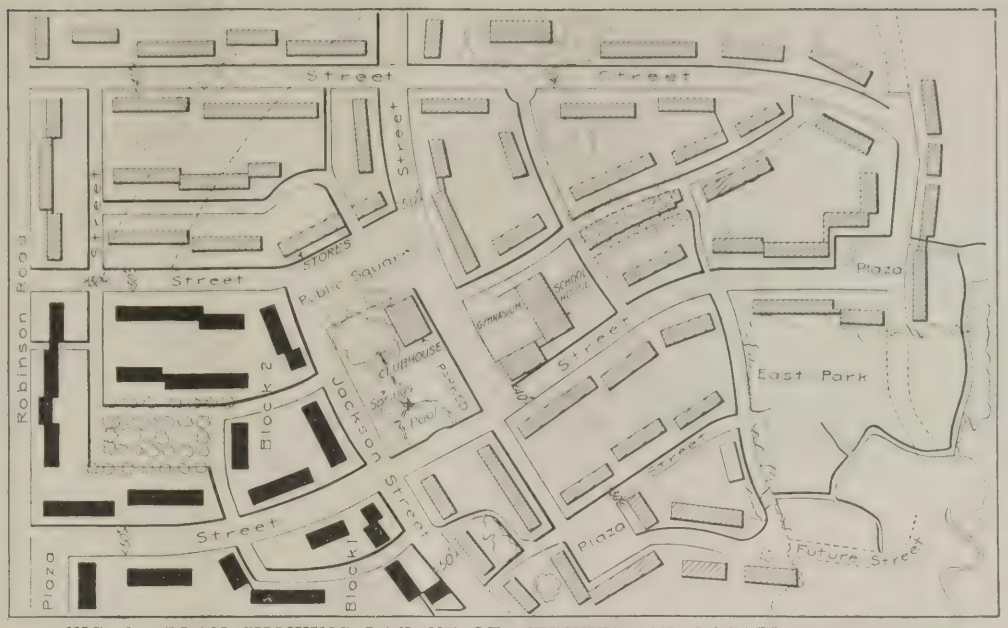
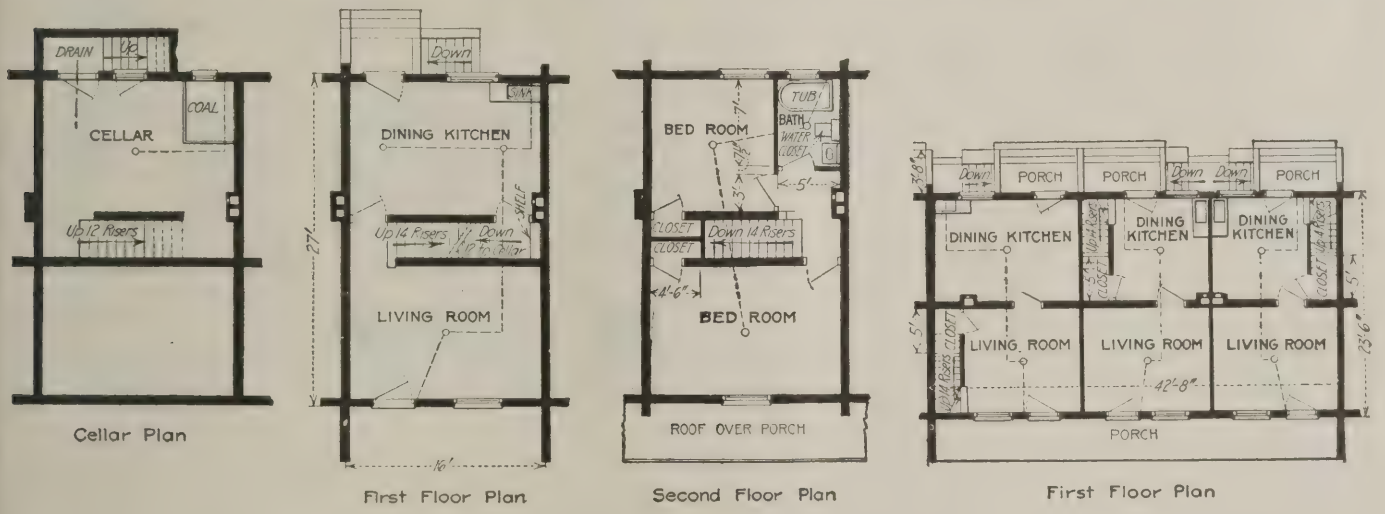


FIG. 3. PLAN SHOWING LAYOUT OF STREETS AND LOCATION OF HOUSES



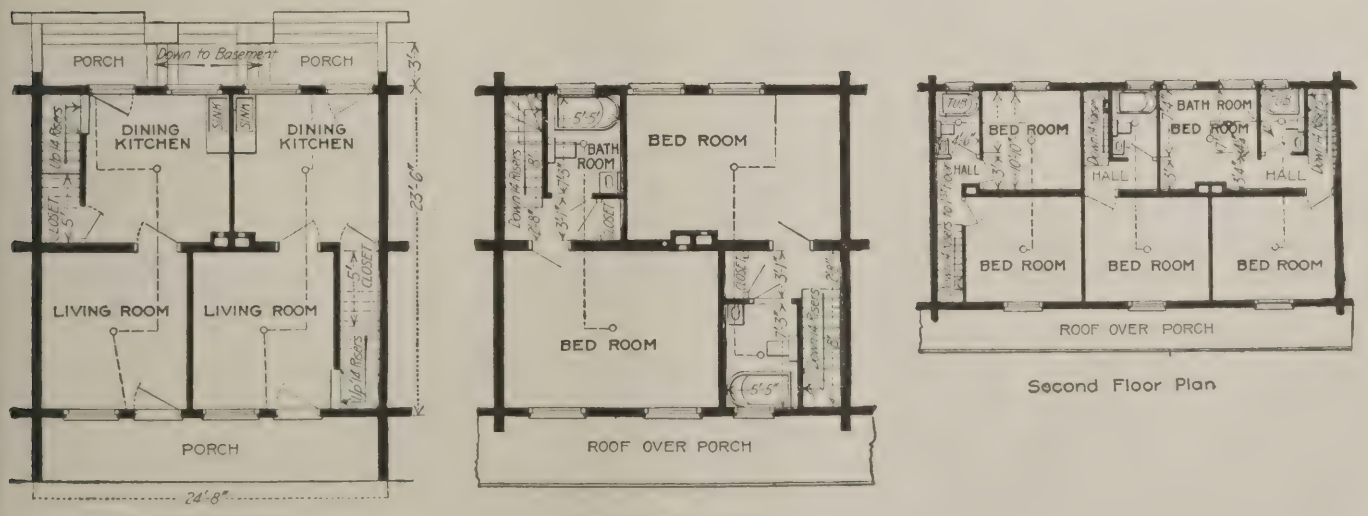


FIG. 4. PLANS OF THREE TYPICAL HOUSES OF YOUNGSTOWN SHEET AND TUBE COMPANY

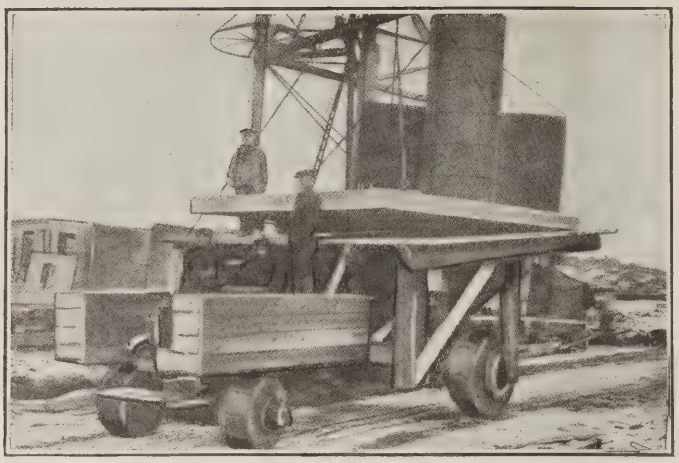


FIG. 5. CRANE LIFTING CONCRETE UNIT FROM "BUS"

effect economy. A single apartment of four rooms, bath, closets, cellar and porches involves less than sixty separate pieces of concrete. One entire wall for a story height comes in one piece; the floor of the largest room, about 16 x 12 ft., is in one slab. Chimneys are hoisted into place in one piece.

The center of manufacturing operations is the mixing plant—a half-yard Ransome mixer, tower, electric hoist and chute, feeding to a car on a tramway, on both sides of which are the casting beds (see Figs. 1 and 2).

Scarcity of good gravel in the vicinity led to the use of slag as the coarse aggregate in the proportion of 1 cement, 2 sand and 4 slag. The cement is about 20 per cent. in excess of good gravel aggregate. Six per cent. of hydrated lime is added.

The concrete is dumped from a 6 cu.ft. push cart, hand operated by two men, on the tramway to short chutes, conveying the mix by gravity to the unit molds on either side of the track, through several hundred feet of casting alleys. As a part of the plant are office building, cement storage building, pumphouse, supplying well water, and a wood working shop.

The houses are of precast units, except for 8-in. footings cast in place. Units are reinforced to sustain the loads in the structure and to withstand the strains in lifting, loading and placing.

Exterior wall slabs are of ribbed design (see Figs. 7 and 8). They are usually of story height and of a length equal to a room or entire side wall dimension. They are rabbeted at the ends so that the adjacent slabs as set provide a space for sealing with grout. At present these slabs are cast with the outside down. Ribs, giving a total maximum wall thickness of 7 in., are formed by boards set in the slab forms. The panels between have a thickness of 3 in. Furring strips, asphaltum painted on the back side, are anchored by nails to ribs when the slab is cast. Partition walls are tubular, the vertical coring being provided by means of form boxes set in the slab forms as the concrete is poured, these being withdrawn, the spaces filled with sand and the other side of the slab troweled on. Sand is removed later by washing with a hose.

Floor slabs are beamed (see floor slab being placed, Fig. 6), the central panels being only 2½ in. thick. These are cast ceiling side down over well finished wood cores designed to give a molded trim around the edge of each panel adjacent to the beams. It will be noted that floor slabs are so rabbeted at the outer edge as to fit over the wall slabs, anchoring the work (Fig. 8). Window and door openings are rabbeted and provided with wood-nailing blocks, cast in. Sills, to get a better finish, are separately cast. Chimneys are cast vertically with vitrified flue in place, rabbeted to anchor with the unit slabs when grouted in.

Severe cold and snow caught the plant unawares. The casting beds were deep in drifts before a winter shelter could be completed. The present inclosure has plank sides and a hip roof of 8-oz. canvas-covered panels laid on joists. These panels are all readily removable at any place in the sheltered casting area where cured units are to be lifted out. A boiler has been installed and steam pipes run between forms. Laborers spent several days removing snow. A gas blow-torch has been installed in the mixer, and hot gaging water is used. Except in the severest weather, concreting will continue through the winter. Even in such weather, it is anticipated that the temperature within the inclosure will not fall to a point to endanger the integrity of work done.

Hooks for lifting are cast in the units and cured

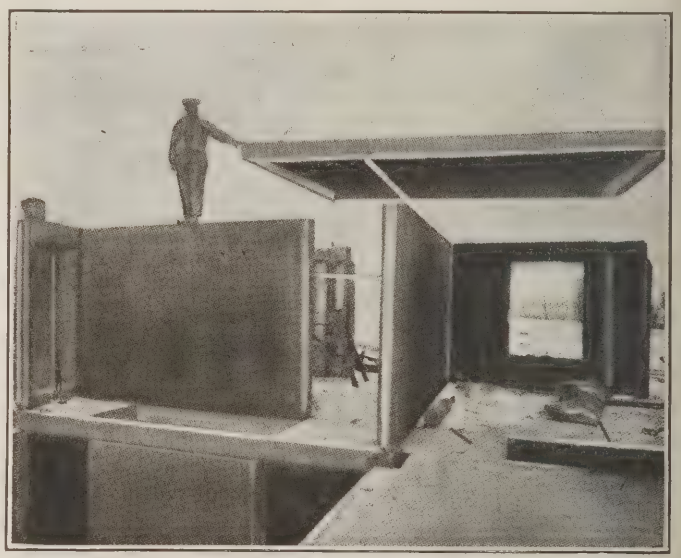


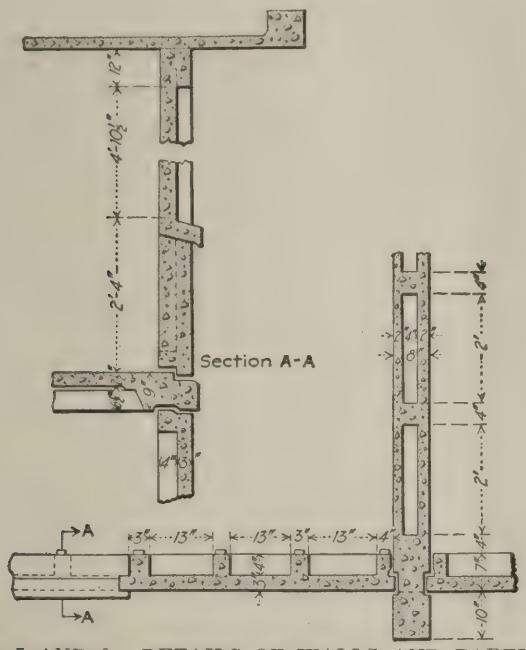
FIG. 6. FLOOR SLAB BEING PLACED IN POSITION

parts are lifted by a locomotive crane, operating on a track throughout the casting area (see Fig. 9) to a "bus." It has wide steel-bound, solid wood wheels, a 40-hp. engine, and a capacity of 11 tons (see Fig. 5). This was largely built on the job. It will take 11 tons of concrete units to a load—some single units weigh as much as 5 tons; travel the ups and downs of the winding roads, and deliver from the casting yard to the farthest corner of the building area, a distance of about 1000 ft., as much as 90 tons a day. A crane operating on rails was regarded out of the question on this particular hillside site. The "bus" solves the problem. At the building site the bus is unloaded by a hoist (see Figs. 7 and 8), each of whose three legs is set on rollers, and counterweighted with gravel by means of the cylindrical hoppers shown in the illustration. A floor unit about to be set by the hoist is shown in Fig. 6.

When the house units are assembled, set, anchored and grouted, the finish is not elaborate. Frames are nailed to the blocks provided at openings, wedged, calked with oakum and plastered over to a neat finish. The

inside surface of exterior walls is lathed and plastered over the furring on the wall ribs; wood floors are laid on sleepers over the unit slabs; interior partition surfaces, plastered exterior wall surfaces and ceilings are painted.

The tubular partitions and the space between sleepers on floors provide space for pipes and conduits. Regis-



FIGS. 7 AND 8. DETAILS OF WALLS AND PARTITIONS

ters are provided in second floor slabs for heat from below. Provision is made for heating with stoves, but a central heating plant is under consideration. There is a bathroom in each apartment, simple but adequate. Stairs are of wood. Exterior walls are given a brush coat of grout (see headpiece), and will be painted with special concrete paint of cream tint. Another note of color will be in the red tile roofs, which are to be laid on wood frame. In spite of this departure from the fireproof material, the fireproofness, to answer most practical purposes, still remains, since a complete fire seal is provided in the attic floor of concrete. Ventilation of this roof space is provided by metal mesh covered openings under the eaves.

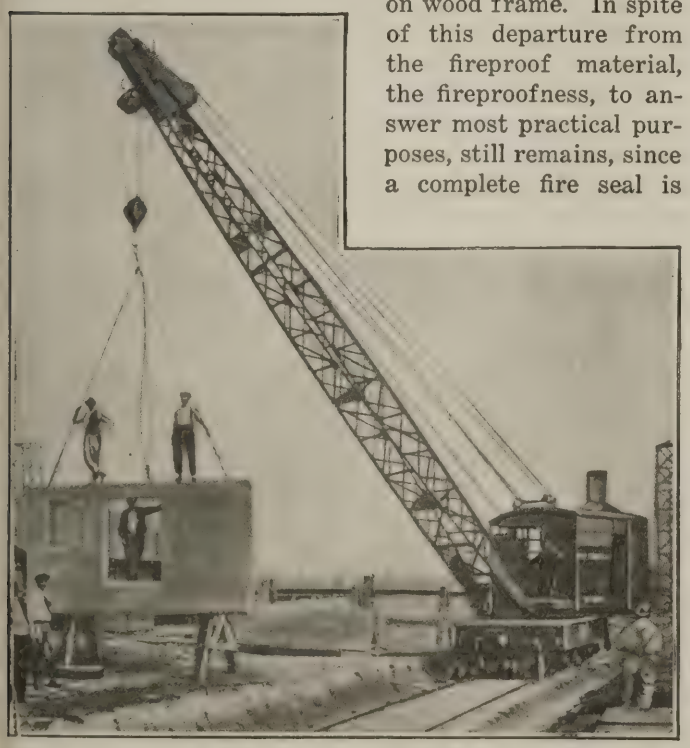


FIG. 9. LOCOMOTIVE CRANE LIFTING SIDE WALL UNIT

These houses, most of them with two rooms upstairs and two rooms below, with small basements, closets and bath, with garden spaces in the rear and a depth of 18 ft. in front for lawn, are to rent for from $12 to $18 per month. With them go liberal plantings of trees, shrubs and vines, shops, public playgrounds, a school, gymnasium, pool and other park and service features as indicated in the general plan.

Alaska Coal No Aid to Pacific Coast Industries

With the Pacific Coast facing a coal famine this winter, the great stores of fuel in Alaska are as far as ever from relieving the situation. For all the good it does, Pacific Coast industrial leaders are satisfied the Government railroad need never have been built. Unless Congress shall enact a more favorable law for the leasing of Alaska coal fields, they are also certain Alaska coal will never be of benefit outside the local demands in the North; and without an export demand the coal tonnage for the new Government railroad will be comparatively unimportant.

The Seattle Chamber of Commerce and Commercial Club has completed statements of fact to accompany its resolutions bearing upon the national need at this time of the development of Alaskan coal and oil resources. The statements are based entirely upon Government reports and include a summary of the British Columbia and Alaska laws. This is graphically shown in the following comparison, which tends to strikingly emphasize the encouragement toward development extended to the pioneers in British Columbia as against the restrictive policy now enforced in the adjoining territory, Alaska.

COAL LAND LAWS COMPARED

Alaska	
Maximum area that may be leased	2,560 acres
Prospecting privilege	None
Rental, first year, per acre	$0.25
Second, third, fourth and fifth years, per acre	.50
Royalty, first five years, per ton	.02
Next 20 years, per ton	.05
Expenditure, first five years, per acre per year	20.00
Bond required, first five years	Half expenditure
Purchase rights	None
British Columbia	
Maximum area that may be leased	6,400 acres
Prospecting privileges, three years:	
Fees and expenditures per year per acre	$0.23
Lease privileges, five years:	
Fees and expenditures per year per acre	.23
Rental per year per acre	.15
Purchase per acre	20.00

Though Matanuska coal, tapped by the Anchorage division of the Government railway, is to be ultimately the export coal of Alaska, and is of a high grade quality, there has been no rush for leases. As a matter of fact, advertisements of the Interior Department recently brought no reply.

The Chamber of Commerce also points out that Alaska has the only coal on the entire Pacific Coast suitable for steaming purposes for the Navy; that it has met every test satisfactorily, and that the Navy is now shipping large quantities of coal by rail from West Virginia to the Pacific Coast at a freight cost of over $9 per ton. It takes from 92 to 100 days for the freight cars to make the round trip.

New Method of Separating Materials of Different Specific Gravities*

By THOMAS M. CHANCE
Consulting Engineer, Washington, D. C.

SYNOPSIS—*By using solutions of various specific gravities a perfect separation of slate and sulphur from coal can be obtained. But the solutions are extremely expensive and as they impregnate the coal they are lost in use. Consequently they are undesirable except for tests of washery efficiency. Mr. Chance has found that a mechanical mixture of water and fine sand created and maintained by agitation will have sustention and therefore selection qualities similar to those of a real solution. Such mixtures are made at low cost and do the coal no harm.*

ALL gravity methods for the separation of ore from gangue, or of slate and other refuse from coal, are based upon differences in the falling velocities, in some fluid medium such as air or water, of the materials to be separated. As all materials falling in a vacuum have the same velocity, independent of the size, shape, weight or specific gravity of their individual particles, it would be more accurate to describe the operation of these methods as depending upon the *retardation* of falling velocities effected by the resistance of a fluid medium, this retardation being greater for small or light particles than for large or heavy particles. This generalization is true also of those appliances utilizing centrifugal force to replace or to supplement the action of gravity.

Making Coal Float by Thickening Liquid.

The separation of materials of different specific gravities by means of a fluid having a specific gravity greater than that of the lighter particles and less than that of the heavier particles has not been applied commercially, or on a large scale, to the separation of ores or to the washing of coal, the method being limited to laboratory experimental work or to laboratory determinations for the purpose of checking up the work of jigs, classifiers, and other types of concentrating appliances. A solution of zinc chloride has thus come into general use in the laboratory to separate coal, bony coal and slate, both to check up the work of coal-washing plants and for the purpose of making tests preliminary to the designing of coal washers.

The use of a heavy solution of some chemical in water has often been proposed for making such separations, especially in connection with the washing or preparation of coal. Difficulties, that are practically insuperable, however, have prevented the commercial development of any such process, these difficulties being both physical and financial. The cost of the chemical used to make high-gravity solutions is usually prohibitive, and the freeing of the coal from all traces of the chemical is found to be practically impossible. Such solutions inevitably penetrate the individual lumps and particles of coal, transfusing into the pores and saturating the joint-planes, and very large quantities of wash water would be required to free the prepared

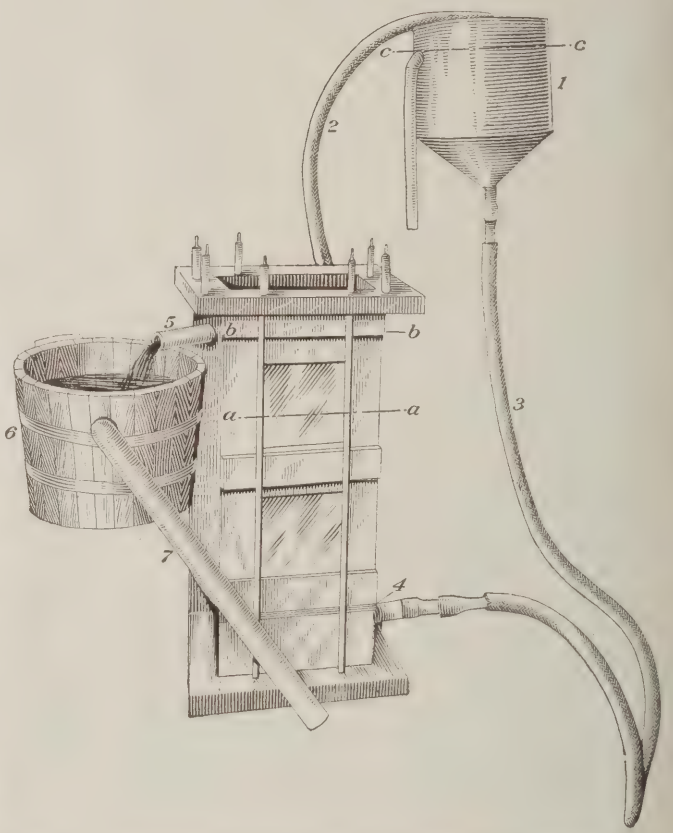


FIG. 1. PERSPECTIVE VIEW OF TESTING APPARATUS

product from the chemical with which it was thus contaminated. The use of large quantities of wash water renders it practically impossible at a reasonable cost to recover the chemical for subsequent use, because this requires concentration of the wash water by evaporation.

The method which it is the object of this paper to describe is based upon the principles that any relatively finely comminuted insoluble solid matter (such as sands), if mixed with a certain quantity of liquid (such as water), can be maintained suspended in the liquid by continuous agitation, and that the mixture, so long as agitation is maintained, will form a mass exhibiting physical properties similar in every respect to those of a fluid of relatively high specific gravity, including its ability to float solid bodies having less specific gravity, while permitting solid bodies of greater specific gravity to sink in it.

The agitation of such a fluid mass may be effected and maintained by any suitable mechanical appliances,

*Abstract of article read before the New York Meeting of American Institute of Mining Engineers, February, 1918. This article receives comment in the editorial section under caption "Chance's Method of Coal Separation."

or by introducing liquid under pressure into the fluid mass, either as jets or as a slowly rising current. When a fluid mass of a certain predetermined specific gravity has been produced in this manner, its specific gravity will remain constant so long as the agitation applied to it is not varied. The specific gravity of the fluid mass will be diminished by increasing the agitation (provided the necessary additional liquid is supplied for dilution of the fluid mass); while its specific gravity will be increased if the agitation be diminished.

It has been found that a mixture of sand and water can be used to produce a fluid mass having a specific gravity suitable for the separation of coal from bony coal, slate, fireclay, pyrite, and other impurities. Sand has been used ranging from 20- or 30-mesh down to 100- or 200-mesh, or even finer, and fluid masses with specific gravities ranging from 1.20 to 1.75 have been easily produced and maintained constant for an indefinite period at any desired gravity within these limits. In the investigations agitation has been effected by stirring arms, by propeller blades, by rotating disks and cones, by hydraulic jets, by upwardly rising liquid, and other means. Combinations of hydraulic and mechanical agitation have also been tried, and it has been found that a very wide range of appliances can be used to produce the desired agitation.

Fluid masses, having specific gravity high enough to float quartz, feldspar, limestone, and other rocks, can readily be produced by using magnetic iron-ore sand and water instead of quartz sand and water. Other heavy materials can be used, such as ore concentrates of galena, metallic copper, etc., for producing fluid masses having very high specific gravities.

Principles Behind This New Departure

For the practical separation of materials of different specific gravities by this method, the following observations are evident:

1. Every particle of material having lower specific gravity than that of the fluid mass will float; that is, the separation will be independent of the size of the materials to be separated. If the fluid mass be contained in a receptacle large enough to permit the introduction of large lumps, it is possible to dump into it the ore or coal, as mined, without any preliminary sizing, whereupon, every particle of less specific gravity than the fluid mass will float, irrespective of its size or shape.

2. As every particle of material, irrespective of its size or shape, having greater specific gravity than the fluid mass, will sink, no preliminary sizing is necessary to insure the sinking of all material having a higher specific gravity than that of the fluid mass.

3. The insoluble material, such as sand, used for producing the fluid mass can readily be washed from the materials which have been so separated, and thus can be recovered and returned to the fluid mass for continuous use.

This method offers facilities for making differential separation of materials which may be of nearly the same specific gravity, because the fluid mass can be so adjusted as to float one material while permitting the other to sink, although the difference in their specific gravities may be slight. This characteristic can be applied to the separation of low-ash coal from high-ash, of coal from bony coal, or of bony coal from slate; and with ores it may be utilized for separating waste rock from rock that contains sufficient ore to justify crushing and concentration, as well as for the separation of ore-bearing minerals of different specific gravities.

The development of this method has been so recent that it has not yet been introduced commercially, every effort having been directed to perfecting appliances suitable for the operation of the method. It is evident that such apparatus may be built in a great many different forms. Much experimental work has been done to determine the conditions under which a satisfactory agitation of the fluid mass can be obtained and maintained, but no difficulty has been found in securing the desired results with many different types of agitators.

An apparatus in which "float and sink" tests may readily be made on coal, bony coal and slate, is shown in Fig. 1, and a working drawing is shown in Fig. 2. The apparatus consists of a vertical box open at the top, 6 in. wide by 8 in. long and 20 in. high. The bottom is closed by a brass plate (4) $\frac{1}{8}$ in. thick, having 48 round holes of $\frac{1}{16}$-in. diameter, spaced 1 in. apart. Below this brass plate is a water-tight box supplied with water under pressure from the tank 1, which receives water from a supply hose 2, and delivers it through the hose 3 to the box below the brass plate. These two boxes are fastened together with eight bolts

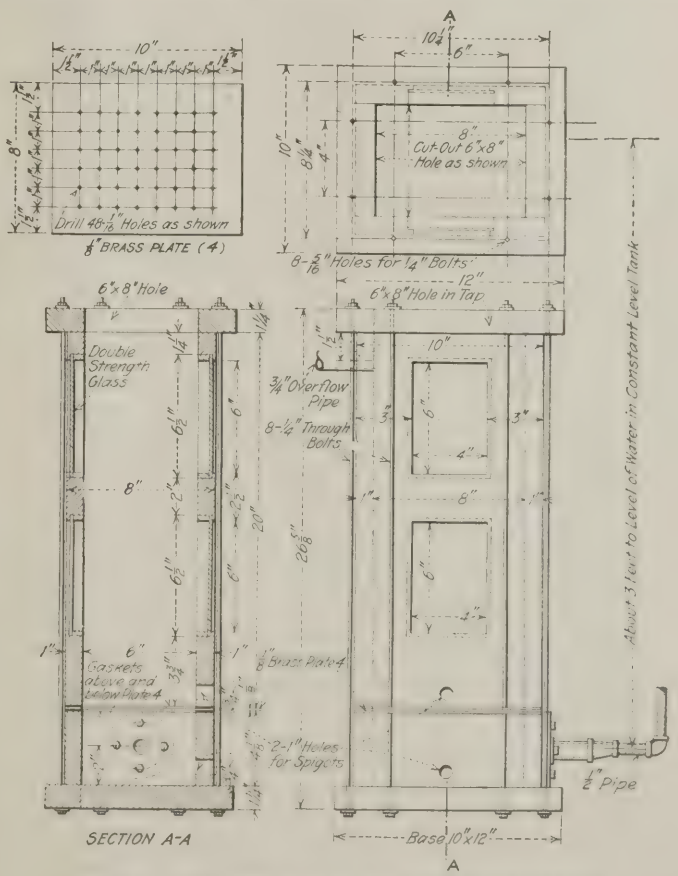


FIG. 2. WORKING DRAWING OF APPARATUS

running from top to bottom, and the joint at the brass plate is made water-tight by gaskets. The vertical box is provided with two glass windows and with an overflow pipe 5 emptying into the bucket 6, in which any sand carried out by the overflow may settle; the bucket has an overflow pipe 7 through which the water is discharged.

The water in the tank 1 is maintained at constant level *cc* by the overflow pipe and hose 8, so that the effective hydraulic head, the vertical distance between the overflow lines *bb* and *cc* is maintained constant, but can be adjusted by raising or lowering the tank 1. If the tank 1 be raised, increasing the agitation, the level of the fluid mass *aa* rises and the specific gravity of the fluid mass is correspondingly reduced; if the tank 1 be lowered, diminishing the agitation, the level of the fluid mass sinks below the line *aa*, correspondingly increasing its specific gravity.

In an apparatus of this type, agitation being effected by hydraulic water alone, it has been found that with mixed sands averaging 80 mesh, and working under a relatively low head, efficient agitation may be obtained by the use of 3 to 10 gal. of water per minute per square foot of superficial area of the apparatus. When mechanical agitation is used in combination with hydraulic water, the quantity of water can be reduced.

The importance of this method as applied to coal washing is illustrated by Fig. 3, which shows the theoretical increase in specific gravity of bituminous coal due to the presence of ash and sulphur (present as pyrite). The specific gravity of coal is naturally increased more by high sulphur percentages (due to

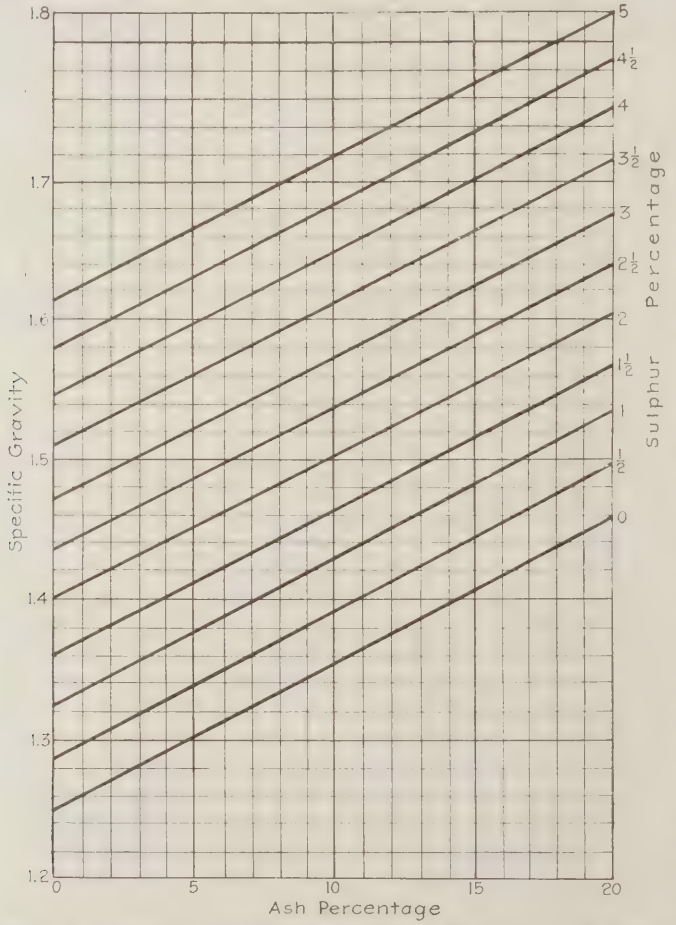


FIG. 3. CHART RELATING SPECIFIC GRAVITY OF COAL WITH PERCENTAGE OF ASH AND SULPHUR

(Based on following factors: Pure coal, specific gravity = 1.25. Clay ash, specific gravity = 2.3. Sulphur, 1 per cent. = 2 per cent. FeS_2, having specific gravity = 4.9.)

the high specific gravity of the pyrite) than by high ash. Thus an "ash-free" coal containing 3 per cent. of (pyritic) sulphur will have a specific gravity of about 1.47, while a "sulphur-free" coal with 20 per cent. of ash would have a specific gravity of 1.46.

As coal of relatively light specific gravity is low in both ash and (pyritic) sulphur, the method offers a means for separating pure coal from that which is relatively impure, without fine crushing of the whole mine product. Assuming the machine be set to produce a fluid mass of 1.40 specific gravity, and bituminous

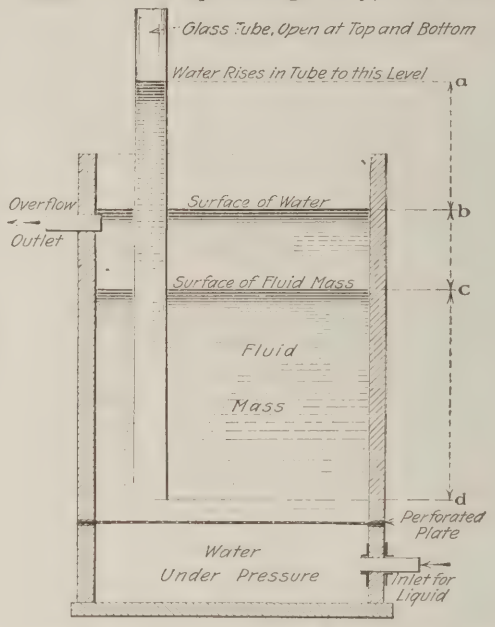


FIG. 4. DIAGRAM SHOWING HOW SPECIFIC GRAVITY CAN BE READILY DETERMINED

coal (run-of-mine) be fed into the washer, every lump and particle of low-ash and low-sulphur coal will float, while every lump and particle of high-ash and high-sulphur coal will sink, together with all the bony coal, slate, pyrite and fireclay. The coal that floats is a very high-grade finished product. The material that sinks can be removed and passed into a second washer, in which the fluid mass is maintained at a specific gravity of, say, 1.60. Here all the slate, fireclay and pyrite sinks, and also the very high-sulphur (4 to 6 per cent.) and very high-ash (15 to 20 per cent. ash) coal, but all the coal of intermediate density will float and constitute a product suitable for general use. If it be desired to improve the intermediate product, this can be done by crushing and subsequent separation in the same or another machine.

In presenting the foregoing paper for the author, who is now in the National service, H. M. Chance showed a working model. For more convenient operation, a small motor-driven centrifugal pump was attached to the overflow outlet pipe 5, Fig. 1, delivering to the inlet 4. The pressure of ingoing water was then adjusted by a valve at 4, and was indicated by the column of water in a vertical glass tube connecting with the pressure chamber. An average pressure of 15 in. of water column was maintained during the demonstration.

The sand used in the test was beach sand, sized by passing through a 20-mesh screen; about 45 per cent. was finer than 80 mesh. The circulation of water was at the rate of about 5 gal. per square foot per minute, and the rising velocity of the water in the box as a whole (not the velocity of the jets) was 6 in. per minute. At this consistency, the specific gravity of the fluid mass was between 1.55 and 1.60.

Mr. Chance estimated that it would be possible to maintain a fluid mass of this consistency, 3 ft. deep, and with an area of 50 x 60 ft. with an expenditure of 15 hp. He then showed how a lump of coal would float on the fluid mass, and also made a separation of slate from coal on a small scale in a wire cage submerged momentarily in the fluid.

Upon immersing a tube, open top and bottom, a certain depth in the fluid mass, the tube is at first filled with the fluid mass and superincumbent water, the water at first standing within the tube at the level *b*, coinciding with the top of the water in the apparatus. After a few minutes the water within the tube rises to the level *a*. This phenomenon is due to the fact that there is no agitation within the tube to prevent the sand from settling, because the tube has no overflow. The sand therefore drops through the tube, settling to the bottom and joining the fluid mass external to the tube, so that the whole tube from the bottom up to *a* becomes filled with water, being sustained at the height *a* by the hydrostatic pressure exerted by the greater specific gravity of the fluid mass.

It is clearly evident that that part of the column of water between *b* and *c* is counterpoised by the water exterior to the tube between the same levels, so that we may neglect this part of the column as having no effect. We are therefore concerned only with the depth of water within the tube between *a* and *b*, and *d*.

$$Sp.gr.\ of\ fluid\ mass = \frac{cd \cdot ab}{cd}$$

For example, if *cd* is 10 in. or 10 ft., and *ab* is 6 in. or 6 ft., sp.gr. = (10 + 6) ÷ 10 = 1.60.

The weight of the solids (held in suspension by agitation) from *c* to *d* is equal to the weight of the column of water from *a* to *b*, irrespective of the specific gravity of the solid matter held in suspension. The depth of water, *b* to *c*, may vary from zero to any desired depth.

Not only can the specific gravity of the fluid mass be determined by this method, but the *actual weight* of the materials held in suspension by agitation, irrespective of the specific gravities of the individual particles (which may vary widely) is exactly equal to the weight of a column of water between *a* and *b*. It will also be noted that this method of measuring specific gravity of an agitated fluid mass gives the average specific gravity from the top to the bottom of the mass; whereas the hydrometer method in common use gives the specific gravity at the depth to which the hydrometer is immersed. In many cases in treatment of ore pulps the specific gravity of a fluid mass may be considerably greater at the bottom than at the top.

It will be evident that the specific gravity of such a fluid mass, and also the weight of the solid matter held in suspension in such mass, can be measured by a pipe or tube *external* to the tank containing the pulp. All that is necessary is to insert a pipe near the bottom of such tank, extending up vertically a sufficient distance above the top of the receptacle. It may also be noted that if the pulp contains considerable quantities of colloidal material, that such pipe can be kept free from this and continuously filled with *clear water* by feeding a small stream of clear water into the top of the pipe.

Britain's Pocketed Coal Mines*

By Don J. O'Byrne

Since the war began Great Britain has been learning many lessons in efficiency, but the most expensive lesson of all comes from the questionable manner in which her coal industries were discouraged. "Carrying coals to Newcastle" was in pre-war times as axiomatic of doing something absurdly unnecessary as anything that could be imagined. Indeed it was an English boast a quarter of a century ago that her mines could supply the coal needs of all Europe, but this ready boast has not been justified by the experience of the present war.

And the main reason why it has not stood the test of time is not the lack of coal but the favoritism displayed in furnishing the necessary mining advantages to certain fields. If a noble lord had coal on his lands it was an easy matter for him to have a railroad pass his way, to form a company for operating purposes and reap his harvest in dividends. If a small landowner discovered coal it would be this same noble lord who would make it his business to see that he could not operate as a competitor.

He would make sure that the railroad would detour instead of passing near the small fellow's holdings and, by preventing a possible outlet, annihilate competition. There are hundreds of tracts of coal lands in Great Britain and Ireland that have been treated in this fashion. One of the most flagrant examples is found in the Castlecomer fields in Kilkenny, Ireland.

Castlecomer is a small town of about 1000 inhabitants. Under the town and running for a mile in each direction is one of the beds that has been noted by mining engineers, but when the railroads were being built, and the particular brand of favoritism referred to was going around, this rich mineral bed was left in a pocket, so to speak. Walk or drive any direction from Castlecomer and you must travel from six to eight miles before you will reach a railroad, and you can inquire until your tongue grows tired but no one can furnish any logical reason why the Great Southern and Western railroad detoured six miles from a straight line (from Dublin to Kilkenny) in order to avoid Castlecomer and go through the agricultural town of Ballyragget.

An extraordinarily unfair piece of railroad engineering left the Castlecomer mines practically dead. In a desultory fashion the Welsh owners of the mines have operated them now and again but never with any degree of profit. Full of ambition the Flewellyns and the Llewellyns left their native Wales for this Irish El Dorado seventy years ago. Today the grandchildren of those hardy miners till the soil in the spring, summer and autumn and do a little mining in the winter. They haul their product in donkey-drawn carts to Kilkenny, Carlow or Ballyragget (about half a ton to a load) and exchange it for merchandise. An effort is now being made to have the government bring the outer world and the Castlecomer mines together.

Who will operate the mine? The Flewellyns and the Llewellyns say they will take no chances. They are farmers first and miners last in this generation. The country faces a grave economic question now, where it should have an efficient industrial organization.

*Editorial under same caption appears in this issue.

Byproduct Coke and Coking Operations*

BY
C. J. RAMSBURG †
AND
F. W. SPERR, Jr. ‡

Third Installment

STUDIES of the character of this article will be largely of academic interest unless correlated with studies of the behavior of different types of coke in the blast furnace and in other types of apparatus in which the material is used. Let us choose the blast furnace for consideration here on account of its tremendous industrial importance.

There is at present some disagreement among blast-furnace men as to the exact function of the coke in the most efficient and economical reduction of iron ore. The majority probably still accept Grüner's theory of ideal working; namely, (as stated by Richards[1]), "All the carbon burnt in the furnace should first be oxidized at the tuyeres to CO (carbon monoxide), and all reduction of oxides above the tuyeres should be caused by CO, which thus becomes CO_2 (carbon dioxide)." It is well known that the reduction of iron oxide by carbon monoxide is the most efficient from the standpoint of heat economy. Richards, however, has pointed out that the direct reduction of iron oxide by carbon is three times as efficient from the standpoint of carbon required as the indirect reduction, and says:

"The ordinary furnace produces at the tuyeres, in order to get heat enough to melt down the charges, more CO gas than is needed to abstract all the oxygen from the charges; under these conditions it is uneconomical to oxidize any carbon at all above the tuyeres. The exceptional furnace, because of pure ores, small amount of slag, pure fuel, high temperature of blast, or dry blast, gives heat enough at the tuyeres to melt down the charges without producing enough CO gas to reduce all the charges; under these conditions, more or less reduction is effected by solid carbon and with the greatest economy in quantity of carbon required in the furnace."

About two years ago H. P. Howland prepared an interesting paper, entitled "Calculations with Reference to the Use of Carbon in Modern American Blast Furnaces," calling attention to the fact that many furnaces are actually operating with higher economy of coke than would be calculated from Grüner's theory; in fact, his calculations on the performance of 26 furnaces seem to show that what Richards regarded as the exceptional furnace is the rule rather than the exception in modern practice.

Howland's tabulation of data on these 26 furnaces is so interesting and pertinent to the subject that we are reproducing a portion of it in Table IV.

Note in the table the performance of the once-despised byproduct coke in modern practice. Of the 19 furnaces using less than a ton of coke per ton of pig iron, 13 are burning byproduct coke and 6 beehive coke. Howland calculates that all the furnaces burning less than 1350 lb. of carbon at the tuyeres are not making enough CO to reduce all the Fe_2O_3 and hence some of the latter must be reduced directly by carbon. He concludes:

"It seems clear, therefore, that in low-coke furnaces one of the most important, if not the most important function of the carbon burned at the tuyeres is to produce heat to enable the carrying on of the direct rather than to produce CO for indirect reduction.



FIG. 14. COKE FROM HIGH VOLATILE COAL

*Presented by Mr. Ramsburg at a joint meeting of the Mechanical and Engineering Section and the American Society of Mechanical Engineers.

†Second vice president, the H. Koppers Co., Pittsburgh, Penn.

‡Chief chemist, the H. Koppers Co., Pittsburgh, Penn.

[1]"Metallurgical and Chemical Calculations," p. 248.

"On this basis, it becomes very essential that our carbon shall burn instantaneously to CO in order that the resulting heat may be localized where needed. This should not be a question of seconds, but of a fraction of a second. If our carbon is of such a nature that this burning to CO is a comparatively long process, more of it will be required than of the quick-burning carbon in order to obtain the same concentration of heat at the desired point.

"We would, therefore, say that the most desirable thing about a coke is that quality in the carbon which will allow of its being instantaneously burned to CO and thus result in the maximum concentration of heat where needed."

W. H. Blauvelt, in a discussion of Howland's paper, says: "In studying the combustion of coke in the furnace, it is clear that the production of the maximum quantity of heat is not of the first importance in blast-furnace operation, or in the utilization of the fuel charged into the furnace. To my mind, the production



FIG. 15. COKE FROM SAME COAL AS FIG. 14, WITH 20 PER CENT. POCAHONTAS

of a high thermal head at the tuyeres is of the first importance, and the best coke is that which reaches the tuyeres in proper condition to produce the highest

TABLE IV. RECORD OF AMERICAN BLAST FURNACES

Furnace No.	Pound Coke per Ton Iron	Tons Iron per Day	Carbon in Coke per Cent.	Kind of Method of Manufacture	Coke Operation	Total Charged	Gasified in Furnace	Gasified at Tuyeres	Per Cent. Total Carbon	Per Cent. Gasified Carbon
1	2,615	301	86.3	BH	Stonega	2,254	2,110	1,868	82.8	88.6
2	2,551	272	84.4	BP	Solvay	2,153	2,049	1,751	81.4	85.6
3	2,472	482	86.1	BH	Conn.	2,128	1,996	1,728	81.2	86.6
4	2,247	450	87.1	BH	Conn.	1,957	1,846	1,605	82.0	87.0
5	2,198	499	86.9	BH	Conn.	1,908	1,810	1,494	78.7	82.6
6	2,123	541	88.3	BH	Conn.	1,875	1,764	1,498	79.8	84.9
7	2,115	360	84.3	BP	Solvay	1,782	1,683	1,427	80.1	84.8
8	1,996	490	86.3	BP	Koppers	1,722	1,611	1,298	75.4	80.6
9	1,936	376	85.7	BP	Solvay	1,659	1,557	1,305	78.8	83.7
10	1,905	393	88.7	BP	Solvay	1,690	1,575	1,252	74.1	79.5
11	1,901	517	85.5	BP	Koppers	1,625	1,524	1,280	78.8	84.1
12	1,863	504	86.6	BP	Koppers	1,614	1,513	1,230	76.2	81.3
13	1,780	426	84.9	BP	Koppers	1,511	1,414	1,124	74.4	79.5
14	1,742	503	84.6	BP	Koppers	1,474	1,382	1,133	76.9	82.0
15	1,716	542	87.1	BH	Benham	1,494	1,396	1,194	80.0	87.0
16	1,715	585	84.6	BP	Koppers	1,451	1,357	1,114	76.7	82.2
17	1,702	543	87.5	BP	Koppers	1,490	1,388	1,130	75.9	81.5
18	1,699	572	87.0	BP	Koppers	1,479	1,387	1,155	78.2	83.4
19	1,673	580	88.6	BH	Benham	1,482	1,384	1,182	79.9	85.0
20	1,658	590	88.3	BH	Benham	1,464	1,366	1,182	80.8	86.5
21	1,636	442	89.5	BP	Koppers	1,463	1,369	1,124	76.8	82.1
22	1,635	593	88.5	BH	Benham	1,447	1,349	1,124	77.7	83.4
23	1,624	592	87.3	BH	Benham	1,417	1,317	1,118	79.0	85.0
24	1,623	457	89.6	BP	Koppers	1,454	1,360	1,090	75.0	80.2
25	1,589	608	88.3	BH	Benham	1,403	1,307	1,100	78.5	84.2
26	1,584	466	89.2	BP	Koppers	1,413	1,324	1,057	74.8	79.9

NOTES.—BH = Beehive. BP = Byproduct. Conn. = Connellsville.



FIG. 16. 90 PER CENT. HIGH VOLATILE AND 10 PER CENT. POCAHONTAS COAL

temperature at the tuyeres, and in just sufficient quantity to do the amount of work required there under the conditions produced by this maximum temperature. The combustion of a much larger amount of fuel at the tuyeres, under conditions that will fall short of producing the highest possible temperature, cannot produce as good results, either in fuel economy or output. . . . Nothing is more fatal to obtaining the highest temperature than an excess of combustion. In the blast furnace an excess of air dilutes and cools the products of combustion, reducing the maximum thermal head at the tuyeres, and the larger volume carries the high temperature zone too high in the furnace. . . . It will probably be generally admitted that furnace coke should be of nearly uniform size, and many furnace managers are eliminating all coke below $\frac{3}{4}$ in. and above 4 or $4\frac{1}{2}$ in.; also, that the best coke is that which is sufficiently strong to resist undue abrasion and crumbling by attrition with the stock, and of an open porous structure that will permit the most rapid combustion when it reaches the tuyeres. Many large users agree that the coke should never



FIG. 17. 70 PER CENT. HIGH VOLATILE AND 30 PER CENT. POCAHONTAS



FIG. 18 COKE IMPROPERLY MADE

be overcoked beyond the point of producing a sufficiently strong structure, as overcoking quickly reduces the combustibility.

"If Grüner's ideal gives the best furnace operation, we should want a coke that is resistant to the oxygen in the ore, but easily combustible at the tuyeres, which is a contradiction of qualities. If my argument is correct, that the furnace man wants the greatest thermal head at the tuyeres rather than the production of the greatest quantity of heat in the furnace as a whole, then he is willing to sacrifice some coke by solution in the oxidizing gases in the upper part of the furnace, provided he can obtain a sufficient quantity of coke at the tuyeres, of a quality that will permit rapid combustion with the minimum amount of air, thereby giving him the maximum thermal head."

The desirability of the condition which Blauvelt aptly terms "a high thermal head" in the zone of the tuyeres will be readily granted even by those who adhere to Grüner's theory. This condition should be attained even at a sacrifice of some carbon by solution loss ($CO_2 + C = 2CO$), and we are of the opinion that the importance of this solution loss is frequently overestimated. Most laboratory experiments made to determine the loss undergone by different cokes have been of little value, because they have been mostly made with pulverized samples, so that their original physical condition has been greatly altered.

We have lately tested the resistance of a number of cokes to the action of CO_2 at temperatures of 800 and 900 deg. C., and find the loss of coke pulverized to 40 mesh to be very much greater than the same coke prepared in small test pieces, $\frac{3}{8} \times \frac{3}{8} \times 1\frac{1}{2}$ in., so as to retain the original structure.

As furnace conditions are better understood the possibility of the use of coke of a wider instead of a more restricted range of quality will become better recognized, with the express limitation that the supply for each furnace must always be absolutely uniform in quality. This requirement of uniformity cannot be too strongly emphasized, and it is almost equally necessary for the proper operation of the coke plant as the blast furnace; but this does not mean that there is one standard grade of coke to which all plants should conform so far as possible. As a matter of fact, the range of cokes that successfully qualify in practical operation is continually being extended, through necessity of one sort or another, with little general realization of the fact. In illustrations accompanying the preceding installment of this article have already been shown the cell structure of some cokes that are giving good results in different American blast furnaces, and the difference is fairly remarkable.

However, for each kind of coke there is evidently some limiting size for efficient service—that is, just large enough to offer such a minimum surface of attack for CO_2 that the loss on this account is negligible, and small enough so that complete combustion may be effected in a minimum of time at the tuyeres. Hardness of body is usually—though possibly not necessarily—proportional to the resistance of a given coke to oxidation by CO_2 or oxygen. The harder grades of coke should be used in smaller sizes—and this is a compensation automatically provided to some extent by the operation of the byproduct oven. Similarly, cokes of close cell structure are more resistant to oxidation, but this may be offset to a large extent by softness. The coke of more open cell structure will probably require less rigid attention to sizing than the denser coke. The important thing is to determine the practical limits of these elements of size, hardness and cell structure. It may be found that a coke of such structure as No. 4 of our scale may be unsuitable, no matter what may be its size or softness; but this ought to be proved by actual test and not taken for granted.

These considerations are of the utmost importance and encouragement to the coke-oven man, because, with a reasonable choice of coal, his control over the quality of his coke is almost unlimited, and, even with a very restricted source of supply, the possibilities of conforming to the desired standard by proper oven construction and regulation are still remarkably great. We propose to conclude this paper by showing two or three examples of what can be accomplished in the way of control of this sort.

One proposition that frequently presents itself is that of eliminating sponge. Sponge is a characteristic honeycombed mass formed in the center of rich volatile



FIG. 19. COKE SHOWING ELIMINATION OF SPONGE

matter. It seems to be caused by an excess of pitchy material moving along with the fused zone in the coking process, and finally accumulating in the center of the oven, where it is eventually gasified, with the production of this light porous material. Sometimes this sponge is found in loose, detached masses scattered all over the coke as it lies on the wharf after quenching, or, again, it may be found adhering very closely to the ends of the pieces of coke, and sometimes blending, without any clear line of demarcation, into the body of the coke itself.



FIG. 20. COKE FROM SAME COAL—DIFFERENT OVENS

Although the amount of this sponge often appears to be very large, it is so bulky that its actual percentage by weight is small. In one case where the amount of sponge seemed to be very large it was actually found that it amounted to 1.65 per cent. of the total coke. Small amounts of sponge probably do no harm, most of the material being soon broken up in the operations of handling the coke, but the presence of the material undoubtedly occasions a certain loss of carbon, and so we usually try to get rid of it. The customary remedy—and one that always works—is to mix with the high volatile coal sufficient low volatile coal, which has the effect of absorbing the excess of bituminous material and eliminating the conditions of sponge formation. Pocahontas coal is the standard low volatile coal that is employed by many of our plants. It is to be noted that different coals require considerably different percentages of Pocahontas coal to completely eliminate the sponge. Fig. 14 shows a coke from unmixed high volatile coal (about 34 per cent. volatile matter). A large amount of sponge is readily apparent. Fig. 15 shows the coke from a mixture containing 80 per cent. of this same coal with 20 per cent. of Pocahontas. The sponge is entirely eliminated and the structure of the coke improved. Fig. 16 shows coke made from a mixture of 90 per cent. of another coal, containing approximately the same percentage of volatile matter, with 10 per cent. of Pocahontas. This shows a fairly large amount of sponge. A mixture of 70 per cent. of this coal with 30 per cent. of Pocahontas still produces some sponge (Fig. 17), and it required as much as 40 per cent. Pocahontas to eliminate the sponge entirely.

Frequently it is too expensive a proposition to buy low volatile coal for the sake of eliminating a little sponge, and sometimes the low volatile coal may be altogether inaccessible for practical purposes. This does not, however, leave us at the end of our resources. By proper methods of control sponge may be eliminated from a wide variety of coals that produce it under ordinary conditions. If the oven is correctly designed and proportioned, and the temperature and coking time carefully regulated, very satisfactory results may be obtained without the necessity of making a special coal mixture. Fig. 18 shows the coke from one coal which was made in a type of oven unsuited to it, and coked at unfavorable temperatures. Fig. 19 shows coke made from the same coal under proper conditions. The sponge has been entirely eliminated.

Occasionally one of the most difficult problems to be overcome is that of too great density of cell structure. Here, again, we can approach the problem in two ways: One, by mixing in one or more other coals that have a tendency to the production of a more open cell structure, and the other way by suitable preliminary preparation of the coal, careful heat control, and special design of the oven. Fig. 20 shows coke made from the same coal mixture coked at different plants under different conditions. The dense coke shown in the lower part of the figure was greatly improved upon when the nature of the coal was better understood, and the excellent product shown in the upper part of the figure was then made when the coal was treated in the right kind of ovens and under proper conditions.

To insure the best results, a special study must be made of each kind of coal that it is proposed to use, and it would be well, in all cases where a new plant is contemplated, to make this study previous to a design of the plant, because the results may suggest some necessary changes in design that would not otherwise be foreseen.

Production of Fuel Briquets

The output of fuel briquets in the United States in 1917 was 406,856 net tons, valued at $2,233,888, an increase over 1916 of 111,701 tons, or 38 per cent., in quantity, and of $788,226, or 55 per cent., in value, again breaking the record of the previous year. According to C. E. Lesher, of the United States Geological Survey, Department of the Interior, the demand for fuel in 1917 was so strong throughout the whole year that there was no lack of market to limit the production of the briquet manufacturers. Despite the increased cost of binders and of manufacturing, most of the plants profitably operated to full capacity.

Cost Accounting at Coal Mines

By J. B. DILWORTH
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SYNOPSIS—*Just as a clinical thermometer reveals a healthy or unhealthy condition in a physician's patient, so a judicious cost-accounting system at a coal mine reveals a healthy or an unhealthy business condition. More than this, properly itemized costs reveal not only if trouble exists but the exact location thereof. A study of the costs of going operations would doubtless save many proposed firms from embarking on a career that is at best financially precarious.*

THE cost statement of a coal-mining operation has two main functions. Its primary object is, of course, to show the total average expense of producing a ton of coal over a given period. Secondarily, it should show the cost per ton of each phase of the operation of production—digging and loading in the mine, hauling, handling at the tipple, etc.—and also the allied expenses less directly connected with the physical act of producing the tonnage, such as superintendence, office expenses, royalty, depreciation and others of a like nature.

A properly prepared cost statement is to the mine operator what the clinical thermometer is to the physician. As a rise above normal in the latter instrument indicates an unhealthy condition of the patient, so an increase in the per-ton total on the cost statement above the figure at which coal should ordinarily be produced at the mine in question, shows an abnormal and perhaps unhealthy condition of the mining enterprise.

But even more efficient than the doctor's thermometer is an accurate and complete tabulation of operating costs, for it not only gives notice of unusual conditions in the mine or office but, when properly itemized, it enables the management to locate quite closely the seat of the trouble.

Cost System Neglected by Many Operators

In view of the vital importance of cost accounting to any complicated industrial enterprise, it is surprising how many smaller coal operators keep no accurate record of their production costs, being content with little more than a guess as to what their actual expenses of mining are and giving never a thought to the less apparent items of maintenance of buildings, depreciation of plant and equipment, depletion of coal area, compensation for their own services, and interest on invested capital.

In only too many instances a true and complete cost statement would show that the operation is being conducted at an actual loss and that the average price obtained for the coal has not been sufficient to cover the total cost of production. This may be true even without any serious blunders in management, due merely to the fact that, owing to physical and economic conditions, the coal can not be produced at these particular mines as cheaply as at others affording a similar grade of fuel whose output is sufficient to supply the normal market.

Probably many an operator of this class has gone into the mining business on the comfortable theory that because a nearby mine has been running for a few years and presumably making money, therefore his operation will do the same; and he proceeds cheerfully on his way, satisfied with the fact that he is selling his coal for perhaps 25c. a ton above the cost of labor and supplies. His rude awakening comes when, after a few years of operation, he needs to buy more mine cars, a new locomotive, enlarge his power plant, repair the tipple or drive a pair of headings through an extensive rock roll. He finds that not only has what he calls "mining costs" increased with the extension of the workings, but he is faced with a large expenditure for additions and renewal to meet which no fund has been created.

Should he decide to sell his property and conserve "profits" already secured, he finds that his depleted coal acreage and deteriorated mine plant will return nowhere near the capital invested in it. At this late date the significance of a complete and well considered form of cost accounting will be only too apparent.

Though the evil effects of such a business method are confined mainly to the injudicious operator himself and to those who have invested with him in the enterprise, yet when cases similar to the one cited are multiplied many times, as they have been in the bituminous coal fields of this country, they adversely affect the whole industry.

Lack of System Affects Entire Industry

Such operators, with their false ideas of costs, will, in a dull market, often sell their output at an actual loss, thus lowering prices and unduly reducing the margin of profit to those who are conducting their business on an economically sound basis.

It is a well known fact that the majority of mines in some of our largest bituminous coal districts have been run for years on an unjustly small margin of profit, if not at an actual loss, their owners holding fast as best they might, stinting repairs and improvements and gradually depleting their coal reserves without adequate returns on their investment, waiting for the occasional appearance of abnormal conditions, such as an anthracite strike, a great industrial boom or a world war, to enable them to realize a compensating profit.

Unquestionably this situation has arisen largely from the competition of operators who, being unfamiliar with comparative mining costs, have undertaken to develop properties not economically ripe for mining (because of location, character of seam, quality of coal, etc.). Once being committed to the enterprise, they carry it through to the bitter end by selling their product at or below cost. In some instances they do so knowingly. Having their capital invested, they hope for a turn in the market which will let them out with a minimum of loss. In other cases, however, the low price is due to the lack of a proper accounting system to reveal the true state of affairs. Of course this condition is not peculiar to the

coal-mining business. Former Chairman Hurley of the Federal Trade Commission recently said:

> A preliminary study of industry generally, as made by the Federal Trade Commission, revealed the fact that not more than 10 per cent. of manufacturers know what it costs to produce their goods, and that the remaining 90 per cent. are pricing their goods arbitrarily, either by guess-work or fixing their prices to conform with, or to beat, the prices made, or supposed to be made, by their equally ignorant competitors—and further, that only a very small percentage of manufacturers make any charge for depreciation of plant and equipment—and that therefore their products are priced before reckoning this important and vital item. To this is due the great demoralization in many lines of industry and the high business death rate.

Fortunately these regrettable conditions are rapidly becoming widely recognized, and much is being written on the subject of cost accounting in the technical press of the day.[1]

In the field of coal mining special impetus has been given to the movement toward full and complete accounting by the recent action of the Federal Trade Commission in requiring all coal and lignite operators to submit monthly statements of cost, income and tonnage on specially prepared forms. Four separate forms are prescribed and furnished by the Commission: C-1, for semi-bituminous, bituminous or sub-bituminous coal, or lignite operators producing more than 100,000 net tons per annum; C-2, for such operators producing less than 100,000 and more than 12,000 net tons per annum; C-3, for such operators producing less than 12,000 tons per annum, and C-4, for anthracite and semi-anthracite operators.

Acceptable Statement Form Being Developed

These forms vary in complexity according to the size of the operation reporting, but those for mines producing over 12,000 tons a year require quite a complete statement of expend tures, charges and income, and necessitate a fairly comprehensive accounting system on the part of the reporting operator.

Another recent important move in the direction of better methods of accounting was that of the National Coal Association in appointing a committee to draft a standard form of "Statement of Coal Production Cost and Revenue" and to prepare a "Manual of Cost Distribution." This was to be done in coöperation with representatives of the Federal Trade Commission. Some delay has been occasioned by the failure of two groups of experts to agree on certain items in the schedules considered, but is is to be hoped that a mutually acceptable form of statement will soon be determined upon and submitted to the operators of the country.

Numerous systems of cost accounting are in use at the many mining operations in our extensive coal fields, some elaborate, with a dozen or more headings and scores of minor sub-divisions, others recording little more than inside and outside labor, supplies and general expenses.

While it is not the purpose of this article to recommend any special method of accounting, the "Statement of Coal Costs" reproduced on this page embodies the principal items which a proper cost system should show. It is essentially a form used by a large and well managed mining company of western Pennsylvania, somewhat altered and enlarged to include certain advantageous features in use by accountants of other companies whose records have been examined.

The method of distributing expenses shown in the table may advantageously be altered in detail to suit varying conditions at different operations. Certain items may be wholly eliminated—for instance, most of those under power if electric current is purchased—or others may be subdivided to record certain charges in greater detail. Of course if washing, coking or stripping operations are carried on separate accounts must be opened for them.

But whatever the details of the accounting system adopted, the records should be in such form that the expenses of operation can be periodically tabulated in a

STATEMENT OF COAL COSTS

Mining:	— Labor — Amt. Cents per Ton	— Material — Amt. Cents per Ton	— Total — Amt. Cents per Ton
Pick coal			
Machine coal (cutting and loading)			
Total and average			
Maintenance of mining machines			
Mine props and caps			
Powder for shooting coal			
Total			
Maintenance of Development:			
Yardage or narrow work			
Slate removal			
Rockwork			
Timbering			
Total			
Transportation:			
Operation of animal haulage			
Operation of mechanical haulage			
Maintenance of roads, planes, etc.			
Maintenance of live stock and stables			
Maintenance of mine cars			
Total			
Ventilation:			
Bratticing, overcasts, etc			
Operation of fan			
Trappers			
Total			
Drainage:			
Pumpers			
Maintenance of pumps and pipes			
Ditching			
Bailing water			
Total			
Power:			
Operation of power plant			
Maintenance of power plant			
Maintenance of power lines			
Fuel			
Total			
Preparation and Loading:			
Weighing and dumping			
Coal cleaners			
Car trimmers and droppers			
Maintenance of tipples and scales			
Total			
General Mine Expenses:			
Superintendence			
Foremen and firebosses			
Watchmen			
Office			
Handling supplies			
Engineering			
Maintenance of buildings			
Total			
Gross Regular Mine Expenses			
Overhead Expenses:			
Royalty			
Administration			
Taxes			
Insurance			
Selling			
Depreciation of plant			
Depletion of coal			
Extraordinary expenses			
Total			
Gross expenses of operation			

[1]Of particular interest to coal operators is a paper read before the National Coal Association at Pittsburgh, Oct. 23, 1917, by J. B. L. Hornberger, comptroller of the Pittsburgh Coal Co.; also an address by this gentleman before the American Mining Congress October, 1913, printed in "Coal Age" of Nov. 1, 1913. An instructive paper by R. J. Maxwell on "An Accounting System for Coal Mines," was reprinted from the Canadian Mining Institute Bulletin in "Coal Age" of Jan. 20 and Feb. 3, 1917.

manner similar to the one outlined here so that the costs of the major operations connected with mining can be seen at a glance.

With a set of such tables before him the operator not only knows what the total cost of his product was during each period, but by comparison he can quickly locate the division in which an excessive expense has been incurred and promptly investigate the cause.

In conclusion, let it be noted that a proper system of mine cost accounting not only reveals the cost of the mine output and thus enables those interested to deter mine the financial status of a going operation, but it is of great value in forecasting the probable cost of coal from a new development of a similar character to the one whose costs are known.

If a prospective investor or operator has a proper tabulation of actual costs obtaining at one or more going mines, he can, by a study of physical conditions on a new property and the wage scale likely to apply there, make a fairly close estimate of what operating costs at the proposed mine will be.

Had such data and methods of analysis been utilized more generally in the past, there would be fewer coal-mining ventures doomed to failure through the physical impossibility of producing coal under the given conditions at a cost sufficiently below its normal selling price to net the operator a profit.

Coal Riches in Southern Algeria*

Recently, in the course of training members of the "Foreign Legion" in modern military tactics in southern Algeria, trench diggers struck a rich bed of anthracite coal. The discovery has aroused a great deal of interest in France and Italy, where the coal question is in a most acute stage.

Geologists now recollect that in 1908 G. B. M. Flamant, a scientist specializing on Algerian formations, called the attention of French geologists to the peculiar characteristics of the geological strata in southern Algiers, which were almost identical with those of the Westphalian coal district in western Germany. He suggested that borings be made at different points to determine the presence or absence of coal beds. He even ventured to roughly estimate the area of the coal field as covering 54 x 93 miles. The prospecting was never carried out and France lost an opportunity to be self-supporting in its coal requirements.

Since the accidental discovery of the coal under the training field, several railroads have continued the prospecting and have found in many places, at a depth of only 10 ft., beds of excellent coal varying in thickness between 50 and 80 cm. (20 to 32 in.). Engineers have estimated the deposits within a square kilometer at not less than 30,000 tons, which could easily be handled by the military railway now leading from the training camp to the coast (the Colomb-Bechar road). As coal sells for 150 fr. (about $30) a ton in Algiers, and 350 fr. (about $70) further inland, the find represents a huge fortune, especially as the first 30,000 tons could shortly be followed by many other thousands.

It is not too much to say that had France put down the borings suggested in 1908 it would not be in so critical a position today, in regard to fuel for its factories.

*Translated from "Le Courier Colonial."

Who's Who In Coal Mining

Frank J. Hayes, the Union's President

By K. C. Adams

Just as frank as his name, Frank J. Hayes, president of the United Mine Workers of America, in six months has proved by his steadiness that he is in every way capable of leading the destinies of the world's largest trade union.

Seven years' experience in labor-union work as vice president of the International, and as many more years as secretary-treasurer of the Illinois District organization, abundantly furnished the new miners' chief



FRANK J. HAYES

Born at Whatcheer, Iowa, May 4, 1882, his first office in the miners' union was that of secretary of his local at Breese, Ill. He served as sub-district and district secretary of Illinois miners continuously from 1903 until his elevation to the vice presidency of the International in 1910.

with the equipment he needed to succeed John P. White, whose labors he assumed last October.

When Hayes was elected to the vice presidency he found the job anything but pleasant, for T. L. Lewis, who was then president, was at outs with the mine workers of the Illinois district, from which organization Hayes hailed. Lewis was attempting to force the Illinois men to accept a compromise settlement with their operators. The district organization refused and Hayes stood by the district. Lewis denied Hayes an office at headquarters and point blank refused to supply him with a stenographer. Lewis also withheld from Hayes certain important assignments, which precedent prescribed should be turned over to the vice president's office as part of his established authority in directing the field work of the union organizers. But Hayes stuck to the job. While loitering around headquarters awaiting the president's pleasure during 1910 he pried deep into the affairs of the organization. Where he found abuses and inefficiency he looked for a remedy and obtained facts that served him well in later years.

The fight between the Illinois miners and Lewis continued. Special conventions and board meetings were held almost continuously, and in each succeeding session the battle between Hayes and Lewis grew in bitterness. The Illinois miners finally won, and Lewis' policies were repudiated. Friends of Hayes urged that he aspire for the presidency, but Hayes along with others had urged John P. White, president of the Iowa miners, to oppose Lewis. For this reason Hayes refused to stand for the office. He would have offered himself had he not already declared himself a supporter of Mr. White. He reasoned that he was a young man with time aplenty ahead in which to reach the goal of his life's ambition. The decision of Hayes established for him the reputation of being a leader with strong common sense.

White defeated Lewis overwhelmingly and Hayes welcomed the new leader into office with all the good will and coöperation of his heart. Teamwork so often referred to as essential to progress and so seldom practiced, became a reality. Dual movements organized against the Lewis régime were quickly routed. Successful wage agreements were negotiated for both bituminous and anthracite miners. White and Hayes were pulling the rope at the same time. And during the six years they served together never a single jerk failed to find them pulling with a united effort.

Many times ill-advised friends importuned Hayes to run against White. The politically ambitious of the union ranks repeatedly sought to cause a rupture in the hope of profiting thereby. But always Hayes exercised his strong common sense. As has been well said: "His ability to uncover their true purposes when political schemers advanced fictitious arguments and the readiness with which he rejected all proposals which were linked with hypocrisy caused those designing persons keen disappointment."

And as he has moved on through the years of official life he has cultivated that rare common sense that frankly admits errors, a trait rare among those in political life and one which is unfortunately only briefly retained by those who happen to possess it when they enter that career, with its many pitfalls. His directness and simplicity enables him to be a patient listener and yet to say No when the occasion so demands.

Let me give a few examples of how Hayes has given decisions with telling results: For many years it has been recognized that the per capita tax of the International Union was not sufficient to finance the organization on a basis of assured progress.

Talk per capita increase to the average member and right away you are on the defensive. To the 1918 convention Hayes not only recommended an increase, but urged that the tax be doubled. Immediately there was an organized move to reduce the increase proposed, in part if not in its entirety. Hayes gave the convention two votes on the question and common sense carried the day with a whoop.

During the discussion Mother Jones sought to have Hayes recognize one of her "pet boys" from somewhere in the jurisdiction. Hayes quietly imparted to the "Angel of the Camps" that she was all right, that the boys were all for her and appreciated her efforts, but that on important deliberative questions the Chair had the right to say who was entitled to the floor. There wasn't any camouflage about the incident. Hayes simply stated he was president; the convention accepted his decision with applause and continued business in an orderly way.

The United Mine Workers Journal has been a football in organization politics since it was established in 1891. Great financial losses have resulted from the voluntary subscription plan by which it has been conducted and by the restrictions which have been placed on advertising. All other International unions of consequence have long ago put into effect a per capita subscription. Changes of one kind or another have been suggested at every Board meeting of the International. At the recent meeting of the board Hayes, acting upon the recommendation of a committee in which John L. Lewis, his vice president, was a leading member recommended and put through unanimously a program whereby the official organ will be published semi-monthly and will go free to each of the 400,000 members—an educational move that should have been adopted long ago. With each member receiving the Journal, a copy of every official document published therein, there will be no excuse for any individual remaining in ignorance of the organization's problems and progress.

On Apr. 13 the International Executive Board unanimously approved a telegram offered by Hayes protesting against the inefficiency of the Fuel Administration. The message did not follow the stereotyped lines of resolutions, but pointed out plainly the whys and wherefores of the Fuel Administration's failure, and plainly stated what must be done to solve the fuel problem. Nothing in the telegram savored of selfishness or pettiness. The next day Hayes and his associates wired President Wilson protesting against the attempt made by the Director of Railroads to make good at the expense of the coal industry by hammering down the price of coal. This is another demonstration of Hayes' plain common sense.

In six months Hayes has negotiated a successful anthracite wage agreement. He has raised $800,000 security to appeal the verdict of the Coronado Coal Co. and others against the union. He made all preparations to fight the case of the Hitchman Coal and Coke Co., a decision having been rendered which would prohibit union organization activities from being carried to a successful conclusion. He has established a union legislative committee at Washington to assist labor from being victimized in hurried war-time legislation and he has forced the issue with the Federal Fuel Administration, in such a manner that solid organization of Alabama mine workers is insured.

During his administration the union has purchased over $400,000 worth of Liberty Bonds to finance world-wide democracy. Hayes has served as a member of Uncle Sam's war labor board by which a policy between capital and labor during the continuance of the war has been formulated and accepted. He has reorganized the field forces of the organization and defeated the would-be secessionists of Colorado led by the ungrateful John Lawson. He has convinced the public that he is a man possessed of common sense, a man whose slogan is "sanity first." Watch Hayes, for he is one of the big men of labor and is sure to make a wonderful record.

Zone System for the Distribution of Bituminous Coal

By order of the Fuel Administration the distribution of bituminous coal for the year beginning Apr. 1, 1918, will be controlled by a zone system, which is intended to reduce the burden on the railroads, facilitate shipment of coal, and keep all the mines working at full capacity.

THE factor that loomed largest in the fuel crisis of last winter was the lack of adequate transportation facilities. Under the plan of distribution then followed, a consumer in any part of the country was free to order his coal supply from any producing district, regardless of the length of haul involved. As a consequence, it often happened that cars and locomotives were engaged in delivering coal to distant regions that could have been served far more quickly from fields near by.

Obviously, this complete freedom of choice as to the source of coal used led to cross-hauling in addition to the utilization of railroad equipment in unnecessarily long hauls, the result being a great waste of transportation power. To prevent this needless waste and make possible an increased production to meet the war demands, the United States Fuel Administration, in conjunction with the Director General of Railroads, has announced a zone system for the control of bituminous coal distribution for the year beginning Apr. 1, 1918.

The zone system was adopted only after prolonged conferences with coal producers, jobbers and consumers, as well as with the traffic and operating officials of the railroads. Briefly explained, it divides the country into a number of zones, each of which must obtain its coal supply from mines that are relatively near, thus preventing abnormal and wasteful transportation movements, insuring more nearly equal distribution of cars to the mines and more steady employment of mine labor.

Of course, so radical a change in the methods of conducting the coal business will cause some inconvenience to producers and consumers, and will involve additional expense in some cases. For example, the producers of Pocahontas coal may no longer ship their output to Chicago and Western points by rail; as a result, they must find new markets in the East. Those plants in and around Chicago that have been burning West Virginia coal will be compelled to substitute Illinois coal, which can be obtained with less than half as long a haul.

It is the hope of the Fuel Administration, however, that the consumer and the producer will bear these unavoidable inconveniences in the realization that the readjustment of the distribution of coal is for the welfare of the nation. In other words, they are appealed to on the grounds of patriotism.

There are exceptions to the conditions imposed by the zone system. Certain industries require coals of particular quality or characteristics, as, for example, by-product, gas, blacksmith and metallurgical coals. If a consumer needs coal of one of these kinds and is unable to obtain it from the producing districts that are permitted to ship into the zone in which he is located, permits will be issued to allow the special-purpose fuel to be brought in from other districts.

The zone system does not affect the following bituminous coal:

1. Coal for railroad fuel, for which special arrangements will be made by the Fuel Administrator and the Director General of Railroads.

2. Coal for movement on inland waterways, which is in no way restricted by the system.

3. Coal delivered to Canada, which is subject to regulations of the Fuel Administrator.

To enable the consumer of bituminous coal to determine the districts from which he may obtain his fuel and to show the producer the zones in which he may sell his output, the map inserted as a supplement to this issue of *Coal Age* has been prepared.

It will be seen that the entire territory of the United States has been divided into a large number of irregular zones or sections, colored differently so that they may readily be distinguished one from another, and each marked with a key number. Each of these separately numbered zones has certain definite boundary lines and is restricted to the use of coals from certain districts. The Key to Consuming Zones gives a complete list of all the zones shown on the map, states the districts from which they may obtain coal, and defines the boundaries of each zone.

If a consumer wishes to find out what coals are available for his use, he locates on the map the zone in which he lives and notes its number. Then, in the Key to Consuming Zones, under that zone number, he will find the list of producing districts from which he can obtain coal. In case there is any doubt as to the number of the zone in which he lives, reference to the boundaries given in the key will at once decide the point. Following this key is a list of the meanings of the abbreviations and terms used in the key.

The Key to Producing Districts is intended to show the producer the several zones in which he may market his product. He knows the district in which his mine is located, and on referring to this key he finds the numbers of the zones, as shown on the map, into which the output from his mine may be sent.

A wall map of large size, showing the same zoning in fuller detail, may be obtained from the Coal Zone Map Co., Glen Echo, Maryland.

Key to Consuming Districts

ZONE NO. 1

RESTRICTED TO FOLLOWING COALS—North Dakota, South Dakota, docks.

BOUNDARIES—Northern and Western: Lake Superior and Canada; North Dakota state line and South Dakota state line to Ortonville, Minn. **Southern and Eastern:** From Ortonville via C. M. & St. P. Ry. through Granite Falls and Benton Junction to Minneapolis, thence via M. St. P. & S. S. M. Ry. through Chippewa Falls and Abbotsford to Amherst Junction, thence via G. B. & W. R. R. to Kewaunee, Wis.; western banks of Lakes Michigan and Huron.

ZONE NO. 2

RESTRICTED TO FOLLOWING COALS—Illinois (summer only), docks, North Dakota, South Dakota, Iowa (to points in Iowa only).

BOUNDARIES—Northern: From Kewaunee, Wis., via G. B. & W. R. R. to Amherst Junction, thence via M. St. P. & S. S. M. Ry. through Abbotsford and Chippewa Falls, Wis., to Minneapolis, Minn., thence via C. M. & St. P. Ry. through Benton Junction and Ortonville, Minn., to the Minnesota-South Dakota state line. **Western:** Minnesota-South Dakota state line. **Southern:** Commencing at South Dakota-Minnesota-Iowa state line east to the C. R. I. & P. Ry. line running through Gordonsville, Minn., and Northwood, Iowa, thence south via that line to Mason City, Iowa, thence east via C. M. & St. P. Ry. through McGregor, Iowa, Madison and Watertown to Milwaukee, Wis. **Eastern:** Lake Michigan from Kewaunee to Milwaukee, Wis.

ZONE NO. 3

RESTRICTED TO FOLLOWING COALS—Illinois, Kentucky (Western), Indiana, docks.

BOUNDARIES—Northern and Western: From Milwaukee, Wis., via C. M. & St. P. Ry. to Waukesha, thence via M. St. P. & S. S. M. Ry. to Illinois-Wisconsin state line. **Eastern and Southern:** From Milwaukee, Wis., via Lake Michigan (west bank) to Illinois-Wisconsin state line, thence via that line to M. St. P. & S. S. M. Ry.

ZONE NO. 4

RESTRICTED TO FOLLOWING COALS—Illinois, Kentucky (Western), docks.

BOUNDARIES—Northern: Via C. M. & St. P. Ry. from Milwaukee, Wis., through Watertown to Madison, Wis. **Southern:** Via C. M. & St. P. Ry. from Milwaukee, Wis., through Milton Junction to Madison, Wis.

ZONE NO. 4A

RESTRICTED TO FOLLOWING COALS—Illinois, docks.

BOUNDARIES—Northern and Western: From Milwaukee, Wis., via C. M. & St. P. Ry. through Milton Junction to Madison, Wis., thence via I. C. R. R. to Dixon, Ill. **Eastern and Southern:** From Milwaukee, Wis., via C. M. & St. P. Ry. through Elkhorn to Beloit, Wis., thence via C. & N. W. Ry. through Belvidere and Sycamore to Dixon, Ill.

ZONE NO. 5

RESTRICTED TO FOLLOWING COALS—Iowa, Kansas, Illinois, Missouri Oklahoma, Arkansas.

BOUNDARIES—Northern and Eastern: From Sioux City, Iowa, via C. M. & St. P. Ry. through Rock Valley and Spencer to Nora Junction, thence via C. R. I. & P. Ry. to Cedar Rapids, thence via C. M. & St. P. Ry. through Sigourney to Ottumwa, thence via C. R. I. & P. Ry. to Keokuk, Iowa, thence via Mississippi River to Missouri-Arkansas state line. **Western and Southern:** From Sioux City, Iowa, via C. M. & St. P. Ry. through Manilla and Adel to Des Moines, Iowa, thence via C. B. & Q. R. R. to Albia, thence via W. Ry. to Moravia, Iowa, thence via C. M. & St. P. Ry. to Chillicothe, Mo., thence via W. Ry. to Moberly, thence via M. K. & T. Ry. through New Franklin to North Jefferson City, thence via western boundary of Cole, Miller and Pulaski Counties to St. L. S. F. Ry., thence via St. L. S. F. Ry. through Springfield and Neosho to Missouri-Oklahoma state line, thence south to Arkansas-Missouri-Oklahoma state line, thence east via Arkansas-Missouri state line to the Mississippi River.

ZONE NO. 6

RESTRICTED TO FOLLOWING COALS—Illinois, Kentucky (Western).

BOUNDARIES—Northern and Western: From Arthur, Ill., via P. C. C. & St. L. R. R. to Decatur, Ill., thence via I. C. R. R. through Centralia to Cairo, Ill., thence via Mississippi River to Memphis, Tenn. **Eastern and Southern:** From Arthur, Ill., via C. & E. I. R. R. through Marion to Joppa, Ill., thence via Ohio River to Cairo, Ill., and thence via I. C. R. R. through Clinton and Fulton, Ky., and Dyersburg, Tenn., to Memphis, Tenn.

ZONE NO. 6A

RESTRICTED TO FOLLOWING COALS—Illinois, Kentucky (Western), docks.

BOUNDARIES—Northern: From Madison, Wis., to Woodman, Wis., via C. M. & St. P. Ry. **Southern:** From Madison, Wis., to Woodman, Wis., via C. & N. W. Ry.

ZONE NO. 7

RESTRICTED TO FOLLOWING COALS—Illinois, Iowa (to points in Iowa only).

BOUNDARIES—Northern and Eastern: From Nora Junction, Iowa, via C. M. & St. P. Ry. to Woodman, Wis., thence via C. & N. W. Ry. to Madison, Wis., thence via I. C. R. R. to Freeport, Ill., thence via I. C. R. R. to Dixon, Ill., thence via C. & N. W. Ry. through Nelson to Peoria, thence via P. C. C. & St. L. R. R. to Decatur, thence via I. C. R. R. through Centralia to Cairo, Ill. **Southwestern:** From Nora Junction, Iowa, via C. R. I. & P. Ry. to Cedar Rapids, thence via C. M. & St. P. Ry. to Ottumwa, thence via C. R. I. & P. Ry. to Keokuk, Iowa, thence east of the Mississippi River to Cairo, Ill.

ZONE NO. 8

RESTRICTED TO FOLLOWING COALS—Illinois, Indiana.

BOUNDARIES—Northern and Eastern: From Dixon, Ill., via I. C. R. R. to Decatur, Ill. **Western and Southern:** From Dixon, Ill., via C. & N. W. Ry. through Nelson to Peoria, Ill., thence via P. C. C. & St. L. R. R. to Decatur, Ill.

ZONE NO. 9

RESTRICTED TO FOLLOWING COALS—Illinois, Indiana, Kentucky (Western).

BOUNDARIES—Northern and Western: From Waukesha, Wis., via C. M. & St. P. Ry. to Beloit, Wis., thence via C. & N. W. Ry. through Belvidere, Sycamore, DeKalb, to Dixon, Ill., thence via I. C. R. R. to Decatur, Ill., thence via P. C. C. & St. L. R. R. to Arthur, thence via C. & E. I. R. R. through Mt. Vernon to Joppa, Ill. **Eastern and Southern:** From Waukesha, Wis., via M. St. P. & S. S. M. Ry. to Wisconsin-Illinois state line, thence via this line to Lake Michigan, thence via Lake Michigan to Michigan City, Ind., thence via C. I. & L. Ry. to San Pierre, thence via N. Y. C. R.R. to Wheatfield, thence via C. & E. I. R. R. through Brazil and Otter Creek Junction through Vincennes to Evansville, Ind., thence both sides of the Ohio River, Evansville, Ind., to Joppa, Ill.

ZONE NO. 10

RESTRICTED TO FOLLOWING COALS—Indiana, Illinois (Danville district on Wabash Ry. only). Kentucky (Western, to Jeffersonville and New Albany only).

BOUNDARIES—Northern and Western: From San Pierre, Ind., via N. Y. C. R.R. to Wheatfield, thence via C. & E. I. R.R. through Brazil, Otter Creek Junction and Vincennes to Evansville, Ind. **Eastern and Southern:** From San Pierre, Ind., via C. I. & L. Ry. to New Albany, Ind., thence along northern bank of Ohio River to Evansville, Ind.

ZONE NO. 11

RESTRICTED TO FOLLOWING COALS—Virginia (L. & N. R.R.), Tennessee (M. R.R.), West Virginia (Southern), Illinois, Indiana, Kentucky (Eastern and Western).

BOUNDARIES—Southeastern: From San Pierre, Ind., via N. Y. C. R.R. north to South Bend, Ind., thence via M. C. R.R. to Michigan-Indiana state line. **Western and Northern:** From San Pierre, Ind., north to Michigan City, thence along Lake Michigan and Indiana-Michigan state line to M. C. R. R. from South Bend, Ind., to Niles, Mich.

ZONE NO. 12

RESTRICTED TO FOLLOWING COALS—Indiana, Illinois (Danville district on Wabash Ry. only).

BOUNDARIES — Northeastern — From Monon, Ind., via C. I. & L. Ry. to Indianapolis, Ind., thence via C. C. C. & St. L. Ry. through Greensburg to North Vernon, Ind., thence via P. C. C. & St. L. R.R. to Madison, Ind. **Southwestern:** From Monon, Ind., via C. I. & L. Ry. to Louisville, Ky., thence via Ohio River to Madison, Ind.

ZONE NO. 13

RESTRICTED TO FOLLOWING COALS—Kentucky (Western).

BOUNDARIES—Northern and Eastern: From Cairo, Ill., along Ohio River (north bank) to Louisville, Ky., thence south via L. & N. R.R. from Louisville through Bowling Green, Ky., including Glasgow and Scottsville branches, to Kentucky-Tennessee state line. **Western and Southern:** From Cairo, Ill., via I. C. R.R. through Fulton, Ky., to Kentucky-Tennessee state line, thence east via state line to L. & N. R.R. running from Franklin, Ky., to Mitchellville, Tenn.

ZONE NO. 14

RESTRICTED TO FOLLOWING COALS—Indiana, Kentucky (Eastern), West Virginia (Northern and Southern), Virginia (L. & N.), Tennessee (M. R.R.), Michigan, Ohio (on G. R. & I. Ry. only).

BOUNDARIES—Northern and Western: From Mackinaw City, east bank of Lake Michigan, to Benton Harbor, Mich., thence via C. C. C. & St. L. Ry. to Niles, thence via M. C. R.R. to Michigan-Indiana state line. **Eastern and Southern:** From Mackinaw City via G. R. & I. Ry. and branches to Michigan-Indiana state line, thence west via state line to M. C. R.R. running from Niles to South Bend, Ind.

ZONE NO. 15

RESTRICTED TO FOLLOWING COALS—Illinois, Indiana, Kentucky (Eastern and Western), West Virginia (Northern and Southern), Virginia (L. & N.), Tennessee (M. R.R.), Michigan.

BOUNDARIES—Northern and Western: From Benton Harbor, Mich., via Lake Michigan to Indiana-Michigan state line. **Eastern and Southern:** From Benton Harbor, Mich. via C. C. C. & St. L. Ry. to Niles, thence via M. C. R.R. to Indiana-Michigan state line, thence west via state line to Lake Michigan.

ZONE NO. 16

RESTRICTED TO FOLLOWING COALS—Indiana, Illinois (Danville district on Wabash Ry. only), Kentucky (Eastern), West Virginia (Southern).

BOUNDARIES—Northern: Michigan-Indiana state line from G. R. & I. Ry. west to M. C. R. R. running from Niles, Mich. to South Bend, Ind. **Western:** Via N. Y. C. R. R. South Bend to San Pierre, thence via C. I. & L. Ry. through Monon to Indianapolis, thence via C. C. C. & St. L. Ry., Indianapolis to Greensburg, Ind. **Eastern:** G. R. & I. Ry. from Michigan state line south to Richmond, Ind., thence via P. C. C. & St. L. R. R. to Greensburg, Ind.

ZONE NO. 17

RESTRICTED TO FOLLOWING COALS—Virginia (L. & N. R.R.), Kentucky (Eastern), Tennessee (M. R.R.), West Virginia (Southern).

BOUNDARIES—From Cincinnati north via P. C. C. & St. L. Ry. to Richmond, Ind., thence west to Rushville, Ind., thence south via C. C. C. & St. L. R.R. through Greensburg, thence east to Cincinnati, O.

ZONE NO. 18

RESTRICTED TO FOLLOWING COALS—Virginia (L. & N. R.R.), Kentucky (Southern), Tennessee (M. R.R.).

BOUNDARIES—Northern and Western: Cincinnati, Ohio, via C. C. C. & St. L. Ry. through Greensburg, to North Vernon, Ind., thence via P. C. C. & St. L. R.R. to Madison, Ind. **Eastern and Southern:** North bank Ohio River, Cincinnati, Ohio, to Madison, Ind.

ZONE NO. 19

RESTRICTED TO FOLLOWING COALS—Kentucky (Eastern), Tennessee (M. R.R.), West Virginia (Southern, also Eastern, to points on C. & O. Ry. from Catlettsburg, Ky., to Cincinnati, Ohio).

BOUNDARIES—Northern and Eastern: From Louisville, Ky., via Ohio River and Big Sandy River to Kentucky-Virginia-West Virginia state line **Western and Southern:** From Louisville, Ky., to Lebanon Junction to Bowling Green, Ky., to Mitchellville, Tenn., including Glasgow and Scottsville (Kentucky) branches, thence via Kentucky-Tennessee state line and Kentucky-Virginia state line via Tug River to Big Sandy River.

ZONE NO. 20

RESTRICTED TO FOLLOWING COALS—Virginia (L. & N. R. R.), Kentucky, (Eastern), Tennessee (M. R.R.), West Virginia (Northern and Southern), Indiana, Illinois (Danville district on Wabash Ry. to points in Indiana only), Ohio, Michigan.

BOUNDARIES—Southern and Eastern: From Richmond, Ind., east via P. C. C. & St. L. R. R. to Ohio state line, thence north via state line to Michigan state line, thence via N. Y. C. R. R. to Jackson, Mich., thence via M. C. R.R. to Lansing, thence via P. M. Ry. through Ionia to Howard City, Mich. **Western:** From Howard City, Mich., via G. R. & I. Ry. through Fort Wayne to Richmond, Ind.

ZONE NO. 21

RESTRICTED TO FOLLOWING COALS—Virginia (L. & N. R.R.), Kentucky (Eastern), Tennessee (M. R.R.), West Virginia (Northern and Southern), Ohio, Michigan

BOUNDARIES—Northern and Eastern: From Mackinaw City, Mich., along the eastern boundary of Michigan (lower peninsula) and Ohio to Toledo, Ohio, thence via C. C. C. & St. L. Ry. through Bellefontaine to Dayton, Ohio. **Western and Southern:** From Mackinaw City, Mich., via G. R. & I. Ry. to Howard City, thence via P. M. Ry. through Ionia to Lansing, Mich., thence via M. C. R.R. to Jackson, thence via N. Y. C. R.R. to Indiana-Michigan-Ohio state line, thence south along state line and P. C. C. & St. L. R. R. running from Richmond, Ind., to Dayton, Ohio.

ZONE NO. 22

RESTRICTED TO FOLLOWING COALS—Virginia (L. & N. R.R.), Kentucky, (East-

ern), Tennessee (M. R.R.), West Virginia (Southern), Ohio.

BOUNDARIES—From Cincinnati, Ohio, north via C. C. C. & St. L. Ry. to Dayton, Ohio, thence via P. C. C. & St. L. R.R. west to Richmond, Ind., thence southeast via P. C. C. & St. L. R.R. to Cincinnati, Ohio.

ZONE NO. 23

RESTRICTED TO FOLLOWING COALS—Kentucky (Northeastern), West Virginia (Northern and Southern, also Eastern, along main lines of C. & O. Ry. and N. & W. Ry. to Columbus and Cincinnati, Ohio) Ohio.

BOUNDARIES—Northern and Eastern: From Toledo, Ohio, via south bank of Lake Erie to Sandusky, Ohio, thence via P. C. C. & St. L. R.R. through Columbus, thence via N. & W. Ry. through Circleville to Chillicothe. **Western and Southern:** From Toledo, Ohio, via C. C. C. & St. L. Ry. through Springfield to Dayton, Ohio, thence via B. & O. R. R. through Washington C. H. to Chillicothe, Ohio.

ZONE NO. 24

RESTRICTED TO FOLLOWING COALS—Kentucky (Northeastern), West Virginia (Southern, also Eastern, along main lines of C. & O. Ry. and N. & W. Ry. to Columbus and Cincinnati, Ohio), Ohio.

BOUNDARIES—Northern and Eastern: From Dayton, Ohio, via B. & O. R.R. through Washington C. H. to Chillicothe, thence via N. & W. Ry. to Waverly, thence via C. & O. Northern Ry. to Portsmouth. **Western and Southern:** From Dayton, Ohio, via C. C. C. & St. L. Ry. to Cincinnati, Ohio, thence via north bank of Ohio River to Portsmouth, Ohio.

ZONE NO. 25

RESTRICTED TO FOLLOWING COALS—West Virginia (Northern, also Eastern, along main lines of C. & O. Ry. and N. & W. Ry. to Columbus and Cincinnati, Ohio), Ohio.

BOUNDARIES—Northern and Eastern: From Bucyrus, Ohio, via T. & O. C. Ry. to Thurston, Ohio, thence via Z. & W. Ry. through Fultonham to Zanesville, thence via Z. & W. Ry., K. & M. Ry. to Athens. **Western and Southern:** From Bucyrus, Ohio, via P. C. C. & St. L. R.R. to Marion, Ohio, thence via H. V. Ry. to Columbus, thence via N. & W. Ry. to Chillicothe, thence via B. & O. Ry. to Athens, Ohio.

ZONE NO. 26

RESTRICTED TO FOLLOWING COALS—Ohio.

BOUNDARIES—Northern and Eastern: From Sandusky, Ohio, via south bank of Lake Erie to Lorain, thence via W. & L. E. Ry. through Wellington to Pittsburgh Junction, thence via P. & W. V. Ry. through Mingo Junction to Ohio River. **Southern and Western:** From Sandusky, Ohio, via P. C. C. & St. L. R.R. to Bucyrus, Ohio, thence via T. & O. C. Ry. to Thurston, thence through Zanesville to Athens, thence via K. & M. Ry. through Athens to Middleport, thence via Ohio River (north bank) to P. & W. V. Ry. opposite Mingo Junction.

ZONE NO. 27

RESTRICTED TO FOLLOWING COALS—Pennsylvania, Ohio.

BOUNDARIES—Northern and Western: Along south bank Lake Erie from Conneaut, Ohio, to Lorain, Ohio, thence via W. & L. E. Ry. through Wellington to Pittsburgh Junction, thence via P. & W. V. Ry. through Mingo Junction to Ohio River. **Eastern and Southern:** From Conneaut, Ohio, via Pennsylvania-Ohio state line to East Liverpool, Ohio, thence via Ohio River to P. & W. V. Ry. at a point opposite Mingo Junction.

ZONE NO. 28

RESTRICTED TO FOLLOWING COALS—No change contemplated in this plan, except that low-volatile coal in the Pocahontas, Tug River and New River districts on the N. & W. R. R. and the C. & O. Ry. and the Virginian Ry., and Clinch Valley districts in Tazewell and eastern Russell Counties along the N. & W. R. R., also high-volatile east of Charleston, W. Va., on C. & O. Ry. and east of Iaeger, W. Va., on N. & W. R. R. will be restricted to the District of Columbia, (except C. & O. Ry.) Virginia, (including tidewater terminals) also points in West Virginia on the direct line of the C. & O. Ry. and N. & W. R. R. east and west bound and Virginia Ry. east bound.

BOUNDARIES—All territory east and northeast of Ohio, Kentucky and Virginia, including New England.

ZONE NO. 29

RESTRICTED TO FOLLOWING COALS—Ohio, West Virginia (Northern, also Eastern, to points on the direct lines of the C. & O. Ry. and N. & W. Ry.).

BOUNDARIES—Northern and Eastern: From Chillicothe, Ohio, via B. & O. R.R. to Athens, thence via K. & M. Ry. to Middleport, thence via Ohio River (north bank) to Ironton, Ohio. **Western and Southern:** From Chillicothe, Ohio, via N. & W. Ry. to Waverly, thence via C. & O. N. Ry. to Portsmouth, thence via Ohio River (north bank) to Ironton, Ohio.

ZONE NO. 30

RESTRICTED TO FOLLOWING COALS—No change.

BOUNDARIES—All territory west of the following state lines: North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Texas.

ZONE NO. 31

RESTRICTED TO FOLLOWING COALS—North Dakota, Wyoming, Montana and other fields east of the Rocky Mountains, docks.

BOUNDARIES—All territory in North Dakota west of the Missouri River.

ZONE NO. 32

RESTRICTED TO FOLLOWING COALS—North Dakota, South Dakota, Wyoming, Montana, docks.

BOUNDARIES—Northern, Western and Southern: North boundary of North Dakota to Montana, thence south to and via Missouri River to Mobridge, S. D., thence via C. M. & St. P. Ry. through Aberdeen to Bigstone City, S. D. **Eastern:** East boundary of North Dakota, thence via Minnesota-South Dakota state line to Bigstone City, S. D.

ZONE NO. 33

RESTRICTED TO FOLLOWING COALS—South Dakota, Wyoming, Montana and other fields east of the Rocky Mountains, North Dakota, docks.

BOUNDARIES—Northern and Eastern: From Montana-North Dakota-South Dakota state line to the Missouri River, thence via Missouri River to South Dakota-Nebraska state line. **Western and Southern:** Western and southern state boundary of South Dakota.

ZONE NO. 34

RESTRICTED TO FOLLOWING COALS—North Dakota, South Dakota, Wyoming, Montana, Illinois (summer), docks.

BOUNDARIES — Southwestern: From Mobridge, S. D., via Missouri River to Sioux City, Ia. **Northern and Eastern:** From Mobridge, S. D., via C. M. & St. P. Ry. through Aberdeen, S. D., to Bigstone City, S. D., thence via Minnesota-South Dakota state line and Iowa-South Dakota state line to Sioux City, Ia.

ZONE NO. 35

RESTRICTED TO FOLLOWING COALS—Iowa, Kansas, Missouri, Arkansas, Oklahoma, Colorado and other fields east of the Rocky Mountains, Wyoming.

BOUNDARIES—Entire state of Nebraska.

ZONE NO. 36

RESTRICTED TO FOLLOWING COALS—Kansas, Missouri, Iowa, Arkansas, Oklahoma, Colorado (Southern).

BOUNDARIES—Entire state of Kansas.

ZONE NO. 37

RESTRICTED TO FOLLOWING COALS—Oklahoma, Missouri, Arkansas, Kansas, Colorado, New Mexico, Texas.

BOUNDARIES—Entire state of Oklahoma.

ZONE NO. 38

RESTRICTED TO FOLLOWING COALS—New Mexico, Colorado, Texas.

BOUNDARIES—All Texas territory west of Pecos River.

ZONE NO. 39

RESTRICTED TO FOLLOWING COALS—Colorado, New Mexico, Arkansas, Oklahoma, Texas.

BOUNDARIES—Northern and Eastern: From New Mexico-Oklahoma-Texas state line east along northern border of Texas to Arkansas-Louisiana-Texas state line, thence south to Logansport, La., thence via H. E. & W. T. Ry. to Houston, via G. H. & H. R.R. to Galveston, thence Gulf of Mexico to Rio Grande River. **Southwestern:** From New Mexico-Oklahoma-Texas state line to Pecos River, thence via Pecos River to Rio Grande River thence via Rio Grande River to the Gulf of Mexico.

ZONE NO. 40

RESTRICTED TO FOLLOWING COALS—Kentucky (Western), Alabama, Texas.

BOUNDARIES—Northwestern: From Logansport, La., via H. E. & W. T. Ry. to Houston, Texas, thence via G. H. & H. R. R. to Galveston. **Eastern and Southern:** From Logansport, La., along Louisiana-Texas state line to the Gulf of Mexico.

ZONE NO. 41

RESTRICTED TO FOLLOWING COALS—Arkansas, Illinois (summer), Iowa, Kansas, Missouri, Oklahoma, docks.

BOUNDARIES—Northern and Western: From Minnesota-Iowa state line directly south of Gordonsville, Minn., to Iowa-Minnesota-South Dakota state line, thence directly south along Iowa-South Dakota state line to Rock Valley, Ia. **Eastern and Southern:** From Iowa-Minnesota state line directly south of Gordonsville, Minn., via C. R. I. & P. Ry. to Mason City, Ia., thence via C. M. & St. P. Ry. to Rock Valley, Ia.

ZONE NO. 42

RESTRICTED TO FOLLOWING COALS—Arkansas, Iowa, Kansas, Missouri, Oklahoma.

BOUNDARIES—Northeast: From Sioux City, Ia., via C. M. & St. P. Ry. through Manilla and Adel to Des Moines, thence via C. B. & Q. R. R. through Chariton to Albia, thence via W. Ry. to Moravia, Ia., thence via C. M. & St. P. Ry. through Seymour to Missouri-Iowa state line. **Western and Southern:** From Sioux City, Ia., via Missouri River (east bank) to Iowa-Missouri state line, thence via Missouri state line, north boundary, to C. M. & St. P. Ry. line running south from Seymour, Ia.

ZONE NO. 43

RESTRICTED TO FOLLOWING COALS—Iowa, Arkansas, Kansas, Missouri, Oklahoma.

BOUNDARIES—Northeastern and Southern: Iowa-Missouri state line from Missouri River to C. M. & St. P. Ry. running south from Moravia, Ia., through Chillicothe, Mo., thence via W. Ry. through Huntsville to Moberly, thence via M. K. & T. Ry. through New Franklin to North Jefferson City, thence via western boundary of Cole, Miller and Pulaski Counties, Mo., to St. L. S. F. Ry. thence via St. L. S. F. Ry. through Lebanon, Springfield, to Missouri-Oklahoma state line. **Western:** Western boundary of Missouri.

ZONE NO. 44

RESTRICTED TO FOLLOWING COALS—Arkansas, Illinois, Kansas, Missouri, Oklahoma, Texas.

BOUNDARIES—Northern and Eastern: From Arkansas-Missouri-Oklahoma state line east to Mississippi River, thence via Mississippi River (west bank) to Memphis, Tenn. **Western and Southern:** From Arkansas-Missouri-Oklahoma state line south to C. R. I. & P. Ry. running from Howe, Okla., through Mansfield, Danville and Little Rock, Ark., to Memphis, Tenn.

ZONE NO. 45

RESTRICTED TO FOLLOWING COALS—Alabama, Arkansas, Illinois (only on lines of St. L. S. W. Ry. and St. L. I. M. & S. Ry), Kansas, Missouri, Oklahoma, Kentucky (Western), Texas.

BOUNDARIES—Northern and Eastern: From Arkansas-Oklahoma state line via C. R. I. & P. Ry. running from Howe, Okla., through Mansfield, Danville and Little Rock, Ark., to Memphis, Tenn., thence via Mississippi River (west bank) to Arkansas-Louisiana state line. **Western and Southern:** South along Arkansas-Oklahoma state line from C. R. I. & P. Ry. Howe, Okla., to Mansfield, Ark., to Arkansas-Louisiana-Texas state line, thence east along Arkansas-Louisiana state line to the Mississippi River.

ZONE NO. 46

RESTRICTED TO FOLLOWING COALS—Alabama, Arkansas, Illinois (only on lines of St. L. S. W. Ry. and St. L. I. M. & S. Ry.), Kentucky (Western), Texas.

BOUNDARIES—Northern and Eastern: From Arkansas-Louisiana-Texas state line east to the Mississippi River, thence along Mississippi River (west bank) to the Gulf of Mexico. **Western and Southern:** Louisiana-Texas state line to the Gulf of Mexico, thence to Mississippi River.

ZONE NO. 47

RESTRICTED TO FOLLOWING COALS—Kentucky (Western).

BOUNDARIES—Northern and Eastern: From Kentucky-Tennessee state line south of Fulton, Ky., east to L. & N. R. R. passing south through Mitchellville, Tenn., through Nashville and Columbia to Iron City, Tenn., including Scottsville and Hartsville, Ky., branches. **Western and Southern:** From Kentucky-Tennessee state line south of Fulton, Ky., via I. C. R. R. to Memphis, thence east via N. C. & St. L. Ry. to Perry-

ville, thence along Tennessee River (east bank) to Alabama-Mississippi-Tennessee state line, thence via Alabama-Tennessee state line to Iron City, Tenn.

ZONE NO. 48

RESTRICTED TO FOLLOWING COALS—Alabama.

BOUNDARIES—Northern and Eastern: From Memphis, Tenn., via N. C. & St. L. Ry. to Perryville, thence via Tennessee River (west bank) to Alabama-Mississippi-Tennessee state line. **Western and Southern:** From Memphis to Arkansas-Mississippi-Tennessee state line, thence east along Mississippi-Tennessee state line to the Tennessee River.

ZONE NO. 49

RESTRICTED TO FOLLOWING COALS—Alabama, Kentucky (Western).

BOUNDARIES—Northern and Eastern: Tennessee-Mississippi state line and Alabama-Mississippi state line. **Western and Southern:** East bank Mississippi River to the Gulf of Mexico.

ZONE NO. 50

RESTRICTED TO FOLLOWING COALS—Kentucky (Southern), Virginia (all Black Mountain and Stonega districts in Lee, Dickenson, Wise, and western Russell Counties of Virginia), Kentucky (Western), Tennessee, Georgia.

BOUNDARIES—Northeastern: From Columbia, Tenn., via L. & N. R. R. to Baugh, Tenn. **Western and Southern:** From Columbia, Tenn., via L. & N. R. R. through Lawrenceburg to Iron City, thence east via Alabama-Tennessee state line to Baugh, Tenn.

ZONE NO. 51

RESTRICTED TO FOLLOWING COALS—Alabama, Kentucky (Southern), Virginia (all Black Mountain and Stonega districts in Lee, Dickenson, Wise, and western Russell Counties of Virginia), Tennessee, Georgia.

BOUNDARIES—Northern: Tennessee-Alabama state line. **Southwestern and Eastern:** Tennessee River.

ZONE NO. 52

RESTRICTED TO FOLLOWING COALS—Alabama.

BOUNDARIES—Northern and Eastern: Tennessee River to Alabama-Georgia state line, thence south along state line to Apalachicola River, thence via said river to the Gulf of Mexico. **Western and Southern:** Alabama-Mississippi state line to the Gulf of Mexico.

ZONE NO. 53

RESTRICTED TO FOLLOWING COALS—Kentucky (Southern, also Western, to points on N. C. & St. L. and T. C. R. R. Nashville to Old Hickory and Hermitage, Tenn. inclusive), Virginia (all Black Mountain and Stonega districts in Lee, Dickenson, Wise, and western Russell Counties of Virginia, also Clinch Valley district in eastern Russell and Tazewell Counties). West Virginia (Eastern, also Southern, on C. & O. Ry. east of Charleston and N. & W. Ry. east of Iaeger, W. Va.), Georgia, Tennessee.

BOUNDARIES—Northern and Eastern: From Mitchellville, Tenn., east along Tennessee-Kentucky state line to Virginia state line, thence via L. & N. R. R. to Norton, thence via N. & W. R. R. through Roanoke, Petersburg (and branches of N. & W. R. R. at Petersburg) to Norfolk, thence south to Virginia-Carolina state line. **Western and Southern:** From Mitchellville, Tenn., via L. & N. R. R through Nashville and Columbia to Baugh, Tenn., including Scottsville, Ky., branch, thence along Alabama-Tennessee-Georgia state line, thence via North Carolina-Tennessee state line, thence via North Carolina-Virginia state line to the Atlantic Ocean.

ZONE NO. 54

RESTRICTED TO FOLLOWING COALS—Kentucky (Southern), Tennessee, Virginia (all Black Mountain and Stonega districts in Lee, Dickenson, Wise, and western Russell Counties of Virginia), Alabama, Georgia.

BOUNDARIES—State of Georgia and all of Florida east of Apalachicola River.

ZONE NO. 55

RESTRICTED TO FOLLOWING COALS—Kentucky (Southern), Virginia (all Black Mountain and Stonega districts in Lee, Dickenson, Wise, and western Russell Counties of Virginia), Tennessee, Georgia, West Virginia (Eastern).

BOUNDARIES—Northern and Eastern: From Georgia-North Carolina-South Carolina state line to the line of the Sou. Ry. running south from Charlotte, N. C., through Chester to Columbia, S. C., thence via S. A. L. Ry. to Denmark, thence via Sou. Ry. to Charleston, S. C. **Western and Southern:** South Carolina-Georgia state line to the Atlantic Ocean.

ZONE NO. 56

RESTRICTED TO FOLLOWING COALS—Kentucky (Southern), Tennessee, Virginia (all Black Mountain and Stonega Districts in Lee Dickenson, Wise and western Russell Counties of Virginia, and Clinch Valley districts in Tazewell and eastern Russell Counties along the N. & W. Ry.), West Virginia (Eastern, on C. & O. Ry. and N. & W. Ry. and Virginian Ry.).

BOUNDARIES—All of North Carolina, and that portion of South Carolina on and east of the line of the Sou. Ry. Charlotte, N. C., through Chester to Columbia, thence via S. A. L. Ry to Denmark, thence via Sou. Ry. to Charleston, S. C.

ZONE NO. 57

RESTRICTED TO FOLLOWING COALS—No change contemplated. Coal to be supplied generally from low-volatile fields.

BOUNDARIES—That portion of Virginia on and north of the N. & W. R.R. Graham, Va., to Norfolk, Va., including branches at Petersburg.

EXPLANATION OF ABBREVIATIONS AND TERMS USED

B. & O.	Baltimore & Ohio R. R.
C. & C.	Coal & Coke Ry.
C. & E. I.	Chicago & Eastern Illinois R. R.
C. & N. W.	Chicago & Northwestern Ry.
C. & O.	Chesapeake & Ohio Ry.
C. & O. N.	Chesapeake & Ohio Northern Ry.
C. B. & Q.	Chicago, Burlington & Quincy R. R.
C. C. & O.	Carolina, Clinchfield & Ohio Ry.
C. C. C. & St. L.	Cleveland, Cincinnati, Chicago & St. Louis Ry.
C. I. & L.	Chicago, Indianapolis & Louisville Ry.
C. M. & St. P.	Chicago, Milwaukee & St. Paul Ry.
C. R. I. & P.	Chicago, Rock Island & Pacific Ry.
E. R. R.	Erie R. R.
G. B. & W.	Green Bay & Western R. R.
G. H. & H.	Galveston, Houston & Henderson R. R.
G. R. & I.	Grand Rapids & Indiana Ry.
H. E. & W. T.	Houston East & West Texas Ry.
H. V.	Hocking Valley Ry.
I. C.	Illinois Central R. R.
K. & M.	Kanawha & Michigan Ry
K. & W. V.	Kanawha & West Virginia R. R.
L. & N.	Louisville & Nashville R. R.
L. F.	Long Fork R. R.
M. C.	Michigan Central R. R.
M. K. & T.	Missouri Kansas & Texas R. R.
M. R. R.	Middlesborough R. R.
M. St. P. & S. S. M.	Minneapolis, St. Paul & Sault Ste. Marie Ry.
N. & W.	Norfolk & Western Ry.
N. C. & St. L.	Nashville, Chattanooga & St. Louis Ry.
N. Y. C.	New York Central R. R.
P. & W. V.	Pittsburgh & West Virginia Ry.
P. C. C. & St. L.	Pittsburgh, Cincinnati, Chicago & St. Louis Ry.
P. Co.	Pennsylvania Co.
P. M.	Pere Marquette Ry.
Q. & C.	Queen & Crescent Route.
S. A. L.	Seaboard Air Line Ry.
Sou. Ry.	Southern Ry.
St. L. I. M. & S.	St. Louis, Iron Mountain & Southern Ry.
St. L. S. F.	St. Louis-San Francisco Ry.
St. L. S. W.	St. Louis-Southwestern Ry.
T. & O. C.	Toledo & Ohio Central Ry.
T. C.	Tennessee Central R. R.
V. Ry.	Virginian Ry.
W. & L. E.	Wheeling & Lake Erie Ry.
W. M.	Western Maryland Ry.
W. Ry.	Wabash Ry.
Y. & O. R.	Youngstown & Ohio River R. R.
Z. & W.	Zanesville & Western Ry.
Summer	From Apr. 1 to and including Sept. 30.
Winter	From Oct. 1 to and including Mar. 31.

KENTUCKY

Eastern	All mines in eastern Kentucky on Sou. Ry. (Q.&C.), L. & N., C. & O., N. & W. and L. F.
Northeastern	Sandy Valley & Elkhorn Ry., L. F., C. & O., and N. & W. in Thacker, Big Sandy and Elkhorn districts.
Northern	L. & N. in Hazard and Elkhorn districts.
Southern	Sou. Ry. (Q.&C.) and L. & N in Harlan, Jellico and Southern Appalachian districts.
Western	L. & N. and I. C. west of Louisville, Ky.

WEST VIRGINIA

Eastern	C. & O. and N. & W. in low-volatile fields of Pocahontas, Tug River and New River districts.
Northern	K. & M., K. & W. V. and C. & C. west of Dundon.
Southern	C. & O. and N. & W. in Kanawha, Kenova and Thacker districts.

Key to Producing Districts

Location of Producing Districts	Numbers of Consuming Zones to which restricted
Alabama	40, 45, 46, 48, 49, 51, 52, 54.
Arkansas	5, 35, 36, 37, 39, 41,[4] 42, 43, 44, 45, 46.
California	30.
Colorado	30, 31, 33, 35, 36, 37, 38, 39.
Docks[1]	1, 2, 3, 4, 4A, 6A, 31, 32, 33, 34, 41.
Georgia	50, 51, 53, 54, 55.
Illinois (summer)	2, 34, 41.
Illinois	3, 4, 4A, 5, 6, 6A, 7, 8, 9, 10[2], 11, 12[2], 15, 16[2], 20[2], 44, 45[5], 46[3].
Indiana	3, 8, 9, 10, 11, 12, 14, 15, 16, 20.
Iowa	2[4], 5, 7[4], 35, 36, 41, 42, 43.
Kansas	5, 35, 36, 37, 41, 42, 43, 44, 45.
Kentucky:	
Eastern	11, 14, 15, 16, 17, 19, 20, 21, 22.
Northeastern	23, 24.
Southern	18, 50, 51, 53, 54, 55, 56.
Western	3, 4, 6, 6A, 9, 10, 11, 13, 15, 40, 45, 46, 47, 49, 50, 53[5].
Maryland	57.
Michigan	14, 15, 20, 21.
Missouri	5, 35, 36, 37, 41, 42, 43, 44, 45.
Montana	30, 31, 32, 33, 34, 35.
New Mexico	30, 35, 37, 38, 39.
North Dakota	1, 2, 31, 32, 33, 34.
Ohio	14[9], 20, 21, 22, 23, 24, 25, 26, 27, 28[7], 29.
Oklahoma	5, 35, 36, 37, 39, 41, 42, 43, 44, 45.
Oregon	30.
Pennsylvania	27, 28, 57.
South Dakota	1, 2, 32, 33, 34.
Tennessee (M. R. R.)	11, 14, 15, 17, 18, 19, 20, 21, 22.
Tennessee	50, 51, 53, 54, 55, 56.
Texas	37, 38, 39, 40, 44, 45, 46.
Utah	30, 31, 33, 35, 36.
Virginia (L. & N.)	11, 14, 15, 17, 18, 20, 21, 22.
Virginia[8]	50, 51, 53, 54, 55, 56.
Virginia[9]	53, 56.
West Virginia:	
Eastern	19, 23[10], 24[10], 25[10], 29[10], 53, 55, 56.
Northern	14, 15, 20, 21, 23, 25, 29.
Southern	11, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 53.
Wyoming	30, 31, 32, 33, 34, 35.

[1]South bank Lake Superior and west bank Lake Michigan.

[2]From Danville district on Wabash Ry. only.

[3]Only on lines of St. L. I. M. & S. and St. L. S. W. Rys.

[4]To points in Iowa only.

[5]To points on N. C. & St. L. and T. C. Nashville to Hermitage and Old Hickory, Tenn., inclusive.

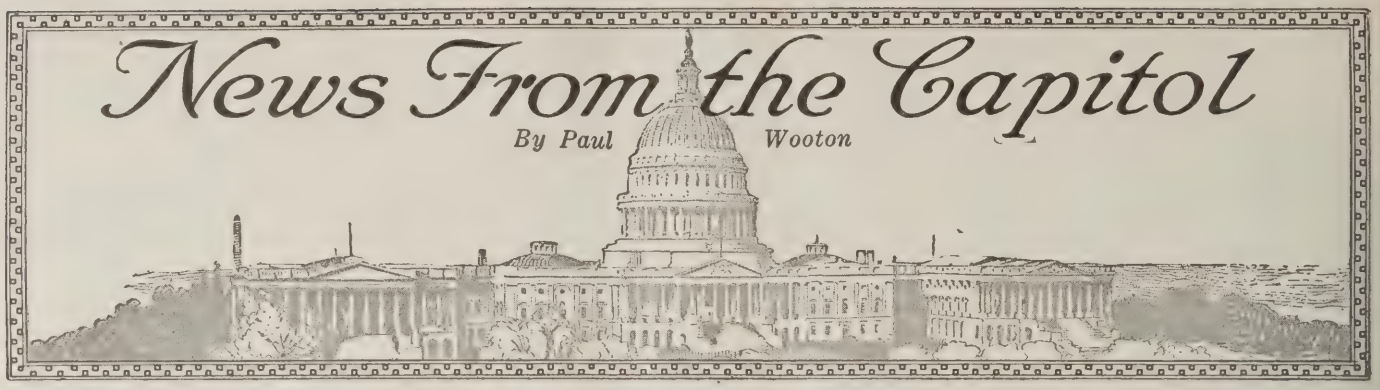
[6]On G. R. & I. only

[7]From mines in Columbiana County, O., only.

[8]All Black Mountain and Stonega districts in Lee, Wise, Dickenson and western Russell Counties.

[9]Clinch Valley districts in Tazewell and eastern Russell Counties.

[10]Along lines of C. & O. and N. & W. to Cincinnati and Columbus, O.



Cyrus Garnsey, Jr., Appointed Assistant Fuel Administrator

Appointment of Cyrus Garnsey, Jr., as Assistant Federal Fuel Administrator, is regarded as being a direct recognition of the work of the engineers' committee, of which Mr. Garnsey was a member. Mr. Garnsey will have administrative charge of all activities of the Fuel Administration, with the exception of distribution and of the oil section. The office of assistant administrator is a new one, so that Mr. Garnsey replaces no member of the present staff.

While Mr. Garnsey is better known as an Alabama operator, he also was for many years an extensive operator of retail yards throughout the South. At one time he operated four retail yards in New Orleans. He is, however, a native of Seneca Falls, N. Y., where he was born Apr. 10, 1861. In 1880 he went to Kansas City as private secretary to the general manager of the Kansas Rolling Mill Co. A few years later he became comptroller of the Kansas City, Fort Scott & Memphis Railroad Co. As the terminus of this railroad was at Birmingham, he was thrown in close relationship with the coal business, with which he became very familiar. In 1899 he became the executive head of the Galloway Coal Co., of Memphis, in which he was financially interested. This company operated mines in Alabama. Mr. Garnsey was one of the proprietors of the Patterson Transfer Co., a large transfer and warehousing concern of Memphis. Mr. Garnsey retired from active business Jan. 1, 1917, at which time he disposed of all his mining interests.

Fuel Administrator Repeals Orders Diverting Coal to New England

Special orders providing for the diversion of coal to New England, issued during the critical period of last winter, were revoked on May 3 by United States Fuel Administrator Garfield. These orders were no longer necessary in view of the inauguration of the zone system, regulating the production and transportation of coal and of the adoption of the system of district representatives of the Fuel Administration facilitating the filling of emergency and other essential requirements for bituminous coal from the different producing fields.

Provision for supplying coal to New England has been made in the zone system recently put into effect by the Fuel and Railroad Administrations. One of the orders issued last winter provided for the diversion of 500 cars of bituminous coal daily, which was consigned to James J. Storrow, Federal Fuel Administrator for New England, with authority to him to place it where most needed. The order of Fuel Administrator Garfield revoking the orders affecting New England became effective May 8, 1918.

Weekly Production Statistics

By producing 11,668,000 tons of coal during the week ended Apr. 27, the mines of the country exceeded any week's production during the last twelve months. Telegraphic advices, however, show that this rate of production was not maintained during the week ended May 4. If the country's full requirements for coal this year are met, the average weekly production must exceed 12,000,000 tons.

Anthracite forwardings during the week ended Apr. 27 were 39,522 cars, nearly 400 cars in excess of forwardings for the week preceding.

Beehive coke production showed a decided trend upward, having been 652,000 tons for the week ended Apr. 27. Byproduct coke production totaled 475,979 tons, practically 90 per cent. of full time capacity of the country's byproduct ovens.

The estimates referred to above were made by C. E. Lesher, geologist in charge of coal statistics for the United States Geological Survey.

Restricts Hard Coal Movement to Canada

Plans for the restriction of the movement of anthracite coal from the United States to Canada during the present coal year have been formulated by the United States Fuel Administration in coöperation with the Fuel Controller of Canada. A representative of the United States Fuel Administrator attended a recent conference of representatives of coal operators, coal miners and railways in Canada, at which this problem was discussed.

The conference reached an agreement as to the movement of anthracite coal into Canada embracing the following: Anthracite coal supplies to points in western Canada will be materially restricted during the present coal year. No American anthracite will be available for shipment to points west of Winnipeg. The Canadian public, both east and west, must be given to understand distinctly that conservation of coal must be practiced to the utmost extent by all classes of consumers.

Harry D. Nims Resigns

Harry D. Nims has resigned his position with the Fuel Administration. Since the founding of the administration, Mr. Nims has occupied a position of great responsibility. He has had an important part in formulating the policies of the Fuel Administration and in defining its procedures. His resignation has been deferred several months at Dr. Garfield's request. He was forced, however, to take the action he did by the fact that he could no longer afford, financially, to contribute his services to the Government. In serving the Fuel Administration the length of time that he has, Mr. Nims feels that he has done his bit and, in justice to his family, must resume his law practice in New York City.

Government Coal Yard in Washington

An item in the forthcoming sundry civil bill will provide for the establishment in Washington of a Government coal yard. The Government's requirements in Washington will be met from that yard, in which a reserve will be built up in an effort to avoid an uncertain fuel supply during future winters. The public also is to have recourse to the yard, in case commercial stocks of coal should become exhausted.

New Prices for Bituminous Coal

New prices for bituminous coal, effective May 1, have been announced by the Fuel Administration as follows:

State or Field	Run-of Mine	Prepared Sizes	Slack or Screenings
Indiana	$2.00	$2.20	$1.70
Brazil Block	2.95	3.25	1.70
Montana	2.70	3.60	1.00
Illinois			
Macon County	2.25	2.50	1.70
Colorado			
Fremont County (operation of Williamsburgh Slope Coal Co. at Florence)	2.25	4.25	1.25
Kentucky			
Knox & Whitley Counties (Blue Gem Coal mined by members of the Tri-county Blue Gem Coal Operator's Association)	3.55	3.80	2.40
Tennessee			
Campbell County (Blue Gem coal mined by members of the Tri-county Blue Gem Coal Operators' Association	3.55	3.80	2.40

Operators who have complied with the Washington wage agreement are permitted to add 45c. per ton to the foregoing prices.

Brief Washington Notes

George E. Warren, of Boston, Mass., has been named chief of the division of fuel and forage of the War Department.

A. M. Ogle, president of the Vandalia Coal Co., of Terre Haute, Ind., has joined the staff of J. D. A. Morrow, who is in charge of bituminous coal distribution for the Fuel Administration.

Albert H. Wiggin, state fuel administrator for New York, has tendered his resignation. This step has been made necessary, he explained, by the increasing work which is falling upon him as chairman of the Clearing House committee. Dr. Garfield has asked Mr. Wiggin if he will be able to continue as fuel administrator if he is furnished additional assistance.

The New York and Philadelphia Coal and Coke Co. must suspend business for five days and is otherwise penalized for violating the regulations of the Fuel Administration with regard to furnishing smokeless coal to ships which have to pass through the submarine zone.

Fuel Session at Spring Meeting of American Society of Mechanical Engineers

Recognizing the importance of the fuel question, the American Society of Mechanical Engineers, which holds its Spring Meeting at Worcester, Mass., June 4 to 7, has announced a session on Thursday morning, June 6, for five-minute presentations of data relating to fuel economy. This session has been planned by the Fuel Conservation Committee of the Engineering Council in order to assist Fuel Administrator Garfield in his nationwide campaign for fuel economy. A feature of this session will be the discussion of problems incident to the adverse fuel conditions of the past winter. A. A. Potter will present a paper entitled "An Investigation of the Fuel Problem in the Middle West."

Legal Department

BREACH OF COAL SALES CONTRACTS—On refusal of a contract seller of coal to deliver at the agreed price, he demanding an advanced price, the buyer, on accepting partial deliveries under the contract at the higher price, is entitled to recover the excess paid above the contract amount in order to secure delivery. But as to quantities called for by the agreement and undelivered, the buyer's measure of damage is the excess of the market value of the coal at the time and place when and where delivery should have been made above the contract price. (New York Supreme Court, Appellate Term; Hencken & Willenbrock Co. vs. Rosenwasser Bros.; 168 New York Supplement, 1097.)

STATUTE OF FRAUDS APPLIED—New York, like the other states, has a law known as the Statute of Frauds under which a contract to sell personal property in excess of a certain price is unenforceable unless evidenced in a writing signed by the party sought to be held, or unless there is at least a partial acceptance of delivery or a partial payment by the buyer. This statute was invoked the other day in defeat of a suit brought to recover $929 as the agreed price of coal dust to be delivered to defendant. The agreement for sale in this case was verbal, and plaintiff, in order to bring its claim within the Statute of Frauds, asserted that there had been an acceptance of the coal dust by the defending buyer. This claim rested on the facts that the fuel had been unloaded at a dock and that the defendant's secretary had orally promised to send a check for the price. It appeared that the next day the defendant wrote plaintiff that the coal dust was "of very inferior quality, full of large lumps, and very sticky and greasy, and not of the quality represented. . . . Before paying this bill, it will be necessary to make us a decided reduction in price," etc. Holding that the plaintiff could not recover, the Appellate Term of the New York Supreme Court decided that there was nothing to show an acceptance of the coal dust, considering the fact that the defendant had a reasonable time in which to inspect the fuel, and indicated in the letter that acceptance would be conditioned upon the making of a deduction in the price. (A. Sidney Davison Coal Co. vs. Empire Brick and Supply Co., 168 New York Supplement, 534.)

EDITORIALS

Chance's Method of Coal Separation

IN THE present issue is given an abstract of Thomas M. Chance's article on "A New Method of Separating Materials of Different Specific Gravities." One may be permitted perhaps to question whether the principles suggested are as "new" as the writer of the article imagines. If the reader will take the trouble to consult Robert H. Richards' monumental and authoritative work on "Ore Dressing," he will find that there are two kinds of settling—free and hindered settling. In the one case—but why not use his own words:

> Free settling is where the individual particles fall freely either in still water or against an opposing upward current, without being hindered by other particles. The classifiers and settling tanks are instances of this principle. Hindered settling is where the particles of mixed sizes, shapes and gravities in a crowded mass, yet free to move among themselves, are sorted in a rising current of water, the velocity of which is much less than the free-falling velocity of the particles, but yet enough so that the particles are in motion. The arrangement of the particles is so positive that if one of them be moved either upward or downward from its chosen companions, it will be found, when set free, to return immediately to practically the same group as before. The jig beds are instances of this principle.—Vol. 1, Chap. XII, p. 464.

Wherein does Mr. Chance's method differ from hindered settling as commonly described? Mr. Chance describes his method merely as an agitation of the liquid "by stirring arms, by propeller blades, by rotating disks and cones, by hydraulic jets, by upwardly rising liquid and other means." The agitation is therefore not necessarily such as to produce an upwardly rising current but, in every case illustrated and in the model presented, he has shown the influx of water as from below as in jigging and classification appliances. In Mr. Chance's separator the diligent inquirer will find more than a faint resemblance to the tubular classifier of Mr. Richards shown on page 611 of his book, the first edition of which appeared in 1903.

So much for the method of agitation and its similarity to that already in use; let us now inquire into the principle of the separator as Mr. Richards and Mr. Chance respectively enunciate it. The particles, as Mr. Richards views them, are shuttlecocks of sand with an uprising liquid as battledore. Mr. Chance, on the other hand, regards the liquid as of higher specific gravity and bases all his argument on the assumption that the artificial fluid of water and sand acts as if it were a syrup or solution of great density.

For this reason he expects that he will not be confronted with the necessity for sizing his material; the large and small will fall or rise together obedient to their specific gravities. In his view it is no more necessary than in the "float-and-sink test" of the ordinary washery to size the material to be treated. Somehow the agitation merely keeps the sand in solution, if that expression may be pardoned.

To Mr. Chance the action seems to be a free settling in a liquid of high specific gravity, and not at all a hindered settling. There is of course a variation in the speed with which such settling takes place. In this speed naturally size and shape will function. But granted that you have a medium for free settlement, eventually all the material heavier than the composite specific gravity of the laden liquid will sink, whether it be large or small, so long as it does not consist of infinitesimal particles. The large pieces will fall first, but all will fall eventually.

So the question arises: Shall we call the Chance separation a free settling in a liquid of high specific gravity or a hindered settling in a liquid sustaining solid matter? The theories are so different that the principles of operation must necessarily be divergent.

But before the matter is dismissed recognition must be given to the fact that Mr. Chance does not use the material being classified as the material for densifying his liquid. His use of sands of varying density modifies the technique. In this his method appears to have real claims to newness. In the hindered settling reliance is placed not on a third body but on the body being settled. Here then is a real divergence, but it is one that makes for difficulty. We can separate coal from slate, but if we keep dumping in the material to be separated and drawing off the product it is only with difficulty that we shall maintain a liquid with any given composite specific gravity. Agitation may cost but little, but the recovery of the sand must be added to the expense. Viewing the matter as from the street, the process promises difficulties which it will take all Mr. Chance's known abilities to solve after the war is won.

Principal Problem for Chemists

OF ALL the problems for chemists, perhaps none is so pressing, and none seems to the tyro so easy, as to discover some way of converting the lower members of the hydrocarbon series—methane, ethane and ethylene—into higher members of the same or other series. If we could make methane and ethane into pentane, hexane and heptane, or ethylene into hexylene, and the like, these being liquids under ordinary conditions, we could convert and so condense some of the gases from byproduct ovens into gasoline and burn the others for power purposes and for coking.

The method would probably be equally available for use in connection with the distilling of coal at low temperatures. It would be possible also to turn the gas from our oil wells into a stable gasoline. If the process was reasonably cheap, it might conceivably be possible even to secure a product from the waste gases of the mines, as Governor Brumbaugh of Pennsylvania has advocated—but that is a far cry

The immediate need is to convert the richer gas of coke and coal-distillation plants into liquids so that there will be a greater profit in operating such plants at the

mines. At present the gas of byproduct ovens has to be wasted if it is not produced in close proximity to points where the demands for power are large.

In converting methane into heptane, if the conversion could be accomplished, 9 per cent. of the hydrogen in the methane would be abstracted. While methane contains 25 per cent. of hydrogen, heptane has only 16 per cent. Ethylene has the same chemical analysis as hexylene. In the other series hydrogen must be added, but these are less important. The trick seems so easy, but Nature often seems firmly resolved to resist taking what appears on first sight to be the obvious course.

May Federal Railroads Lock Out Miners?

WE HAVE all roasted the mine worker who laid idle when the world waited for fuel. We have all berated the strikers and the makers of "holidays," real or feigned. "They had no right to strike. Could they not arbitrate their wages? Let them go on working and justice would be given them."

We believed that we had the Government with us in our censure. It is true, we did have the Fuel Administration with us, but the Railroad Administration, if it sided with this point of view, must have done it with a wink. While the patriotic mine worker could see the point and largely refused to strike when unruly men urged him to do so, the Railroad Administration, blind and determined, did as it pleased; for it has never had the coal shortage burned into its soul. It is well known that the railroads caused the fuel shortage; they are going to cause it again, and yet they go merrily on their way with complete indifference.

The mine worker is required to work at the price set whether he wants more or not. He is told to trust to the fairness of the Fuel Administration and the umpires appointed. But the Railroad Administration feels itself privileged at any time to lock out the mine worker in order to secure a lower price, to quit buying and to bring the nation and the coal industry to terms by class warfare, by the "lockout," in short. It is not willing to pay the Fuel Administration's price, and it will not be put off with umpires, however disinterested. The Government appoints its own arbiters, and it is the Government that goes back on them. It reverts to the supposedly forgotten "class struggle," to that quarrel between buyer and consumer which is analogous to the strife between servant and master.

There is something to be said for this way of doing business, especially in times of peace. But when the Government has preached that striking and locking out with an enemy at the door are inexcusable, on what imaginable basis of equity does this Railroad Administration stand? What excuse has it for its enormity? It would be scandalized if its employees would take an attitude such as it assumes. It would condemn them if they ventured to assert that they could sell their labor at their pleasure and fix their wage to suit their interest whether the nation won or lost the war.

But, to all appearance, the Railroad Administration autocratically believes itself superior to the moral code embounden on its employees and will not buy coal at the price declared fair by the Fuel Administration. It will strike first, and when it starves for coal this winter it will commandeer all the coal it wants and let the world go cold. Never was there anything less logical, more unreasonable, than this Frankenstein of a trust with which we are now confronted.

Fortunately its decision that it will buy only when it can get less than a fair price affects, at present, only certain parts of the country and not the whole, for the private consumer, in general, is not participating in the Railroad Administration's lockout, but is buying coal in accordance with the Fuel Administration's admonition and in harmony with the dictates of both patriotism and prudence.

But this does not exonerate the Railroad Administration. Its culpability is not redeemed by the fact that it leaves the burden of service on the private citizen, and crying "store coal" spikes the switch to its storage yards, causing the mines in certain parts of the country to shut down, muddling the zoning system and causing the coal industry to lose men. The railroads in the hand of the Government have proved more oppressive than when administered by private ownership.

Britain's Pocketed Coal Mines

THERE has been a general belief for many years that the Irish mines have been deliberately kept idle to satisfy the purposes of English landowners and capitalists. As a rule it is more profitable to tap coal fields by railroads and to operate mines than to avoid coal fields in railroad construction and keep them idle. However, conditions do obtain sometimes where contrary policies seem likely to prove profitable.

If, however, the coal fields of Ireland in general and the coal field referred to in the short article entitled "Britain's Pocketed Coal Mines" in particular are such wonderful opportunities for capital the authoritative "Coal Resources of the World" fails to evidence it.

Cole and Lyburn say that in the Leinster field, which O'Byrne so highly praises, only the Jarrow seam remains to be worked in the middle coal measures and even that seam is partly worked out. The coal is often less than one foot thick but in the Jarrow channel it may reach 4 ft. The best coal in the lower coal measures is the Skehana seam, which is in places 2 ft. thick with an average of 20 in. There are no upper coal measures. All the coals mentioned dip heavily and are much faulted. The other fields are but little better though the Ballycastle field of Antrim may contain some 6 ft. coal in spots, and this is tilted from 10 to 50 degrees.

Even if coal were found in Ireland equal to the English coal in quality and operative availability it does not follow that it would be able to hold its own. The English coal being located on the sea coast can be laid down with ease at any point on the Irish littoral. As all the larger Irish towns are along the coast that is an important advantage.

The Irish fields are small and with one exception well removed from the sea. They do not give any evidence of being operable to much advantage and, even if mined, their area is closely circumscribed. All the coal in Ireland over one foot thick and less than 4000 ft. deep if mined and delivered in the United States would supply the demand for only about four brief months; for according to the figures given by Cole and Lyburn there are only 198,000,000 short tons in the whole island from Ballycastle to Fastnet Light.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The very dearth of outstanding labor news argues for the patriotism, the well-ordered patriotism of the mine worker. The mine worker has always been keen to assert his rights, but he has forgotten them now in the exercise of his duty as a citizen. The amazing news from Illinois about the coercion of men who will not work or who will not salute the flag before working shows that the workingman has not been a slow second to the operator in believing that nothing matters now but the war. Both mine operator and mine worker are making generous concessions to the nation and to one another, and that spirit should continue till the war comes to an end.

PANTHER VALLEY MEN OPPOSE WOMEN WORKERS

In the anthracite region the attitude toward the employment of women taken by the employees is unfortunate. We are quite ready to admit that there are parts of the country where there is no such scarcity as calls for the entry of women into industries unsuited to them, but the anthracite region is not one of these. The shortage of labor in that section of the coal fields is inflicting quite a loss on the nation. Anything within reason that will relieve it is deserving of a hearty welcome. However, it is pleasing to see that the men did not strike, but went at the matter the right way, putting the law into operation.

In that region the men who refused to buy Liberty Bonds were in many instances severely dealt with. The mine workers threatened to strike if these men were retained. At the Spring Mountain colliery of the Lehigh Valley Coal Co. one of the prominent union men, a pit committeeman, refused to buy Liberty Bonds and his name was dropped from the rolls by the company. It appears that he took out two bonds in his children's names. His fellow committeemen have threatened a strike should he fail to secure reinstatement.

OKLAHOMA SUFFERING USUAL SUMMER DULLNESS

The lack of orders in Oklahoma is alleged to be causing men to leave the mines for the farms. This condition is not new. Looking at the table on page 587 published in *Coal Age*, Mar. 30 of this year, it will be seen that Oklahoma in 1916 led in shortness of time worked, with only 178 days of operation. Her near neighbor, Arkansas, was next in order with 184 working days. Indiana followed with 187 days and Ohio with 197 days.

Miners living in states like Oklahoma and Arkansas never altogether lose the farming habit. It is likely that they will drift back to the mines this winter as they have in other winters, and the country will be advantaged by the wheat, corn and cotton they will produce. A few months' work will take care of the Oklahoma needs and nothing will be gained by hauling the coal that the state produces into a large territory to which it is not normally tributary. The cars will go to other states where the demand for coal is more stable and factories call for coal the year round.

CONSUMERS WANT THEIR HARD COAL SCREENED

Some of the shortage of work in Arkansas has been due to a disagreement between producer and consumer. The Kansas City retailers have been demanding screened coal from the semi-anthracite producers of Arkansas. The operators declare that they cannot sell the screenings and cannot afford to prepare lump coal at Government prices, dumping the screened coal on the ground. The chairman of the fuel administration of Kansas City, Walter L. Lampkin, is said to have written a letter to Senator J. A. Reed declaring that the mine operators in the semi-anthracite fields of Arkansas were deliberately cutting down production to create an artificial shortage.

The troubles in Canada are apparently not serious. The mine workers of the Nova Scotia Steel and Coal Co. say that promises made to them by minor officials have not been kept and that the head office is only indifferently in touch with labor conditions at the mines. The Glace Bay management satisfies the union, but the union officials declare that the Sydney Mines management is less sympathetic. They claim that in this respect Glace Bay and Sydney Mines have in recent years changed roles. It is likely that the Royal Commission, now in session, will iron out all difficulties without a strike. It seems likely that a compromise will be effected before the month of cool-headed consideration has passed, thus making it legally permissible, though not patriotic and advisable, for the miners to call a strike.

May Do Clerical Work But Not Labor

The abortive attempt of the Lehigh Coal and Navigation Co. to introduce women around its mining plants was described in last week's issue. Other details have since come to hand. It appears that there were 42 girls and women, practically all foreigners, who undertook to perform these services for the company. The conservatism of the mine workers, however, was too great to withstand the shock.

It was not lack of patriotism, though it might well have that appearance. The need for more help in the anthracite region is so acute that any attempt to prevent the furnishing of that labor is saved from the aspersion of disloyalism only by showing that the purpose of disloyalty is lacking.

The employees of the Navigation Company can prove the sincerity of their patriotism by pointing to the large proportion of their numbers that purchased Liberty Bonds whenever they were offered.

Loan	Percentage of Employees Subscribing	Total Employees' Subscriptions	Average Subscriptions
First	54.9	$259,350	$63.18
Second	50.9	222,250	58.50
Third	99.8	562,250	70.00

The reader will note that only two men in every 1000 failed to respond to appeals to buy the third issue of Liberty Bonds, and that the mine workers subscribed an average of $70 per man, which is indeed almost one-third of the average subscription of all the purchasers of the Third Liberty Bond issue throughout the country.

STATE LAW SUPPORTS DEMAND OF LABOR LEADERS

But to return to the bloomer girls, the United Mine Workers gradually concluded that they would not permit the girls to be employed. They declared that, unless the female labor was dispensed with, all the collieries of the Panther Creek region would go on strike.

But patriotism prevented the mine workers from striking as they threatened. They appealed to the Pennsylvania Department of Mines, and on May 1 Seward E. Button issued the following letter:

"Undoubtedly the great drain that has been made upon the mining communities by employment other than mining has deprived the operators of a great deal of the labor necessary to operate their mines to full capacity, but the Department of Mines, impressed with the duty of upholding the mine laws, cannot, without authority, allow any exceptions, and the provisions of the law that prohibit the employment of females about the mines except in clerical work will be strictly enforced."

The following letter has been sent each inspector in the 25 anthracite districts:

"It having come to the notice of the Department of Mines that girls and women were being employed at some of the mines in the anthracite region, the inspector of the district in which the violation of the law occurred has been notified to stop the practice immediately. Under the provisions of the anthracite law, females cannot be employed in or about the mines except at clerical work, and you are hereby advised to see that no violation of this provision is permitted in your district."

Arrest of Disloyal Labor Agitators

Increased activity of Government agents in the Illinois coal fields is resulting in the arrest, here and there, of agitators who appear to be actuated by disloyal motives. Jacob Crawley, 39 years old, a miner who has been working for several weeks at Ziegler, Ill., was arrested a few days ago on information that he had made persistent attempts to induce the 400 men working in the Ziegler mine to go on strike. It is said that Crawley posed as a Secret Service agent, and told the miners that he had been sent to Ziegler to help them get just what they wanted.

Ziegler is only a few miles from Christopher, where the Government agents last week told the miners they could either go to work or face prosecution for a conspiracy to reduce the fuel supply. The men at Christopher decided that they would go to work. McCawley Baird, of East St. Louis, who is assistant to the United States District Attorney, says that if the men at Ziegler quit work at the behest of disloyal agitators, they will be given the same alternative.

Leopold Schwagling, 35 years old, employed at the Kolb mine No. 2, at Mascoutah, Ill., was arrested as a pro-German by a Federal officer because he objected to saluting each morning the flag erected over the tipple. By the demand of the miners flags are displayed at all the mines in that section, and the men are required to salute them.

Gregory Denounces Murder of Robert Prager

Referring to the lynching of R. P. Prager at Collinsville, Ill., Attorney General Gregory, in an address to the executive committee of the American Bar Association, May 6, said: "We must set our faces against lawlessness within our own borders. Whatever we may say about the causes for our entering this war, we know that one of the principal reasons was the lawlessness of the German nation—what they have done in Belgium, and in northern France, and what we have reason to know they would do elsewhere.

"For us to tolerate lynching is to do the same thing that we are condemning in the Germans. Lynch law is the most cowardly of crimes. Invariably the victim is unarmed, while the men who lynch are armed and large in numbers. It is a deplorable thing under any circumstances, but at this time above all others it creates an extremely dangerous condition. I invite your help in meeting it.

"From all the facts I have been able to gather concerning the lynching of Robert Prager in Illinois, I doubt his having been guilty of any offence. Such happenings grow out of a condition of mind where people say 'the Government is giving us no protection; spies are blowing up our factories; they are giving information to Germany; our boys are being shot in the rear, and our duly constituted authorities are doing nothing to protect us and we will take the law into our own hands.'

"This appeals to the excited and drunken mind. Unless stopped, it is going to result in a condition most deplorable."

After saying that "unless the hysteria which results in the lynching of men is checked it will create a condition of lawlessness from which we will suffer for a hundred years," he added:

"There is another potent reason for sternly repressing these disorders. The cry of the mob is that it is protecting the boys at the front. The reverse is true. No greater wrong can be done to our soldiers in France than that of lynching Germans in America. The story of the death of that German in Illinois is being considered in Germany to-day. Such acts will be seized upon by our enemies as justifying severe reprisals on our soldiers in German prison camps. Having sowed the wind, we will reap the whirlwind."

Our Patriotic Mine Workers

From all over the country come reports regarding the Liberty Loan. In another column we have drawn attention to the fact that the Lehigh Coal and Navigation Co. sold the loan to 99.8 per cent. of its employees. The average subscription was $70 per employee, perhaps the largest in the country. A pamphlet issued by the Lehigh Valley Coal Co. records the fact that this corporation, which sold nearly a million dollars worth of bonds, has not a single slacker in its ranks and that the average subscription was $57.01.

The Clearfield Bituminous Coal Corporation reports that though its men bought heavily of the first and second issues of bonds, they were all ready to do their part when the third issue was opened for subscription. As a result the Grassflat district in Clearfield County bought $21,400 worth, the Barnesboro district in Cambria County $7150, the Clymer district in Indiana County $17,000, the Rossiter district in the same county $47,400, and the Clearfield office $3250, a total of $96,200.

Clearfield Bituminous Coal Co. Did Well

This result was obtained by strenuous work on the part of the superintendents of the mines and by the coöperation of the management with the committees in the several counties and districts. The fact that a large percentage of these men are foreign born and many of them unnaturalized, proves conclusively that all of them are loyal Americans irrespective of nationality.

So much from what we are told by A. J. Musser, the purchasing agent of the company. From records which may not be wholly correct, we learn that the Clearfield Bituminous Coal Corporation has about 2000 employees. Its record therefore will compare not unfavorably with the two anthracite companies just referred to, though the figure per employee is somewhat lower and the percentage of subscribers less than 100.

Robert F. Roth, chief engineer of the E. E. White Coal Co., of Glen White, W. Va., informs us that the "patriotism speedometer" in that village registered $1000 per min. for 50 min. on Friday, May 19. This $50,000 subscription represents the bonds taken by the mine employees separate from those purchased by the company. Mr. Roth rates it as $60,000 per million tons of coal produced, and estimates that $38,000,000 would be subscribed by the mine workers of the United States if they all did as well as the mine workers at the E. E. White mines.

Meantime Ohio Had War Saving Stamp Drive

Ohio seems to have taken up more readily with thrift stamps. Three mines in Belmont County have bought $30,000 worth of these stamps, three locals in Athens County purchased stamps to the value of $50,000, and three in Perry County bought stamps of an equal gross valuation.

Under an Amsterdam, Jefferson County, Ohio, date line we are informed that a two-day drive was made for thrift stamps in the middle of April, and $48,000 was subscribed by the miners of the vicinity. Two men were appointed at each mine, the companies paying them for their time and trouble. The subscriptions were taken at every man's working place.

The stamps were subscribed for at the current price of $4.15. Each pay day a stamp will be placed in the pay envelope by the company, and $4.15 deducted from the pay. This rate will be maintained until the amount subscribed is paid. The subscriptions ran from $50 to $500. The employees of the Wolf Run Coal Co. agreed to buy $21,000 worth, those of the Youghiogheny and Ohio Coal Co. contracted to purchase stamps to the value of $16,000, while the men of the Ohio & Pennsylvania Coal Co. undertake to accept in wage payment stamps worth $11,000. The mines are small, and 85 per cent. of the mine workers are foreigners; but the record shows that they do not lack for patriotism.

Less Coal but More Wheat and Cotton

In Oklahoma mine workers are deserting the mines by the hundreds to take up work on the farms. The irregular operation of the mines is given as the reason. Under the zoning system the operators say they are not receiving enough orders to keep the mines running at anything like capacity, and the men, anticipating that work will be even more uncertain as the summer advances, are disposed to turn to the farms, where wages are high and work is steady. Operators are dissatisfied with the zoning system, or at least with the manner in which it has been applied to the Oklahoma mines. They say that most of the people ignore the buy-early appeals and that, for this reason, it is necessary to expand the field of transportation and sale for the Oklahoma mines if they are to be kept producing during the summer.

Commission To Settle Sydney Trouble

Employees in Canada under the Lemieux act are forbidden to strike until a period for conciliation has passed. The Lemieux act resembles the much-discussed Bryan treaties in regard to the making of war, only its application is to labor disputes alone, and the period of delay is a month only and not a year. Lengthy reference to the law was made in *Coal Age*, Apr. 14, 1917, pp. 670 and 671.

The Lemieux act is working badly around the coal mines of Canada. If one may not strike, surely one may take a holiday—and there is nothing to prevent that holiday being unduly protracted. But you can do most anything these days so long as you declare your motives are good.

Want Higher Wage and Union Recognition

The Nova Scotia Steel and Coal Co. has been having trouble with its men who desire more wages and recognition of the union. The men, at first, were disposed to delay their strike to accord with the law, but the ferment ultimately became so general that a "holiday" was declared at four of the collieries Apr. 26. This holiday lasted till Apr. 29.

On that day the Royal Commission arrived to consider the complaints of the employees and the defense of the company. It is composed of Judge Chisholm, of the Supreme Court of Nova Scotia, chairman; Rev. Dr. John Forrest, of Pine Hill College, Halifax, and J. B. McLachlan, secretary-treasurer of the Amalgamated Mine Workers' Union.

The president of the union, Silby Barrett, is taking no active part in the discussions though he has recently returned from Newfoundland. McLachlan and Robert Baxter, the vice president of the union, have been conferring with General Manager Adams with the view to obtaining an amicable adjustment.

It must be understood that the iron, steel and tinplate workers are interested in the work of the commission as they have been threatening a strike. They have, of course, their own union—the Amalgamated Association of Iron, Steel and Tin Workers.

Say That Company Store Makes Them Infrugal

The mine workers of Nova Scotia are endeavoring to obtain an amendment to the coal mines regulation act that will make it illegal after Oct. 1 for any corporation, like the Dominion Coal Co., to stop the wages of their employees for the payment of store bills. The Dominion Coal Co. may have to close its chain of stores. In any event it will be hampered in merchandizing, for it will no longer enjoy its immunity from bad debts which is the bane of the independent merchant.

The miners argue that the restriction of the credit system which will follow will make the miner more frugal. With his crutch broken they expect he will stand erect as a man should. But some men need such crutches, though it is true that there are some who use them who could well lay them aside. To take the crutch from a feeble man is not an act of charity, but rather the reverse. A man newly engaged often needs the assistance of the company store.

Shorten Working Day in Canada

The miners and other underground mine workers in British Columbia have already established the 8-hour day, but this provision has hitherto not applied to mine workers on the surface. Now the government of British Columbia has introduced a bill not only providing for the 8-hour day for outside workers around the mines, but providing that the 8-hour day for all surface workers shall be reckoned from "bank to bank."

The amendment to the Metalliferous Metals Inspection Act granting these reductions in hours runs as follows:

"No person shall be employed underground in any metalliferous mine for a longer period than eight hours in any twenty-four hours; and in computing the said period of eight hours the same shall be reckoned from the time the person enters the mine until he reaches the surface. No person shall be employed above ground at or about a metalliferous mine for a longer period than eight hours in any twenty-four hours; provided that nothing in this rule contained shall apply to persons employed in the office, boarding-house or bunkhouse of any mine."

Hon. Wm. Sloan, minister of mines, argues that failure to meet the men in this respect has kept alive friction between employer and employee, and that the establishment of the principle of an eight-hour working day for the coal miner, below or above the surface, will have a salutory effect. It is his opinion that under such a working arrangement the men will be more satisfied and there will be less reason for industrial trouble. In this connection he points to the strikes in British Columbia in 1917 at Fernie, B. C., where the coal mines were closed down for several months; to Rossland, B. C., where a lockout was declared by the Canadian Consolidated Mining & Smelting Co. when the men threatened to strike; and to a strike at the Trail, B. C., smelter, where work was stopped for several months in an effort by the men to obtain an eight-hour day, as illustrations of how industry may be interfered with, and production diminished, through a spirit of discontent and dissatisfaction among the workers. The mineral output of British Columbia in 1916 was $42,290,462 and in 1917 it dropped to $37,182,570, the difference being attributable to these disturbances. It is the Minister's hope that with their grievances settled the present year will be free of such trouble and the product of the province will jump back to the 1916 mark and, possibly, climb to the 50,000,000 figure.

The coal mine operators of British Columbia are not in favor of the contemplated legsilation. They have lodged their protest with the Minister of Mines. Their argument is that shorter hours will mean less production at a time when, because of the demands of the war, greater production is essential. They say in effect: "We do not object to the principle of this legislation but we think it is inopportune." In discussing the matter with the Minister they suggested that the proposed law might be deferred to six months or a year after the end of the war. In this connection reference was made to last year's large exportations of coal from the United States to Canada. The United States thus met the Canadian shortage at serious disadvantage to herself, for coal was much needed in the United States. While this was done last year to meet an unexpected emergency, no one expects the United States will do the like again. The Dominion government, consequently, is expecting western coal miners to supply the necessary coal.

THIS country has drafted its young men for the greatest sacrifice that a man can make. Is there any logical reason why all able-bodied males should not be compelled to do at least eight hours work every working day until this war ceases, for which they will be paid far beyond what the man who makes the greatest sacrifice is paid? The enemy recognizes no restrictions of labor or time, so that the least that those of us who are at home can do is to stay on the job and put our hearts into it.—*George S. Rice to American Institute of Mining Engineers.*

DISCUSSION BY READERS

Practice in Mines in England

Letter No. 1—In reading the letter of Richard Bowen, *Coal Age*, April. 6, p. 644, I could not help but feel that what he believes is true in regard to the practice in English coal mines, he would find to be directly opposite to what is actually the case in those mines. I am certain that such is the fact in the County of Durham where I belong.

Allow me to state, for Mr. Bowen's information, that the mine officials, in the County of Durham, England, have *all* to say in regard to the safety of men, the enforcement of the mining laws and securing discipline in the mines. Their authority, in this respect, is greater than that of most of the mine officials in this country. The Miners' Union does not, as he states, "control everything pertaining to wages, safety of men, mine laws, etc.," and, in my opinion, the mines there are kept up-to-date.

If Mr. Bowen has never worked in the coal mines of the County of Durham, it would do him much good to take a trip across and visit some of those mines. He would soon see that the firebosses employed there, as well as the assistant mine foreman, have a good deal to say about the way affairs are run inside of the mine. Each of these officials is at the head, in his own district; and not, as Mr. Bowen says, "tagging on the tail."

Referring to the statement that "if a man starts in as fireboss he is apt to continue in the same position," let me say that when that is the case it is the man's own fault. Every honest worker has a good chance of promotion if he will study the science and art of mining and take the examination for mine manager.

Every man that wants to study is afforded plenty of chances to do so, as there is a night school held twice a week in every mining town. There are, besides, classes of mining that meet twice a week, which are attended by the men. I can say, with Mr. Bowen, that my motto is, "keep things moving and up to date," as I have been taught this from boyhood by the officials in the coal mines of England. ROBERT LAVERICK,

Seward, Penn. Mine Foreman.

Electrically Driven Mine Pump

Letter No. 3—In addition to the suggestions made in the letter of W. H. Noone, *Coal Age*, Mar. 23, p. 559, kindly permit me to offer a few comments in regard to the possible cause of the trouble experienced in the operation of the electrically driven mine pump to which reference has been made.

While I am not acquainted with the particular type of control of this pump, it occurs to me that the seat of the trouble may lie in the lack of proper adjustment; and I would suggest the following in the hope that it may serve to correct the trouble. My suggestion is based on the supposition that the controller may not have sufficient starting resistance to allow the motor to accelerate uniformly from zero to a speed corresponding to that when running under full load.

When using a manual controller I would suggest that the operator take a longer time to move the controller lever from the *off* to the full running position, allowing sufficient time on each notch of the controller for the motor to accelerate properly.

When using a dashpot-accelerated controller, or one accelerating the motor in accordance with the constant current method of acceleration, the dashpot should be adjusted to give a longer accelerating period. In the case of an air dashpot, the adjustment is made by means of an adjusting screw, or, in the case of an oil dashpot, a like adjustment may be made by using a little heavier grade of oil.

When using a controller acting on the constant-current method of acceleration, if the series relays or magnetic lockout switches have been adjusted to give the longest interval between the closure of each switch the accelerating period may be further increased by allowing a longer interval of time between the closure of the main switch and the first resistance switch, which will make the remainder of the resistance switches close somewhat faster than in the previous adjustment.

In closing, permit me to say that I feel that one of the suggestions mentioned here will undoubtedly cover the type of control on the pump in question. Motor control for pumps is described in Booklet "P" of the Cutler-Hammer Manufacturing Co., which will be gladly sent to any address on request.

R. J. MAUJER,

Pittsburgh, Penn. The Cutler-Hammer Mfg. Co.

Miners and the War

Letter No. 10.—It would seem, from the number of excellent letters that have been written on this subject, that the miner would be aroused to a feeling of his personal responsibility in regard to the prosecution of the war. As time goes on, it appears more and more important that some effective method be used to stir up the miner and interest him in the part he must play in the defense of the country.

If America is to develop a fighting machine that can successfully combat that of Germany, everyone must feel the earnestness and purpose of the undertaking. Every miner must be vitally interested in the production of coal, as this is the factor that underlies all munitions of war. We talk of "democracy"; but what does it mean when we fail to realize and assume our share in the great cause?

Let me suggest that mine officials must not cease to impress on their men the cold facts of the war as they are made known to us from day to day. There is no danger of exaggeration, for the truth is more

hideous and strange than fiction. We cannot afford to be skeptical in regard to the terrifying war policy of Germany when we reflect on the quick manner in which Belgium and Northern France were invaded. All that has been printed and told regarding the atrocities committed, the wholesale indiscriminate slaughter of women and children, is true and many of their foul deeds cannot be published without violating common decency.

The fact of the matter is that not alone the miners but all of us are unwilling to believe the half we are told of the war aims of Germany. The truth seems inconceivable but makes it all the more important that we should be informed and willing to tell others of the overbearing policy that Germany has pursued for years, dating back to the "mailed fist" of Bismarck. One thing is certain and that is, if Germany is successful at this time, Great Britain and America will not escape the fate of Belgium and France.

The production of coal, which is the miner's task, is not the only requirement of the Government, but it is fundamental. We need every pound of coal that can be put out of the mines to manufacture the necessary munitions of war—guns, ships, ammunitions, food and clothing for the soldiers and sailors. Every energy must be employed in the effort to produce what is necessary for our success in the war. I feel certain that if everyone fully understood the war aims of Germany there would be no slackers in this country, except the pro-German element. Let us do our part.

Thomas, W. Va. W. H. NOONE.

Women in Industry

Letter No. 3.—If not too late, I would like to add a few words endorsing some of the sentiments expressed in a letter that appeared in *Coal Age* some time since [Jan. 12, p. 70].

If my memory serves me correctly, the writer of that letter was opposed to the employment of women to take the place of men in coal mining and other industries, at the present time. In my opinion, women should not be employed, in most of our industries, until all available male help is exhausted. Their employment in the mines is particularly objectionable.

We are approaching a time when there will be a large reduction in the manufacture of liquor. It is possible that this may cease altogether. In that event, there would be thousands of men thrown out of employment and available for use in other industries. The employment of women involves many difficulties. For the most part, special training would be required, and it is a question whether they would be physically able to perform much of the work now done by men. I do not doubt but that they would prove as skillful in the performance of any work of which they are capable.

Our women are now doing a great service to their country, in the different spheres in which they are interested, chiefly the Red-Cross work of furnishing many necessities for the war, and serving as trained nurses in hospitals and at the front. I believe, also, that women are better adapted to work along agricultural lines and perform light service in mills of a certain class. The women of England and France have proved this beyond a doubt.

I recall, further, the suggestion that boys, under the age of 16, who are now debarred, by law, from working in mines would be able to do good service if the law was to be set aside during the war. These boys could be placed in charge of experienced miners, a boy with a man, and their employment would go far toward expediting the work underground.

Most of the boys not only speak their mother tongue but talk English as well, having been taught the English language in the schools. In this respect, they would be of great assistance to their older fathers and brothers, who so frequently fail to understand the instructions given them by the foreman and his assistants.

In a short time, the boys would be able to fill the places of those who have reached the draft age and been summoned to the front. I believe that this subject has an important bearing on the future welfare of coal mining. R. W. LIGHTBURN.

West Leisenring, Penn.

Storage-Battery Locomotives

Letter No. 3.—Since the publication of a number of articles in *Coal Age*, a year or more ago, drawing attention to the peculiar adaptation of the type of locomotive known as the "storage-battery" machine, little has appeared in print regarding its performance in the mine. It was, therefore, with pleasure that I read the letter of "Engineer," in the issue Mar. 16, p. 513.

In the hope of learning the results that have attended the use of this type of locomotive in the mine, kindly let me ask that some of those who have been operating these machines submit their opinions in reference to their capability to perform the work required underground. My own opinion has been that the storage-battery machine is destined to become a very dominant factor in the production of coal within the next three or four years. I have been anxiously awaiting to hear from others along this line.

There are many coal companies, among them one of the largest companies in the Pittsburgh district, that have employed a great number of these machines in their mines, for a long time. There can hardly be a doubt but that some of these companies could furnish some very interesting figures regarding the cost of maintenance of such machines and the advantages realized through their use in the gathering service, at the working face in the mine.

DUTY OF PASSING INFORMATION ALONG

It may not be out of place for me to suggest that, in these times of stress and worry, it behooves every member of the coal-mining industry to pass along all the information he may have regarding the latest types of modern mine equipment. The storage-battery locomotive belongs to this class, and its performance in the mines where it has been in use should be made known to those who, as yet, are unacquainted with its peculiar advantages.

It is my belief that the economies realized in the use of this machine must be very great, in comparison with the old mule that has been and is still so largely employed in gathering cars at the face. There must be, also, a great saving over the employment of the type of machine known as the "cable-and-reel" motor. Such

being the case, interested readers of *Coal Age* will be glad to learn these facts first-hand.

The present is no time to hoard knowledge that will advance the common interests of the coal-mining industry, inasmuch as these interests are or should be subordinate to the greater interests of the country. Let us hope that there will be a generous response along this line, not only relating to the particular type of machine that I have mentioned, but all mining equipment possessing peculiar advantages in the production of coal, which is the country's great need today. ANXIOUS.

New York City.

Observation of Sun for Latitude

Letter No. 1—Referring to the article describing the Ross meridiograph for assisting the quick determination of a true meridian, *Coal Age*, Apr. 20, p. 732, kindly permits me to offer a few comments on a misstatement made in the article, with reference to finding the latitude of a place by observation of the sun at noon, which I was glad to see was quickly caught and corrected in the following issue, Apr. 27, p. 790.

The statement to which I refer occurs at the close of the second paragraph, second column, page 732, which reads, "The altitude of the sun at noon is always the co-latitude of the place." Also, at the top of the third column, on the following page, it is stated, "The latitude is the angular distance of the sun at noon from the zenith."

Of course, this condition can only obtain twice during the year; namely, when the sun is crossing the equator,

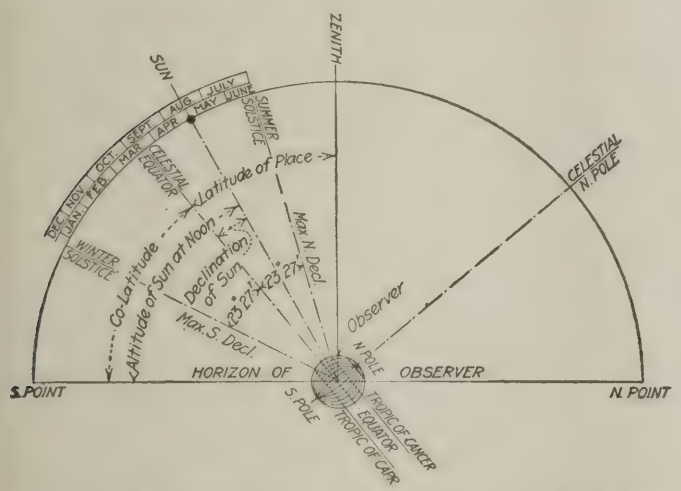


DIAGRAM ILLUSTRATING OBSERVATION OF SUN FOR LATITUDE

in March or September, and the declination is, consequently, zero. At all other times, it is necessary to subtract a north declination from, or add a south declination to, the observed altitude of the sun at noon, when the observer is in north latitude. In like manner, if the observer is in a south latitude, it is necessary to subtract a south declination or add a north declination to the observed altitude of the sun.

In other words, when the observer and the sun are both on the same side of the equator the declination must be subtracted from the observed sun's altitude, but if the observer and the sun are on the opposite sides of the equator the declination must be added to the observed altitude. The result will be the co-latitude of the place, which must be subtracted from 90 deg. to obtain the latitude.

As will appear from a study of the accompanying diagram, the latitude of a place is always the angular distance of the celestial equator from the zenith, while the co-latitude is the angle that the plane of the equator makes with the observer's horizon.

When observing the altitude of the sun at noon, for the purpose of determining the latitude of the place of observation, it is important to make the necessary correction for refraction of the sun's rays in passing through the earth's atmosphere. This correction will vary, ordinarily, from a fraction of a minute to 2 or 3 min., depending on the latitude of the observer and the declination of the sun at the time of observation. This correction must be subtracted from the sun's observed altitude.

Again, since an observation is rarely ever taken to the center of the sun, the disk of the orb being more frequently observed, allowance must be made for the semi-diameter of the sun; but, as the resulting parallax amounts to but a few seconds of arc it is usually ignored, in this observation.

HOWARD ECKFELDT,
Prof. Mining Engineering,
South Bethlehem, Penn. Lehigh University.

[We are glad to present this clear and succinct explanation of the determination of the latitude of a place, by observing the altitude of the sun at noon. The misstatement to which reference is made was a pure oversight that occurred in the hurried preparation of a difficult article for press, and observed too late for correction in that issue.—Editor.]

Sinking Shaft Through Quicksand

Letter No. 1—Having had some considerable experience in the sinking of shafts through any kind of material and in different localities, I was much interested in the inquiry of John A. Rury that appeared in *Coal Age*, Apr. 13, p. 712, and in the reply given by the editor, explaining numerous expedients to be adopted in such cases.

From the reading of the inquiry, it may be assumed that the proposition presented is attended with difficulties that will call for much experience on the part of those in charge of the sinking. Many instances have come under by observation where the attempt has been made by a company to sink a shaft through watery strata, without having the knowledge and experience that will insure success in such an undertaking.

Kindly allow me to suggest to Mr. Rury that it would be far cheaper, in the end, for him to employ an experienced shaft sinker and contract with him to sink the shaft to the required depth at a fixed price, which should be such as to afford the contractor a reasonable profit in doing the work.

My experience is that freezing is an exceedingly expensive process to apply in the sinking of shafts, because of the trouble that is liable to occur later when the frozen strata has had time to thaw out. When the excavation has passed through the strata and it is no longer necessary to maintain the freezing process, there

will frequently be some trouble experienced through water flowing into the shaft, and if proper provision has not been made to take care of this inflow disaster will certainly result.

It is worthy also of mention that, at the present price of cement and the possibility of getting no satisfactory results from its use, in an attempt to control the inflow of water into the excavation, grouting may prove a difficult and expensive undertaking. In every case, judgment and experience must decide on the measures to be adopted and which will prove most successful and require the least outlay in time and material.

For the reasons given I would advise Mr. Rury to consult some reliable engineering company or contractor who will engage to do the work after looking over the ground. In doing this he will relieve his company of the burden of possible failure, which burden is then assumed by the party contracting to do the work.

F. D. BUFFUM, Engineer,
Pittsburg, Penn. The Rust Engineering Co.

Loading and Shipping Clean Coal

Letter No. 5—Most mining men have been forcibly impressed with the growing demand, within the last few months, calling for "coal—more coal." Whatever the experts may say in regard to the supply of coal being sufficient to meet the demands, provided the car situation was cleared up and the hundreds of coal cars now lying idle on the side tracks distributed to the mines, there is one thing that is of equal if not of greater importance to the coal industry. I refer, now, to the indifferent and careless manner in which many miners load their coal.

Our mine is located on the main line of one of the great railroad systems of the country and is an important coaling station for the road. During the early winter I was continually notified, by the railroad authorities, of the many complaints they had from their firemen in regard to the poor quality of the coal that they were compelled to use.

APPEAL TO PATRIOTISM OF MINERS AND AID OF THE UNION INVOKED

As a result of these complaints coming from the railroad, I was forced to adopt some means to make our men use more care in loading their coal. I appealed to their patriotic sense of duty, telling them that it was a duty that they owed to their country and urging them to do their utmost to bring our output up to a condition fit for the market.

This argument made little impression, however, and I was then compelled to adopt the expedient of laying men off a day for the first offense, two days for the second offense, and discharging any man guilty of a third offense. Finding, after a short time, that these measures produced little effect, as the men still continued to load dirty coal and take a chance of being punished for it, I decided to make a more direct appeal to the miners and again attempt to arouse their sense of patriotism in another way.

For that purpose, I addressed the following letter to the miners' local, which met during the week, and the men were all notified to attend the meeting, as a matter of importance was to be presented:

Gentlemen—Owing to the scarcity of cars and other equipment, the coal mines of this country are working less than half-time. The railroads are unable to supply sufficient cars to haul to market the coal that is needed. It is up to all of us to help out in the present crisis that has befallen our nation. Every miner can do his share by loading only clean coal. Where he must load rock it must not be mixed with his coal, and mine officials will discharge any man who will deliberately load dirty coal.

There are localities where a man has some excuse for failing to load clean coal, as when his working place is wet, the coal of an inferior quality and the roof bad. But any man, working in a place under normal conditions, who deliberately loads rock with his coal is unfair both to himself and his fellowmen and will be dealt with accordingly. Such a practice on the part of our miners will ruin the company who employ them, and eventually force the mine out of the market.

The practice of loading rock with the coal acts to keep the miners out of employment, in other parts of the country, because of increasing the scarcity of cars. Time is wasted in the needless hauling of rock instead of coal or other useful materials; neither can you raise steam with impure coal any more than you can cook food in the home with the same.

Complaints are coming too frequently to the office in regard to the failure to raise steam sufficiently on the railroads, because of the dirty coal we are sending them. Let me urge, therefore, that every one do his best to load only clean coal. No man should sell as the fruits of his own labor that which he would himself refuse to buy as being unfit for use. Your country calls on you to do your best. Respond to your country's needs by giving the best that is in you.

Since making this appeal, our company has had no further complaints from the railroad, and I can say, with pleasure, that the coal loaded by our men is now equal to the best in the market. GRIFFITH GRIFFITH.

Blackfield, Penn.

Letter No. 6—The numerous articles that have appeared recently in *Coal Age*, regarding the shipment of dirty or high-ash coal have almost unanimously laid the blame or, as the boys say, "passed the buck" to the miner. While there is, undoubtedly, much truth in this accusation there are other factors concerned in the production of an inferior quality of coal.

The nature of the seam and its infolding strata has probably more to do with the quality of the coal mined than the greediness or the carelessness of the miner. As is well known, some coal seams contain dirt bands or are overlaid with a frail roof that makes the cleaning of the coal, in the mine, difficult. Again, some coals contain inherent ash, which is explained by geologists who say that the high-ash content of the coal may be due to the precipitation of colloids by alkaline waters and the deposition of silica in the organic mass of the coal.

THE MINER NOT ALWAYS TO BLAME

It is obviously unfair to blame the miner when he is compelled to work a seam of coal that cannot be expected to yield a fair quality of coal. It frequently happens that a company will open and operate such a seam of coal simply because it lies close to a railroad. It is

unfortunate that there were many such coal tracts available, at the time when the present boom matured.

Many inferior coals appear to the eye much as a low-ash coal of good quality, and the unwary or irresponsible operator has not hesitated to undertake the mining and marketing of such coals, taking advantage of the unprecedented demand. It is my belief that conditions such as these I have mentioned are largely responsible for the inferior quality of coal sent to market.

While there are many good coal properties available, the would-be operator has invariably chosen to invest his small capital in coal lands affording easy shipping facilities. He is deceived in the belief that the nearby coal will bring the same price in the market and will require a smaller invested capital than better grade coals that are more isolated.

Under the present existing conditions, high-ash coals will be marketed as long as men can be found that will buy and use them in their plants. Until such inferior coals are refused on the market, the better-grade coals that are less available and require a bigger investment, in mining, will not be worked by a large class of operators who have not the capital to justify the undertaking.

Besides the factors that I have mentioned, the thickness of the coal seam is an important development in determining the cost of mining. A thin seam requires the handling of a large amount of waste material. It frequently happens, however, that these thin seams contain the purest coal, while seams of greater thickness are intimately mixed with bands of fireclay, slate and bone that, in many cases, are practically impossible to separate completely from the coal. Bony coal often so closely resembles coal of good quality, that a sharp scrutiny, in broad daylight, is necessary to distinguish between the two grades, and it is practically impossible to make the separation in the dim light of the mine.

J. W. KNOWLTON,
Chief of Testing Department,
Elkins, W. Va. West Virginia Coal & Coke Co.

Air Compressor in a Gassy Mine

Letter No. 1—The proposition presented by "Inquirer," *Coal Age*, Apr. 20, p. 759, interested me, and I am led to offer the following suggestion, as the result of my own experience in the use of coal cutters:

The question uppermost in my mind is, What is the advantage that led to the installation of the coal punchers driven by compressed air, in this mine. There are, undoubtedly, conditions under which those machines can be used with some advantage. However, I have found that where a mine is equipped with electrical power, and conditions in the seam will permit of the use of chain coal cutters, these are the machines to be employed.

My suggestion is that, by all means, use the electric chain coal cutters whenever and wherever possible. I have used the Sullivan "Ironclad" continuous cutting mining machines, for some time, and have found them most efficient in room-and-pillar workings.

One point worthy of mention is the greater cutting capacity of the chain machines over that of the puncher type. The former I have found equally as flexible as the latter and easy to handle. I do not hesitate to recommend them for use wherever the conditions will permit.

In closing, permit me to say that I have not experienced the difficulty this correspondent mentions, in securing the delivery of recent orders, although it may be possible that war conditions have lately aggravated the situation and delayed deliveries. ANON.

————, W. Va.

Letter No. 2—Referring to the inquiry, *Coal Age*, Apr. 20, p. 759, from a correspondent in Kentucky, regarding the installation of an air compressor in the return airway of a gassy mine, for the purpose of furnishing power to several coal punchers, let me say that I agree with the conclusion of the editor that the compressor should be installed on the intake air.

In Pennsylvania, the mining law requires that an electric motor must be flame-proof if placed in a mine, or it must be located in a room ventilated separately with intake air, in order to avoid the possibility of an explosion from the sparking of the brushes or other connections. I mention this inasmuch as the correspondent contemplates the use of electric cutters.

POSSIBLE EXPLOSION IN COMPRESSOR CYLINDER

Permit me to say that the editor's suggestion that there is a possibility of explosion taking place in the compressor cylinder, should the compressor be located on the return air, does not appeal to me as worthy of consideration. In my opinion, the compressor cylinder never gets so hot as to ignite gas-laden air compressed by the machine.

Regarding the second question asked in reference to how the location of the compressor on the intake air would affect the ventilation of the working places, I agree fully with the editor when he says that this "would not interfere with the ventilation of the working places, because the air compressed would again be released at the working face, after operating the drills." In this connection, it should be remembered that in driving tunnels and subways, the excavation is often wholly ventilated by the exhaust air from the drills.

The correspondent's idea of locating the compressor at a point nearer the working face is a good one, as it will release a great length of pipe, which can then be used for other purposes, and at the same time avoid the losses in the pipe line by leakage and friction, in transmitting the air so great a distance.

Johnstown, Penn. FRED W. SAKON.

[The reference to the danger of a possible explosion taking place in the compressor cylinder as being hardly "worthy of consideration" does not take into account the fact that, in the use of single-cylinder compressors, explosions are not infrequent, even when the compressor is working on pure air. This is generally attributed to the flashing of the mineral oil used to lubricate the cylinder. In compressing air to five or six atmospheres, at sea level, the heat of compression in the cylinder may rise to between 400 and 500 deg. F., which is much above the flashing point of many mineral lubricants. Should the flashing of the oil occur, it can readily be imagined what would result when the compressor is working on air charged with gas and dust.—Editor.]

INQUIRIES OF GENERAL INTEREST

Gas Encountered Reopening Mine

We have been engaged recently in the reopening of an abandoned mine that gives off some firedamp. The seam is flat and is reached by a slope opening driven from the surface to the coal. Water had accumulated in such quantities that the workings were full to the roof. Since there was but one opening to the old mine, we at once started a second slope about 1 mi. from the mouth of the old slope and at a lower point.

We started to pump out the water from the old slope, but found much gas traveling up the slope. The gas gave a cap 4 in. high, on the Wolf lamp, but would not explode, although the flame in the lamp twisted about in a queer manner, as though it would explode. We even attempted to explode this gas by the use of black powder but failed.

As the water lowered in the mine I was able to penetrate about a half-mile into the workings, but could get no further owing to the blackdamp. A peculiar feature that I observed was that the flame cap decreased in height the further I went in the mine. The lamp, however, showed a cap up to the point where I was forced to turn back for lack of air.

I observed, also, that for a distance of about 350 ft. from the mouth of the slope, fresh air was flowing into the mine along the bottom, while mixed air and gases were traveling out of the mine, at the roof. The two currents, the one flowing in and the other out of the mine, were divided by an imaginary line near the center of the airway. Further down the slope, I failed to detect any movement of the air, while, as I have said, the flame cap on the lamp grew constantly shorter as I proceeded.

Water accumulated very rapidly in the second slope, it being at a much lower level. We are now pumping from that slope, which is full almost to the mouth. I have had considerable experience with "lazy gas," before, but never found gas that would give a cap on the lamp and yet would not explode. Any information that *Coal Age* can give me on this point will be much appreciated.

Adamsville, Ala. J. M. KEMP.

In several instances, we have referred in *Coal Age* to conditions that frequently occur in coal mines, favoring the production of what is termed "flashdamp." This is a mixture of methane and carbon dioxide, formed under conditions that permit these two gases to diffuse into each other in the absence of air. Pure flashdamp containing no air, as explained on page 127, *"Mine Gases and Explosions"—Beard,* consists of a mixture of 812 vol. of carbon dioxide to 1344 vol. of methane, since the gases mix in the inverse ratio of the square roots of their densities.

Practically, pure flashdamp contains about 8 vol. of carbon dioxide to 13 vol. of methane; but this ratio will vary according to the admixture of air, while the diffusion is taking place. Under conditions where sufficient air is present, the mixture may be even explosive; but flashdamp containing little or no air will not explode, owing to the presence of so large a proportion of carbon dioxide, which is extinctive of flame.

It should be remembered, here, that a body of firedamp, at its most explosive point, being 1 volume of methane to 9½ volumes of air, is rendered inexplosive by the addition of one-seventh of its volume of carbon dioxide (*"Mine Gases and Explosions,"* page 104). But, a much larger proportion of carbon dioxide is present in flashdamp, which makes the mixture inexplosive.

Again, under conditions where a body of more or less pure flashdamp is found accumulated in a pocket in the roof of a chamber and there is pure air below, a safety lamp raised into the mixture will show plainly a cap on the lamp flame, which is quickly dimmed. The flame may even be extinguished by the gaseous mixture filling the combustion chamber of the lamp and displacing the fresh air from around the flame. The extinction of the lamp, however, will depend on the purity of the flashdamp or the proportion of air it contains. It is this momentary appearance of a cap on the lamp that has given the name "flashdamp" to this mixture.

The same explanation will apply to the changing character of the flame cap remarked by this correspondent, as he proceeded further into the mine. He reports a 4-in. cap appearing on the Wolf lamp, in the mine entrance, and gradually decreasing in height as he penetrated into the mine, until he could go no further and was obliged to withdraw, owing to the blackdamp, which filled the old workings to an increasingly dangerous extent.

The observed inflow of air along the bottom of the slope, for a distance of about 350 ft. from the mouth of the mine, and the outflow of the mixed air and gases along the roof of the passage is only natural. It is a matter of common observation that, under similar circumstances, the cooler outside air will continue to circulate along the floor of an airway and form a current quite distinct from the warmer air flowing at the roof.

This is frequently observed where rooms or chambers are driven to the rise or dip of an entry and the temperature at the faces of the breasts is a few degrees above or below that of the air circulating on the road. In every case, the lighter air will travel along the roof, while the heavier air follows the floor, the two currents being separate and distinct.

In some instances, the air at the roof will give a plainly observable cap, which disappears as the lamp is lowered. At other times, a lamp will be almost or completely extinguished by the air flowing at the bottom, while the light is not affected in the same manner nearer the roof. These facts have lead to the conclusion that gas is often stratified in a mine airway; or, in other words, travels in veins.

EXAMINATION QUESTIONS

Bituminous (Penn.) First-Grade Examination, Apr. 11, 1918

(Selected Questions)

Ques.—What dangers are to be guarded against in the operation of mining machinery in gaseous mines, and what precautions would you enforce to lessen the same?

Ans.—Aside from the usual precautions taken to safeguard mining machinery of any kind, and which apply alike to gaseous and nongaseous mines, further danger arises from the operation of electrical mine equipment, because of the sparking of wires or brushes, the blowing out of fuses, or the breaking of incandescent lamps. Any of these occurrences may give rise to the ignition of accumulated gas or dust and result in a disastrous explosion.

In an electrically equipped gaseous mine, every precaution should be taken not only to avoid the occurrences just mentioned, but to prevent dangerous accumulations of gas and dust in all portions of the mine workings. The installation of electrical equipment of every kind should be in charge of a competent electrician who is thoroughly acquainted with the conditions that are liable to obtain in a gaseous mine.

Ques.—In a mine giving off 2200 cu.ft. of gas per min., the volume of air entering the intake opening is 4,200,000 cu.ft. per hour. What is the percentage of gas in the air current at the outlet? Would you consider this percentage of gas dangerous?

Ans.—The quantity of air entering the mine is 4,200,000 ÷ 60 = 70,000 cu.ft. per min. Adding to this the volume of gas generated in the mine in the same time, gives a total current of 72,200 cu.ft. per min. passing out of the mine. The percentage of gas in this current is $2200 \times 100 \div 72{,}200 = 3.05$ per cent., nearly.

Ordinarily, this would be considered a dangerous percentage of gas to be found in the workings of a bituminous mine, and immediate steps should be taken to increase the volume of air in circulation, so as to lower the percentage of gas that it may not exceed 1 or 2 per cent., depending on the character of the coal, its inflammability and the fineness of the dust produced in the mining of the coal.

Ques.—On assuming charge, as a mine foreman, at a gaseous mine, what information would you consider it necessary to obtain in order to intelligently perform your duties?

Ans.—The mine foreman must have a thorough knowledge of the requirements of the mining law and be fully acquainted with the existing mine rules and regulations. He must understand the conditions that prevail in the mine, relating to the amount of gas generated in the different sections of the workings, character of the roof strata and the coal. He must study carefully the system of ventilation employed and the distribution of the air.

The mine foreman must examine in detail all ventilating equipment and appliances, including the fans and engines on the surface and the air stoppings, bridges, doors and brattices in the mines. He must investigate the work of the firebosses and know the duties each is expected to perform.

Having given these matters careful attention, he must instruct his assistant foremen in a manner that they will be able to carry out his plans intelligently, with a view to securing the greatest safety in the operation of the mine. They will be able, from their previous experience, to give the new foreman much information that will be valuable to him in gaining a knowledge of the practical conditions affecting the working of the mine.

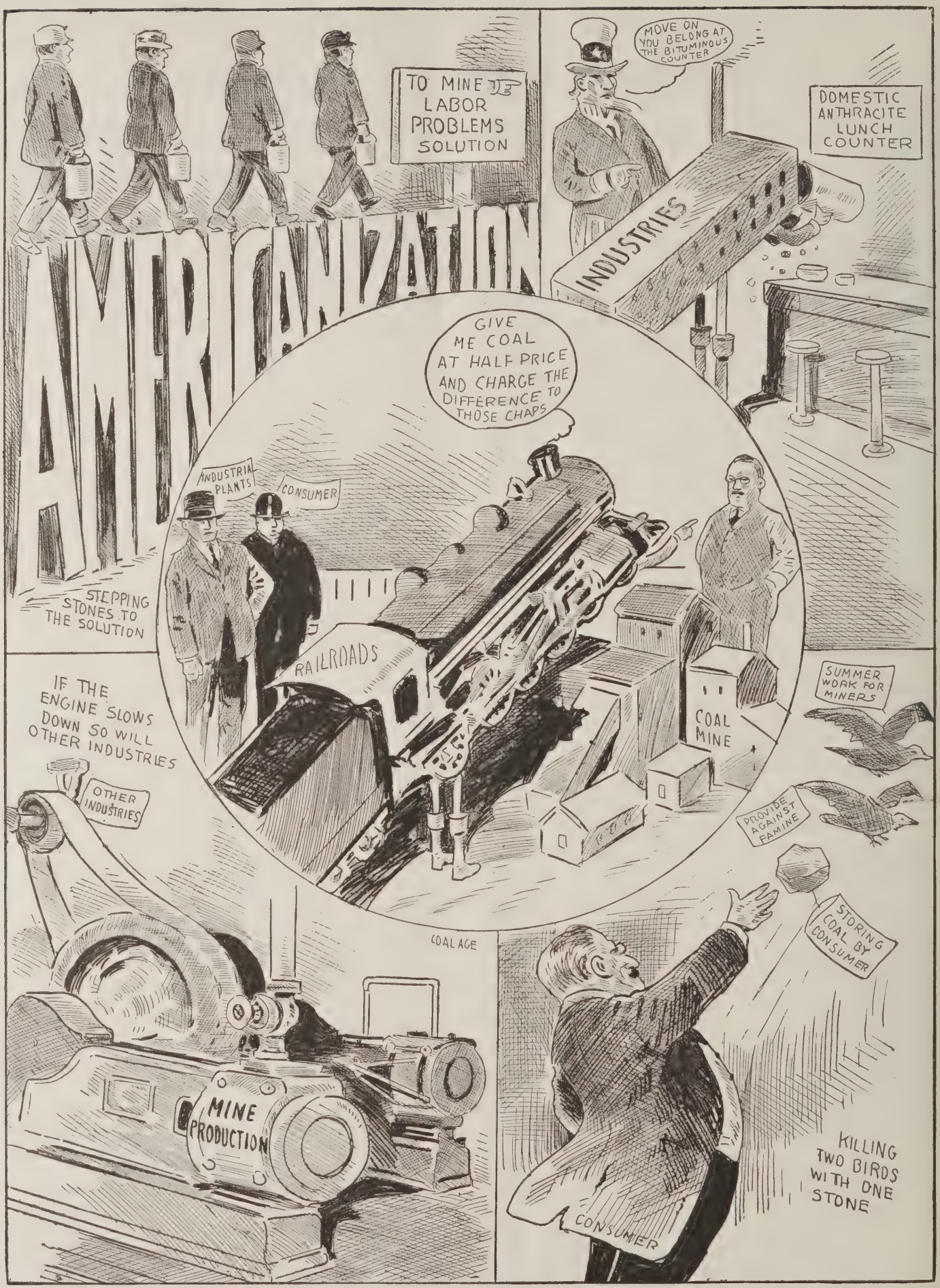
Ques.—Describe what system of ventilation and general management you would adopt in a gaseous mine, in order to keep the mine in a safe condition.

Ans.—The choice between the blowing and exhaust systems of ventilation will depend on the character of the mine. In general, it can be said that the exhaust system is best adapted to the ventilation of a gaseous mine, because it permits of the haulage being performed on the intake airway, without necessitating the use of doors at the shaft bottom, which would be required if the mine was ventilated on the blowing system. On the other hand, the blowing system of ventilation is generally preferred in a nongaseous mine, for the reason that the warm return air current passing on the main haulage road and ascending the hoisting shaft prevents the formation of ice in the winter time. In order to keep the mine in the safest possible condition, the air current should be split and each district of the mine ventilated by a separate current, the return from each district passing directly into the main return airway.

In regard to the management, where blasting is performed in the mine, only permissible explosives should be used and shotfirers should be employed to examine, charge and fire all shots after the men have left the mine. Competent firebosses should examine every portion of the mine before the men are permitted to enter for work in the morning.

Ques.—State what dangers, if any, may arise from the exclusive use of electric safety lamps in a mine.

Ans.—Although the exclusive use of mine electric lamps is rapidly growing in favor, it is generally acknowledged that there are two sources of danger to be guarded against in their use: (1) The possible ignition of gas or dust by the accidental breaking of the globe of an incandescent lamp, or the sparking of electrical connections. (2) The danger of workmen being overcome by gas, the presence of which is not made known by the electric mine lamp. With proper care and precaution, however, these dangers are not generally considered as detrimental to the use of electric mine lamps, which have special advantages that render their adoption in mines as being highly desirable.



High Lights in the Fuel Situation as Seen by the "Coal Age" Cartoonist

COAL AND COKE NEWS

What Happened in April

The figures in brackets in the text refer to pages in the present volume, reference to which will give fuller information regarding the matters discussed in the item to which the bracketed figures are attached.

Apr. 1—United States Fuel Administration zoning order comes into operation [547]—Orenda Smokeless Coal Co. purchases the Orenda mine from the Merchants Coal Corporation with 1700 acres of coal land [648]—State of Indiana goes "bone dry."

Apr. 2—New prices are made for coal from Raton, Gallup, Carthage, Cerillos, Sugarite and Monero districts in New Mexico [632].

Apr. 3—Prices made by the local fuel administration in Wyoming for the Wyoming sub-bituminous coal mines are confirmed by the Federal jurisdiction [698]—New prices are made for parts of the States of Kentucky, Tennessee, Virginia, Iowa and all of Georgia [698]—Senate passes the Third Liberty Loan bill.

Apr. 4—Use of domestic sizes of anthracite for steam-raising purposes condemned by the United States Fuel Administration [698]—Price of coke raised 5 per cent. when manufactured east of the Mississippi River and sold west of the Rocky Mountains [698]—Fuel Administration orders that the term "foundry coke" shall cover only coke selected for foundry use according to the usual trade practice—New prices are made for Black Creek, Brookwood and Blue Creek cokes of Alabama and for beehive-oven coke produced in Fayette, Kanawha, Preston and Nicholas Counties in West Virginia, and for all kinds of coke produced in the State of Washington—Charles M. Means appointed manager of inspection division, United States Fuel Administration [699]—Judge Strauss, of Pennsylvania, rules, in the Joseph Zadwick case, that the corroboration of a second party is not needed to establish the right to workmen's compensation, when a workman dies as the result of a strain received in an isolated part of the mines [714].

Apr. 5—R. P. Prager is lynched as an alien spy by mine workers at Collinsville, Ill., [704, 705 and 842]—Big strike commences in the Dombrowa coal fields of eastern Russia. It was still continuing May 3 according to advices from Zurich, Switzerland.

Apr. 6—Central Pennsylvania mine workers decide to put off their threatened strike [704]—Third Liberty Loan is offered for sale.

Apr. 9—Wagon mines forbidden to add cost of hauling to Government price when coal is loaded in open-top cars except where coal is bought by a railroad for its own use—Strike commences at Lethbridge, Alta. [749]—Michigan-Ohio-Indiana Coal Association meets on this and day following at Cincinnati, Ohio [676 and 677]—President creates a National War Labor Board composed of the same members as composed the commission which advocated the formation of the board—Dr. Garfield demands that the price of coal paid by railroads shall be the price set by the Government as the fair and maximum price at the mines.

Apr. 10—Fuel administrators from states east of Mississippi meet in Washington—Order of Administration requires that smokeless coal shall be delivered only to the bunkers of ships and specifies that contracts for smithing coal made before Feb. 14 will be abrogated if the coal delivered is found not to be a true smithing coal and if the coal is not used, or to be exclusively used, for smithing; other regulations are made in the same order [747].

Apr. 11—Bottle manufacturers, not making food containers, agree to reduce their output 15 per cent.—The Government takes control of 63 coastwise vessels which added to the fleet owned by the railroads, which are also federally controlled, makes 111 coastwise vessels under Government control, having a rated capacity of 400,000 tons.

Apr. 12—Explosion in the Shoal Creek mine, Panama, Ill., possibly caused by alien enemies [749].

Apr. 13—Zone system modified so as to forbid the Pennsylvania R.R. from delivering in Washington or Baltimore, coal produced on the Pennsylvania R.R., to Monongahela R.R. and the Huntington & Broad Top Mountain R.R., and their short line connections in Pennsylvania, West Virginia and Maryland [746]—The International Board of the United Mine Workers of America protests against the frequent changes in coal prices, declaring it a large cause of the irregular work at the mines [748]—House passes the Senate bill changing the basis for the second draft from population to the number of men listed in Class 1.

Apr. 16—Frank J. Hayes, president of the United Mine Workers of America, and other officers of the union organization confer with H. A. Garfield on the slackness of the mines alleged to result from price regulation—Strike commences in Georges Creek and Upper Potomac regions, laying 6000 men idle [748 and 796]—Wage increase of 50c per day granted by the Western Fuel Co., British Columbia, to some 1500 employees [749]—Senate and House adopt conference report on "Sabotage Bill," which prescribes imprisonment penalties for interfering with war industry; but the punishment provided for strikers is eliminated.

Apr. 17—United States Fuel Administration announces that the Tennessee Coal, Iron and Railroad Co. will submit to the conditions of the Peale contract in Alabama [842]—Strike in Georges Creek region comes to an end [748 and 796].

Apr. 18—New prices for Colorado coke, for the coke of Monongalia County, West Virginia, and for such 72-hour selected foundry coke as is made by the Empire Coal Co. at Empire, Ala. [795].

Apr. 19—New prices are made for Fairmont, Thacker, New River, Logan, Kenova and Kanawha districts and Putnam County in West Virginia; Thacker and Kenova districts in Kentucky; Districts Nos. 1 and 2 and Grundy and Platte Counties in Missouri; Cherokee, Crawford, Osage, Franklin, Linn and Leavenworth Counties in Kansas [794].

Apr. 21—New wage scale signed for Alabama region [797].

Apr. 22—"Lightless Night" order suspended till Sept. 1—Delegates from District No. No. 2 (central Pennsylvania) meet at Dubois, Penn., and decide against a strike and in favor of an investigation of wages by the United States Fuel Administration [796].

Apr. 23—Hitchman Coal and Coke Co. decides to withdraw its action against the United Mine Workers of America which related to the enforcement of so-called "ironclad" contracts with working men in its employ [840]—Lehigh Coal and Navigation Co. places girls as timekeepers, weigh-scale tenders, switch tenders, etc. [841]—Explosion in which three men were burned occurs at the mine of the Deep Vein Coal Co., West Terre Haute, Ind. [808].

Apr. 24—Commercial florists and enameled-ware manufacturers agree to reduce fuel consumption 50 per cent.—Joint conference held at Bridgeport, Ohio, relative to a new scale for No. 8 A seam [840].

Apr. 25—Contract signed for No. 8-A seam [840]—Men working at No. 11 mine of the Old Ben Coal Corporation are ordered back to work under pain of arrest under charges of conspiracy [841]—New prices are made for Indiana coal, of both "bituminous" and "block" variety; for Montana coal; for Macon County (Illinois) coal; for such Kentucky "Blue Gem" as is mined in Knox and Whiteley Counties by members of the Tricounty Blue Gem Coal Operators' Association, and for Tennessee "Blue Gem" mined in Campbell County by members of the same association; certain boxcar coal is given higher rates; order not promulgated till May 2.

Apr. 26—Meeting of West Virginia coal operators at Huntington to form state operators' association [807]—New maximum prices are made by Fuel Administration for special mines in Virginia [837] and also for coke made at Coalmont, Tenn., and from the Pratt seam in Alabama, also in Marion, Harrison, Barbour and Randolph Counties, West Virginia, and in the State of New Mexico [837]—Four collieries of the Nova Scotia Steel and Coal Co. are laid idle by a "holiday" of indefinite length, a holiday being taken because the mine workers are forbidden by law to strike.

Apr. 27—New zoning arrangements made in regard to shipments in box and stock cars and to the shipment of smithing coal [835]—S. E. Button, chief of the Department of Mines of Pennsylvania, agrees to issue orders against the employment of girls in and around anthracite mines [841]—Meeting of would-be seceders from the union [796]—Extensive modifications are made in the zoning regulations.

Apr. 29—The United States Fuel Administration increases price of coke 60c. per short ton where the coke is for export to foreign countries or for transport to a possession or dependency of the United States. The 5 per cent. on coke shipped across the Rocky Mountains may be added to 60c. under this order [837]—The mine workers of the Nova Scotia Steel and Coal Co. return to work for at least three days.

Harrisburg, Penn.

Fatalities in the state increased 25 per cent. from Jan. 1 to Apr. 15, this year, over the record for a similar period in 1917, according to reports of the Bureau of Statistics of the Compensation Board. The fatalities are divided as follows: Mines, 302; industrials, 362; public service lines, 182; making a total of 846 for the first three months and 15 days of this year. During the same period last year 296 employees were killed while at work in the mines, 320 in industrial plants and 82 on public service lines. The record for 1916, was as follows: Mines, 333; industrials, 276, and public service, 87.

Luzerne County heads the list with the largest number of fatalities in the mines this year, 68; Schuylkill county is second with 38; Lackawanna County third, with 32; and Fayette County has 30. Other counties of the state in which mining is one of the industries show few fatal accidents.

One of the reasons given for the fatality increase over the previous year is the employment of green help in and about the mines. Enlistments and the draft have taken from channels of industry many of the experienced employees, leaving vacancies to be filled from the available supply of labor to be obtained. Speeding up operations to meet the demand for coal has also had a tendency to bring about conditions which are considered as requiring attention.

Exemption of expert coal miners from the military draft, practical utilization of the natural gas now going to waste in the anthracite mines, and the mine-cave evil were the chief questions discussed by Governor Brumbaugh in his address to the Pittston District Mining Institute on May 4. The audience included 1400 mine officials.

The Governor declared for the exemption of the expert miner from the draft as a measure absolutely necessary for the maintenance of the production of coal at its highest mark during the progress of the war. On the question of utilization of coal gas, a favorite one of the Governor, he said that it was most fitting he should give expression to his views and hopes on the question in Pittston, because it was more than a half century ago that practical use was first made of mine gas, the expedient having been adopted in the old Tompkins mine of burning the gas at the foot of the air shaft as an aid to ventilation.

On the mine-cave problem, a vital question in the anthracite region, especially in Pittston, where disastrous caves occurred within a week, the Governor declared that, owing to the divided property title inter-

est, the rights of life and property came into conflict. As between the two, he declared life stood first. Governor Brumbaugh favored an adjustment based on an agreement between the interests affected. The Governor pleaded for loyalty to the country in the present crisis by the labor interests of the anthracite region to the end that the production of coal shall be maintained at its highest point. The Governor went to Pittston as the guest of the Pittston District Mining Institute.

Fairmont, W. Va.

The new executive committee of the West Virginia Coal Association, which will consist of an accredited representative of every district association in the state, will meet at Huntington on June 1 to outline the plan of procedure by which the state coal association is to be perpetuated in line with the resolution adopted at a mass meeting of coal operators of the state held at Huntington, Apr. 26.

The coal men are determined to work along lines where a conflict of interests can be avoided, and it is felt that there is no question but the association can find plenty of work to do without entering upon questions which affect different districts.

Each association in the state will name not only a member of the executive committee but an alternate as well. Where regular meetings of district associations are not to be held this month special meetings are to be called for the purpose of selecting representation on the executive committee of the state organization.

W. H. Cunningham, of Huntington, who is secretary of the state organization, emphasizes that the retiring executive committee vacates on June 1, and that the election of new members is therefore of the greatest importance, in a circular letter which has been sent to all associations and to coal operators who attended the Huntington meeting on Apr. 26.

As the result of a conference which was held by President C. H. Jenkins of the Central West Virginia Operators Association with officials of the Baltimore & Ohio during the previous week, the car supply in the Fairmont and adjacent fields was probably the best which has been observed there for some time, the supply being well sustained throughout the week. President Jenkins says that operators are now beginning to feel that the Baltimore & Ohio intends to do all that it can in the future, and that with closer coöperation between mine owners and the railroad the results would be most marked. The Fairmont region received 1148 cars on Apr. 27. On Monday the supply jumped to 1458, indicating to operators that the pledges of the Baltimore & Ohio were to be fulfilled. On Tuesday 1128 cars were furnished, only six mines out of 151 reported being closed down. Men idle numbered 1382, with a production loss of 13,545 tons. On May 1 the supply had dropped to 845 cars. Restrictions on shipments is a new order in the Fairmont field, but close attention is being given it. Wrecks in numerous instances have made such restrictions necessary.

Inasmuch as there are said to be at least 200 wagon mines in the Fairmont district, the decision of the Interstate Commerce Commission denying team track operators the use of open-top cars will materially affect many mines in the northern section of the state.

Charleston, W. Va.

Relief from freight congestion in the East, to some extent at least, is reflected in a much better car supply in all the coal districts of West Virginia during the past week, though conditions are even yet far from normal. There was a most marked improvement in the car supply in the Kanawha district the latter part of last week, 1148 cars being supplied to the mines of this district, for instance, last Friday. On the other hand, the delivery of loaded coal cars to connections from the Kanawha district showed a marked decrease over deliveries of previous days, the loaded deliveries numbering 833.

Chesapeake & Ohio officials claim that they are greatly hampered in trying to supply the mines on their lines with empties by the large number of "bad order" cars dumped on them in the interchange of cars, in which condition such cars are useless, while at the same time congesting the company's sidings. Requiring all the labor it can command to repair its own equipment, the company is unable to find labor to repair the cars of other lines, nor does the company believe that it is its duty to make such repairs.

In the smokeless district along the Norfolk & Western, the mines had 100 per cent. car service during the week ending Apr. 27, the production in that territory at the same time being 60 per cent. of normal, based on present "man-power" conditions and the ability of the coal companies to produce. Car service conditions and labor conditions have shown such a marked improvement during April that the total production for the month will probably establish a record for the present year. A total of 458,927 tons of coal was produced in the Norfolk & Western territory during the week ending Apr. 20 as compared with 436,985 produced during the preceding week, a net increase of 21,942 tons. Out of 200 mines in the Tug River and Pocahontas districts to be supplied during the week ending Apr. 20, only 17 hours were lost because of a shortage of cars.

Development work in connection with new coal projects in West Virginia may be halted and stopped entirely, except in special cases, if the new order discontinuing the putting in of new sidings, as it is now understood has been issued by the Director General of Railroads, is put into effect in this state. As understood in some sections at least, the new order prevents the laying of new sidings without regard to the length of the proposed siding. It is understood that the new order is based on the theory that to put in new sidings would not only require many cars now otherwise needed for the transportation of fuel, but would draw labor from mines already in existence to new projects and thus disorganize existing organizations. As a matter of fact operators point out that in the counties in which most of the new mines are being opened native labor is used—that is, labor not heretofore used in the mines—that being the case in Barbour, Upshur, Preston, Braxton, Gilmer and Monongalia Counties. It is only within the last year or two that coal mining has been undertaken in some of the counties just named.

Much capital has been invested within the last year in the counties of Fayette, Marshall, Brooke, Raleigh, Putnam, Lincoln, Mason, Nicholas, Webster, Randolph, Mineral, Harrison, Marion, Taylor, Wayne, Wyoming, Boone, Logan, Kanawha, Clay, Ohio, Mercer, McDowell, Mingo, Lewis and the counties already mentioned. In these counties plants have been installed, tipples built and applications for sidings approved, all such preparations not only representing an investment for charter and other legal requirements but an actual expenditure, so that if the companies who have made such preparations are unable to secure sidings it will result in serious embarrassment. Of 69 applications made to the Baltimore & Ohio for sidings recently none were granted.

Morgantown, W. Va.

Word has been received from the West Virginia University at Morgantown that the United States Bureau of Mines has agreed to co-operate with the University in the Short Course in Coal Mining, by placing Mine Rescue Car No. 8 at Morgantown for the two weeks' period June 17-29. This means that the men in attendance at the short course will receive their training in first aid and mine rescue from the Federal experts who accompany the car, and will have the benefit not only of the apparatus owned by the University but also that carried on the mine rescue car.

The headquarters of car No. 8 are at Huntington, and it is subject to call whenever an accident or explosion occurs which requires the use of the breathing apparatus. Needless to say, the men who are in charge of the car are really experts in mine rescue and first-aid work, and it will be quite a privilege for the students in the short course in coal mining to receive the personal instruction which the Federal engineers will give.

During the two weeks that the car is located at Morgantown the following subjects will be covered in the short course, in addition to the first aid and the mine rescue work—Mine Gases, Explosives, Timbering, Methods of Working, and the Prevention of Accidents. The short course is open without cost to any resident of West Virginia interested in coal mining.

Birmingham, Ala.

A thorough inspection of all coal being mined and shipped by the Alabama producers will be started immediately, and coal that carries dirt, slate or other impurities is likely to be returned at once. John DeB. Hopper, who has been appointed inspector of coal in Alabama by the fuel administrator, is taking up the work with his assistants and will make frequent visits to shipping points, investigate coal being mined, loaded and shipped, and give instructions thereon when it is found there is the least carelessness in the cleaning process.

There is much activity in the coal mining section at the close of this week, but the output is not as large as it might be. Not only is there complaint that the labor is giving only partial effort, but it is also stated that much inefficiency is being found. There is more coal being mined now than ever. There is need for every ton of coal that can be mined. Shipments of coal are being rushed, and the car service, under Government regulation, including a zone system of delivery, is showing a steady improvement.

Readjustment of wages will go into effect at the mines May 15, and this is expected to be an inducement for better work and larger production. So far little buying of coal at mines is noted for next fall and winter consumption. The belief is strong that within 60 days there will have been a start on accumulating of individual stocks of coal for next winter's consumption.

Coke production shows no change, ovens operating nearly at the maximum of production. Shipments of coke from this district are not very extensive, the bulk of coke being made here being used in the local territory. Manufacturers of coke are not in a position to take on many, if any, new contracts for their product, and it may be sixty days and longer before any business can be considered. Revisions of coke prices for this state have brought about a better feeling in coke mining circles, though contracts are in hand that will last for some time.

It is officially reported that the Sloss-Sheffield Steel and Iron Co. is considering the erection of a large coke-making plant. J. W. McQueen, president of the company, has gone to New York, and it is stated that he will present suggestions to the company that may result in the erection of a large coke plant in the vicinity of Birmingham.

PENNSYLVANIA

Anthracite

Reading—Jonathan Reber, of this place, has a contract with the Lehigh Coal and Navigation Co. to dredge the dams in the Lehigh River this summer and take out the marketable coal. It is expected that many thousand tons of good coal can be reclaimed.

Scranton—Before Judge L. H. Barber, specially presiding, the mine-cave case of the Penn Store Co., Ltd., a subsidiary of the Scranton Coal Co., against the People's Coal Co., marks one of the first instances in the history of the anthracite industry where one coal company is suing another for damages caused by a mine cave.

Following out a policy inaugurated by the Delaware and Hudson Coal Co. some time ago, a safety-first institute was organized on May 3 by the employees of the Marvine colliery. It was announced that the company will award cash prizes for the best suggestions offered by members of the institute for the prevention of accidents. A cash prize of $50 will be given for the best suggestion from an individual member; $25 for the second prize and $10 for third. For the best suggestion coming from an institute $25 will be given; $15 as second prize and $10 as third prize.

Treverton—Disregarding a warrant issued by the Reading Railway Co. forbidding them to board an accommodation train from Shamokin to North Franklin colliery near here, 50 miners were arrested by special railroad officers and taken before a justice of the peace. They settled the case by paying nominal fines.

Nanticoke—Both cages at the Loomis shaft of the Delaware, Lackawanna and Western R.R., Coal Department, were wrecked on May 4 when traveling in opposite directions. In some unknown manner they collided. A force of workmen were at once put to work repairing the damage so that operations at the colliery could be resumed at once. No one was injured in the smashup.

Hazleton—Every one of the 16 mines of the Lehigh Valley Coal Co. in the Hazleton district having attained a 100 per cent. record in Liberty Bond subscriptions, the achievement was signalized on the evening of May 4 by the simultaneous sounding of the colliery whistles at 6 o'clock. Twenty nationalities are represented among the employees of the company, a considerable percentage of them from enemy alien countries.

Plymouth—The large coal washery of the Lehigh and Wilkes-Barre Coal Co., adjacent to the Parrish colliery breaker, fell to the ground with a crash shortly after 1 o'clock on the afternoon of May 1. All employees had been ordered out of the building. It was well that this was done, as a few minutes later the high and heavy building toppled a few inches to one side and fell, tearing loose steam and water pipes, smashing machinery and breaking heavy timber. The washery was erected about seven years ago by the Parrish Coal Co. and the company was taken over by the Lehigh and Wilkes-Barre Coal Co. about four years ago.

Freeland—In order to have everybody plant a garden this summer, the G. B. Markle Co. will furnish garden plots, fertilizer and plowing for the sum of $1 for each garden. The employees held an informal meeting at the colliery clubhouse and talked over methods of cultivation and planned for the summer's work. The Philadelphia & Reading Coal and Iron Co. began this work last year, and late last fall it plowed land for this spring. The latter company has an expert cookery instructor going about among the homes teaching the housewives the best way to prepare the "Hooverized" war-time dishes.

St. Clair—The Delaware & Hudson Coal Co., which has operated solely in the Wyoming region in the past, is now proving and plotting its Schuylkill holdings in the vicinity of St. Clair and Middleport. It maintains an engineering force in Pottsville which takes care of the leased lands in this part of the field.

Maryd—The Maryd Coal Co. has installed two electric storage battery locomotives and an electric generating plant. The inside haulage equipment before the new instalation consisted of gasoline motors and mules.

Pittston—One man was killed and another seriously injured, and more than 20 buildings in an entire block were ruined on May 1, when a cave occurred in the workings of the White Coal Co. Property damage will amount to tens of thousands of dollars. The cave is one of the most serious that has occurred in the anthracite region and is unusual in that the subsidence covered an enormous area at practically the same time. The cave was not unexpected, officials of the company having ordered the 40 employees out of the workings during the morning. It was predicted during the winter, after several minor caves had damaged property, that when the frost would leave the ground the entire "Hill" section would be endangered. The prediction was borne out by the cave during the afternoon. The White Coal Co. operates the Checker vein, and is practically all "robbing work." In 1917 the company mined 28,000 tons. The Lehigh Valley Coal Co. owns the lower veins, but not mined them for a number of years.

Wilkes-Barre—In orders handed down by the court recently appointments were made for the mine formen's, mine inspectors, and miners' examining boards. The mine inspectors' board has three new members this year. The board consists of E. R. Pettebone and John M. Humphrey, mining engineers; Cornelius McLaughlin, of Avoca; John Larkin, of Nanticoke, and Thomas Gallagher, of Lansford, practical miners. Gallagher succeeds John J. Hanlon, of Avoca; Larkin succeeds Daniel B. Bolton, of Nanticoke, and Gallagher succeeds the late Peter Dougherty, of Lansford. The miners' examining board is composed of the following: Patrick McGuire, of Hazleton; Gustav Ulberich, of Wilkes-Barre; Michael H. Quinan, of Pittston; Harry Cook, of Nanticoke; James F. Gildea, of Plains; John B. Thomas, of Dorranceton; John H. Evans, of Plymouth; Alexander Patterson, of Hazleton; James McGlynn, of Jeanesville.

Bituminous

Lovejoy—The Estep Brothers Coal Mining Co. is equipping its new mine here with electricity throughout. A substation has been erected and the motor-generator set is on the ground. Three Jeffrey locomotives are ready to begin operation. The power will be furnished by the Penn Public Service Company of Indiana. The power will be turned on at the plant about May 15.

Starford—The mine of the Starford Coal Co. has been closed temporarily pending the drilling of a tract of land ahead of its present holdings. A fault was hit recently, and if the new field proves a success headings will be driven through the fault.

Blairsville—The Graff Brothers have opened an old mine near Smith Station and have their siding with the Pennsylvania R.R. completed. The first coal from the new operation was shipped a few days ago. The mine is in the Pittsburgh seam of coal.

Evans City—The Brewster mine of the Big Creek Coal Mining Co. near here is undergoing great improvements. The company is equipping the mine with electrical machinery and has its power lines and substation constructed. Shortwall mining machines are on the ground, as well as other electrical machinery. The power will be furnished by the Pittsburgh, Harmony and New Castle Street Railway Co. The production will be increased greatly, and the mine will be one of the large producers on the south end of the Buffalo, Rochester & Pittsburgh Railway.

Kantner—The new branch of the Baltimore & Ohio R.R., from Stoyestown station to the new mines opened by the Quemahoning Coal Co. on the Koontz farm, Shade Township, and operated as Ralphton No. 9, was recently completed and the shipment of coal has been commenced. At present the shipment is from a large amount of coal stored awaiting the opening of the road, but new homes for miners will be erected and the mines already opened will in a short time be operated to full capacity.

WEST VIRGINIA

Sutton—The Briestweiser Lumber Co. of Pittsburgh, Penn., is planning to develop a tract of coal land owned by the company in Braxton County, near this city.

Elkins—Tests are being made by the Hayes Coal Mining Co. of Alton, of a property under option to the company in Randolph County, near Silica, on the Baltimore & Ohio, to ascertain whether or not the land is worth developing.

U. C. Edgell and associates have purchased from John T. Flynn a small acreage of coal near Wilsonburg, Harrison County, and will develop the property at once.

Charleston—The order of the Public Service Commission recently directing the Norfolk & Western R.R. to establish track connections and extensions and furnish cars to serve the mines of the Trace Coal Co. was upheld by the Supreme Court of Appeals.

Buckhannon—J. A. Tucker and J. J. Schargnecker have formed a partnership for the purpose of engaging in the coal mining business, the style of the firm to be known as the Scharfnecker-Tucker Coal Co., with mines at Ower's Mills and Hampton. The first car was loaded last week at the Ower's Mills mine. A plant will be installed at Hampton at an early date.

Moundsville—The boiler house and power house of the Central Coal Mining Co.'s mine, generally known as the Fort Pitt mine, on the Ohio side of the river opposite Moundsville, was destroyed by fire recently. The damage is estimated at about $20,000. About 300 men are employed at the mine.

Weston—The P. C. Lynch Coal Co., of Beckley, has acquired 1000 acres of coal lands on Stone Creek, near Weston, from Thomas E. Miles, of Hornor, and T. S. Stalnaker, of Weston, for a consideration of $72,000. The company recently acquired 400 acres in the same vicinity. It is arranging to erect a mining plant and build a new mining town near Weston at an outlay of $200,000.

Grant Town—The New England Fuel and Transportation Co., which has the largest mine in West Virginia at this place, broke a record one day recently when it hoisted 1206 mine cars. The mine is splendidly equipped and on this day loaded 63 railroad cars in addition to supplying coal for its coke ovens.

Mt. Clare—There are four different openings on the Holden property of 12 acres, near here, and four different wagon mines convey coal to the commercial siding.

Fairmont—The Franklin Gas Coal Co., which has opened a 40-acre tract adjoining that of the Elkhorn Coal Corporation in Harrison County, is working a 9-ft. vein, conveying the coal by incline to a tipple.

Hallwood—The West Virginia Rail and River Coal Co. has purchased the fee of the properties located on the Ohio River near here, which it has been operating under lease for two years. The property consists of approximately 3000 acres and has a mine producing 400 tons daily. In addition there are miners' houses, valuable timber and salt wells on the property. S. F. L. Dean is president of the company.

KENTUCKY

Providence—Fire which recently broke out in the R. L. Forsythe mine was finally flooded out after it had been burning for several days. It will take several days to pump out the accumulated water. The fire started from a charge that was fired late in the evening, and which smoldered through the night.

Pineville—Lewis R. Jones has sold the Straight Creek Fuel Co., to Judge M. J. Moss, Ray B. Moss and M. J. Moss, Jr. The new owners expect to develop the mine. It is understood that Judge Moss purchased the property with the idea of allowing the boys to handle it.

Paducah—City authorities have been busy for several days in examining several coal properties, it having been decided that the city will own and operate her own mines. The city expects to buy a small mine either in the Clay or Providence district.

Harlan—The Clinton Coal Co., which was recently organized in eastern Kentucky, with headquarters at Hazard, plans establishment of a town on Carr's Fork, and expects to start immediate developments.

Whitesburg—Added impetus has been given to the Big Sandy field through the organization of the Somerset Fuel Corporation, by a party of West Virginia capitalists, who have secured the coal rights to several hundred of acres of land on the Big Sandy extension of the Chesapeake & Ohio.

Hawesville—L. S. Powers, a coal mine operator working mines near here, has installed a new set of air pressure coal mining machinery, which is expected to considerably improve production at the plant.

Hazard—The Hawley Coal Co., of Milwaukee, Wis., which recently increased its capital stock from $3000 to $50,000, is making improvements at its mine near Middlesboro, Ky., which will enable it to increase production to 100 tons a day.

Roxana—The Kentucky and West Virginia Coal Co., which operates mines here, has let contracts for construction of fifty miners' houses. Mine companies and oil producers have been making arrangements for better accommodations for employees, due to the fact that employees have to be better treated than ever to enable the employer to hold them. An oil company in Lee County is installing electric lights, hot and cold water and showers in each of a number of employees' bungalows.

TENNESSEE

Briceville—The Cross Mountain Coal Co. is increasing its output from the old mines and is opening up new mines, planning a new tipple, boiler house, office, amusement hall and picture theater. It is improving old houses and building new ones. The output is to be increased about six times over that of 1917.

INDIANA

Terre Haute—Terre Haute citizens are confident their city can secure the location of a Federal coal-washing plant. One is already in operation at Danville, Ill. Sulphuric acid, used in explosives, is made of iron pyrites, which Edward Bassett, state geologist, says Indiana has in liberal deposits.

Oakland City—Armed guards have been placed at the opening of Mine No. 4 by the Ayrshire Coal Co., owner of a system of large coal mines in this vicinity. Enemy activity, believed to be due to German sympathy, prompted the action. Several attempts were made in one day to wreck the electric motors of the mine. A motorman, as he rounded a curve with a string of loaded coal cars, saw an obstruction on the rails. On the next trip another obstruction was encountered. This was repeated every trip of the two motors during the afternoon, when watchmen were placed along the entry. Twice the watchmen saw men throwing props on the track, but each time they escaped into the old works. The mine, which is a large one, has about 15 openings.

Petersburg—All coal mines along the Evansville & Indianapolis R.R. in this part of the state are idle as a result of a dispute over freight rates. Many miners are leaving for employment in other fields. This situation has existed for some time. It is estimated that the daily loss in wages is $10,000, as several hundred men are affected. So far, the fires in the engines have been kept burning and the mines clear of water, but it is feared that a permanent closing of the mines will occur if a satisfactory agreement is not reached soon. Many of the coal companies have lost heavily by the shutdown. One mine operated one day to supply coal for the oil field west of town.

ILLINOIS

Edwardsville—T. T. Brewster, president of the Mt. Olive and Staunton Coal Co., St. Louis, has applied to the circuit court for an injunction to restrain the City Coal Co. from operating Mine No. 3 and asks for an order that it be turned over to the Edwardsville Coal Co. Brewster says he has been operating the mine since 1913, when the lease of the other company expired. Representatives of the defendant company say that while their lease expired at that time, Brewster made no effort to intervene and they believed that the lease was automatically extended for five years.

Gillespie—The charter of the Gillespie Coal Co. has been filed. The capital stock will be $100,000, the stock to be distributed as follows: S. M. Westwood, $25,000; D. E. Alyward, $12,500; R. H. Isaacs, $12,500; W. F. Schmidt, $12,500; G. W. Schmidt, $12,500; B. K. Leach, $12,500; and H. A. Anderson, $12,500. The company owns 559 acres of coal land near Gillespie, the rights being located under the southeast quarter of Section 12, the north half and the southeast quarter of Section 13, Town 8, range 7. The Big Four railroad has announced that necessary arrangements have been completed for the running of a miners' train between Gillespie and the new No. 4 mine of the Superior Coal Co. It will leave the Big Four depot at 6.15 a. m. and return at 5.15.

Carlinville—The four mines of the Standard Oil Co. will produce 14,500 tons of coal daily when they are running at full capacity. The two mines northeast of town are down 200 ft. They will be known as No. 2 and No. 3. Each will employ 1100 men and each will produce 5000 tons of coal daily. The third new mine will be known as No. 4. It is now ready for the tipple. This mine will employ 550 men and will produce 3000 tons daily. The old mine at the edge of town will be known as Mine No. 1. It will employ 350 men and will produce 1500 tons of coal per day. The Carlinville Home Builders Association, an organization composed of bankers and business men of this city, will erect 300 new houses to help care for the influx of miners and their families. The Chicago & Alton R.R. has built a spur to the No. 4 mine and is rushing work on spurs to No. 2 and No. 3. The Chicago & Alton and the Illinois Traction System have arranged to run shuttle trains between the city depots and the three mines.

Personals

Fred C. Pavey, of the Baum Coal Co. of St. Louis, Mo., has gone to the Wickham Coal Co. as sales manager. The Baum Coal Co. has arranged to close its St. Louis office.

W. C. Tucker, formerly superintendent for the Wisconsin Steel Co., at Benham, Ky., has been appointed general superintendent for the Cross Mountain Coal Co., at Briceville, Tenn.

B. R. Craig, acting general superintendent and chief engineer of the Shawmut Mining Co., St. Marys, Penn., has been appointed general manager and chief engineer of the same company.

C. J. McKee, district mine inspector Associated Companies, Kittanning, Penn., has resigned to accept the position of safety engineer with the Jamison Coal and Coke Co., Barrackville, W. Va.

P. G. Elder, assistant mine superintendent, Buckeye Coal Co., Carmichaels, Penn., has resigned to look after his mining interests near Walsenburg, Colo., where he will be located after May 15.

J. W. Bowles has been appointed safety inspector with the Pittsburgh Terminal Railroad and Coal Co. He was formerly district mine inspector of the Associated Companies, Pittsburgh, Penn.

Martin Maloney, formerly with the Jefferson and Clearfield Coal and Iron Co. at McIntyre, Penn., is now in charge of the Armerford mines of the Armerford Coal Mining Co. near Blairsville, Penn.

Edward McCleary, formerly mine inspector with the Associated Companies, Pittsburgh, Penn., has been appointed chief safety inspector of the Victor American Fuel Co., with headquarters at Denver, Colo.

John Gordon Smythe, chief engineer of all divisions of the Consolidation Coal Co., has been made a captain in the Officers' Reserve Corps and expects to report for duty soon. He will likely be assigned to construction work.

D. H. Parker, formerly mine superintendent at the Soudan Mine, Youghiogheny & Pittsburgh Coal Co., Van Voorhis, Penn., has recently been appointed general superintendent for the W. H. Warner interests at Charleroi, Penn.

T. C. Miller, for eight years chief engineer for the Wisconsin Steel Co., Benham, Ky., has been appointed chief engineer for the Cross Mountain Coal Co., at Briceville, Tenn. He has also been made assistant to the general superintendent.

George Love, who has been with the Cowanshannock Coal and Coke Co. at Yatesboro, Penn., has moved his family to Rochester Mills, Penn., and has accepted a position as superintendent of the Savan mine of the Savan Colliery Co. there.

W. F. Nansteel, for six years master mechanic for the Wisconsin Steel Co., Benham, Ky., but late of the boiler inspection department of the Hartford Insurance Co., Pittsburgh District, is now master mechanic of the Cross Mountain Coal Co., Briceville, Tenn.

David Whitcomb, fuel administrator for the State of Washington, has been notified by Fuel Administrator Garfield of his appointment as executive secretary to the National Fuel Administration, with headquarters at Washington, D. C. Mr. Whitcomb has accepted and will take up his new duties about May 15. Mr. Whitcomb's appointment follows close upon a stay of more than a month in Washington, D. C.,



DAVID WHITCOMB

whither he was called by Dr. Garfield for conference. He was appointed state fuel administrator last September and organized his office locally and state-wide immediately on his return to the city in October, 1917. He is a native of Worcester, Mass., a graduate of Amherst College and the Harvard Law School. He is the head of the Arcade Building and Reality Co., president of the Seattle Building Owners and Managers Association, and was Seattle manager of the Red Cross drive last summer.

Thomas Hogarth has resigned as mine foreman of Penn Mary No. 2 mine, of the Penn Mary Coal Co. at Heilwood, Penn., to become mine foreman of the new Coal Run Nos. 4 and 5 mines at Kent, Penn. Mr. Hogarth is considered one of the best mining men in Indiana County.

James Keener, of Howesville, Preston County, W. Va., has resigned as superintendent of the Allbright Smokeless Coal Co., and is developing a mine for himself nearby. He has been succeeded by **Charles Brennan**, of Thomas, W. Va., a former employee of the Davis Coal and Coke Co.

Charles F. Ice, for 30 years identified with coal mining in northern West Virginia, and who is viewed as one of the most capable men in the Fairmont district, which includes twelve and a half counties in the Northern-Central part of the state, has been appointed chief inspector of coal for the Fairmont district, working in conjunction with the District Representative of the Fuel Administration and having his office at Fairmont.

F. A. Dalburg, mining engineer, has recently returned from Valparaiso, Chile, following two years prospecting work through Chile, Bolivia and Peru. Previous to this South American work Mr. Dalburg spent two years in the Philippine Islands, one year in China, and eighteen months at Spitzbergen, Norway, in coal-mining work. He has now affiliated as chief engineer with the Humble Oil and Gas Co., Witchita Falls, Tex., where he may be reached after May 15.

James E. Anderson, formerly chief mine inspector with the Associated Companies, Pittsburgh, Penn., has resigned to take up new work as chief safety engineer of the mining department with the Rockwood-Badgerow Co., of Chicago, Ill. His thirty odd years' experience in coal mining through Illinois and the Middle West, combined with a most genial personality, has gained "Grandpa" Anderson thousands of friends in the coal-mining fraternity, all of whom wish him unbounded success in the new work.

Obituary

Robert Morrison Olyphant died at his home, 160 West 59th St., New York, recently. He was well known to the older members of the coal trade. He was connected with the Delaware & Hudson Co. from 1873 to 1903, first as manager and then as president, and at the time of his death was honorary chairman of the executive committee of the company.

W. F. Jacoby, president of the Calumet Coal Co., 17 Battery Place, New York City, died at his home on May 1. Mr. Jacoby was at one time a station agent for the Philadelphia & Reading Co. Later he was connected with the Davis Coal and Coke Co., then he organized W. F. Jacoby & Co. which was later merged into the Fenn Collieries Co. In 1906 Mr. Jacoby withdrew from the latter company and became president of the Barton Coal Mining Co., with a mine at Barton, Md. About a year ago he, with C. W. Proctor, organized the Calumet Coal Co., the business of which will be continued.

Industrial News

Charleston, W. Va.—The White Ash Block Coal Co. has given notice of its intention to surrender its corporate charter and to go out of business.

Goodwill, W. Va.—The Foursome Block Collieries Co. has filed notice of an increase in its capitalization from $100,000 to $150,000, to provide for expansion.

Pittsburgh, Penn.—The Aspromet Co. announces the removal of its New York office to 170 Broadway. The telephone number, Cortlandt 5428, remains unchanged.

New York, N. Y.—Exports of coal from the Port of New York during the month of March were 2607 tons of anthracite, 4508 tons of bituminous and 956 tons of coke.

Knoxville, Tenn.—The Cross Mountain Coal Co. has filed notice with the Public Service Commission of an increase in its capital from $100,000 to $200,000, to provide for expansion.

Blocker, Okla.—The Tri-State Coal and Coke Co., recently incorporated with a capital of $100,000, has perfected its organization, and is planning for the immediate development of about 230 acres of coal lands. J. E. Stillwell is president.

Pennington Gap, Va.—The Cumberland Collieries Co. has been organized, and is planning for the immediate development of a large tract of coal lands recently acquired in Lee County. E. H. Easley is president; V. L. Sexton is vice president.

Alden, Penn.—The Alden Coal Co. is having preliminary plans prepared for the construction of a new one-story coal washery, about 45 x 50 ft., at its plant, to cost about $20,000. Frank B. Davenport, Coal Exchange Building, Wilkes-Barre, is engineer.

New York, N. Y.—The George Haiss Manufacturing Co., 365 Rider Ave., manufacturer of coal-handling machinery, has had plans prepared for the construction of a new one-story brick building, about 55 x 65 ft., on Rider Ave., near 141st St. The estimated cost of the structure is $15,000.

Indian Bottom, Ky.—The Rockhouse Coal Co., recently organized, is planning for the immediate development of about 200 acres of coal lands recently leased in the Rock-

house Creek fields, Letcher County, to have a daily capacity of about 1000 tons. P. M. McClanahan is president and manager.

Washington, D. C.—Construction of 50 wooden barges 3500 tons each, for use in the coastwise coal trade, has been authorized by the Shipping Board. The vessels will be built at New England and South Atlantic shipyards. They will aid materially in solving the problem of keeping New England supplied with coal.

New York, N. Y.—The Wilputte Coke Oven Corporation has been awarded a contract for the construction of 40 Wilputte ovens, with extensions to existing byproduct plant and benzol plant, by the Citizens Gas Co., of Indianapolis. Work has been started and the plant is expected to be in operation by December, 1918.

Columbus, Ohio—Improved conditions in the distribution of coal in the various cities in Ohio and Michigan have caused the Federal Fuel Administration to issue an order dissolving the distributing pools at Columbus, Cincinnati, Cleveland, Akron, Canton, Toledo and Detroit. The pools were in operation since early in January.

St. Louis, Mo.—The Interstate Commerce Commission hearing on the application of the St. Louis Chamber of Commerce for the abolition of the bridge arbitrary of 20c. a ton on coal, which was set for May 6, has been postponed to June 3, at the request of the railroads, concurred in by the East St. Louis Chamber of Commerce.

New York, N. Y.—The following officers were elected at a recent meeting of the Alberger Pump and Condenser Co., 140 Cedar St.: President, William S. Doran; vice president, William R. Wilson; secretary, Richard C. Williams; treasurer, Frederick A. Brockmeier. George Q. Palmer was elected chairman of the board of directors.

Des Moines, Iowa—The Flat Brush Coal Co. is planning the opening of a mine at Melcher, W. Va., at a cost of $100,000. When completed the mine is expected to have a capacity of about 400,000 tons a year. Engines, boilers, screens, cars and rails have not yet been purchased. E. C. Smith is superintendent in charge of construction.

St. Louis, Mo.—Sebastian A. Weissenborn, coal operator, has moved from offices on Olive St., between Third and Fourth Sts., which he had occupied for 37 years, to new ones in the Boatmen's Bank Building. He moved on his seventy-third birthday. He has been in business in St. Louis 40 years and is now associated with his son, J. E. Weissenborn.

Springfield, Ill.—Although the present contract for supplying coal to the various Illinois state institutions does not expire until July 1, the state is preparing plans and specifications for the new contract. It is said that bids will be asked early this year on account of the uneasiness which has prevailed in the state over a possible shortage of fuel for state institutions.

New York, N. Y.—C. Andrade, Jr., of Matlack Coal and Iron Corporation; J. M. Leonard, of the Brothers Valley Coal Co., and Gardner Pattison, of Pattison & Bowns, have been elected directors of The Wholesale Coal Trade Association of New York City to fill the vacancy existing as the result of the authorization given the Board of Directors to increase its membership to eleven.

Charleston, W. Va.—The Federal Coal Co., recently incorporated with a capital of $3,000,000, is planning to organize subsidiary companies for the development of 33,000 acres of coal lands in Boone County and 22,300 acres in Nicholas County. The company has already ordered a large amount of equipment and it is said that about $500,000 will be expended for improvements.

Columbus, Ohio—Contracts have been awarded by the Columbus Board of Education for approximately 10,000 tons of coal for the various school buildings of the city. The Reliance Coal Co. secured the larger contract to supply 28 buildings with Hocking mine-run at $5.05 delivered. Scholl & Graham will supply 12 schoolhouses at $5, and the Hamilton-Parker Co. 12 school buildings at $4.90.

Oakland, Md.—The Taylor-Offutt Coal Co. has been organized and is planning for the immediate establishment of a plant for the development of 800 acres of coal lands about three miles from Oakland. H. N. Taylor, of Philadelphia, Penn., is president; William R. Offutt, of Oakland, is vice president; Julius C. Renninger, Oakland, is secretary; and William W. Justice, Philadelphia, Penn., is treasurer.

Evansville, Ind.—Coal prices in Evansville and Vandenburg county will not be affected through an order of the state fuel administrator received by George S. Clifford, county fuel administrator for Vandenburg county. Lump coal will be delivered in the city at $3.85 to $4.40 a ton, the price to the consumer depending on the source from which the coal comes. The prices are the same as those of last winter.

Indianapolis, Ind.—The question of whether coal, transported to points on the Ohio River in Indiana, may be shipped from these points to other cities in the State by rail, under the zone system, was presented to the state fuel administration by Harry Dowd, fuel administrator for Jennings County. The question was referred to C. G. Hall, district representative of the national fuel administration, with offices at Terre Haute.

Cincinnati, Ohio—Permission has been granted to Cincinnati coal dealers to increase their selling price 25c. per ton. This action was taken by Chairman Albert Bettinger, of the Hamilton County Fuel Committee, after hearing the request, presented by James A. Reilly, general manager of the Queen City Coal Co. He showed that there is a big increase in the cost of delivery and claimed that an advance was necessary to cover the increased costs.

Hartford, Conn.—The Terry Steam Turbine Co. has appointed E. E. Maher as manager for the Chicago District, with offices at 1328-29 McCormick Building, 322 South Michigan Ave. John D. Stout has been appointed manager of the New York office, in charge of that district with the exception of navy and marine installations. Mr. Stout has been assisting Mr. Herbert, formerly in complete charge of that district, who will now devote his entire time to navy and marine requirements.

Pittsburgh, Penn.—E. J. Frauenheim Jr., president and secretary of the Logansport Coal Co., has organized the E. J. Frauenheim Coal Co., with a capital of $200,000 to develop operations in Somerset County. Two miles of railroad are to be built. The mine will be electrically equipped for an output of 1000 tons a day of smokeless, byproduct and smithing coal. It is situated on the Western Maryland R.R. E. J. Frauenheim is president, C. F. Roy, vice president and Nettie M. Frauenheim, secretary.

St. Louis, Mo.—The Ajax Coal Co. has been incorporated here for $25,000 by Ralph D. Woodley, C. J. Dolan and L. Jaech. They have arranged to open up a yard at Theresa Ave. and Gratiot St. and engage in the retail coal business. This is generally supposed to be a subsidiary company of the Taylor Coal Co. of Chicago, which also is supposed to control the Energy Coal and Supply Co., with retail yards in southeast Missouri, and the Distributers Coal Co. and the J. W. Reiner Coal and Lumber Co., also of Chicago.

Terre Haute, Ind.—Indiana mines reached a maximum of more than 75 per cent. of their capacity for the week ended Apr. 20. Horace H. Herr, director of publicity and conservation of the state fuel administration, has announced in the Terre Haute district 13 mines of the 96 in operation in the district were closed one day of that week because of a lack of cars. The Southern Indiana bureau reported only five of its 41 mines closed on Saturday of that week. Mining conditions throughout the State showed a slight improvement over the preceding week, Mr. Herr said.

Kansas City, Mo.—United States Fuel Administrators Webster of Iowa, Kennedy of Nebraska, Crossley of Missouri, Cary of Kansas and Couch of Arkansas, and E. J. Wallace, of the Missouri Retail Coal Merchants Association, with Mr. Hope, of the Fuel Administration at Washington, held a conference here on May 6 to determine the tonnage of anthracite that moved into this territory in 1916 and 1917, and what tonnage is coming from the same shippers at this time, with the intention of taking steps to see that there is an equal distribution of tonnage for the Central West.

Jefferson City, Mo.—Fuel Administrator Crossley has made an emphatic ruling on the illegitimate shipment of coal to associations or individuals who are not licensed dealers, which is generally called "snowbirding." He has ruled that the act to regulate a man's business also carries with it the assumption that he must protect that business. He has licensed every dealer in the state. Corporations that retail coal to their employees, etc., may have action taken against them for the violation of the incorporation laws, if their charter does not specify that they are to engage in the retailing of commodities such as coal.

Alton, Ill.—At a conference of Chairman George M. Potter of the Alton Fuel Committee with the dealers of Alton, Wood River and East Alton, at the Board of Trade rooms here, the dealers filed a formal protest against the rule permitting mines having coal-washing equipment to charge an additional 20c. a ton. It was declared that the mining companies, taking advantage of ambiguity of the rule, were charging 20c. additional whether the coal was washed or not, and it was shown that only part of the coal is washed at any mine, although the increase is charged on the entire output. The protest was taken under advisement.

Columbus, Ohio—While ice in the upper lake passages has been hindering the opening of the lake trade, still there has been a considerable tonnage from Ohio and West Virginia mines loaded at the lower lake ports. Reports show that the ice is moving away well, and it is expected that the lake trade will be in full swing by May 15. The Hocking Valley docks at Toledo loaded 131,900 tons up to May 4. Of that amount 25,832 tons were loaded prior to Apr. 20; 20,250 tons during the week ending Apr. 27 and 85,810 tons during the week ending May 4. The Toledo & Ohio Central R.R. loaded 39,000 tons up to Apr. 26 and 38,000 tons the week ending May 3, making a total of 77,000 tons for the present season.

New York, N. Y.—Action toward securing a supply of coal for the poor of New York city was taken at a meeting of the Executive Committee of the Committee on Domestic Supplies of the Mayor's Committee on National Defense on Monday of this week. City Chamberlain Johnson assured the meeting of the financial support of bankers who will loan money at a low rate in order to purchase the coal. Michael Burns, of Burns Brothers was appointed a committee of one to call a meeting of coal distributors of the various boroughs, and to have a committee of the distributors meet in conference with the Executive Committee of Domestic Supplies, when definite steps will be taken toward securing the coal.

Cincinnati, Ohio—The Hamilton County Fuel Administration has granted retail dealers an additional 25c. in price, effective May 15, on account of increased delivery cost, evidence that in some instances delivery costs have increased 100 per cent. being presented to the Administration. The Fuel Administration has directed the City of Cincinnati to make arrangements at once for the winter's coal supply for schools and city institutions, including the fire department, in order to aid in the movement to get as much work as possible out of the way before winter. The Cincinnati Traction Co. reports that it is accumulating reserves as rapidly as possible, present receipts running 1000 tons a month over current requirements.

Grafton, W. Va.—At the regular monthly meeting of the Grafton Coal Operators Association, held at the Willard Hotel here on May 2, George S. Brackett, of Flemington, W. Va., general superintendent of the Pitts-Vein Coal Co., was elected secretary-treasurer of the association, to succeed H. R. Bissell, resigned. David Williamson, of Wendel, Taylor County, W. Va., general manager of the Maryland Coal Co. and Simpson Creek Coal Co., was elected vice president to succeed Mr. Brackett. Mr. Brackett and Thomas Murphy, of Austin, W. Va., president of the association, were selected as delegates to attend the meetings of the state association being formed at Huntington, W. Va., and the next meeting of the National Coal Association at Philadelphia, Penn.

Columbus, Ohio—The recent order of the Director General of Railroads, prohibiting the construction of spurs and switches to new mines, excepting when the individual projects are approved by his department, has effectually stopped all mine development work in the Hocking Valley mining district. This is shown by the total absence of leases announced by the Buckeye Coal and Railway Co., of Columbus, which has been making on the average of about three leases weekly for new openings. The Buckeye Coal and Railway Co. controls a large acreage in the Hocking Valley and has been making innumerable leases to small operating companies for the opening of mines. The present company retains the sale of coal, and many tons were added to its selling amount as the result of the leases.

MARKET DEPARTMENT

Weekly Review

Early Buying a Stimulus to Production—Soft Coal Output Still Behind—Labor Short in Anthracite Region—New England Outlook Poor—Lake Trade Gaining Momentum

OPTIMISM rightly comes with sunny skies and high temperatures. The Fuel Administration early recognized this fact, and the "buy-your-coal-early" campaign was the result. With warm weather, argued Dr. Garfield, the public will soon forget the experiences of the past winter and delay until fall the buying of coal. This delay, the Fuel Administrator foresaw, would mean that many mines would have to close down for lack of orders, and as a stimulus to production the public is being urged to order its coal now—during the spring and summer months.

The matter of a sufficient supply of bituminous coal in this country has never been simply a question of production. It is at all times a question of adequate transportation facilities. The car-supply problem, furthermore, is one that seriously affects only the soft-coal mines of the country—the mines from which must come the fuel to keep our vital war industries going. It can readily be seen, therefore, that the final solution of the coal problem, insofar as it affects the shortage of bituminous coal, rests in large measure with the Railroad Administration.

Nothing proves this statement more conclusively than the showing made by the bituminous mines during the last two weeks, when record tonnages were produced. For the week ending Apr. 27, owing to an improvement in the car supply, these mines shipped a total of 11,668,000 short tons, an increase of 5.7 per cent. over the preceding week. For the four months ending April, 1918, the production of soft coal is estimated at 181,992,000 short tons, which is an increase of more than 5,000,000 tons, or about 3 per cent. over the same period in 1917.

In order to meet the estimated demand of 620,000,000 tons this year, however, the production for the first four months of 1918 should have been over 206,000,000 short tons. In other words, the soft-coal supply is behind more than 25,000,000 tons. Whether production will be maintained at a rate that will overcome this shortage depends on the railroads.

To the degree in which transportation difficulties are solved will the soft-coal problem be solved. Not only must the mines receive plenty of cars, but these cars must be distributed evenly over the entire week. A 100 per cent. car supply on Monday and nothing for the rest of the week will not correct the situation.

While the eastern bituminous fields are working short time for the reasons mentioned in the foregoing, the operators in the states west of the Mississippi report that they are forced to shut down because the public is not buying coal. The mines in these states can easily take care of the consumers in the respective territories allotted them under the zone system, but they must be kept working to maximum capacity during the entire year in order to provide a proper supply. The railroads, too, should be buying their coal now, so as not to conflict with industrial and domestic demand in the fall.

The anthracite region, instead of being confronted with a car-shortage problem, is hampered by a scarcity of labor in its efforts to maintain maximum production. The shipments of anthracite during the week ended Apr. 27 totaled 39,522 cars, an increase of 392 cars over the preceding week. This production is insufficient to take care of the demands, and the public, anticipating another scarcity next winter, is insisting on prompt deliveries. In the meantime more and more men are being drawn from the mines by the draft, while quite a number desert for other industries. The outlook for anthracite is not over-pleasing.

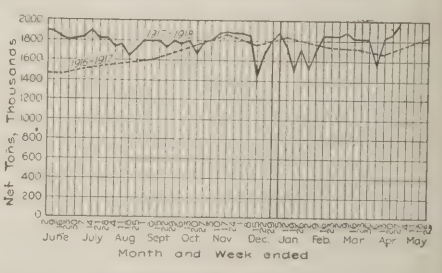
New England seems to be in a bad way for both anthracite and bituminous. With the needs for 1918-1919 fixed at 10 million tons by rail and 20 million tons by water (an increase of 5½ million tons by way of water transportation) the quantity sent there so far this year is below normal. Unless shipments are speeded up, the New England States will suffer a shortage next winter that will be even worse than it was last winter.

Shipment over the lake routes is proceeding in considerable volume, though the movement from the mines to the loading docks has diminished. Cargoes are not available for all the carriers offered, and as the ore movement is not yet large, ships are being detained at the ports to await the arrival of coal from the mines. Little anthracite coal has been loaded to date.

COAL PRODUCTION

The week ended Apr. 27 recorded not only the highest rate of production of bituminous coal during the past twelve months but the third successive week of rising production. Production of bituminous coal (including lignite and coal made into coke) is estimated at 11,668,000 net tons, an increase of 5.7 per cent. over the preceding week. The average production per working day is estimated at 1,946,000 net tons compared with 1,840,000 net tons last week and 1,680,000 net tons during April, 1917. Production for the month of April, 1918, is estimated at 46,478,000 net tons, an increase of 4,400,000 net tons, or 10 per cent., over April of last year. Production for the four months ended April, 1918, is estimated at 181,992,000 net tons, an increase of over 5,000,000 net tons or 3 per cent. compared with the same four months of 1917. The production of beehive coke during the week ended Apr. 27 is estimated at 652,000 net tons, compared with 614,000 the week previous. The average daily production is estimated at 109,000 net tons, an increase of 7 per cent. over last week.

The operators reporting produced 8,551,767 net tons or 77.5 per cent. of total production. These 4617 mines were operated to 72.2 per cent. of their full-time capacity during the week of Apr. 20. Losses attributed to car shortage declined from 18.1 per cent. the week of Apr. 13 to 16.2 per cent. and no market losses from 2.8 per cent. to 1.8 per cent. Labor shortage-losses were reported at 4.8 per cent of full-time capacity, as against 3.6 per cent. the week previous. Western Pennsylvania operators, representing 13.7 per cent. of the production of operators reporting, produced 81.8 per cent. of their full-time capacity, compared with 72.2 per cent. the week of April 13. Operators in the Fairmont field of West Virginia report production at 50 per cent. of their full-time capacity compared with 40 per cent. the week previous. Increase in production is attributed to improved car supply. Hazard and Northeastern Kentucky operators report increased production due to improved car supply. Improved car supply is also reported by the Cumberland-Piedmont operators and the Western Kentucky operators, but such improvement is partly offset by strikes in the former fields and labor shortage in the latter. Operators in western and Pacific coast states report increased production due to better market conditions. Kansas and Missouri operators alone report material decrease in production due to car shortage.



Beehive Coke—Improved car supply and better labor conditions caused beehive coke production in the Connellsville and adjacent districts to reach the highest point attained this year. Sixty-one of the principal operators reported production of 324,800 net tons during week ended Apr. 27, or 75.2 per cent. of their full-time capacity. The same operators shipped 166,450 net tons of coal.

Byproduct Coke—An increased supply of byproduct coal during week ended Apr. 27 resulted in the largest production since the weekly statistics on byproduct coke were begun. The plants of the country operated at 89.1 per cent. of maximum capacity as compared with 88 per cent. the week previous. Out of a loss of potential capacity of 10.9 per cent., only 5.1 per cent. was lost for lack of coal. No labor difficulties reducing output were reported. Losses due to repairs to plant decreased slightly. Material improvement

was reported by operators in New Jersey and Ohio, production by the operators of the former state rising from 84.7 per cent. the week of Apr. 20 to 88.8 per cent., and by the operators of the latter state from 93.8 per cent. to 96.6 per cent. Lack of byproduct coal caused the operators in Indiana to report the lowest ratio of production to maximum capacity at 79.2 per cent.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended Apr. 6	Apr. 13	Apr. 20	Apr. 27
Bituminous shipments, 123 roads	160,178	188,311	193,667*	204,599†
Anthracite shipments, 9 roads	32,223	37,760	39,130*	39,522†

* Revised from last report. † Subject to revision.

Anthracite shipments slightly increased during the week of Apr. 27. Nine roads reporting 39,522 carloads compared with 39,130 during the preceding week.

BUSINESS OPINIONS

Bradstreet's—With the Government operating in practically every essential line, civilian trade, while still large, has been subjected to further repression. Vim in war work, speeding up of the Liberty Loan campaign, extraordinarily large Government orders, further improvement in the outlook for food crops, and more cheerful sentiments regarding operations on the warring fronts, which latter factor is reflected in financial markets, are overshadowing features.

Dry Goods Economist—It is understood that all wool in the possession of dealers or growers, the new clip of 1918, and wools that are in transit from foreign countries will be put at the disposal of the Government and the major part of it will be taken over for army needs. The residue—the extent of which cannot be estimated—will later become available for the manufacture of fabrics for the civilian population's use. In cottons, the impression is growing that price regulation is nearer than ever before, and, according to statements by leaders in Congress, cotton exchanges may be closed by the Government to put a stop to speculation.

Marshall Field & Co.—Current wholesale distribution of dry goods is well ahead of the corresponding period of a year ago. Road sales for both immediate and future shipment show good increases over the same week in 1917. Merchants have been into market in about the same numbers. Collections are excellent.

Atlantic Seaboard

BOSTON

Anxiety continues over inability of consumers to make contracts. Important industries on priority list still uncovered. Railroad fuel question waits decision. State administrators now placing requisitions with district representatives. "Storrow order" all-rail cancelled, but will continue in new form. Water receipts disappointing. Thirty-four new ships coming from the Lakes. Work of paring down fuel allowances to "non-essentials" continues at Washington. "Smithing coal" prices flourish mildly. Anthracite receipts all-rail curtailed through embargoes. Large volume of steam sizes coming forward. Barges move slowly.

Bituminous—Notwithstanding that already six weeks of the coal year have passed, there is as yet no well formulated plan of handling the requirements of plants both large and small whose output is of great importance to the Government. Washington indicated a program, but tested by results it falls short of being practical and there is a wavering between state fuel administrators and Washington as to what requirements are to be made special cases and what are to be left to individual action and to chance. While New England plants are able to keep running on supplies eked out here and there, the anxiety increases over receipts in future. Production shows gains over a month ago, but so far New England has had a small share of the increase.

The situation here is the more urgent because of the Army's great need of cloth for uniforms, and every pressure is now being exerted upon textile mills to speed up their output. Supplies needed by the Red Cross are also dependent upon coal for New England cotton factories. One of these plants alone making army shirtings as well as surgical dressings, is using 4000 tons weekly, and because of labor and other conditions the great bulk of this fuel should come forward in weekly proportions. It should also come by water were the facilities adequate, but in the great shortage of shipping there is really no hope of keeping such a plant in operation exclusively by water borne coal.

Operators who furnished coal all-rail last year are many of them embarrassed by their interrupted negotiations with railroads. The latter are apparently obliged to wait until the Railroad Administration decides upon a policy. Meanwhile there are still "assigned cars" for certain railroad fuel, although the program of the Fuel Administration is all against them. Railroads in this territory that a fortnight ago were almost frantic in their efforts to relieve themselves of engine coal congestion now find the volume of coal in transit so much smaller that they are not adding to their storage as they were hoping to do.

The Garfield-McAdoo orders of Jan. 3, usually called the "Storrow" order, has now been cancelled, effective May 8, but a small volume of coal will continue to be at the disposal of the New England Fuel Administration for emergency purposes. Some of this coal to the extent of 20 cars daily is moving to each of three loading piers, namely, Port Reading, N. J., South Amboy, and Curtis Bay, Md. There is reason to believe that the "Storrow" order will soon reappear in new form for delivery all-rail. It is probable the different district representatives will be expected to furnish a given number of cars weekly, the same as has been done since Apr. 1, when "assigned cars" were abolished on the east end of the Pittsburgh division of the Pennsylvania Railroad.

At Hampton Roads it is again a case of too few bottoms for the coal available. Dumping has again slackened on this account and consumers at this end are correspondingly disappointed. The terminals here are by no means worked to capacity, although there are periods when demurrage accrues either on account of steamers "bunching" or because many of the steamers would not in normal times be considered at all suitable for this trade. The price regulations also have a bearing on the irregularity of loading and rehandling. The 35c. differential in favor of New River tends to create a preference for the piers where Pocahontas can be furnished, and at this end the heavy bonus granted "retail dealers" offers a strong temptation to factors who would ordinarily forward their coal from railroad piers.

In this connection the United States Shipping Board has authorized the statement that from now on there will be a steady flow of completed new vessels from the Great Lakes shipyards. Thirty-four of these are now en route for Atlantic ports, and of the whole number soon to be available 16 to 20 are to be put into the coastwise coal carrying service from Hampton Roads to New England. They approximate a total of 50,000 tons, but at least three times as many more are needed.

Under the wide open regulation as to coal for "smithing purposes" a fairly good-sized tonnage is moving into New England at prices around $7 f.o.b. mines. It is one of the scandals that the same kind of coal merchant who dabbles in "smithing coal" is also permitted to charge any rate he pleases on barge transportation that he may happen to have under "contract."

Anthracite—Embargoes continue an upsetting factor in receipts all-rail for a large area. A further cause is the recent repairs to Poughkeepsie Bridge in order to make it suitable for the new type of locomotive, several of which have already been delivered. A considerable tonnage of barley and culm is coming through for those steam-users who want to be forehanded.

Water shipments are still much hampered by the lack of tugs, although there are now domestic sizes on hand almost everywhere. At the same time the stocks on the wharves of Boston retail dealers is less than 25 per cent. what it was a year ago.

NEW YORK

No abatement in demand for anthracite domestic sizes. Report that Fuel Administrator Wiggin is to resign, and coalmen want practical coal man appointed. New England wants coal. Local retail dealers swamped with orders. Bituminous situation easier, but free coals are scarce. Bunker coals in greater demand.

Anthracite—There has been no abatement in the demand for coal. Although production figures show an increase over the previous week, receipts are insufficient to take care of the call for supplies. Reports of labor conditions at the mines indicate that they are becoming serious, and that in addition to the men going to war many are going into other industries.

A rumor that Albert H. Wiggin is to resign as state fuel administrator resulted in a telegram being sent to Dr. Garfield by the Wholesale Coal Trade Association of this city stating that the directors of that body request the appointment of a practical coal man as his successor should Mr. Wiggin resign. The telegram stated that in view of a possibility of a coal famine this year, the situation in New York under the circumstances demands calling into service a man who has a thorough knowledge not only of the requirements of this community and the territory depending upon it for its coal supply, but one who shall know thoroughly the producing district from which the supply must necessarily be drawn.

Shipments of anthracite during the week ended Apr. 27 were 39,522 cars as compared with 39,130 cars the week previous, an increase of 392 cars; while dumpings at the New York tidewater docks for the week ended May 4 amounted to 7303 cars as compared with 7286 cars for the previous week, an increase of 17 cars.

New England continues to call for coal, and the local shippers are being urged to send shipments forward. It is claimed that receipts so far this year are far below normal requirements, and unless shipments are speeded up at once the shortage next winter will be as bad as, if not worse than, it was last winter.

In New York City dealers are swamped with orders, the consumers having taken the advice of the Fuel Administration. There is hardly a day that some yard is not without coal. Egg and stove are in greatest demand. Most retail dealers have chestnut and pea, but more of the first-named coals are used by household consumers, hence the heavy demand.

The steam sizes are easier. Buckwheat No. 1 is easy, but not in oversupply. Rice and barley are more plentiful with quotations in some quarters slightly lower than a week ago. Wherever possible barley is being stored by consumers.

Contracts have been awarded for supplying the school buildings in Manhattan and the Bronx with coal for one year, but as no bids were received for furnishing fuel to the buildings in the other boroughs of the Greater City an agreement has been reached which provides that the schools will be kept in coal.

Current quotations, per gross ton, f.o.b., Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.15	$6.90
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	4.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	.....

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—Market conditions are more encouraging. With an improvement in car supply reports from the mines indicate heavier production and a better feeling among the mine workers. The increased production for the week ended Apr. 27 is reflected in the dumpings at the New York tidewater ports for the week ended May 4, when 6565 cars were dumped as compared with 6070 cars the previous week. However, the increased dumpings did not add materially to the available quantity of free coal, which is at a minimum here.

Receipts here are barely able to take care of the needs of regular customers which, in many instances, continue to be nearly up to full winter requirements notwithstanding the higher temperatures.

Operators are optimistic, however, of the future and believe that with a more equitable distribution of cars there would be a surplus of coal. They also point out that while many of the miners are now disgruntled because of the small number of cars furnished by the railroads and are threatening to seek employment elsewhere, they would willingly remain at the mines if they could be assured of steadier employment.

A slight improvement in cars is reported by operators along the Baltimore & Ohio where last month some of the mines received about 40 per cent. of their requirements. Some operators along this road have contracts for railroad fuel which do not expire until July 1

Some change for the better may be expected because of the cancellation of the Fuel Administration's order of last winter diverting certain shipments to New England. In the cancellation order, which took effect May 8, it is stated that the order is not now necessary because of the zoning system.

The shortage of fuel in New England is serious according to reports received here, and not much hope is held out unless more coal is sent to the Southern ports for transshipment, even though the United States Shipping Board shall provide more bottoms.

The demand for bunker fuel is heavy owing to the limited number of pools from which these coals must be taken.

BITUMINOUS PRICES

	F. o. b. New York Price	Mine Price	
	Gross	Net	Gross
Central Pennsylvania	$5.06	$3.05	$3.41
Maryland:			
Mine-run	4.84	2.85	3.19
Prepared	5.06	3.05	3.41
Screenings	4.50	2.55	2.85

PHILADELPHIA

Anthracite trade unduly stirred by newspaper reports. Shipments unimproved. Local committee labors to secure heavier receipts. Retailers cautioned against soliciting new trade. Misunderstanding as to distribution. Shipments of buckwheat coal forbidden until exemptions are granted. Bituminous trade unchanged. Situation continues serious. Future unpromising. Assigned cars continued.

Anthracite—All retail men are swamped with orders, and some of them have oversold their quota as based on shipments to them during the period of the present allotment—April, 1916, to March, 1917, inclusive. Published accounts anticipating another scarcity next winter have made the public more anxious than ever to stock their cellars, and the dealers have been tormented with insistent demands for prompt deliveries. The shipments show little improvement, and as coal is usually delivered by the dealers as rapidly as received, there is very little coal in the yards. It would appear that the dealers who depend on the smaller operators for the bulk of their supply are receiving a larger proportion of their requirements than those who are supplied by the companies.

The entire trade is hopefully awaiting the result of the local fuel administration's efforts to secure heavier shipments for them. Chairman Lewis has been busy compiling figures showing shipments, deliveries, stocks on hand, as well as orders unfilled. The dealers have been assured of his earnest efforts in their behalf to secure more coal for this territory within the next 60 days.

The fuel committee somewhat surprised the retailers by giving them written notice to use due caution not to solicit orders for new trade beyond their reasonable expectation of ability to fill such orders. The consumer was also warned that in placing his order with other than the regular dealer he risks not being supplied with coal, for the reason that the fuel administration's efforts to secure a proper allotment of coal for the city are based on each dealer's tonnage of former years. The dealers, however, have been directed to supply newcomers in their immediate neighborhood, irrespective of the fact whether they have been former customers.

This week the producing companies were somewhat startled by a drastic order handed down by the National Fuel Administration directing that they discontinue shipping at once all buckwheat to manufacturing plants until these plants secured permits from Washington. There were a few exemptions to this order, which were based on the exemption clause of the Garfield closing order under date of Jan. 17 last. The trade is entirely in the dark as to the reason for this order, and as a matter of fact up to the end of the week some of the shippers claim not to have received the instructions. There is no doubt of the issuance of the order, as your correspondent has seen the circular letter sent out. The suddenness of the ruling had a tendency to disrupt some shippers, especially those without storage room. As the order allowed the selling of buckwheat to retail dealers for domestic trade, several shippers availed themselves of this opportunity. In the meantime consumers succeeded in securing exemptions from the national administration and shipments are assuming a normal trend again. The operators are in the dark as to the cause for the move, and at first felt that possibly the Government intended to take the coal for some special use, but as they have not done so it begins to look as if the purpose of the order was to have their hand directly on the distribution of steam coal.

Another order that stirred certain anthracite shippers was sent out by the national anthracite distribution committee. This had particular reference to the producers and distributors of anthracite coal who have changed their selling agencies during the coal year 1916-17, and directed that these concerns must place their output in the same communities which received coal from these mines in the coal year beginning Apr. 1, 1916. The letter stated that unless this was done the output of such operations would be considered as "liquid" coal and the distribution directed by the above committee. It will be recalled that there were several changes of this nature during the above-named period, whether either by sale or expiration of lease, the selling agencies had been changed, the most notable being wherein the Pennsylvania R.R. disposed of its anthracite interests held through the Susquehanna Coal Co.

The prices per gross ton f.o.b. cars for line shipments and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5.70	Rice	2.65	3.65
Stove	4.75	6.05	Boiler	2.45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—Conditions do not improve and have really shown very little variation for the past two months. Every operator continues to clamor for more cars and then some more. Short working time is yet the rule at numerous mines, yet all the while promise is made that rail conditions will improve so as to relieve the situation. Locally the important plants, such as public utilities and concerns on war material, continue to be fairly supplied, while other less essential industries are curtailed. Shippers continue to complain that the practice of assigning cars is not yet entirely eliminated.

BALTIMORE

Coal supply here largely at the mercy of diversions. City served in rather haphazard fashion with industrial fuels. Hard coal receipts comparatively light.

Bituminous—"About 300 cars of coal are being diverted to Baltimore district." That was the message of hope that came to the trade and business here after a week of scarcity caused by railroad congestion that prevented coal directly consigned from coming through. This coal is being distributed here at present, supplemented by directly consigned coal that had edged its way past the jam at the Cumberland gateway. For several days there was a glowing example of the fact that the Baltimore & Ohio and Western Maryland Ry. were unable to care for their coal delivery obligations in this territory without attempting to supplement the extra amount cut off from this section by the embargoing of the Pennsylvania deliveries. The 15,000 or so tons diverted here from their original northern destinations not only aided in preventing shortage among consumers, but assisted in clearing a part of the railroad congestion to the westward of this point.

Anthracite—Hard coal dealers here report that the summer weather has brought a lessened urgent call for hard coal. Coal men are rather glad of a let-up in demand for immediate deliveries, because the receipts of anthracite are comparatively light. Constant urging by Fuel Administration officials, supplemented by announcements here by the Maryland fuel administrator that people should put in their supplies up to two-thirds of requirements at once, had caused more of a rush for immediate delivery than the coal men could supply. Now the lull will allow a catching up. Few of the coal men are figuring that they are to secure enough hard coal over summer to enter the fall term with even the two-thirds supply in the bins of their household customers.

Lake Markets

PITTSBURGH

Car supplies slightly improved. Lake shipments light. Little coal for stocking purposes.

There has been a slight further improvement in car supplies, and the Pittsburgh district is now working fairly well, although not up to capacity by any means. Conditions are better than 30 days ago, when the Geological Survey report showed 27.8 per cent. of the capacity idle on account of car shortage. As to the Pittsburgh and Connellsville districts generally, however, conditions were not as good even as shown by that report, which covered western Pennsylvania as a whole. The Panhandle division has been particularly short of coal cars right along, while the Connellsville district shippers have been very short. The railroads have endeavored to place coke cars first in that region, and coal cars next, and even the coke cars have been quite below requirements. Numerous exceptions, however, are made in the case of byproduct coke. The difference between coal and coke car supplies is shown by the report, for the week ended Apr. 27, by certain coke producers in the Connellsville, Greensburg and Latrobe districts. Their coke car shortages represented 8.6 per cent. of their capacity, while their coal car shortages represented 18.8 per cent. of capacity. Their mine labor shortage was reported very high in the case of coal, presumably because they figured their mining labor full as to coal destined for their beehive ovens and allotted only the remaining labor to their raw coal business.

Lake shipments have increased a trifle, but are still very light, and the movement is not expected to be on in full for several weeks yet, or until the vessel movement is in full swing.

Coal consumers are fairly well supplied for current needs, but are obtaining little coal to accumulate stocks, as the authorities are so anxious that they should do at this time. There is little free coal in the market. Prices remain quotable at the Government limits: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with 15c. brokerage allowed to be charged extra under certain conditions.

BUFFALO

Plenty of bituminous in consumers' hands, especially in Canada, but clamor for anthracite is as general as ever. Shippers do not see any real excuse for so much fright over the anthracite situation.

Bituminous—The jobbers as a rule do not find it easy to fill their orders and they are groping along as best they can between the operators, who have no real need of them, and the consumers, who give them business sparingly. All reports from Canada agree that the territory covered from Buffalo by rail is full of bituminous coal, so that the sellers have paid large demurrage charges. Some of them are still with coal on track that there is no demand for. A great part of this coal is of poor quality. It would not sell here, and all that could be done with it was to send it on till it reached the end of the line. There it stuck and there much of it will remain unsold awhile yet.

The chief reason for the Canadian situation is that a margin of 30c. profit is allowed there, while only 15c. can be realized here. Some of this poor coal has been taken by the railroads, but even they cannot well absorb all of it. So the paying of demurrage must go on awhile yet. It is said that as soon as the water coal destined for the St. Lawrence valley trade by shippers from Ohio ports gets well started the situation there will be much the same that it is now in the district further west in Canada.

Bituminous prices are still pretty low, so that the consumer has the Fuel Administration to thank for that at least, being $4.45 for thin-vein Allegheny Valley, $4.25 for Pittsburgh lump, $4 for mine-run and $3.75 for slack, all per net ton, f.o.b. Buffalo.

Anthracite—The actual scarcity of this coal is not very great, for the shippers say that they have distributed as much this season as they did last season to date. Some claim that they have done more than that, so far as the city is concerned, but that is not easily determined. At any rate the consumers are not at all satisfied and are making all possible effort to get more. The rule not to furnish any coal except on written order accompanied by a statement of the needs and the amount on hand is strictly adhered to, but the retailers find that if they get any amount to handle they must be at the trestles very early in the morning, for the supply usually gives out before noon. Some days the trestles get none, and never do they get enough to keep the deliveries busy.

Whether this proceeding is going to be such that the actual needs are met before winter is hard to say, for it will require a house-to-house inspection to find how much the consumers have on hand. They will

not make that known if they can help it. All will buy much more than they need if they can get it. Shippers are advising everybody to use as much wood as they can for fuel, and it is expected that a large amount of bituminous coal will be burned in homes next winter, especially where the anthracite supply is most uncertain.

The lake season opens slowly, with only a part of the shippers supplied with coal for that trade. The amount loaded so far is 69,000 tons for Chicago and 20,400 tons for Milwaukee in April, and 18,000 tons for Chicago, 10,000 tons for Duluth-Superior and 13,500 tons for Milwaukee so far in May. Rates are 48c. per net ton to Duluth, 55c. to Milwaukee and 65c. to Chicago.

DETROIT

Receipts of bituminous are materially reduced. Anthracite is scarce. Lake shipments are of good volume.

Bituminous — Shipments of bituminous coal coming into Michigan are lighter than a month ago. Traffic records show the movement of 27,434 cars into the state between Apr. 1 and Apr. 28, of which 24,315 were bituminous and 3119 anthracite. Detroit's average daily receipts during this period were 395 cars of bituminous and 69 cars of anthracite. Estimates on local consumption requirements call for a daily supply of all kinds of coal, amounting to about 700 cars. Further reduction of the volume of bituminous coal shipments is developing with the opening of navigation season on the lakes. This curtailment is the result both of demands on the mines for lake coal and of a shortening of transportation equipment, resulting from the diversion of cars and locomotives from all rail routes to those over which the coal is hauled to lake loading docks.

The local situation is made more complicated as the result of a clash between W. K. Prudden, Michigan fuel administrator, as opposed to the Wayne County fuel commissioners and Detroit coal dealers. After allowing Detroit dealers a margin of $2.50 a ton for deliveries of domestic coal made during the summer months, Mr. Prudden has become something of a storm center. Detroit dealers assert it is impossible for them to handle domestic coal at the margin allowed and make a profit. They say that rather than continue business at a loss, they will close their yards. The Wayne County fuel commissioners, Edgar B. Whitcomb, chairman, James Couzens and Charles A. Dean, support the Detroit dealers' contention, though they were unable to agree among themselves what would be a just margin. Mr. Couzens suggested $2.60 a ton, Mr. Dean desired $2.75, and Mr. Whitcomb thought $3 necessary.

Owing to the differences, coal distribution to Detroit consumers of domestic stock have been much restricted, and time which should have been utilized in stocking up household consumers has seen little progress in that direction from the Detroit Board of Commerce, which also is endeavoring to obtain from the Federal Fuel Administration a modification of the zone system that will give Detroit a larger supply of West Virginia coal, as a substitute for Pocahontas and New River coals, neither of which is now supplied the Detroit market.

Anthracite — Incoming shipments of anthracite have been so scanty that the receipts of retail dealers have been scarcely more than sufficient to supply current needs of their customers. The state fuel administrator says an allotment of anthracite will soon be made to Detroit. Meantime the opportunity to put in stocks required by household consumers for next winter is being lost.

Lake Trade—Shipments over the lake routes is proceeding in considerable volume, though the movement from the mines to the leading docks has diminished. Cargoes are not available for all the carriers offered and as the ore movement is not yet of much volume, ships are being detained at the ports to await the arrival of coal from the mines. Little anthracite coal has been loaded to date.

COLUMBUS

The coal trade has shown more strength during the past week. Lake trade is increasing, and has had the effect of absorbing all tonnage. Steam business is rather more active than previously.

The coal trade in central Ohio territory has been rather strong in every department during the past week. This is especially true of domestic and lake tonnage, which has been snapped up rapidly. Steam business continues to show considerable strength, as mine-run is not as plentiful as formerly. Taking it all in all, the trade is in good shape and future prospects are for continued activity.

Domestic trade is still attracting the bulk of the attention of producers, jobbers and fuel administrators. The warnings recently issued to householders to lay in their fuel supply have met with prompt response, with the result that dealers in every section are active. With Pocahontas and West Virginia splints arriving on the local market in larger quantities, many private users who have been holding back for the fancy grades are now placing orders. Retailers are busy making deliveries, and all available trucks and teams are employed. Retail stocks are not so large as formerly, as many have been using from their surplus. Retail prices continue firm at the levels which have prevailed for some time. Anthracite is quite scarce on the local market.

The steam business is rather active, as some of the larger users are stocking up to a large degree. Uncertainty as to price fluctuations is now about over, and consequently some of the larger consumers who have been holding back are placing orders. Most of the steam orders are for immediate shipment. Railroads are taking coal for current needs only, as many have large surplus stocks on hand. The smaller consumer of steam varieties is not stocking, being content to buy in the open market. On the whole the steam trade is more active than formerly.

Lake trade is becoming more important as the season advances. This is especially true as it affects coal produced in Ohio and West Virginia. A considerable tonnage is moving to the lower lake ports and vessels are being loaded. Ice in the upper lake channels is still interfering with the free movement, but this is expected to pass away in the near future. Loadings at the docks of the lower lake ports are growing larger.

Production is better since the car supply has been improved. This is especially true of the Hocking Valley, where the output is close to 80 per cent. The fact that May 1 was kept as a holiday reduced the output to a certain extent. In eastern Ohio operators are still worried by a rather short car supply.

CINCINNATI

Improved car supply has helped the situation, but supply remains below demand. Storage orders are on an unprecedented basis.

Reports from the various nearby coal-mining districts indicate that in most cases a better car supply is being received, the average probably running as high as 75 per cent. of requirements. As this is much better than has been the case for some months, the volume of coal loaded and forwarded is also larger than for some time. So far, however, actual receipts have not been such as to run much ahead of the orders actually in the hands of dealers, although it is understood that such orders are to be filled from time to time during the spring and summer, as supplies of coal become available. This is especially true of domestic consumers, thousands of whom have placed with their dealers orders covering their entire winter's supply, to be cared for as the dealers may find convenient. Large industrial consumers are also placing orders in advance of current requirements, in order that they may accumulate substantial reserves for next winter, in line with the advice of the trade and of the Fuel Administration. These orders explain the heavy demand for coal, and will go far toward taking care of all that can be shipped to this market during the warm weather.

LOUISVILLE

Good weather conditions lead to smaller domestic demand for immediate use. Domestic stocking demand good. Steam buyers signing up contracts freely.

Mild weather since the latter part of April has resulted in a much lighter demand from the retailers, except in that large domestic consumers are placing heavy stocking orders. Indications are that winter will find more coal stored by domestic consumers than even the Fuel Administration had anticipated, according to some of the local coal men. The steam demand is also good, but is principally on contract orders.

The situation at the eastern and western Kentucky mines shows little if any improvement, the car supply still being short, while labor is scarce and steadily growing scarcer. However, indications are that none of the mines will have to close down this summer during the dull period, as has been the case with some of the smaller mines in past years. It is believed that it will be easier to hold labor, as operations will be controlled almost entirely by the car supply.

So far local retailers have not made much headway toward piling up any yard stocks, as the domestic demand is strong enough to keep the yards fairly well cleaned up. Some little western Kentucky coal has been looking for an open market, but as a whole the supply is well taken care of.

BIRMINGHAM

Increasing priority demands bringing about an embarrassing condition in the trade. Nonessential industries are feeling the pinch of a short and uncertain supply. Domestic receipts continue unsatisfactory in volume. Mine capacity not being obtained, due to slack working schedules principally.

Coal producers in this field are now complying with Government instructions to supply industries and other classes of steam users certified as being essential to the welfare of the nation with 100 per cent. of their requirements, or with such a proportion thereof as possible, before turning their attention to the nonessential consumers. As a result, the fuel question with the latter class is becoming more and more serious. The Southern Ry. made a substantial increase in its demands upon the mines on its system the past week, and it is understood that its tonnage requirements from such operations for the current week will be based on 47 per cent. of the production. This and other interferences with the normal movement of coal to regular customers is causing much confusion in the trade and embarrassment to consumers not in the preferential class. Free coal is indeed scarce, and the majority of the available tonnage is of an inferior grade.

Complaint is made that domestic receipts are very unsatisfactory and uncertain. Hardly any local yards have made any progress in stocking—some are kept clean by deliveries on current orders. Retail prices will be boosted 45c. per ton May 16, it is understood, though the local fuel board has not yet announced the increase. This amount will be added to the mine prices when the new wage scale and agreement is put into effect by the commercial operators. Furnace companies will receive little or no benefit from the increased mine price, as they have a limited tonnage for the market.

Much relief could be afforded the situation by an increased production. However, mine labor continues to manifest indifference. Comment is general that, although there is some labor shortage, many operations have full working forces and such mines are falling far short of capacity output. The Miners' Union ratified the recent wage agreement at their convention last week, but such action is not expected to boost production, in the light of past experiences.

Coke

CONNELLSVILLE

Slight increase in shipments. Labor shortage more in evidence. Prospective influence of four new byproduct plants.

There has been a slight gain in Connellsville coke shipments, but the movement is still not altogether adequate. With long range comparisons, the blast furnaces are distinctly better supplied than 30 days ago, and of course vastly better than in January or February; but there is still considerable lack of coke. In the first place, many of the furnaces, particularly merchant stacks, are running at gaited rates, being unable to operate full, and in the second place there are a number of idle furnaces which it is desired to blow in. Very rarely are any furnaces banked nowadays, but this does not show that production is up to the available capacity, by any means.

Labor shortage is somewhat more in evidence, partly by reason of the change of season, whereby some men are attracted to other employments, and partly by reason that with somewhat better car supplies there are more jobs. Undoubtedly the irregular operation of the past few months has induced some men to seek steadier employment. Their wages at the coke works are very high, at scale rates, but practically all the work is piece work.

A decided change in the situation as to coke supply is in near prospect, by reason of several byproduct coke operations nearing completion. The 180-oven plant at Cleveland of the American Steel and Wire Co. is expected to make its first coke this week. The Lorain plant of the National

Tube Co., 208 ovens, and the Clairton plant of the Carnegie Steel Co., 640 ovens, are expected to begin making coke late next month. All three plants should be running at capacity within a couple of months after making their first coke, making easily 75,000 tons of coke a week, and the shortage of Connellsville coke has hardly amounted to more than that in the past two months The coke will, of course, go only to Steel Corporation blast furnaces, and much of the coal must come from the Connellsville region, but the Clairton coal will move by river exclusively, thus relieving the railroads to that extent at any rate. The Solvay plant in the Ironton district, 40 ovens, is expected to be operating some time next month. It has made a number of ten-year coke contracts with merchant blast furnaces in the Ironton district. That district has been suffering particularly from coke shortage for a year or more.

Very little free coke appears in the market. Market prices remain at the Government limits: Furnace, $6; 72-hour selected foundry, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Apr. 27 at 343,865 tons, an increase of 6989 tons. Owing to incomplete returns shipments were not reported, except that river shipments were 17,620 tons, against 10,500 tons the preceding week.

Buffalo—The reports from the coke districts agree that it is difficult to get cars, especially for moving the coal from the mines to the ovens. So far as can be learned the furnaces in this district are getting coke enough to keep them running, but it is with much difficulty. Much doubt is expressed of the ability to do this were it not for the byproduct plants here, which not only provide the supply of their own concerns, but also sell considerable to the other furnaces, which are dependent on outside production. Prices are on Government basis, with $2 freight added.

Middle Western

GENERAL REVIEW

Shortage of equipment limits the storing of any great amount of coal regardless of the willingness of the public to put in large stocks.

Large storage orders have been placed with producing companies, but the limited car supply has prevented any great tonnage movement. At the solicitation of the Fuel Administration and operators the consumers have, in many instances, begun taking all the coal available, not only to provide sufficient fuel for immediate needs, but to make an earnest effort to create a surplus for future contingencies. So far the good intentions of consumers have not met with any measurable success, because of the failure of the railroads to provide a sufficient car supply. In few cases has the supply of cars been sufficient to give the mines more than 80 per cent. working time, and reports from some of the mines state they have not worked to 50 per cent. of capacity. During the past week the railroads have been buying considerable tonnage; in fact they have absorbed all the surplus sized coal, which has caused some worry with regard to finer grades. This is true in the Springfield and Fulton County districts, where there is a considerable amount of screenings unloaded at the mines. When the new zone plan went into effect there were some substantial contracts on screenings for movement to Kansas City, Mo. The cutting off of this market seriously affected the central Illinois fine coal market, as the movement had been of long standing, and necessitated the finding of another market.

Market conditions on high-grade Illinois and Indiana size coal are excellent, although some difficulty is reported in moving coal at the Government price from the inner-group territory.

The movement of anthracite into the Middle West has not anywhere come up to expectations, dealers claiming that this is due to the heavy eastern demand, which is having the first call.

CHICAGO

Railroad congestion continues to be embarrassing to the Chicago coal men.

The solution of the coal situation was again put up to the railroads this past week. The storage demand has suddenly become strong, and it is needless to say the mines will have all they can do provided they can at all times have a full car supply. While Chicago is a dumping-ground for anything that looks like coal, some grades of Illinois and Indiana have not brought the full Government price. Screenings have sold off 15c. per ton. This 15c. was given to the jobber, who in turn effected movement at the Government price. Friday and Saturday the market stiffened on fine coal and no off sales have been reported.

One of the gratifying results of the "buy your coal now" campaign is that users have fully satisfied themselves that it will be impossible to get eastern bituminous and that they must use either Illinois or Indiana; hence they are fast falling in line with their storage orders. Hard coal continues to move slowly, although there is some improvement over the previous week.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky
Domestic lump	$2.65@2.80	$2.65@2.80	3.10@3.25
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25
Egg	2.65@2.80	2.65@2.80	3.10@3.25
Small egg or nut	2.65@3.80	2.65@2.80	3.10@3.25
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00
Screenings	2.15@2.30	2.15@2.30	2.60@2.75

MILWAUKEE

Docks again busy receiving coal. Seventeen cargoes arrive in one week. Deliveries of the new supply of anthracite now being made. Hard coal to be 30c. lower than last season.

Lake traffic is in full swing again and coal cargoes are arriving daily, the first of the season having been received on Apr. 30. Up to and including May 6, 17 cargoes aggregating 130,747 tons, were docked. Of this amount 27,236 tons were hard coal. A more even flow of receipts is expected this season. Last year the movement was very irregular. Capt. W. C. Richardson, of Cleveland, a member of the mobilization committee, was on hand when the first cargo arrived. Because of the strike at the Escanaba ore docks, he ordered three vessels with capacity amounting to 27,700 tons, to proceed light to Lake Erie for coal.

Reports from 29 Wisconsin counties to the state fuel administration office are in effect that wood cutting is being prosecuted on a scale never before known, the increase ranging all the way from 25 to 400 per cent. Special Fuel Assistant Snead suggests that Milwaukee put in a supply to meet an emergency.

As a measure of conservation, Fuel Administrator Fitzgerald has issued an order limiting florists to 50 per cent. of their normal supply of coal. The business will be crippled, but the authorities hold that it is not necessary to the life and comfort of the American people.

The Wisconsin Railroad Commission has requested Federal Fuel Administrator Garfield to conduct a thorough examination into the cost of handling coal on the docks. The action was taken at the instance of Wisconsin public utility operators, following permission to them to increase their rates on account of the increased cost of coal.

The city fuel stations have been closed for the season. A total of 1,500,000 lb. or 825 tons, was sold at ½c. per pound. The matter of their reopening will depend upon circumstances.

ST. LOUIS

General conditions show considerable improvement and future prospects unusually good. Carterville is entirely oversold, and the market is beginning to tighten on everything excepting steam coal. Shortage of equipment continues and transportation is slow. Shortage of labor general. Small anthracite shipments and of poor quality.

The local situation is unusually good. Conditions in the past week have entirely changed, and it is almost impossible now to buy Carterville coal. The same may be said of DuQuoin coal. To begin with, there is a shortage of cars in the Carterville field, and the mines are not working regularly. Added to this is the fact that the tonnage of nearly all mines seems to be decreasing on account of labor shortage.

The general prosperity has brought about a desire on the part of the consumer to buy the best coal obtainable, with the result that the demand for Carterville is so far ahead of the available supply that nearly every mine in the Carterville field is sold up to the first of July, figuring on the present car supply.

In the DuQuoin field the car supply is short, and conditions are somewhat similar to those in the Carterville field. The Mt. Olive situation is fairly good. Car supply is better here than in the other fields, and the mines are working better time, with a better labor supply, although transportation is somewhat slow. This accounts in one way for the shortage of cars in the Carterville and DuQuoin field, inasmuch as the railroads are not moving some of their equipment as well now as they did under the adverse winter conditions. The demand for the Mt. Olive grade is exceptionally good locally.

In the Standard field the situation continues to improve, and while coal is being sold under the Government maximum price, indications are that this will not continue long. There have been instances in the past week where 2-in. lump has sold as low as $2.35 and 6-in. lump as low as $2.50. The car supply in this field on some roads is fairly good, but on the Illinois Central and Missouri & Ohio it is extremely bad.

The reconsigning restrictions also have a tendency to retard the equal distribution of coal, and this in itself has prevented a large tonnage of coal moving to places where it is needed.

The railroads have begun to buy. During the past week something like 1000 to 1500 cars of coal have been bought on the open market, with prices ranging from $2 to $2.15 for mine-run, depending on the period of shipment. They furnish their own cars.

The steam condition from all the fields is extremely poor. Carterville screenings are down to $2, and screenings from the DuQuoin field have gone as low as $1.75, while Standard screenings have been down to $1.40; and rumor has it that a lot of Standard screenings were sold in Chicago for the freight and demurrage.

There is little Arkansas coal coming in, and such small tonnage of anthracite as comes in from the east is off grade and off size and is not good coal.

While the market is off a little in a general way, quotations are the Government maximum, which is as follows:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@3.00	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@3.00	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 2 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 3 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 4 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 5 nut	2.15@2.40	2.15@2.40	2.15@2.40
2-in. scrgs	2.15@2.40	2.15@2.40	2.15@2.40
2-in. lump	.....	.....	2.25@2.50
3-in. lump	.....	2.50@2.65	.....
Steam egg	.....	2.35@2.50	2.25@2.40
Mine run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	2.65@3.00	2.65@3.00	2.65@3.00
No. 2	2.65@3.00	2.65@3.00	2.65@3.00
No. 3	2.65@3.00	2.65@3.00	2.65@3.00
No. 4	2.65@3.00	2.65@3.00	2.65@3.00
No. 5	2.15@2.30	2.15@2.30	2.15@2.30

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

	Current	One Month Ago	One Year Ago
CINCINNATI			
No. 2 Southern foundry	$35.90	$35.00	$37.90
No. 2 Northern foundry	33.26	34.26	....
NEW YORK †			
No. 2 X Northern foundry	34.25	34.25	41.50
No. 2 plain Northern foundry	33.75	33.75	.....
No. 2 Southern foundry	39.00	38.75	.....
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	35.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	41.00
No. 2 Southern foundry	37.00	37.00	.....
PITTSBURGH			
Bessemer iron *	36.15	37.25	42.95
Basic iron *	32.00	33.95	40.00

* These prices include the freight charge from the valley to the Pittsburgh district. † Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

		—New York—			
	Mill, Pittsburgh	Current	1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.195	$4.75	$4.27	$4.20
Channels, 3 to 15 in.	3.00	4.195	4.75	4.27	4.20
Angles, 3 to 6 in., ¼ in. thick	3.00	4.195	4.75	4.27	4.20
Tees, 3 in. and larger	3.05	4.245	4.80	4.27	4.25
Plates	3.225	4.45	6.50	4.52	4.45

BAR IRON—Prices in cents per pound at cities named are as follows:

	Pittsburgh	St. Louis	Denver	Birmingham
Apr. 1, 1918	3.50	4.17	4.05	4.38

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.30	$4.85	$4.25	$4.25	$4.80	$4.75
Cut	3.75	5.25	.....	4.40	....	6.40	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh Current	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.90	$6.00	$4.50	$5.30	$6.25	$5.30	$5.00
Track bolts	4.90	8.90	5.50	Pre-	7.45	6.75	6.00
Standard section angle bars	3.25	....	4.45	mium	4.90	....	4.30

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+10%	+35%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.25	$6.50	$6.50	$6.25	$7.50	$6.50
Assorted	5.40	6.50	6.50–7.00	6.40	7.75	6.75

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	—New York— Current	1-Month Ago	One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$58.35	$58.35	$58.00	$57.55	$57.00	$65.00	$61.00
6 in. and over	55.35	55.35	55.50	54.55	54.00	62.00	58.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	—Pittsburgh— Current	One Year Ago	—Chicago— Current	One Year Ago
Standard Bessemer rails	$65.00	$38.00	$65.00	$38.00
Standard openhearth rails	67.00	40.00	67.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	58.00	*3.135 (100 lb.)	53.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	57.00	*3.09 (100 lb.)	54.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	53.00	*3.00 (100 lb.)	52.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$31.50	$30.25	$35.00
Stove plate	25.00	22.25	20.00
No. 1 machinery cast	34.00	26.50	21.50
Machine shop turnings	15.25	15.50	20.00
Cast borings	15.25	15.25	19.00
Railroad malleable cast	34.00	27.00	25.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.28	$0.17

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	15c.	14c.	15c.
Hollow	24c.	25c.	...

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜	44%	17%	¼ to 1½	33%	17%
½	48%	33⅓%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¾ to 1½	33%	18%
½	45%	36⅓%			
¾ to 1½	49%	36½%			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	—Black— New York	Chicago	St. Louis
⅜ to 3 in. butt welded	38%	42.8%	40.1%
3½ to 6 in. lap welded	18%	38.8%	36.1%
	—Galvanized— New York	Chicago	St. Louis
⅜ to 3 in. butt welded	22%	27.8%	25.1%
3½ to 6 in. butt welded	List	24.8%	22.1%

Malleable fittings. Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 15 and 5%.

SHOP SUPPLIES

NUTS—From, warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	—New York— Current	One Year Ago	—Cleveland— Current	One Year Ago	—Chicago— Current	One Year Ago
Hot pressed square	$1.05	List	$1.40	$1.90	$1.05	$3.00
Hot pressed hexagon	.85	List	1.20	1.70	.85	3.00
Cold punched square	1.00	List	75	1.40	1.00	2.50
Cold punched hexagon	1.00	List	75	1.40	1.00	3.00

Semifinished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40%	50%
Chicago	50%	45%
Cleveland	60%	50%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
¾ by 4 in. and smaller	30—5%	40—10%	40—10%
Larger and longer up to 1 in. by 30 in.	30%	30—5%	35—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York..... $3.00 Cleveland..... $3.00 Chicago..... $3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York..... $3.50 Cleveland..... $3.50 Chicago..... $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	30%	40%	40%*
Tinned	30%	40%	40%*

* For less than keg lots the discount is 35%.

Button heads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in., sell as follows per 100 lb.:

New York..... $6.09½ Cleveland..... $5.85 Chicago..... $5.50

Coneheads, same sizes:

New York..... $6.19½ Cleveland..... $4.50 Chicago..... $5.60

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	Chicago	St. Louis	Birmingham	Denver	Pittsburgh
Cup	7	5¼	6.9	7½	10½	7½
Fiber or sponge	8	6	7.4	7½	15	7½
Transmission	7	6	7.4	7½	13	8½
Axle	4½	4	3.6	3	5	5¼
Gear	4½	4½	7.0	7½	6	3½
Car journal	22 (gal.)	3½	4.5	3	6	7½

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	90.00	65.00	100.00	65.75	100.00	60.00
Commercial	50.00	35.00	22.00	20.75	22.00	25.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in	75c. per ft.
Common, 2½-in	40%

Air

First Grade	Second Grade	Third Grade
¾-in. per ft $0.55	$0.30	$0.25

Steam—Discounts from list

First grade 30% Second grade 30–5% Third grade 40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	40+5%	35%
Denver	35%	30%
Birmingham	35%	40%
Chicago	30—10%	40—5%
Cincinnati	40—10%	40%

RAWHIDE LACING—40% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.65
Duck and rubber for piston packing	1.00
Flax, regular	.90
Flax, waterproofed	1.10
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.90
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.10
Asbestos wick, ¼- and 1-lb. balls	.65 to .70

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20% List
Galvanized cast steel rigging	30%
Bright plain rigging	17½%
Bright cast steel	5%
Bright iron and iron tiller	

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0 34½	Atlanta	$0.36
New York	33¼	Denver	35½
Cincinnati	33½	Kansas City	34
Chicago	32½	New Orleans	33
St. Paul	34	Seattle	33½
San Francisco	31	St. Louis	33
Pittsburgh	36	Los Angeles	32

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING		BLOCKS AND SHEETS	
Pipe Size	Standard List Per Lin. Ft.	Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1-in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2-in.	.60
3-in.	.45	2½-in.	.75
8-in.	1.10	3-in.	.90
10-in.	1.30	3½-in.	1.05

85% magnesia high pressure 15% off

For low-pressure heating and return lines: 4-ply 58% off; 3-ply 60% off; 2-ply 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw per barrel	$1.55*	$1.26	$1.65	$1.25	$1.65	$1.25
5-gal. cans	1.65*	1.36	1.80	1.35	1.75	1.30

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red			White			
	Current		1 Year Ago	Current		1 Year Ago	
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
25 and 50-lb. kegs	11.25	11.41	11.25	11.50	11.25	11.00
12½-lb. keg	11.47½	11.62	11.50	11.75	11.47½	11.25
100-lb. keg	11.02½	11.19	11.75	12.00	11.02½	11.50
5-lb. cans	11.82½	15.25	13.25	13.50	11.82½	13.00
1-lb. cans	13.72½	14.62½	13.25	13.50	13.72½	13.00

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$12.00	Birmingham	$15.00
St. Louis, salmon	9.00	Denver	8.50

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½ lb. rolls	35c. per lb.
Rubber tape, ½-lb. rolls	45c. per lb.
Wire solder, 50-lb. pools	45c. per lb.
Soldering paste, 1-lb. cans	50c. per lb

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.l.	L. C.l.	C.l.	L.C.l.	C.l.	L.Cl
No. 1 grade	$1.30	$1.55	$1.60	$1.75	$1.90	$2.05
No. 2 grade	1.15	1.30	1.45	1.60	1.75	1.90

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.95 per roll in carload lots and $2.20 for smaller quantities.

Shingles, red and green slate finish cost $5.25 per square in carloads, $5.50 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq. ft.)	64	65
Tar pitch (in 400-lb. bbl.)	20	21
Asphalt pitch (in barrels)	35	40
Asphalt felt	72.50	77.50

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
4–5	$3.10	$3.10

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$80.00	$137.00
Chicago	79.00	137.00
Denver, per ton	11.00	200.00
Kansas City	75.00	140.00
St. Paul	56.00	110.00
Boston	80.00	150.00
Birmingham	61.20	114.80
Cincinnati	68.80	129.00
Pittsburgh	86.50	147.10

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$40.00	$31.00	$38.00
Birmingham	30.00	33.00	28.00
Pittsburgh	48.50	48–50	50–55

	8 x 8-In. x 20 Ft. and Under				12 x 12-In. 20 Ft. and Under	
	Y.P.	Fir	Hemlock	Spruce	Y.P.	Fir
Boston			$45.00			$35.00
Kansas City	$34.50	$38.00			$39.00	40.00
Seattle	24.50	24.50	24.50	$24.50	24.50	24.50
St. Paul		51.50	44.00	44.00		60.00
Denver		37.00		33.00		40.00
Atlanta	25.00				30.00	
San Francisco		28.00	28.00	28.00		28.00

	1-In. Rough 10 In. x 16 Ft. and Under			2-In. T. and G 10 In. x 16 Ft.	
	Y.P.	Fir	Hemlock	Y. P.	Fir
Boston			$35.00		$35.00
Kansas City	$47.25	$53.00	53.00	$54.50	58.00
Seattle	24.50	24.50	24.50	24.50	24.50
St. Paul		39.00	38.50	50.00	44.00
Denver		37.00	32.00	32.00	
Atlanta		37.00		30.00	
San Francisco		28.00	28.00		28.00

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$12.00	$15.00	$31.00	$18.50	$16.25	$31.25	$13.50	$17.40	$36.30
10	22.15	25.25	50.05	25.00	28.50	56.40	30.30	34.30	67.60
8	31.40	24.25	69.50	34.85	38.85	74.70	42.80	46.85	
6	49.40	53.30		59.75	64.25		63.60	74.10	
4	71.30	76.15		84.40	84.90		101.75	106.55	
2	108.00	113.65		125.50	132.00		151.50	163.00	
1	140.40	147.85		163.00	171.15		201.00	209.50	
0	176.85	176.85		216.00	225.00		276.00	285.00	
00		239.45		263.00	273.50		317.00	330.00	
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0000		357.00		388.50	400.50		508.00	516.00	

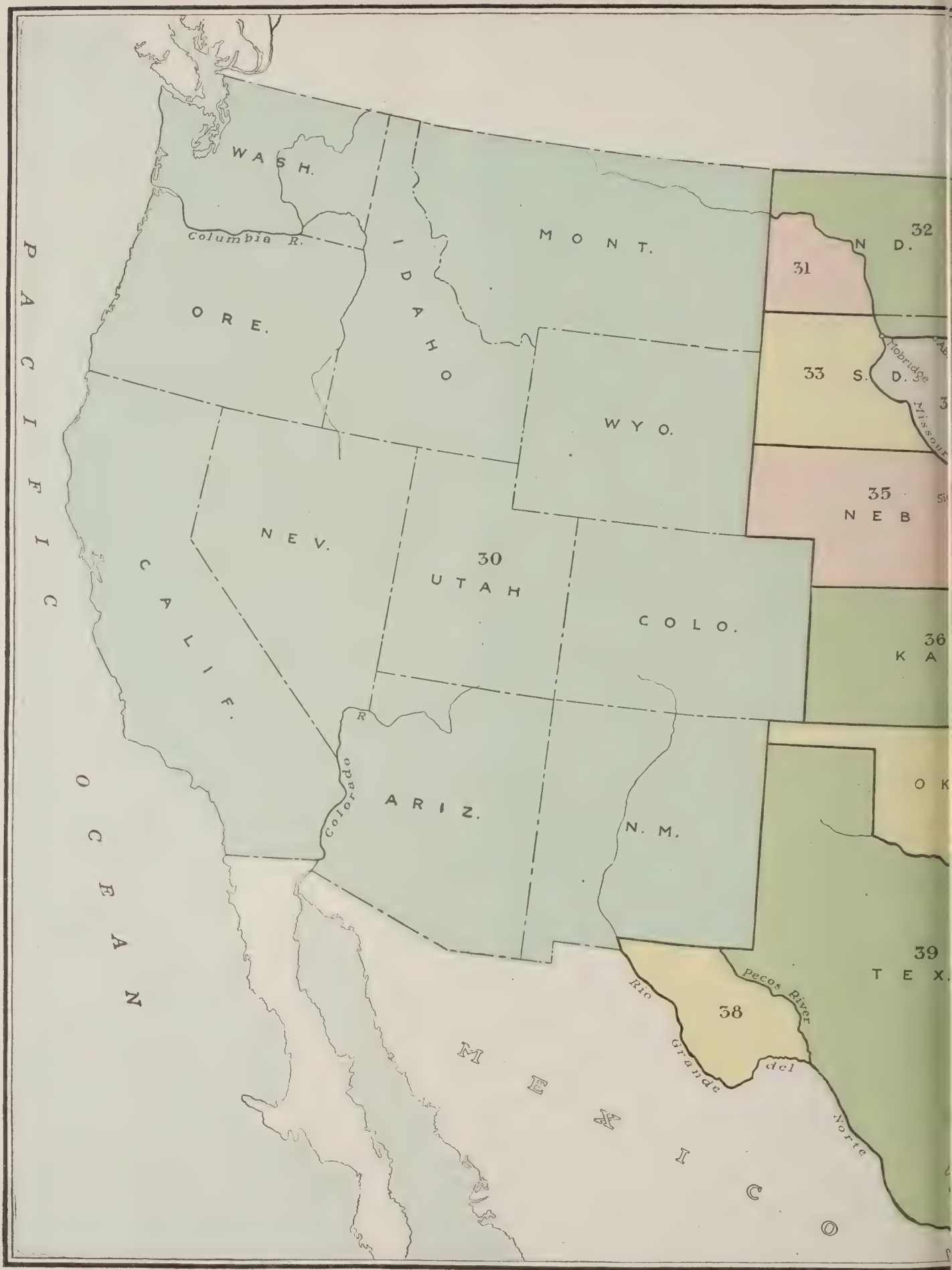
EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb keg for black powder:

	Low Freezing	Gelatin			Black
	20%	40%	60%	80%	Powder
New York		$0.27½	$0.34½		$2.40
Boston	$0.24¼*	.27¼	.34¼	$0.41¼*	
Kansas City	.20	.26¼	.33¼	.43¼	
Seattle	.17¾	.24¾	.31¾	.41¾	
Chicago	.18¾	.22¾	.33	.43	
St. Paul	.20	.23	.28		2.45
St. Louis	.20	.24	.29	.43¾	2.45
Denver	.18	.25¼	.32½	.42½	
Dallas	.23	.29½	.37	.47	
Los Angeles	.22	.28	.36		
San Francisco		.17¼†	.23½†	.30½†	.40½†

† In carload lots. * 25% and 75% respectively.

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates are effective in cents per 100 lb.:

Boston	21.5	Minneapolis	35.5
Buffalo	11.6	New Orleans	30.7
Chicago	21.5	New York	19.5
Cincinnati	18.5	Philadelphia	18.5
Cleveland	13.5	St. Louis	27.0
Denver	79.0	St. Paul	40.0
Kansas City	47.0	Pacific Coast (all rail)	100.0



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Map Showing Districts in Which Co



From Various Sources Is Available

COAL AGE

Volume 13 NEW YORK, MAY 18, 1918 Number 20

The Lesson

Written expressly for Coal Age

BY BERTON BRALEY

There is no "Private Business" any more,
No trade that we can manage as we choose,
For in the mighty holocaust of war
The Nation's need comes first, and we must lose
Our petty pride in personal success
And merge ourselves in one tremendous whole,
Break from the fetters of our selfishness
And help our land to win the war with coal.

There is no "Private Business" any more,
That is a fact which we must recognize,
The interests that we have served of yore
Are lost in this titanic enterprise;
Nothing we own is ours, but held in trust
To serve the Nation in its greater need,
The individual is less than dust,
"All for our country" is the business creed.



Annihilate the Hun



Brushed Aside

There is no "Private Business" any more,
No man may say: "This enterprise is mine,
Which I shall manage, as I have before,
According to the plans that I design";
That old conception has been brushed aside
By vast events and we have come to know
That if the things we care for shall abide
Our little private interests must go.

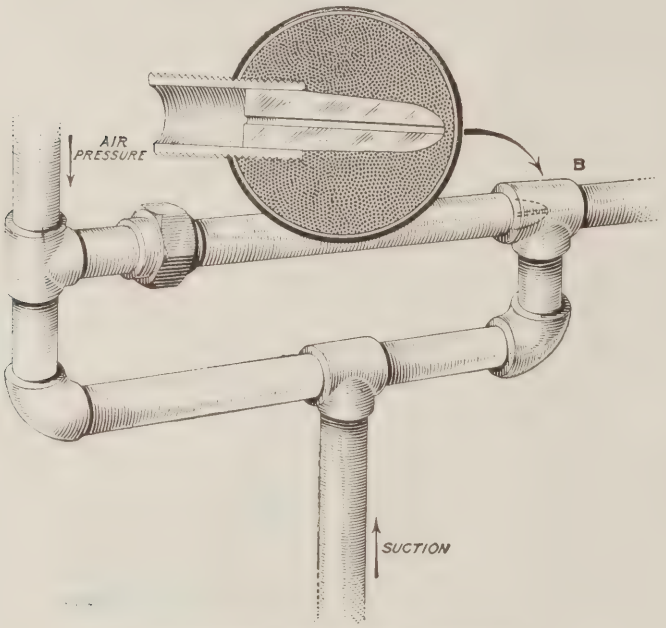
Tipple and breaker, gallery and seam,
No longer are they ours; they help to make
The strength of that huge economic scheme
Which backs our men who fight for freedom's sake.
We've yielded much of "vested rights" and power—
We shall yield further at the call of war;
Our selfish plans are nothing at this hour,
There is no "Private Business" any more.

IDEAS AND SUGGESTIONS

A Duplex Ejector

BY L. V. LAUTHER
Guttenberg, N. J.

Most men about coal mines are familiar with the ordinary type of homemade ejector composed essentially of a tee with a suitable nozzle screwed into one run opening, the discharge screwed into the other while



COMPOUND HOMEMADE EJECTOR

the outlet opening receives the suction. This type of ejector while fairly successful for low heads is not powerful. The accompanying illustration shows what might be termed a "duplex" ejector. While it is somewhat more elaborate than the "simplex" ejector it is also more powerful. The construction is simple and needs no comment. For 1-in. pipe and fittings the nozzle opening should be about $\frac{5}{16}$ in. in diameter.

How Soon Will Heat-Insulating Material Pay for Itself?

BY W. F. SCHAPHORST
New York City

The caption states a problem that should certainly interest the owner, superintendent, engineer and everybody else connected with the economic problems that must daily be met in and about a power plant. At first blush it may seem like a rather indeterminate problem, but elaborate tests have been made on the subject of heat transmission through bare pipes, and on these I have built a formula giving the cost of the heat loss in any number of hours. By reversing the formula it is possible to compute the number of hours required for a given heat-insulating material to pay for itself.

The formula is as follows:

$$H = \frac{2000PBE_b}{(1.6 + 0.0056D)DACE_c}$$

where

H = Number of hours required for the covering to pay for itself;
P = Cost of pipe covering per lineal foot;
B = B.t.u. per pound of coal;
E_b = Efficiency of the boiler;
D = Temperature difference in deg. F., or the metal temperature minus the room temperature;
A = Area of the metallic surface in square feet;
C = Cost of coal per ton of 2000 lb. in dollars;
E_c = Efficiency of the covering.

It is quite possible that this formula will give rather surprising results in a good many cases. The opinion of many is that a covering will pay for itself in a short time. They over-estimate the value of pipe covering and heat insulation in general, because the value of coverings is a subject that has been harped on for many years. Others have a tendency to sneer at coverings, claiming that prices are so high that they never pay for themselves. However, let us take an example and by means of this formula see for ourselves. Let us take a case where

P = $2 per lineal foot;
B = 12,000;
E_b = 70 per cent.;
D = 200;
A = 3.1416 sq.ft., or the area of a pipe 1 ft. in diameter and 1 ft. long;
C = $4;
E_c = 90 per cent.

Substituting in the formula we get

$$H = \frac{2000 \times 2 \times 12{,}000 \times 0.70}{[1.6 + (0.0056 \times 200)]200 \times 3.1416 \times 4 \times 0.90} = 5480\ hr.$$

which is equivalent to about 228 days, assuming that the pipe was under steam continuously, day and night. If the steam periods are intermittent (as is often the case in heating systems) the number of days, of course, will be greater. Thus in some heating systems where the pipes are under pressure for approximately 100 days per year it will take a trifle over two years for the covering to pay for itself. But insulating materials are durable. In fact, there is no reason why they should ever wear out under proper care, especially indoors. Therefore, after one or two years of use the steam saved is "pure profit."

This formula is applicable to flat or round surfaces. A good way in which to use the formula, therefore, is to compute the cost of the covering per square foot and in the formula insert "one square foot" for A. The relative values of the various sizes of coverings will thus easily be solved. Small pipe coverings usually cost more per square foot of surface covered and there-

fore it will take longer for the covering to pay for itself. This leads to the conclusion that large pipes, certainly, should be insulated against heat loss.

It will be readily understood that a formula of this kind cannot apply equally well indoors and out. The temperature difference is generally much greater out-of-doors, and the radiating effect is also greater on account of the more serious nature of the air currents. A wintry blast against a hot steam pipe is notorious as a money waster. I therefore wish to impress upon the minds of readers that in applying this formula to out-of-door conditions it can be correctly assumed that the coverings will pay for themselves much more quickly than the result will indicate. The greater the temperature difference and the more rapid the air currents the more necessary the insulation.

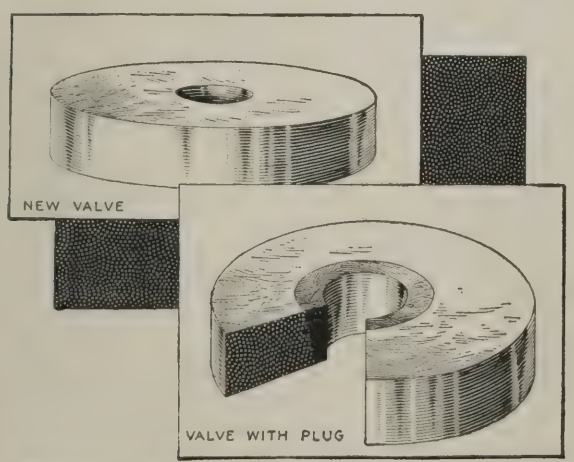
The formula also shows that a high boiler efficiency will increase the number of hours (H), whereas a high efficiency of the covering will decrease the number of hours. It furthermore shows, of course, that a good inexpensive covering is most desirable. It is probably true, in extreme cases, that covering doesn't pay; but by applying this formula carefully it is my belief that such cases will seldom be found.

Keeping Rubber Valves in Service

By Timothy Ryan
Hazleton, Penn.

The following is a method whereby increased service can be secured from rubber pump valves. I have had considerable trouble with valves of this kind and they became an expensive item of repairs.

The hole in the valve becomes enlarged, due to the friction of the valve stem, and practically new valves would have to be cast aside as the hole in the center would allow too much water to pass through it. I have overcome this difficulty with a rubber bushing. To do this I take a valve with a large hole and punch the hole somewhat larger; then take an old valve that is of no use and punch a piece from it to fit the hole in the valve



METHOD OF REPAIRING WORN RUBBER VALVES

to be used again. This makes a blank valve. The hole in the center can now be made of a size to fit the valve stem. Before placing the enlarged plug in the valve, I, of course, apply a little rubber cement.

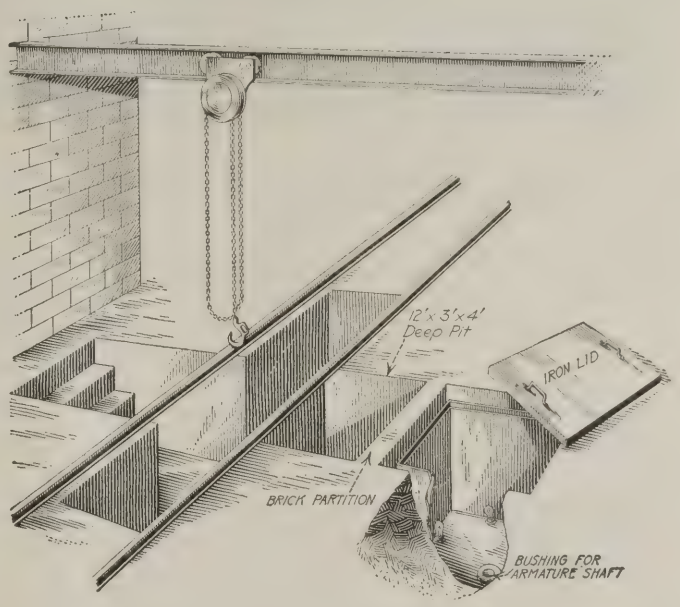
When the hole in the center of a bushed valve becomes too large, the center can be replaced by another bushing with a smaller hole.

By this means valve stems that are worn small can be kept in service. Thus if the original size of the stem was $\frac{3}{4}$ in. and it wears down to say, $\frac{5}{8}$ in., the stem hole in the center of the valve can be punched $\frac{5}{8}$ in. I have tried this method for several months and find it works quite satisfactorily.

Homemade Armature Oven

By R. Z. Virgin
Wheeling, W. Va.

At the ordinary mine plant there is no oven built or provided wherein the electrician may bake the armatures after winding. A homemade oven, similar to the one shown in the accompanying illustration, may be used



REPAIR PIT AND ARMATURE OVEN

for this purpose; while the idea is not new, it perhaps has not been thought of in some localities.

Above is shown the side wall of the building, with an "I" beam across the motor pit, on which runs a trolley carrying a set of chain blocks which are used to lift wheels, armatures, etc. At one side the pit is extended and partitioned off with brick or cement. This portion of the extension is of noncombustible material and is 48 in. long, 48 in. wide and 40 in. deep. Into this fits a box 30 x 36 in. and 36 in. deep, lined with sheet asbestos $\frac{1}{8}$ in. thick. Inside the box are placed eight carbon lamps, 16-cp., 250 volts. In the bottom of the box is a bushing or step bearing long enough to accommodate the armature shaft and take its weight. This keeps the armature upright.

After the armature is wound, it is taped on the ends to keep the varnish off, and submerged in a tank of baking varnish, just up to the commutator. It is then drained off and allowed to stand and drain for 24 hours, after which it is placed in the oven and baked for 36 to 48 hours. If a second coat is desired the same process is repeated. A box of this size will accommodate armatures of about the size generally used in a 15-ton locomotive.



Bettering Coal by Heat and Pressure*

By CHARLES T. MALCOLMSON
President, Malcomson Briquet Engineering Co., Old Colony Building, Chicago, Ill.

SYNOPSIS — *The coal is distilled at a low temperature. The semicoke thus obtained is mixed with pitch obtained from that distillation. It is then briquetted and subjected to a further distillation at 1800 deg. F. More tar, oils and ammonium sulphate are obtained than when coking coal in the byproduct coke oven.*

AN ELABORATE series of experiments has been conducted during the past three years at Irvington, N. J., which has resulted in the perfecting of a process for the manufacture of smokeless fuel from high-volatile coals, and for the recovery and refinement of the coal-tar products derived therefrom. These experiments have been financed by Blair & Co., of New York, and were conducted under the direction of Charles H. Smith, the inventor of the process.

The low-temperature distillation of coal has interested investigators for many years. Sporadic attempts have been made to solve the mechanical problems, but until the Smith process was developed they were not carried to conclusions of economic value. The present coal shortage and the increasing demand for smokeless fuels make this subject one of timely interest.

Description of Plant

The following equipment was installed and operated during the experimental period: Four horizontal and two vertical units of commercial size for the low-temperature distillation of the coal; two vertical, two horizontal and two inclined benches for distillation of the briquets at medium and higher temperatures; presses and auxiliary equipment necessary for making briquets; and a complete byproduct recovery and tar-refining plant. This commercial equipment is provided with gas and electric meters, pyrometers and other apparatus for recording accurately the results of all experiments.

There is, in addition to the commercial equipment, a complete chemical laboratory with distillation and recovery apparatus, including facilities for refining and cracking the tar and measuring the yields and calorific value of the gas. This apparatus makes it possible to study on a small scale the various problems involved in the process.

Description of Process

Mr. Smith's experiments have resulted in the production on a commercial scale of: (1) A fuel, called "carbocoal," which, for convenience in handling, is prepared in briquet form. (2) A yield of tar more than double that obtained in the ordinary byproduct coking process. (3) Ammonium sulphate in excess of that normally recovered in the ordinary byproduct coking process. (4) Gas, in amount approximately 9000 cu. ft. per ton of coal carbonized, which is at present used in the process.

The essential features of the Smith process are the two distillations carried on at different temperatures, first of the raw coal and second of the raw briquets. The raw coal, after being crushed, is distilled at a relatively low temperature, 850 to 900 deg. F., and the volatile contents are thereby reduced to the desired point. The result of this first distillation is a large yield of gas and tar, and a product rich in carbon, termed "semi-carbocoal." The semi-carbocoal is next mixed with a certain proportion of pitch obtained from the tar produced in the process, and this mixture is

*Paper entitled "Carbocoal," to be read at the Colorado meeting of the American Institute of Mining Engineers, September, 1918.

briquetted. The briquets are then subjected to an additional distillation at a higher temperature, approximately 1800 deg. F., resulting in the production of carbocoal, the recovery of additional tar and gas, and a substantial yield of ammonium sulphate.

The characteristic feature of the primary distillation is that it is continuous and that the coal is constantly agitated and mixed during the entire operation. This is accomplished by a twin set of paddles which also advance the charge through the retort. By this means, all portions of the charge are uniformly distilled, and by controlling the speed at which the charge moves through the retort the distillation may be arrested at any desired stage. As only a partial carbonization is permitted in the primary distillation, the hard metallic cells characteristic of coke are avoided. The period of distillation is one to two hours, and the continuous retort has a carbonizing capacity of one ton of coal per hour.

In the subsequent distillation of the briquets, all evidence of the pitch as a separate ingredient disappears. There is a marked shrinkage in the volume of the briquet, with a corresponding increase in density, but no distortion of its shape. This distillation requires four to five hours and is performed in an inclined, self-charging and self-discharging bench.

The carbocoal represents more than 72 per cent. of the weight of the raw coal, the exact percentage depending upon the volatile content of the latter.

Carbocoal is dense, dustless, clean, uniform in size and quality, and can be readily handled and transported long distances without disintegration. It is grayish black in color, slightly resembling coke, but its density more nearly approaches that of anthracite coal. It is manufactured in briquet form and can be made in any

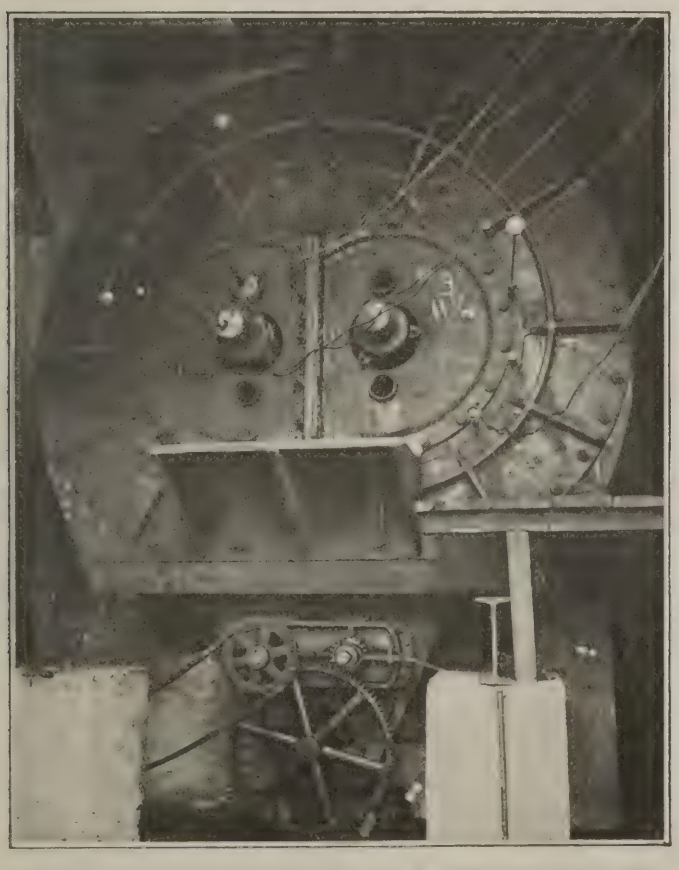


FIG. 1. DISCHARGING END OF A PRIMARY RETORT

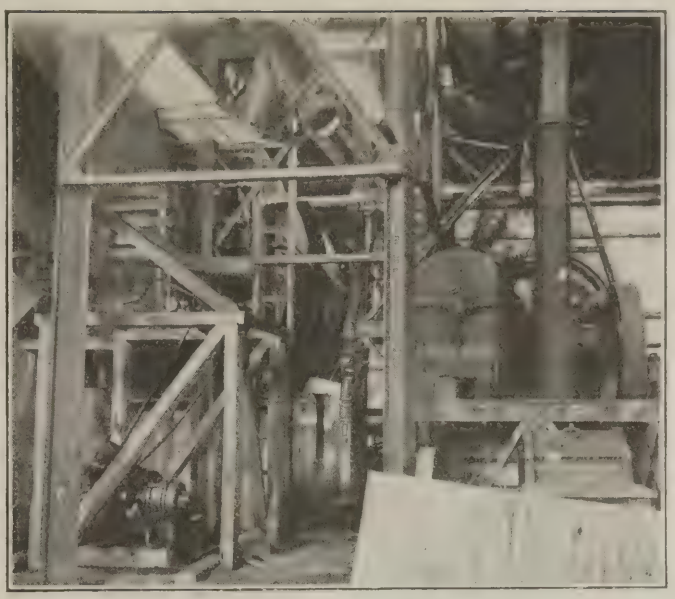


FIG. 2. WHERE COAL IS CHARGED TO PRIMARY RETORTS

size, from $\frac{1}{2}$ oz. to 5 oz. The larger sizes are better suited to locomotive purposes, and the smaller sizes for domestic use.

Heretofore, devolatilized fuels, such as coke, have not attained the high rates of combustion desired for locomotive, marine and general steam purposes; and their greater displacement has operated against their general use where transportation cost or stowage space has been an important factor. Carbocoal overcomes these objections. It is actually a relative soft but tough form of carbon, readily attacked by oxygen in combustion; and for this reason, requires much less draft than other high-carbon fuel.

Carbocoal has been tested by the Long Island R.R.; by the Pennsylvania R.R. at its testing plant at Altoona; by the Carolina, Clinchfield & Ohio R.R.; and by the United States Navy.

These tests have demonstrated that the fuel is smokeless. At a combustion rate of 100 lb. per hour on each square foot of grate surface it has evaporated 8.5 lb. of water, from and at 212 deg. F., per pound of fuel fired. At the lower combustion rate of 27 lb. per hour on each square foot of grate surface it has evaporated 12.8 lb. of water, from and at 212 deg. F., per pound of fuel fired. It has been demonstrated also that it requires no greater draft than bituminous coal. A maximum combustion rate of 166 lb. per hour on each square foot of grate surface has been reached for a short period.

Carbocoal has been found particularly suitable for the following purposes: (1) Marine and locomotive service, where limited grate area and restricted boiler capacity demand efficient fuel; where smoke is objectionable or dangerous, as in the case of ships in time of war. (2) Stationary boilers, where smoke pollution of the air is offensive and dangerous to health. (3) Domestic uses, including furnaces, stoves, ranges and open grates, where cleanliness is a desirable factor. (4) Kilns, drying and roasting ovens, and all purposes where an intense and uniform heat is desired. (5) In metallurgical furnaces, as a substitute for coke. (6) Gas producers.

Carbocoal has been subjected to practical tests in

household use for over a year. It fulfills all the requirements of a domestic fuel. It can be burned satisfactorily without change of furnace or grates, and it responds readily to changes in draft. The uniformity of combustion, absence of fines, even distribution of ash, and absence of clinker as compared with the coal from

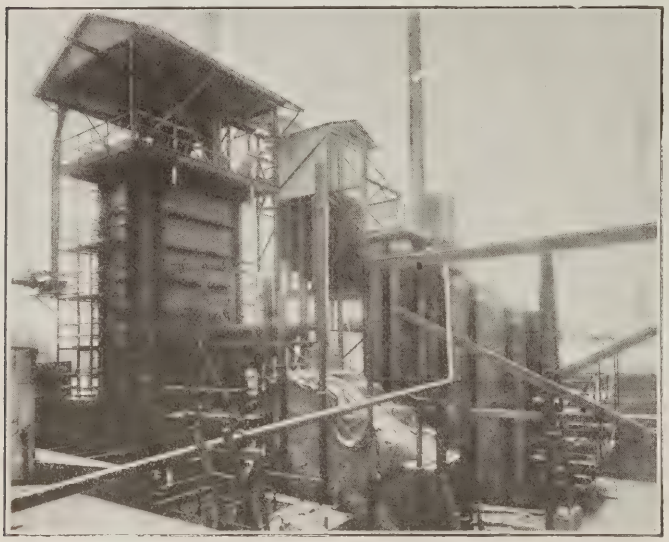


FIG. 3. INCLINED BENCHES FOR CARBONIZED BRIQUETS, KNOWN AS SECONDARY RETORTS

which it is made, are additional characteristics in favor of this fuel. Tests have demonstrated that carbocoal can be banked satisfactorily overnight, requiring no more attention, and with no greater consumption, than anthracite.

Carbocoal is compressed into briquet form to obtain maximum density, to minimize transportation costs and the losses incident to handling; and to secure the efficiency of combustion resulting from uniformity of size. Briquets of bituminous and anthracite coals have been manufactured for many years. Such briquets are made from the smaller sizes or screenings of coal, with the addition of a binder, such as coal-tar pitch. In carbocoal, however, an entirely new product is obtained, differing from the original coal in chemical and physical properties. The briquets contain no binding material to soften or disintegrate in the fire. Carbocoal must therefore be recognized not as a mixture, but as a new product, the result of a process of manufacture.

The amount of ash and sulphur in the carbocoal depends upon the characteristics of the coal from which it is made. The summarized proximate analyses of carbocoal, manufactured from 25 different coals at the Irvington plant, are shown in Table I.

The percentage of byproducts recovered from clean coal is greater than that recovered from high-ash coals; therefore the careful preparation of the raw coal by washing or other means is profitable.

TABLE I. ANALYSES OF CARBOCOAL

	From Run-of-Mine, Per Cent.	From Washed Coal, Per Cent.
Moisture	1.00 to 3.00	1.00 to 3.00
Volatile matter	0.75 to 3.50	0.75 to 3.50
Fixed carbon	82.00 to 88.00	85.00 to 90.00
Ash	8.50 to 12.00	7.00 to 10.00
Sulphur	0.5 to 1.50	0.6 to 1.50

The total yield of tar by the carbocoal process is large. Coal containing 35 per cent. volatile combustible produces more than 30 gal. of water-free tar per short ton. The tar products recovered from the distillation of the coal, at the low temperature used in this process, are different in nature from those obtained in other processes where high temperatures are used. At the lower temperature, there is an abundance of tar vapors and a relatively small yield of gas of high illuminating value. At the higher temperature these primary products are split up, with a consequent increase in the gas yield and a corresponding decrease in its illuminating value and in the amount of tar vapors recovered. There is also an increase in the percentage of residuals, the pitch increasing from 30 per cent. in the low-temperature distillation, to 64 per cent. or more when high temperatures are used.

The tar obtained in the primary distillation of the coal has a specific gravity of 1.00 to 1.06. It contains a large percentage of light solvent oils, tar acids and cresols, but very little carbolic acid and no naphthalene or anthracene. The free-carbon content of this tar is low. The light oils contain appreciable quantities of naphthenes, pentane, hexane, hexahydro-benzenes, and also hydrocarbons of the paraffin series, which make these oils valuable as a substitute for gasoline.

A satisfactory method of removing the paraffin and aromatic portions of the light oil has been developed, so that chemically pure (or rather c. p.) benzol and toluol can now be obtained by this process. During the low-temperature distillation period, 20 to 28 gal. of tar, including the light oil obtained from the stripping of the gas, are recovered, the exact amount depending upon the volatile content of the coal. This low-temperature tar contains approximately 30 per cent. of pitch and 70 per cent. of tar oils, as compared with 50 to 60 per cent. of pitch and 40 to 50 per cent. of oil products contained in ordinary gas-house and coke-oven tar. In the second or high-temperature distillation, 5 to 6 gal. of tar are added to the above yield. This tar is heavier than that obtained from the first distillation, and is similar to coke-oven tar.

Table II compares the tars and light oils obtained in the production of carbocoal with those obtained in the



FIG. 4. RAW BRIQUETS MADE FROM SEMI-CARBOCOAL

ordinary byproduct coking processes. In addition to the above yield of tar there is obtained, in both the byproduct coke oven and the carbocoal process, by stripping the gas, from 2 to 3 gal. of light oil. This yield depends upon the characteristics of the coal carbonized. Approximately 30 per cent. of the fraction from 170

to 360 deg. F. in the carbocoal process are tar acids; the remainder of the fractions are neutral oils. The value of the products from the distillation of tar depends, of course, on the extent to which the tar is refined. The fractionation and subsequent treatment of the tar oils, which is a part of this process, give the products shown in Table III, for the carbonizing of 1000 tons of coal; the figures are based upon data obtained from carbonizing run-of-mine coal from Clinchfield, Virginia.

TABLE II. RECOVERY OF LIQUID PRODUCTS PER TON OF RAW COAL CARBONIZED

	Distillation Temperature, Deg. F.	By-product Gal.	Coke Oven Per Cent.	Carbocoal, First Distillation Gal.	Carbocoal, First Distillation Per Cent.	Carbocoal, Second Distillation Gal.	Carbocoal, Second Distillation Per Cent.
Light oil	0–170	0.27	3.47	1.58	6.60	0.003	0.05
Middle oil	170–230	0.44	5.85	3.29	13.70	0.036	0.60
Creosote oil	230–270	0.78	10.37	3.11	12.95	0.126	2.10
Heavy oil	270–360	1.26	16.81	8.88	37.00	2.485	41.42
Pitch		4.66	62.18	6.90	28.75	3.290	54.83
Loss		0.09	1.32	0.24	1.00	0.060	1.00
Totals		7.50	100.00	24.00	100.00	6.000	100.00

Pitch is always an element of questionable value in tar distillation. The Smith process, however, utilizes all of its pitch for briquetting the semi-carbocoal produced by the first distillation. Moreover, the valuable portions of this pitch are recovered in the tar and gas resulting from the second distillation. It is therefore noteworthy that all the tar products recovered by this process are oil derivatives.

TABLE III. PRODUCTS OBTAINED FROM A THOUSAND TONS OF CLINCHFIELD, VA., COAL

	Raw Coal	Carbocoal	
1. Carbocoal of analysis hereinunder			725 tons
Moisture	0.72	1.84	
Volatile matter	35.01	2.75	
Fixed carbon	57.23	85.64	
Ash	7.04	9.77	
	100.00	100.00	
Sulphur	0.63	0.52	
2. Sulphate of ammonia			20,000 to 25,000 lb.
3. Other nitrogen products, principally, pyridine bases, approximately			2,000 to 4,000 oz.
4. Motor spirits (or c. p. benzol, 250 gal., c. p. toluol, 500 gal., motor spirits, 1,000 gal.)			1,800 to 2,200 gal.
5. Crude tar, acids principally cresylic acids			4,040 gal.
6. Water-white naphthas			3,500 gal.
7. Creosote oil			5,450 gal.
8. Heavy creosote oil			4,660 gal.
Other products, used in process:			
9. Pitch			10,000 gal.
10. Gas, of 530 B.t.u., approximately			9,000,000 cu.ft.

The primary distillation of the raw coal gives only a small yield of ammonium sulphate. The secondary distillation of the raw briquets, however, brings the amount up to approximately 21 lb. per short ton of raw coal carbonized.

In the primary distillation of the raw coal, from 5000 to 6000 cu.ft. of gas per short ton of coal is recovered. This has a heating value of 650 to 700 B.t.u. per cubic foot. The distillation of the briquets yields also about 4000 cu.ft. of gas of 350 to 400 B.t.u. per cubic foot. The process in its present stage of development uses all of the gas recovered from both distillations.

The illustration at the head of the article shows the carbonized briquets that are known as carbocoal.

Two of the most important conditions that make mechanical stokers successful in burning smoky coal without smoke probably are: (a) Slow and uniform heating of the coal with the result that a large part of the volatile matter is distilled at low temperature, and (b) distillation of the volatile matter occurs in the presence of oxygen.—*Bureau of Mines Bulletin No. 135.*

Prevention of Mine Explosions

By James Ashworth
Consulting Mining Engineer, Vancouver, B. C., Canada.

The following brief notes from the recent address of the president of the Monmouthshire District Association of Students in England, will be of interest in connection with the unsolved problem of preventing disastrous explosions of gas and dust in coal mines:

The disaster at Halmerend, North Staffordshire, is another tragic lesson to us that, in spite of all that has been done, we have yet no right to suppose that we have secured immunity from explosions.

Watering and stone-dusting may be made an effectual defence against the initiation and propagation of explosions in main roadways if the watering is continuous; or if steps are taken to insure that the stone dust is regularly applied and intimately mixed with the coal dust.

It is essential that the walls and roof should present a smooth surface, without projections or cavities in which coal dust and gas may lodge. But even when the roadways are rendered safe, there still remains the question of preventing explosions at the coal face. Here watering cannot be satisfactorily applied, and the coal dust is formed in such enormous quantities, and with such rapidity that effective stone-dusting may be generally considered to be impracticable. It is therefore worth considering, whether some totally new method cannot be discovered whereby the danger from coal dust may be entirely eliminated. . . .

Safety Lamps—It would be well worth while trying to discover some sure and rapid method of detecting and estimating firedamp without the use of flame of any kind. This would permit of electric safety lamps, only, being used in the mine and would be another great step taken on the way to safety.

Rescue Apparatus—Here, there is also need of improvement. A short while ago Dr. Haldane made the startling and distressing statement that most forms of apparatus in use were little better than death traps. After a time, the oxygen in the breathing bag may reach a high temperature; and this, together with the weight of the apparatus, may be sufficient to produce exhaustion and collapse on the part of the rescuer, even in circumstances where without the apparatus the man would be safe.

Messrs. Corrie and Winborn, at the request of the Commission on Breathing Apparatus, have recently been investigating this point, and have found that, by introducing a quantity of sodium sulphate crystals into the breathing bag, the temperature may be kept sufficiently low to permit the rescuer to work without discomfort.

Sodium sulphate melts at a temperature of 34 deg. C., and, on melting, extracts its latent heat of fusion from the oxygen and thereby keeps the temperature in the bag low, which is a most interesting direct and simple application of pure science to a practical problem.

These subjects offer quite a large field for discussion and investigation. There are many weak points in the different types of mining equipment in use today, and these require constant study to ascertain if possible how to improve them.

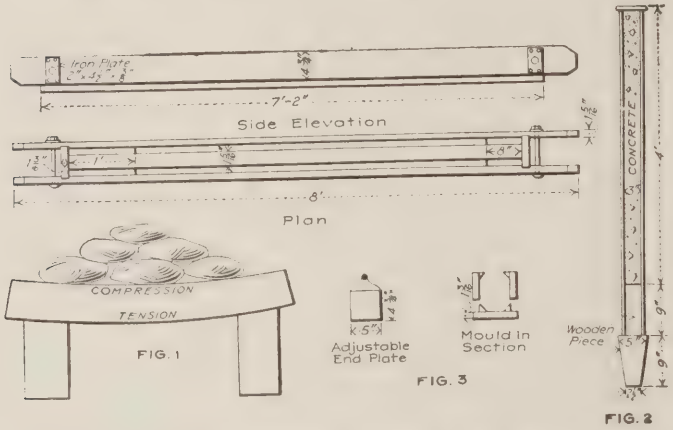
Concrete in Coal Mine Service

By J. F. SPRINGER
New York City

SYNOPSIS — *Concrete is being used more and more about mines, replacing less permanent construction materials. Unfortunately concrete possesses low tensile strength. This may in part be rectified by suitable reinforcement. In order to be dense and strong sufficient sand only should be used in concrete to fill the voids in the crushed rock or gravel; enough cement should be used to fill the voids in the sand.*

IT WILL be wise for coal-mine officials having little or no knowledge of concrete to familiarize themselves with its qualities in advance of committing themselves to its use. They will then be better able to see exactly where it can be used to advantage and where its use would probably lead to disappointment.

Concrete is a splendid material in its proper place. There are many ways in which coal mines may employ



FIGS. 1 TO 3. CONCRETE BEAM, MINE PROP AND DETAILS OF WOODEN FORM

it with economy and satisfaction. Some of these are now being taken advantage of while others are being developed. Other uses await discovery through the inventive and adaptive ability of coal-mine officials. It is so important, however, to have a just conception of the character of concrete that no apology or further explanation will perhaps be necessary to justify a brief statement of its qualities.

Concrete is strong in compression. That is, it will endure heavy pressure tending to squeeze its mass together. But it is weak in tension. It is therefore ill-adapted to resist stresses tending to pull its particles apart.

There is, however, a corrective for this weakness. Steel possesses in high degree the quality lacked by concrete. Furthermore, its coefficient of linear expansion is nearly the same as that of concrete. Steel may be regarded as having a coefficient of 0.0000066 for each degree Fahrenheit. Concrete has a coefficient of 0.0000055. This fact makes it possible to employ this metal to supply what concrete lacks. That is to say, properly reinforced concrete possesses considerable tensile strength. Naturally, however, such concrete is more expensive than that made without reinforcement. While ultimately highly rigid, concrete may be molded or cast in a great variety of sizes and forms. This constitutes a great advantage over other masonry and is one of the chief reasons for the tremendous popularity of this material with construction engineers. This quality ought to recommend it for mine use.

Concrete is highly indestructible. It cannot be said that no fire, however hot, will break it down; but it is one of the most highly fire resistant materials in use for construction purposes and a favorite with fire insurance companies. It is also age-resisting. I am not one of those enthusiasts, however, who claim that it will resist forever the vicissitudes of wind, storm, water, ice and climate. The consideration that claims similar to this can not be quickly disposed of is significant of age-resisting power.

Concrete is, when properly employed, easy to maintain. This is one of the chief reasons why concrete roads are now enjoying such popularity. There is no necessity for keeping a concrete structure painted. This is a great advantage.

One highly valuable quality of concrete relates to the ease of its manufacture. Everything but the ingredient used in the smallest quantity is ordinarily obtainable at or near the point of use. It can quickly be made and poured, and a minimum of skilled attention is necessary. In a short time after pouring it is usable. In other words, concrete lends itself to rapid and economical construction.

Standardized Units Tend to Lower Cost

There is, however, some modification necessary to make this statement generally true. The cost of forms is sometimes a serious matter tending to hinder the use of concrete. This objection is being met, in part, by an increasing standardization of constructional units. Thus knockdown forms may be made and used over and over again.

When concrete is used in considerable masses without reinforcement it is often possible to reduce its cost per cubic yard by the use of what are called "plums." These are simply sound rocks, properly freed from dirt and loose pieces, which are buried in the ordinary concrete. These may cost little. They replace equal volumes of what is usually a material costing much more money largely because of the necessary presence of portland cement.

Concrete is suited to a variety of methods of local transportation, after mixing, to the point of use. These are generally rather inexpensive methods. In short, concrete is usually cheap to place. It can be taken from the mixer to the place of its final use in a wheelbarrow, a hand bucket, a steel bucket of large size handled by a mule team, an auto-truck or tramway locomotive, or raised, lowered and swung by a derrick. Or a hoisting engine may handle a bucket or wheelbarrow between levels.

Concrete may be dispatched after mixing by means of

a closed or open chute operating by gravity, as shown in Fig. 5. Or it may be transported over horizontal distances running up to 1000 ft. through a pipe line, the drive being effected by compressed air. For shorter distances, a patented method of using steam is available. Further it may often be dispatched below ground by simply dropping batches of the dry ingredients down a vertical pipe to a mixer below, where the actual final mixing may take place.

Concrete may be mixed and placed in all weathers, though special precautions may be necessary in winter. Concrete may be placed in the open air or under water. There is now no great difficulty in successfully pouring concrete beneath water, although until recently this could hardly have been said. And I do not say that this can now be done without proper precautions. But what to do and how to do it are no longer unknown. As witness of this statement, I cite the placing of the concrete envelopes around the submerged steel tunnels in the Detroit River and in the Harlem River.

The use of concrete as a protective covering for steel is approved practice. This differs from the use of the two materials in the form of reinforced concrete. In the latter case the concrete is the principal constituent, the steel acting as a supplementary substance. In the former the steel construction is built and designed to perform the duty required, but needs protection from agencies which would tend to impair or destroy its usefulness. An overhead girder may, for example, be constructed of steel and may in this condition, without the addition or subtraction of anything else, be quite capable of sustaining the load placed upon it, provided the steel does not rust and is not injured by the heat from some accidental fire near-by. Concrete in such a case provides an envelope suited to protect against both the evils mentioned.

I have, so far, been dealing mostly with the good qualities of concrete. It may be well now to consider some of the qualities which concrete possesses either not at all or only in moderate degree. Thus, while concrete is admirably adapted to withstand the action of water, it is not readily made impervious to water, especially when it is under a considerable head. This consideration may or may not be important, depending upon the purpose for which the concrete is to be used. Where considerable heads are encountered the preventive practice seems to be now tending toward the addition of a protective covering of other materials.

Concrete may be made resistant to the penetration or percolation of water, whether under a head or not, by various means, but chiefly by increasing the density of the concrete itself. Again, concrete is well adapted to resist the wear and tear of the traffic on country roads; but this must not be magnified to the point where the traffic becomes not only excessively heavy in its amount but excessively severe in its action. In such cases the approved practice is to add a wearing surface of another material, superimposing this on the concrete foundation.

Again, concrete exposed to frequent alternations of freezing and thawing or of salt water and sunshine has in the past proved rather deficient. But even this difficulty is being surmounted, not so much by modifying the general mass of the concrete itself as by using an extremely dense exterior layer of concrete or cement mortar.

Again, the rigidity of concrete makes it ill-adapted for some uses though well suited to others. Thus it is not considered advisable to construct piers with concrete floor where the foundations of the pier are subject to uneven subsidence. The same objection would apply to concrete props in a coal mine unless the vertical rigidity of the prop can be reduced. There is some reason to expect that this can be done, as will be mentioned later. Wood props yield a bit and, as the stress rises toward breakage, they give notice of approaching failure. In short, they do not give way after the manner of a sudden collapse.

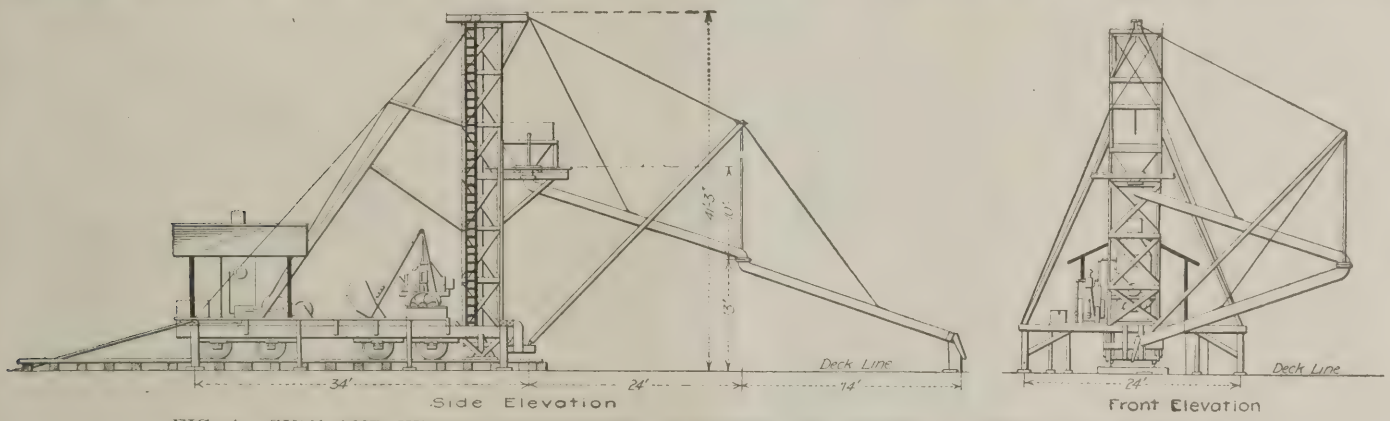


FIG. 4. SIDE AND FRONT ELEVATIONS OF MIXER AND CHUTE ILLUSTRATED IN FIG. 5

In Great Britain the coal-mining industry is confronted by excessive prices for wooden timbering. Naturally attention has been directed toward concrete. The cross bar of the ordinary three-piece set is essentially a girder or beam. The service to be performed is by no means a new one for concrete—that is, reinforced concrete. This case is that of a simple beam supported at its ends and loaded on top. It is thus subject to two kinds of stress. The load brings about deflection. On the top side the material is under compression while on the under side the beam is under tension (see Fig. 1). It is assumed that all the upper part of a beam is stressed in compression and that all the lower part is stressed in tension, and that the two parts are separated by a horizontal plane or by some other mathematical surface where there is neither compression nor tension. This is the neutral plane or neutral axis (if only a vertical section be considered).

Applying this analysis to the construction of a concrete mine bar, it is easy to understand that the steel

reinforcement should be located mainly in the lower half since this is the region where the concrete is unable to bear the tensile stresses. If the longitudinal reinforcement were evenly disposed, so that there were as much in the upper part of the beam as in the lower part, there would be a waste of steel. It is necessary for reasons of economy that the compression strength of concrete should be utilized. This means that little reinforcement need be used in the upper part of the beam, the bulk of it going into the lower part to perform the service that the concrete cannot perform. However, in the manufacture of bars and in their transport to the point of use, also in their handling during installation, the bars may be put under tensional stresses on all faces. Accordingly, it will not be advisable to go to the extreme of leaving any faces absolutely without reinforcement.

It is advisable to call attention to one matter. If bars are reinforced so as to resist tension on one side or face, they should be plainly marked or suitably shaped so as to indicate easily which side or face this is. Otherwise a bar made to sustain a given load might fail because of improper installation. The prop, whether used alone or as a support for a cross bar, must either itself yield or be conjoined with something that will. Offhand the concrete prop does not seem adapted to mine service. But one mining concern, the Haunchwood Collieries, has 5000 reinforced concrete props in use. These particular props are reinforced by four pieces of ½-in. wire rope. Generally they are octagonal in section and have a diameter of 5 or 6 in. The length is usually 6 ft. The cost, in England, is understood to have been about 5 or 6c. per linear foot of prop. The concrete is made of washed granite. The cost includes labor and material. The extreme lengths in use run up to 7½ ft. "They stood well where there was top pressure only, but where there was a side weight they were liable to crack. Even then, however, they gave warning, and before the crack had fully developed there was time to substitute another prop. They were tried in the face in front of the packs, but only where there was a soft bottom; it was of no use putting them where the bottom was hard. They had a good cap piece on the top, and the soft clay bottom allowed the prop to push its way downward. In the face, however, they invariably broke if any heavy lumps rolled up against them. Props were tried reinforced by four wire rods, but they did not seem to stand compression as well as those reinforced with wire rope. The wire rods were not brazed together in any way." These props were not proof against hammer blows.

I give this experience with concrete props to show that they are practical. It must not be understood, however, that I am indorsing the use of wire rope for reinforcement. That reinforced concrete can be made to resist severe shocks will be readily granted perhaps when I call attention to the fact that thousands of reinforced-concrete piles have been driven by hammer action. In most cases, however, the hammer effect was somewhat cushioned. Nevertheless there must have been a severe shock in order to get penetration.

It is proposed to use a system of reinforcement where longitudinal rods are welded to "triangular bracing" when manufacturing props. To get the yielding effect a base or cap for the bottom or top respectively might be used. This base or cap is provided with a suitable bearing surface to come into contact with the earth or rocks. The prop fits into a deep depression in the opposite face and becomes a kind of piston or ram. The cavity is partially filled with clay or some similar plastic material. With the prop pressing against this clay-like substance the necessary yielding effect might be secured by means of one or more small holes piercing the wall of the cavity. The base or cap may be made of concrete, cast iron or steel. If used as a cap instead of a base, it is easily recoverable after its service has been performed.



FIG. 5. GRAVITY CHUTE FOR DISPATCHING MIXED CONCRETE

Experiments made under a hydraulic press with a cast-iron base or cap and a stiff clay filling showed that a pressure of 23 tons (2240 lb. each) required 14½ minutes to produce a subsidence of $\frac{1}{16}$ in. when the outlet hole in the wall of the cavity was $\frac{3}{32}$ in. in diameter. It is understood that the diameter of the cavity was 5¼ in., thus giving a surface of about 21 sq.in. and a load of about 2450 lb. per square inch. Naturally the stiffness of the clay and the diameter of the outlet have a strong influence and furnish means of getting variations. These are provisions for introducing the yield. They are not always necessary, as

would seem to be indicated by the case of the Haunchwood Collieries.

A mine prop has been proposed which is constructed of steel tubing, wood and concrete (see Fig. 2). A representative case may be taken as a prop 5½ ft. long and 3¾ in. in diameter. The tube for this prop may properly be 3 in. inside diameter, thus giving a wall thickness of ⅜ in. The length is taken at 4¾ ft. This tube is filled with concrete except for a distance of 9 in. at one end. There will thus be 4 ft. of tube filled with a solid core of concrete and 9 in. empty. A wooden piece 18 in. long is now cut from a round stick 5 in. in diameter. Amidships a shoulder is arranged and 9 in. of the piece is reduced in diameter to fit into the tube. The remaining 9 in. is tapered to suit the probable service—say, for example, that a conical taper is made by reducing the diameter, in the 9-in. length, from 5 to 2½ in. This wooden piece is fitted into the open end of the tube. A crown or cap of any desired kind may be put on at the other end. The prop is now ready for service.

A mixture following the formula 1:1½:3 is suggested as suitable for the concrete filling. This seems unnecessarily rich. If a more moderate mixture is desired, the formula 1:2:4 or 1:3:5 would be suitable. Instead of a conical taper a wedge form may be used. When in service an excess load causes the wood tip to burr or broom. The tip thus saves the prop itself from destruction. It was stated about two years ago that there were several hundred of these props in use and that some had been set 30 or 40 times and that there had not been a single one lost.

A method of manufacturing a nontapered all-concrete prop has been worked out in England approximately as follows: A wooden form of collapsible construction is given a maximum length of, say 8 ft. (see Fig. 3). This will enable a prop to be given a maximum length of about 7 ft. Shorter lengths can be made with the same form. The prop is octagonal in section. The distance between opposite faces of the octagonal prism is 4¾ in. The size of the prop may be taken as roughly equivalent to that of a round one 5 in. in diameter. The assembled form is held together by bolts and will easily strip from the concrete prop as soon as these bolts are removed. The boards should be well greased or otherwise safeguarded against sticking to the concrete. Probably crude vaseline thinned with kerosene would be as suitable a grease as any. However, crude oil, linseed oil and soap solution are all usable.

Simpler to Use C-Clamps Instead of Bolts

In order to provide for shorter lengths the wooden strips may be slotted at proper points and a metal diaphragm slipped into the slots. Where a considerable number of props are to be made it will perhaps be found simpler to use C-clamps instead of bolts. In any case it may be found desirable to hold the form in the center as well as at the ends.

Mine props made abroad have been poured from concrete made on the formula 1:1¼:2¼. The fine aggregate was "cracker granite dust" instead of sand. This probably corresponds to our crusher dust. The coarse aggregate was clean ashes. I am reporting the ingredients and the proportions, not indorsing them. These things must stand or fall upon test. Most props were made hexagonal, the diameters being 3¾ to 4½ in., and the lengths 4½ to 6½ ft. A 6-ft. prop, ready for service, would weigh some 80 lb. Wire rope, to the average amount of about 7 lb. per prop, was used for reinforcement. Three or four strands were employed. Apparently the size of the strands was about ⅜ in. They were set about 1½ in. apart and kept so by wire. First concrete would be poured in until a layer 1 in. thick covered the bottom of the form. Then the wire arrangements to hold the rope strands were set.

It might be well for American operators and manufacturers to try out this idea of using old wire rope for reinforcement. It seems to have had a measure of success abroad. According to ideas prevalent here—and abroad too—a rope reinforcement is peculiar. It appears that the ropes are not always laid parallel but are sometimes crossed.

Ratio of Sand to Coarse Aggregate

As to concrete itself, whether used for props, bars or something else, the fundamental principle underlying the proportioning of the ingredients is that the cement combined with water shall be sufficient to fill all voids left in a mix of the sand and coarse aggregate. There is only the one binder. If it does not fill the interstices, then the concrete will necessarily be porous; and porosity may be taken to mean reduction in strength as well as in impermeability. Thorough mixing is good concrete practice, but no amount of mixing will take the place of cement.

As coal mines will probably want to use a considerable variety of aggregate, because of local convenience, it may be well to say a word or two on determining the ratio between the sand and the coarse aggregate that are to go into the concrete. The following principle may be taken as a guide. Use such relative amounts of sand and coarse aggregate as will produce a compact mass. A tentative ratio may be determined as follows: First put a known bulk of the coarse aggregate into a water-tight vessel. Then pour in measured quantities of water until the voids are all filled and the water is even with the surface of the material. The ratio between the two volumes will be the tentative ratio desired, the water corresponding to the sand. Next mix the sand and coarse aggregate in these proportions, using the mixer that is to do the actual work. Imitate the rate and period of turning that are later to be employed. Then see if the dry mix is really compact. If not, vary the amount of sand or coarse aggregate until compactness is secured. Water may be used with this mixture to determine tentatively the relative amount of dry cement to use. Then test out this relative amount. Probably more cement will be needed in order to cover the imperfections in mixing. The foregoing directions are based on the assumption that what is wanted is a thoroughly compact, strong concrete. Where porous concrete is permissible less care may be exercised.

Some years ago specifications for sand used to require that it be clean and sharp. It is still necessary or advisable that sand be clean. Otherwise, we have material present which will prevent the binder—the cement—from filling all the voids and coming in contact with the surfaces of sand and coarse aggregate. As to sharpness, no attention need be paid to it, since there appears to be no substantial reason to expect that angular particles of sand will make better concrete than rounded particles.

Determination of Sulphur in Coal

By EDWIN M. CHANCE
Formerly Consulting Engineer, Philadelphia, Penn.*

SYNOPSIS—*Precautions needed to secure a correct evaluation of the sulphur in coal and coke which can not be obtained unless all the needed precautions are taken. Artificial gas used in the conduct of the analysis is apt to be absorbed by the Eschka mixture.*

THE following is the method adopted by the American Chemical Society and the American Society for Testing Materials in the determination of sulphur in samples of coal and coke along the lines of the Eschka method:[1]

Apparatus—The following apparatus should be provided: Gas or electric muffle furnace or burners for igniting coal with the Eschka mixture and for igniting the barium sulphate; porcelain, silica or platinum crucibles for igniting coal with Eschka mixture; No. 1 Royal Meissen porcelain capsule, 1 in. deep and 2 in. in diameter which, because of its shallow form, presents more surface for oxidation and is more convenient to handle than the ordinary form of crucible; No. 0 or 00 porcelain crucibles or platinum, alundum or silica crucibles for igniting the barium sulphate. No. 1 Royal Berlin porcelain crucibles of shallow form and platinum crucibles of similar size may be used in place of the No. 1 Royal Meissen but owing to the deeper form somewhat more time is required for the burning out of the coal.

Solutions and Reagents—The solutions and reagents are as follows: Barium chloride solution, made by dissolving 100 g. of barium chloride in 1000 c.c. of distilled water; saturated bromine water, made by adding an excess of bromine to 1000 c.c. of distilled water; Eschka mixture, made by thoroughly mixing two parts by weight of light calcined magnesium oxide and one part of anhydrous sodium carbonate, both materials to be as free as possible from sulphur; methyl orange made by dissolving 0.02 g. of methyl orange in 100 c.c. of hot distilled water, the solution being filtered; hydrochloric acid solution, made by mixing 500 c.c. of hydrochloric acid of specific gravity 1.20 with 500 c.c. of distilled water; normal hydrochloric acid made by diluting 80 c.c. of hydrochloric acid of specific gravity 1.20 to one liter with distilled water; saturated sodium carbonate solution containing approximately 60 g. of crystallized or 22 g. of anhydrous sodium carbonate in 100 c.c. of distilled water; sodium hydroxide solution made by dissolving 100 g. of sodium hydroxide in one liter of distilled water. This solution may be used in place of the sodium carbonate solution.

Preparation of Sample and Mixture—Thoroughly mix on glazed paper 1 g. of coal and 3 g. of Eschka mixture. Transfer to a No. 1 Royal Meissen porcelain capsule 1 in. deep and 2 in. in diameter or to a No. 1 Royal Berlin crucible or to a platinum crucible of similar size, and cover with about 1 g. of Eschka mixture.

Ignition—On account of the amount of sulphur contained in artificial gas, the crucible shall be heated over an alcohol, gasoline or natural-gas flame as in procedure (a) below, or in a gas or electrically heated muffle, as in procedure (b) below. The use of artificial gas for heating the coal and Eschka mixture is permissible only when the crucibles are heated in a muffle.

a. Place the crucible in a slanting position on a triangle, and heat it over a very slow flame to avoid a rapid expulsion of the volatile matter, for any such speedy volatilization tends to prevent complete absorption of the products of combustion of the sulphur. Heat the crucible slowly for thirty minutes, gradually increasing the temperature and stirring until and after all black particles have disappeared, which is an indication of the completeness of the action.

b. Place the crucible in a cold muffle and gradually raise the temperature in about one hour between 870 and 925 deg. C. (cherry-red heat). Maintain the maximum temperature for about 1½ hours and then allow the crucible to cool in the muffle.

Subsequent Treatment—Remove and empty the contents into a 200 c.c. beaker and digest it with 100 c.c. of hot water for ½ to ¾ hour, with occasional stirring. Filter and wash the insoluble matter by decantation. After several washings in this manner, transfer the insoluble matter to the filter and wash five times, keeping the mixture well agitated. Treat the filtrate, amounting to about 250 c.c., with 10 to 20 c.c. of saturated bromine water, make slightly acid with hydrochloric acid and boil to expel the liberated bromine.

Make just neutral to methyl orange with sodium-hydroxide or sodium-carbonate solution, then add 1 c.c. of normal hydrochloric acid. Boil again and add slowly from a pipette, with constant stirring, 10 c.c. of a 10 per cent. solution of barium chloride. Continue boiling for 15 minutes and allow to stand for at least two hours, or preferably over night, at a temperature just below boiling. Filter through an ashless filter paper and wash with hot distilled water until a silver-nitrate solution shows no precipitate with a drop of the filtrate. Place the wet filter containing the precipitate of barium sulphate in a weighed platinum, porcelain, silica or alundum crucible, allowing a free access of air, merely folding the paper over the precipitate loosely in a manner that will let in the air but prevent spattering. Smoke the paper off gradually and at no time allow it to burn with flame. After the paper is practically consumed, raise the temperature to approximately 925 deg. C. and heat to constant weight.

The residue of magnesia, etc., after leaching, should be dissolved in hydrochloric acid and tested with great care for sulphur. When an appreciable amount is found this should be determined quantitatively. The amount of sulphur retained is by no means a negligible quantity.

Blanks and Corrections—In all cases a correction must be applied either (1) by running a blank exactly

*Since writing this the author has become Major of Ordnance, United States Army.

[1]Year-Book, American Society of Testing Materials, 1915, p. 605.

as before described, using the same amount of all reagents that were employed in the regular determination, or, more surely (2) by determining a known amount of sulphate added to a solution of the reagents after these have been put through the prescribed series of operations. If this latter procedure is adopted and carried out, say, once a week or whenever a new supply of a reagent must be used, and for a series of solutions covering the range of sulphur content likely to be met with in coals, it is only necessary to add to or subtract from the weight of barium sulphate obtained from a coal, whatever deficiency or excess may have been found in the appropriate "check" in order to obtain a result that is more certain to be correct than if a "blank" correction as determined by the former procedure is applied.

This is due to the fact that the solubility error for barium sulphate, for the amounts of sulphur in ques tion and the conditions of precipitation prescribed is probably the largest one to be considered. Barium sulphate is soluble in acids and even in pure water, and the solubility limit is reached almost immediately on contact with the solvent. Hence, in the event of using reagents of very superior quality or of exercising more than ordinary precautions, there may be no apparent "blank," because the solubility limit of the solution for barium sulphate has not been reached or at any rate not exceeded.

As shown in the preliminary report, the Atkinson and sodium peroxide methods give results in close agreement with the Eschka method. Register has shown that if 15 per cent. of nitrogen is present in the gases contained in the bomb calorimeter the sulphur of a coal is almost completely oxidized to sulphuric acid and the washings of the calorimeter may be used for the determination of sulphur.

The allowable variations are as follows:

	Same Analyst Per Cent.	Different Analysis Per Cent.
Sulphur under 2 per cent	0.05	0.10
Sulphur over 2 per cent	0.10	0.20

I have quoted this method in detail because it has been my experience that the short cuts and modified methods so frequently published generally fail to give satisfactory results in other hands than those of their authors. An experienced chemist, familiar with this sort of work can, in many cases, take advantage of his knowledge to reduce the amount of work this method requires where the highest accuracy is not required. This paper, however, is not intended for the experienced chemist as to him it would be but at best a twice-told tale. To the inexperienced, or to those unfamiliar with this sort of work, however, these short cuts are extremely dangerous, and to them many of the discrepancies in fuel analysis may be attributed.

The combustion of the mixture of coal and Eschka mixture may advantageously be carried out in a gasoline muffle furnace, such for example as the Case muffle furnace manufactured by the Denver Fire Clay Co. The advantage of this type of furnace is that it is self-contained and may be set up anywhere, being independent of gas supply or electricity. By using a furnace with an 8-in. by 12-in. muffle, a number of sulphur determinations may be run at once so that the work is expedited and simplified. I have found it advantageous to remove the capsules from the muffle after they have been heated for about 1½ hours and stir their contents thoroughly with an iron wire and then return them to the furnace. In this way the combustion is hastened and the danger that small particles of carbon at the bottom of the capsule will remain unconsumed is removed.

The coal sample for this determination should be ground until it will all pass a 60-mesh sieve.

In the standard method for the determination of sulphur, mention is made of the possibility of using the washings from the bomb calorimeter for the determination of this element. I have done a good deal of work on this method and as a result I am convinced that it is entirely worthless when applied to high-ash anthracites, as in this case not more than half the sulphur of the coal may be depended upon to be found in the bomb washings. With low-ash anthracite such as the better grades of "prepared sizes" about 75 per cent. of the total sulphur of the coal will be found in the washings from the bomb. It is decidedly unwise, therefore, to depend upon this method and its use should be discouraged.

I have spent much time in developing a volumetric method for determining sulphur in the washings from the Eschka mixture and have succeeded in working out a satisfactory method. In the long run, however, the volumetric was found to be but little more accurate than the gravimetric method, and certainly no more accurate, so it has been abandoned.

A word to the young or inexperienced chemist: Religious adherence to the recommendations of the standard method will secure the accuracy desired, divergence from them will cause errors in the long run.

Storage-Battery Locomotive Does the Business

In an anthracite mine at Hazleton, Penn., an Ironton 5½-ton storage-battery locomotive recently replaced a 10-ton trolley locomotive and three mules. This replacement was not due to the trolley machine being incapable of pulling. It arose solely from the fact that here, as in many mines, a 5- or 6-ton locomotive can handle all the loaded cars that are ever ready at any one time. It is not economy to use a locomotive much larger than necessary. The flexibility of the storage battery machine enables it to cover ground as well as pull heavy loads.

It is not unusual to hear some one sing out to the locomotive driver: "Say Bill! Have you got on all the cars she can pull?" The answer will come back, "Yes." "Then put on one more." This is hard on the locomotive, of course, and must be anticipated by husky construction.

The storage battery as built for mine-locomotive service does truly wonderful work if reasonably treated. A workman was recently reproved for putting water in a battery which contained material injurious to it. As it was good drinking water the man thought the complaint unreasonable. "I drinks that water," he growled, "and it don't rust me; and I guess it is good enough for that blankety blank battery!"

With one-half the consideration a mule gets in a mine, the battery will deliver a much stronger "kick." Moreover, the battery delivers the "kick" when it is wanted, and that certainly cannot be said of Maud.



New Methods of Handling Coal Electrically

By C. L. PACKARD
Schenectady, N. Y.

SYNOPSIS — *This article delineates the improvements in coal-handling equipment made by one company in the recent past. Among these are extreme sizes—large and small—of mine locomotives, a new type of locomotive controller and a shipping pier installation for transferring coal from cars to a ship's hold with a minimum of breakage.*

MANY applications of electrical equipment for the coal-mining industry have been contributed by the General Electric Co. during the past year. These cover transportation units and installations of types of standard apparatus in new sizes for hoisting and handling coal at the mine and seaboard and in industrial plants.

Early in the present year there was placed in service at one of the plants of the H. C. Frick Coke Co. a 30-ton, 48-in. gage mine-haulage locomotive equipped with three 125-hp., 500-volt driving motors and a type M multiple unit control, also both straight air and hand brakes. This locomotive is used for main mine haulage and develops 20 per cent. tractive effort (12,000 lb.) at 8.8 miles per hour. It is arranged so that two units can be operated in tandem, thereby bringing the two-unit capacity up to 60 tons.

Among the larger units under construction is one which, when completed, will be the heaviest locomotive of its gage and height so far built. It consists of a 40-ton, 36-in. gage, single unit articulated truck locomotive driven by four 500-volt motors. Its equipment includes automatic air brakes and HC control, which is similar in principle to the well known PC control, except that it is operated manually instead of by compressed air.

While this locomotive is intended for surface hauling, its dimensions are limited by the fact that its route includes a relatively low tunnel. Its overall dimensions are: Width, 6 ft. 1 in.; height over cab, 9 ft. It will develop 20 per cent. tractive effort (16,000 lb.) at 7 miles per hour.

The HC controller referred to was used for the first time on mine locomotives in 1917. As the locomotive units increased in size with corresponding increments in their current demands, it was found that the drum type of controller could not be utilized effectually on account of limited capacity, while the PC type necessitated the equipment of the locomotive with air compressors for their operation.

The HC controller is capable of handling the heaviest currents required by any mine locomotive in service or under construction. The main contactors are actuated by a cam which is in turn moved by means of a simple hand-operated lever. This type of controller was developed to handle 250- and 500-volt mine locomotives ranging from 15 tons rating to 40 tons. The arrangement of this control is shown in Fig. 2.

In contrast to the exceptionally large sizes referred to there was also produced the smallest practical mine locomotive ever constructed. This is a storage-battery unit



FIG. 1. A 30-TON MINE HAULAGE LOCOMOTIVE

rated at two tons, for operation on 20-in. gage track. It has a single driving motor which gives an effective drawbar pull at 400 lb. at 3 miles per hour. The battery is carried on a trailer having approximately the same dimensions as the locomotive. This machine is shown in Fig. 3.

This outfit was designed for underground service and to meet unusual conditions in mine development work. It is used on different levels in the mine, and its exceptionally limited dimensions—overall length, 48 in.; width, 34 in. and height, 35 in., as well as the fact that the step and operator's seat are removable—permit its ready transfer in the shaft cage from one level to another.

An important development in storage-battery locomotives was the production of a motor specially adapted for this service which rendered feasible the use of a single reduction gear drive. Prior to 1917 the motors applied to this type of locomotive were of the light weight, high-speed type originally designed for motor vehicle propulsion, and double reduction gearing was necessary in order to obtain the low speeds normally required for locomotives. The new motor has the same mechanical characteristics as those used on trolley type locomotives,

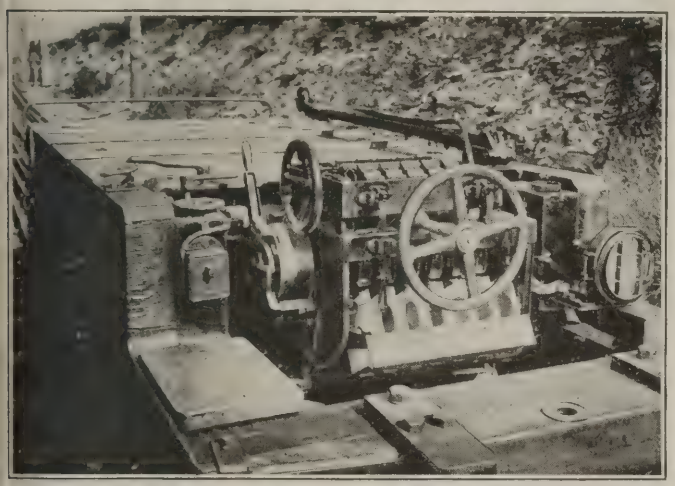


FIG. 2. NEW TYPE OF LOCOMOTIVE CONTROL

and with a slow-speed armature permits the efficient application of the storage-battery energy through single reduction gearing, thereby avoiding the use of the additional gear, pinion and countershaft heretofore required, and eliminating the friction losses they involved, simplifying the mechanical arrangement of the locomotive and reducing first cost and maintenance charges. The saving in energy consumption is, of course, specially important in that it increases the radius of action of storage-battery locomotives for each charge.

While the electrification of mine hoists in 1917 was not equal in number to those of 1916, a large number of installations were made, principally of induction motors. Upward of 90 equipments of 100-hp. and above, aggregating over 22,000 hp., were supplied. A particularly interesting installation was made at one of the Fairmont, W. Va., mines of the Consolidated Coal Company.

This was the initial installation of this type in an Eastern coal field and consisted of duplicate equipments of 1400-hp. capacity, operating on the Ilgner-Ward Leonard system. These equipments are designed to hoist 485 tons of coal per hour from a vertical depth of

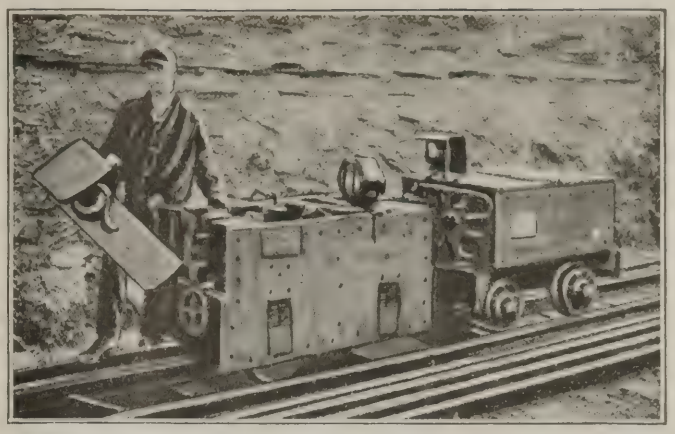


FIG. 3. DIMINUTIVE MINE LOCOMOTIVE

550 ft., 3.25 tons being handled per trip, with the cages operating in balance.

The hoist motor is rated 1400 hp., 90 r.p.m., at 550 volts, its armature being mounted on the same shaft with the winding drum. The drum is of the cylindro-conical type, the cylinder portions being 8 and 11 ft. in diameter. At full speed of the drum the cage speed reaches a maximum of 3100 ft. per minute. The slack rope system is employed in which the lower cage is landed and its empty car replaced by a loaded one during the time the upper car is being dumped. The hoist motor is supplied with power through a flywheel motor-generator set whose demand on the power supply is automatically limited to 600 hp., although the hoist motor develops a peak of 1800 hp. during hoisting.

For coal handling in quantity at an industrial plant equipment was supplied for two high-speed, alternating-current, hammer-head, coal-handling gantry cranes, provided with a unique system of dynamic braking. This was installed at the Steubenville, Ohio, plant of the La Belle Iron Works. Each crane is equipped with a 375-hp. slip-ring induction motor direct-coupled to a 40-hp. direct-current motor, and hoists a 4-ton bucket of coal at 500 ft. per minute.

Dynamic braking is obtained by combining the small direct-current motor with the alternating-current motor so that the direct-current unit serves as an exciter and gives dynamic braking, which is comparable with that ordinarily obtained with direct-current motors on this class of work. This is the first large application

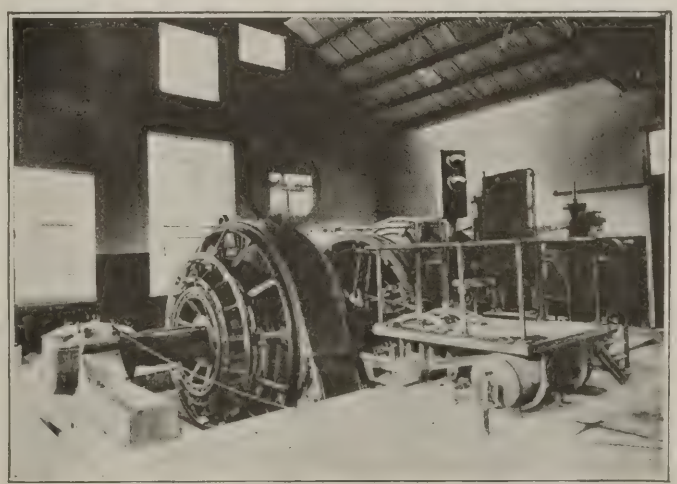


FIG. 4. DIRECT-CONNECTED MINE HOIST



FIG. 5. UNIQUE COAL-HANDLING CRANE

of this system of braking for cranes. It is more economical in first cost and has a number of practical operating advantages when compared with the method which utilizes a motor-generator set in addition to an exciter for securing dynamic braking for alternating-current hoist motors. Creeping speeds of 110 ft. per minute, lowering, are obtainable with cranes under ordinary service conditions.

An interesting application for car unloading and shiphold filling is the installation on one of the Baltimore piers of the Baltimore & Ohio R.R. This pier was designed and equipped for the rapid transfer of coal from cars to shiphold with the lowest possible breakage. Its equipment at the shore end of the pier consists of two steam-operated dumpers, capable of handling forty-five 100-ton cars per hour. In service this equipment has dumped 50-ton cars at the rate of 60 per hour.

The coal at the dumpers is deposited into hoppers and distributed by six short feeder belt conveyors to the conveying belt system of the pier. Two radial incline conveyors pivoted at the car dumpers also deliver directly to the power station hopper or to a balancing bin of 6000 tons capacity. The feeder belts travel at varying speeds and are driven by motors averaging about 15 hp. in capacity. Each incline conveyor utilizes a 150-hp. motor.

On the pier itself, which is 700 ft. in length, there are six longitudinal belts traveling at constant speed. The four inner or main conveyors are about 1000 ft. long, with 60-in. belts, and on either side of the pier is a 48-in., 820-ft. conveyor known as a trimmer. These conveyors all move at the rate of 425 ft. per minute. Each main conveyor is driven by a 300-hp. motor and carries coal at the rate of 1500 tons per hour. The trimmers are driven by 150-hp. motors and have a capacity of 1000 tons per hour each, making the aggregate delivery of the pier 8000 tons per hour. The pier is 110 ft. wide, and the six longitudinal conveyors occupy practically the entire deck space.

The coal is transferred from the four centrally located main conveyors to the hold of the ship by means of four transverse bridges arranged to travel lengthwise of the dock, and carrying shuttle conveyors from which the coal is finally delivered. The operation of the entire system of belts serving each of these bridges is centered in the bridge by means of remote electrical control.

The two trimmer conveyors likewise deliver coal by means of two traveling towers, which move along the sides of the pier, and are provided with 30-ft. projecting booms pivoted at the tower. These can swing 270 deg. horizontally and 90 deg. vertically and deliver the coal from the trimmer conveyors directly into the hold of the ship. The four shuttle belts are driven by 35-hp. motors, and the two trimmer towers and boom conveyors by 40-hp. motors.

In addition to the remote-control system for the widely separated motor drives, a unique arrangement of feeders furnishes current for the various motions of bridges and towers, without resorting to the complicated system of trolley wires or feeder rails with their concomitant contact shoes which would ordinarily be used. This control is accomplished by running all feeder cables in conduits along the deck of the pier and bringing them out through bellmouths located at suitable points, whence they pass over rollers to cable reels mounted on the movable bridges and towers. For the bridges, the necessary tension is maintained on the cable by suitable counterweights when winding and unwinding. In the case of the trimmer towers constant torque motors, similar to those used on mining-locomotive cable reels, are utilized in place of weights. Current supplied at 13,200 volts is stepped down for the operation of three 500-kw. synchronous converters, which in turn deliver current at 550 volts through eight main feeders.



FIG. 6. ONE OF THE TRANSVERSE BRIDGES ON THE LOADING PIERS



FIG. 7. TRIMMER CONVEYOR AND PROJECTING LOADING BOOM

Coke for Boiler Furnaces

By M. Meredith
Liverpool, England

It is not thoroughly realized by the majority of steam-plant owners that coke and coke breeze can be burned in boiler furnaces with considerable profit and at the same time to the advantage of the nation. The reason doubtless lies in large part in the fact that everyone is too thoroughly occupied with production to be able to spare much thought to changes and minor economies in the boiler house. Yet the difficulty involved is not as great as might be imagined.

S. G. Martlow gave some useful information on this matter recently. In a certain boiler house the partial substitution of coke and coke breeze for Welsh smokeless coal has effected a reduction of 20 per cent. in the fuel bill and saved $3750 in the course of the past year. The Lancashire boilers in which the coke is being burned had been equipped with patent hollow firebars, 17 to each furnace. One firebar was removed from each set and the bars put wider apart, so that the air spaces between bars were ½ in. wide instead of ⅜ in. The passages in the bars as well as in the pigeonholes under the bridge were plugged with refractory clay.

Each ashpit was closed by a casting carrying a pair of trumpet-shaped blower tubes acting as air ducts, and having steam jets controlled by outside stop valves. Except at times of light load forced draft is employed. Because of the situation of the plant smoke was not permissible (this being the reason for the former use of Welsh smokeless coal) and the coke entirely fulfilled this condition.

At the introduction of the byproduct fuel one of the instructions given to the firemen was: "When using coke, never entirely shut the dampers." This was to guard against the possible collection of gas in the flues at standing periods, which might lead to an explosion when the fires were stirred up at any time for a resumption of load.

Compared with raw coal the number of shovelfuls thrown on the grate is considerably more, owing to the difference in specific gravity of the two fuels. Bulk for bulk, the heating value of coke and breeze is less than that of a good coal and the volume of fuel per day put into the furnace is at least 50 per cent. greater; also, cleaning fires has to be done more frequently. Thus the firing is more trying to the men, and there is more clinker than when best Welsh coal (now practically unobtainable) was consumed. Account must naturally be taken of these factors in paying the firemen.

The accumulation of clinker has been diminished to a great extent by enlarging the gunmetal nozzles of the steam jets from the original 1/16 in. to ⅛ in. in diameter. With the larger jets such clinker as is deposited is more easily removed and the life of the gratebars is prolonged.

The saving effected in this case is borne out by the records from other plants. By using a mixture of slack and coke breeze in equal proportions, a saving of 30 per cent. on the fuel bill has been made in the case of a small generating station in the North of England, while considerably greater economies are being effected in plants that have been fitted out with the requisite apparatus for burning a mixture of coke and coke breeze.

Minecdotes

In Which the Mine Boss Emulates King Solomon

The mine boss and the master mechanic were sitting in the office, discussing the extension of a new pipe line, when two miners came in very much excited, disputing the ownership of a certain car of coal which had come up the day previous without a check.

Each presented his case to the mine boss, claiming that he was short one car and the car was his. The mine boss found from the weighmaster that only one car had come up without a check, and as both men had places where they pushed their cars by hand to a parting, he knew he would be unable to identify the particular car in question.

He therefore had no evidence whatever to help find the rightful owner, but in spite of this there was no hesitation whatever in his manner as he turned briskly to the two men.

"Now, I'll tell you what I'll do with you fellows. I don't know which of you owns that car, so the fairest thing I can do is to give each of you credit for half of it. Is that agreeable to you?" turning to one of the miners.

"Yes, that's fair enough," the man replied, after thinking it over a moment.

"And how about you?"

"It don't suit me at all. That car belongs to me, and I want it," the second miner replied.

"Well, you can go. I'll let you know after a while what I will do about it."

After the man had left, the mine boss spoke up to the first miner.

"You've got your nerve to try to put one over me like that. I happen to know that you didn't have your place ready to load coal yesterday until 4 o'clock, and then it was too late to get cars. You heard that we had a car without a check and thought you'd work me for it. I know your kind, and if you ever try to put over any more funny business like that on me I'll fix your clock right. Do you get me?"

The man protested a minute and then walked sheepishly out of the office.

"I'll hand it to you," said the master mechanic after the man had gone. "You handled that pretty slick. The fellow was a rummy, however, to try it when you knew about his having no coal."

"But I didn't know he had no coal. That was pure bluff to make him own up. Any man as willing as he was to split was pretty good evidence that he was getting something for nothing, and I figured if I went at him strong enough he would back down. It's part of the system."

"Well, I'll say one thing for your system; it's sure a good one."

"It ought to be," replied the mine boss. "It's about 3000 years old. Old Solomon was the first man on record to try it, and I guess he was as smart as they come."

[*Coal Age* will pay liberally for short, witty stories for this column. Contributions should breathe the atmosphere of the mine.]

SNAPSHOTS IN COAL MINING



STEEL TIPPLE OF THE CONSOLIDATION COAL CO., NEAR FAIRMONT, W. VA.



MODERN STEEL BREAKER UNDER CONSTRUCTION IN THE ANTHRACITE COAL REGION OF PENNSYLVANIA

SURFACE PLANT

NEW ENGLAND FUEL AND TRANSPORTATION CO.

GRANT TOWN, W.VA.



Commissary



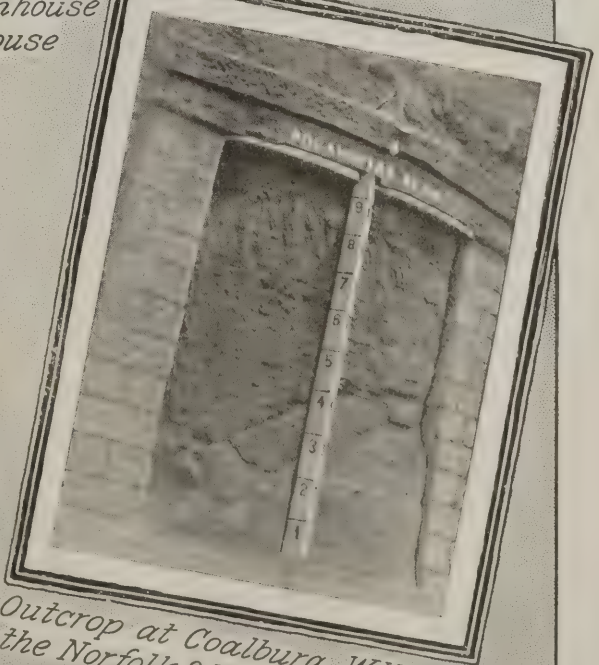
Moving Picture Theater and Amusement Hall



Main Shaft, Fanhouse and Boiler House



Shaft and Tipple



Outcrop at Coalburg, W.Va., on the Norfolk & Western Railway

NEW APPARATUS AND EQUIPMENT

Stretcher for Pitching Places

A new stretcher has been developed for coal and metal mines modelled after that used by the Homestake Mining Co. of Lead, S. D. The construction of this stretcher is so strong and rugged that it has been shipped across the continent without any wrapping or crating whatever, yet despite this severe test of its availability for rough work the stretcher arrived in first-class condition at its destination.



STRETCHER FOR STEEP PLACES

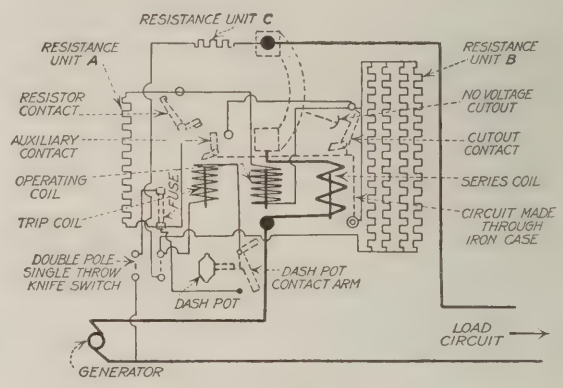
The strong safety feature of this new Homestake mine stretcher is that the patent is securely strapped thereon so that there is no chance of his further injury during transportation. The stretcher may also be raised vertically, up or down an incline, or skidded through the passages without disturbing the patient. For this reason it will undoubtedly prove valuable to many mining companies throughout the country. The Government is now using this stretcher in some departments, and it has been found to give every satisfaction.

The accompanying illustration gives an idea of the ruggedness and practicability of the Homestake mine stretcher for all phases of underground work. It is manufactured by the Mine Safety Appliances Co., Chamber of Commerce Building, Pittsburgh, Pennsylvania.

Automatic Reclosing Circuit Breaker

The Automatic Reclosing Circuit Breaker Co., of Columbus, Ohio, has recently brought out an improved form of automatic reclosing circuit breaker known as type "CN." This breaker is provided with a low voltage lock-out arrangement so that when the breaker is opened either by an overload current or by voltage failure the breaker cannot reclose until the trip coil has operated.

The trip coil can be adjusted so that it will not operate except when the voltage has been restored to 50 per cent. or more of normal value. The accompanying illustration shows the wiring diagram of this breaker. These breakers are designed especially for the protection of motor circuits in mines and industrial plants.

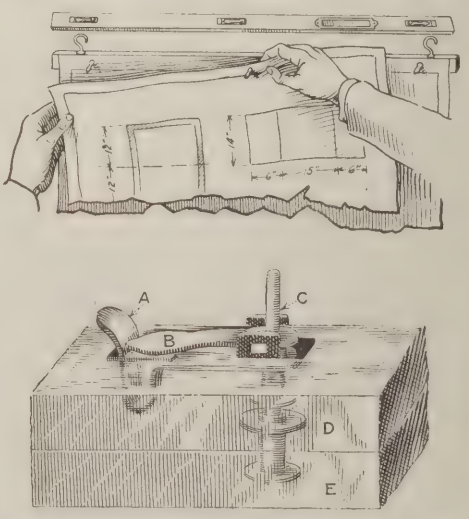


WIRING DIAGRAM OF BREAKER

They are built for 110, 250 and 600 volt direct-current circuits.

Holder for Blueprints and Drawings

A holder for blueprints, records, charts, drawings and newspapers is being marketed by the National Co., 275 Congress St., Boston. Two strips are provided, the upper one being removed when it is desired to add or take out material. These strips are clamped together by means of three catches which permit prints of narrow widths to be held firmly. The holder is suspended by hooks placed at the top. The catch, as shown in detail in the illustration, consists of a hardened-steel stud *C*, fastened to the lower strip *E*, and levers *A* and *B*, the latter being fastened to the upper strip *D*. The device is locked by pressing lever *B* and released by pressing *A*. The holders are made in 30- 36- and 42-in. sizes.



DETAILS OF NEW BLUEPRINT HOLDER

Electric Control Equipment of Mine Hoist

At Mine No. 2 of the Mission Field Mining Co., near Danville, Ill., 2800 tons of coal per day is being hoisted from the valley, where it is mined by stripping. The length of the incline from the valley to the tipple is approximately 1800 ft. This incline is shown in Fig. 1.

The mine hoist is of the traction type, electrically operated. The motor and the control equipment are located in a small house a short distance from the tipple. The motor is operated from 2300-volt alternating-current supply lines and is of 150-hp. capacity.

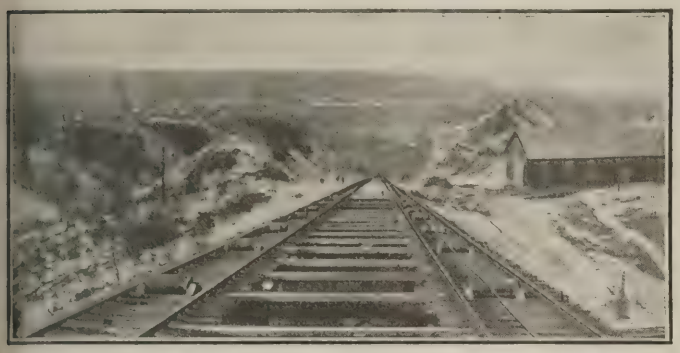


FIG. 1. NO. 2 INCLINE OF MISSION FIELD PLANT

At the top of the incline is a cab, or operator's house, mounted between the tracks from which the hoist runner can watch the loaded cars and shut down the hoist at the proper time by the simple manipulation of a master controller lever. This governs the operation of the magnetic control panel shown in Fig. 3, which is located in the motor house previously referred to.

When the operator at the Mission mine throws the master lever to the "on" or "run" position the series of magnetic switches carried on the control panel close in succession, bringing the motor gradually and safely up to speed by cutting out, step by step, the resistance which is connected in the secondary side of the slip-ring type of alternating-current motor employed. This motor is shown in Fig. 2. The resistance, which is of the grid type, may be seen above the magnetic control panel in Fig. 3. By means of this magnetic control the operator is kept away from the high-voltage current, since his master controller only handles control current which is of low potential. At the bottom of the panel two primary, solenoid-operated, inclosed, oil-immersed switches are mounted. These close and open the main primary circuit to the motor.

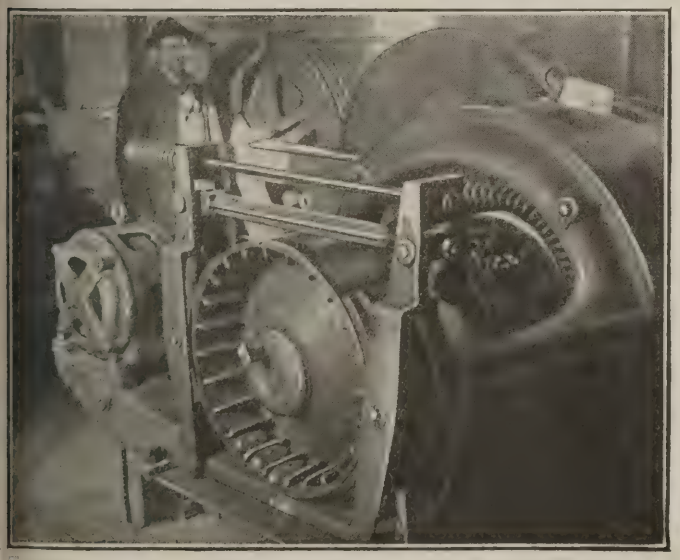


FIG. 2. MOTOR WHICH RUNS THE HOIST

When the operator throws the master lever to the "off" or "stop" position, the magnetic control panel cuts the motor from the line and inserts the resistance in the secondary circuit ready for the next start. A brake of the motor-operated reversible-shoe type is also actuated and brings the motor to a quick stop. This brake appears rather large in comparison to the hoist motor in Fig. 2 because it is in the foreground. The small motor on the end of the brake applies the braking power and replaces the solenoid magnet of the usual direct-current brake. A small pinion on the motor shaft engages with a toothed quadrant which is linked to the arms carrying the brakeshoes. When power is applied this small motor revolves until the brake is released. It then stalls and maintains the brake in the released position until the power is cut off. Adjustment for wear is easily effected by turning a nut on the thrust rod. This brake, as well as the magnetic control apparatus, is manufactured by the Cutler-Hammer Manufacturing Co. of Milwaukee, Wisconsin.

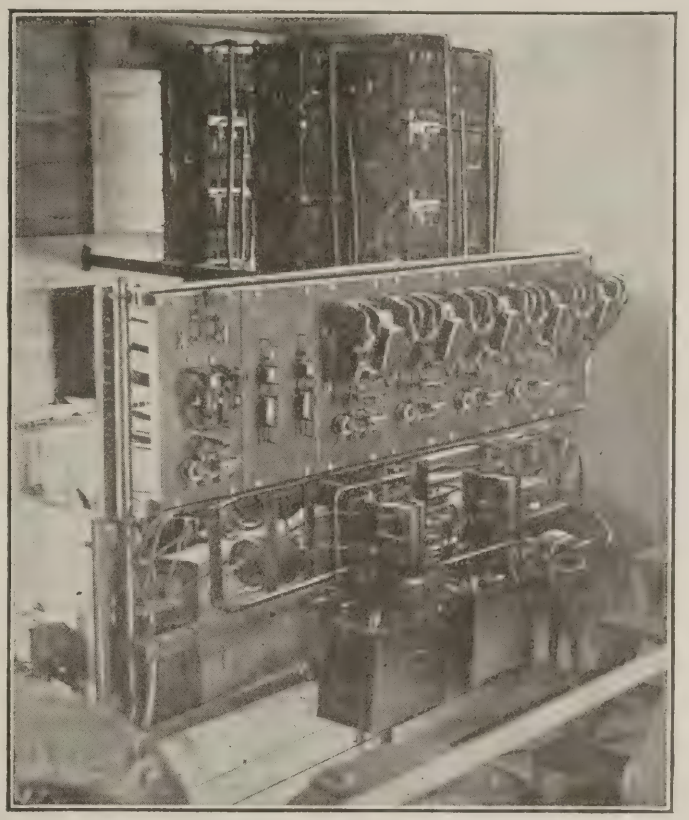


FIG. 3. MAGNETIC CONTROL PANEL

Experience with burning soft coal shows that if soot is once formed a large percentage remains floating in the gases after all other gaseous combustible has been almost completely burned. In a hand-fired furnace analysis of the flue gases will sometimes show no CO when at the same time black smoke is coming out of the stack. Even a large combustion space is not an unfailing solution for burning soot, without a large excess of air.—*Bureau of Mines Bulletin No. 135.*

Nature of Mine Explosions

By H. E. GRAY
Confluence, Penn.

SYNOPSIS—*What the term "explosion" really means, in its application to coal mines. Effect of an explosion in mine workings. The production of air waves, and "trill" of the air previous to the detonation that wrecks all in the path of the fatal blast.*

THE general mining public is sometimes electrified and shocked by newspaper accounts of explosions in mines. No doubt we often wonder how and why such accidents happen. As far as I am able to learn, there is no information yet obtainable which enlightens us fully as to the nature of this great death-dealing factor in mines.

Our textbook definition of the term "explosion" is a "very rapid combustion taking place and accompanied by a violent and destructive expansion of the gaseous products." Such an explanation, however, fails to furnish an adequate idea of the true nature of a mine explosion. The gruesome discoveries, made by rescuing parties after firedamp has done its awful work in a mine, has proved beyond a doubt that the terrible expansive force developed in the narrow confines of the mine is responsible, to a large extent, for the destruction of lives and property in the underground workings.

The mine cars are overturned and demolished, bodies of animals and men mutilated beyond recognition, tracks torn up and other objects lifted bodily and thrown to one side of the passage. Tons of coal and slate are thrown down by the terrible force of the explosion, and obstruct the airways and traveling ways.

My desire is to make clear what constitutes a mine explosion, from the time of its inception, when conditions are practically normal, until it has reached its full development. It should be understood that in considering explosions that occur in underground workings, we have to deal with conditions that differ materially from those that exist in the open atmosphere.

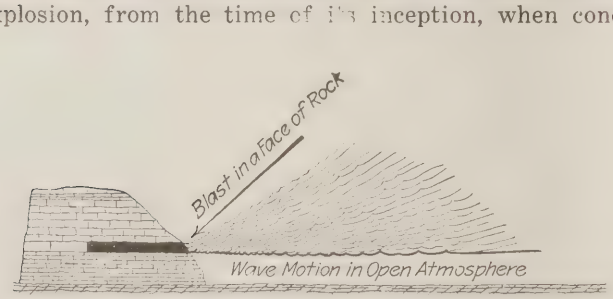


FIG. 1. ILLUSTRATING A BLAST IN THE OPEN AIR

In the case of an explosion of any material on the surface, the air waves produced by the shock or concussion radiate from a common center, in all directions. The greatest velocity of wave motion is at the center of disturbance, or where the explosion originated. Here the waves are shortest and increase in length as they recede from that center till lost in limitless space, as I have attempted to illustrate in the accompanying sketch (Fig. 1), showing the effect of a blast in a hillside.

When an explosion occurs in the open atmosphere, we may observe the following: (1) The explosion develops its maximum force in a moment of time. (2) The vibratory waves produced are not confined within narrow limits, but are free to expand in all directions, into boundless space.

On the contrary, when an explosion occurs in a mine the explosive wave is forced to travel with great velocity through the narrow air passages, and the effect is often increased as it goes by the aid of firedamp and fine coal dust, which is thrown into the air and consumed by the heat and flame of the blast.

In my opinion, a mine explosion develops a vibratory movement of the atmosphere in the mine, resembling the trill of a human voice, and this may be produced

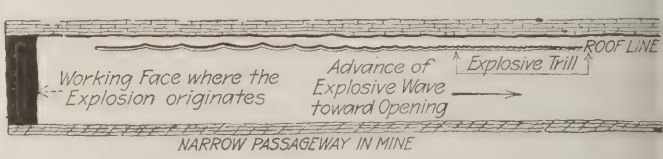


FIG. 2. SHOWING EFFECT IN A NARROW MINE ENTRY

either with or without the aid of heat or flame. For instance, I believe that a trill movement may be set up in a mine atmosphere by a rapid subsidence of the roof strata over a large area. The most disastrous explosions, however, are always accompanied by a solid wave of flame.

An explosion of gas in a mine may not develop its full force instantaneously, but there is often a gradual development from the place of its inception to the point where it "trills," as I like to express it, or explodes.

The chief elements in the development of a mine explosion are the volume of gas or dust consumed, intensity of heat or flame producing ignition, and the air space or area of the immediate working places.

The movement of the original explosive wave in a mine must always be in a forward direction; and this movement in one direction must be maintained or, as I believe, it will be impossible to develop an explosive trill. The turning back of the flame over the path taken I think, invariably results in its extinguishment and terminates the explosion. I would say that the distance traveled by an explosive wave, from the point of origin to the point where it trills or explodes, is usually about 200 feet.

For sake of illustration, let me assume a narrow passageway in a mine, 1000 ft. in length, and that somewhere near the working face is an accumulation of fire damp, sufficient in volume and quality to produce a violent explosion. In some manner this body of fire damp is ignited and produces a large body of flame. The heat of the flame causes a rapid expansion of the surrounding air and gas.

All of this has taken place in a moment of time, and the entire mass of air and burning gas is driven for

ward, in a single direction by the force of expansion. Because it is confined within narrow limits on all sides, except in the direction of the mine opening, there is formed an advancing explosive wave that moves forward consuming the dust and gas in its path, whereby the temperature and explosive energy are momentarily increased.

The vibratory waves, however, gradually shorten as the propelling forces behind and the retarding forces ahead produce a compressive effect. Every moment increases the velocity of the moving mass of flame and gases, the waves gradually shortening until the climax is reached by a fine vibratory trill movement, and the real detonation of the mass immediately follows. I have again attempted to illustrate my idea, as shown in Fig. 2.

As I have previously stated, men, animals and other heavy objects are picked up as so many feathers in a windstorm and hurled against the roof and sides of the mine. The explosion has now done its work. One thing still remains for us to try to do and that is to show how explosions in mines may be prevented.

Upkeep of Adequate Motive Power

In speaking before the United States Chamber of Commerce in its sixth annual meeting in Chicago recently, Alba B. Johnson, president of the Baldwin Locomotive Works, took the ground that Congress should place upon the functionary charged with the making of railroad rates the responsibility of making the rates sufficiently high for thorough maintenance of the roads.

Tracing briefly the development of the locomotive from the days when they weighed five tons each to the present type, weighing more than 500,000 lb., Mr. Johnson showed how the spur of competition had been responsible for America's progress in handling its vast transportation problem up to its present high point of efficiency, where "American railroad men need have no fear of comparison with other countries either in the encouragement given to improvements in engineering practice or in the reductions which have been achieved in the cost of transportation." Continuing, Mr. Johnson said:

> The participation of the United States in the world-war has brought about new conditions. A mass of legislation and regulation which had accumulated during years of peace and which was predicated upon certain popular fears and prejudices resulted in the failure to allow increase in revenues corresponding to increased costs. The necessities of the war soon demonstrated that these regulations which prevented coöperation by insisting upon competition, did not make for efficiency, but prevented many measures of improved service which the railroad managers were themselves eager to adopt but which had been made prohibitive. In order at a single stroke to untangle this situation, the Government decided that it was wise to assume control of transportation by placing all the principal lines in the control of a director general of railways, and to operate the roads as a unit during the period of the war and for a fixed time thereafter. For the first time in the history of the country all of the railroads became subject to a unity of management and to a unity of control in their purchases. For the first time it became practicable to adopt and to enforce standards to a large extent.

The whole problem of standardization Mr. Johnson discussed at length, pointing out the obvious operating advantages on the one hand and contrasting with them the possibilities of the paralysis of invention and the stagnation of new improvement on the other. "It would be an evil day," he said, "for American engineering, for American progress in the art of transportation, which would involve a policy of discouragement to new and useful improvements in the art. We should therefore look carefully before we leap, to make sure that we are not giving up the substance of continued growth in efficiency and economy, to grasp the chimera of standardization. Especially should this be considered most carefully when the world-wide danger of this war is upon us."

Turning to the remarkable growth and development of electric power in transportation, he briefly reviewed its history from the electric locomotive ordered by the Northern Pacific in the early '90's up to the present when electrical engines are part of the standard equipment of such lines as the New York Central, the New York, New Haven & Hartford, the Pennsylvania, the Chicago, Milwaukee & St. Paul, the Norfolk & Western, and others. As to the future relationship between steam and electricity, Mr. Johnson said:

> Doubtless the electrification of suburban lines and the application of electricity to lines having great density of traffic will be financially justified, and as these grow in number and join themselves together electric zones will be created in which it will be economical to adopt electricity exclusively as the motive power. Any question of rivalry between the steam and electric locomotive may be set aside. The problem is wholly an economic one, the only question being as to which is the more efficient and suitable for the particular conditions, and the consequent adoption of one or the other is dependent upon the geographical or other circumstances governing each case.

Speaking of the admittedly inadequate motive power of our present equipment, Mr. Johnson said:

> During the depression preceding the war there was a small surplus of power which, as should have been foreseen, was absorbed in traffic with the first increase of activity. As a rule, railroads have purchased locomotives largely under the spur of excessive traffic and have abstained from purchasing during periods of reduced earnings. This is contrary to the economics of the situation. Enlargements of facilities should be made in times of depression. The reason the railroads have not done this since 1907 is that under the regulatory policy which went into effect at the time, railway managers have not been able to accumulate surpluses sufficient in their judgment to warrant bold construction in times of small earnings, and especially because future earnings have not been susceptible of approximate calculation even where the volume of traffic could be estimated in advance. Adequate provision of motive power, like adequate provision of other rolling-stock and other facilities, can only be assured when Congress places upon the functionary charged with the duty of regulating rates, the definite responsibility of making such rates as will yield earnings sufficient for thorough maintenance, for adequate improvements and sufficient to attract the capital necessary for providing additions and extensions.

The low percentage of combustible in the furnace gases when the excess of air is large is not entirely a result of improved combustion, but to some extent is due to the dilution of the gases with air. It is evident that with a large excess of air, the percentage of combustible gases is less, even if there be no improvement in the combustion. Therefore, when the air supply is varied the percentage of combustible gases does not reliably indicate the completeness of combustion.—*Bureau of Mines Bulletin No. 135.*



Weekly Production Statistics

A break occurred during the week ended May 4 in the steady increase in production of bituminous coal which had taken place for three successive weeks. The decrease over the record production of the week ended Apr. 27 was 2 per cent. Telegraphic advices to the Fuel Administration show that the production for the week ended May 11 practically equals that of the week ended May 4. During the week ended May 4 production totaled 11,559,000 net tons.

Anthracite forwardings were 40,570 cars, thus showing a substantial increase over the week ended Apr. 27 and preserving unbroken the recurring increase since the first of April.

Beehive coke production fell off to 657,000 tons during the week ended May 4. The decrease was a full 11 per cent. Shortage of labor is given as the principal cause. Byproduct coke production showed a gain over the week of Apr. 27 and now stands at practically 90 per cent. of the full-time capacity of the ovens.

The estimates given above are those of C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

Fuel Administration Asks Appropriation

Congress has been asked to devote $4,575,000 for the maintenance of the Fuel Administration from July 1, 1918, to June 30, 1919. The appropriation is to be supplied as follows:

Salaries	$2,392,000
Temporary employment	381,000
Traveling expenses	750,000
Services other than personal	565,000
Supplies and equipment	368,000
Purchase, operation and maintenance of passenger-carrying motor-driven vehicles for use of United States Fuel Administrator, his assistants and deputies, in the business of the Fuel Administration	10,000
Law books, periodicals, and books of reference	5,000
Rent	104,000
	$4,575,000

Drive for Coal Orders To Be Made During "Coal Week"

The marked success which has attended the setting apart of a week for Liberty Loan and Red Cross drives has led the Fuel Administration to designate the week beginning June 3 as "Coal Week." During that week systematic efforts will be made throughout the country to secure the booking of coal orders. Dealers are to be asked to give publicity to the fact that purchases of domestic fuel will be delivered in the order of their receipt.

To Supervise Distribution of Lake and Canadian Coal

In order that special attention may be given the distribution of Lake and Canadian coal, C. P. White has been placed in immediate charge of these activities of the Fuel Administration. For 20 years Mr. White was in charge of Lake Superior coal dock properties. This experience brought him in close touch with the fuel needs of Canada and the Northwest. He also has been connected with the coal department of the Wheeling & Lake Erie R. R. and formerly was in charge of the Pittsburgh Coal Co.'s operations north and west of Chicago. For a time he was vice president of the Carnegie Dock and Fuel Co. with headquarters at Minneapolis. Until recently Mr. White has been general manager of the Clarkson Coal Mining Co., which conducts operations in eastern Ohio.

Railroad Fuel Question Still Unsettled

Illness of Director General McAdoo made impossible last week further steps looking to the settlement of the railroad fuel controversy. Reports to the Fuel Administration show that the railroads are buying on a hand-to-mouth basis and are not entering into contracts. Loss of production is resulting from the fact that operators cannot enter into contracts with others, as they know that the railroads must be supplied with fuel.

To Conserve Power Plant Fuel

Fuel conservation in power plants is to be insisted upon by the Fuel Administration. Active steps in this direction are being taken. Thomas R. Brown, of Pittsburgh, Penn., has been appointed administrative engineer for the Pittsburgh district, with C. P. Dilling as his assistant. Other administrative engineers will be appointed for other districts.

The Fuel Administrator hopes to save 50,000,000 tons of coal during the next year in industrial plants. This is to be done largely by correcting firing and operating methods. Each power plant is to be inspected personally. Each plant will be rated on the basis of the thoroughness with which the conservation regulations are carried out.

While no mention is made by the Fuel Administration that plants with the lowest ratings will be the first to be cut off from fuel supply, when there is not enough coal to go around, it is believed that that practice will be pursued.

New Regulations Affecting Shipment and Sale of Bituminous Coal

A regulation issued on May 13 by the United States Fuel Administration prohibits the shipment by way of the Great Lakes and the sale, distribution and use of smokeless coal from the Pocahontas and New River districts in Virginia and West Virginia, for domestic purposes in Wisconsin, Minnesota, North Dakota, South Dakota and Iowa.

By an additional regulation bituminous coal from the states of Pennsylvania, Ohio, Maryland, West Virginia, Virginia, Eastern Kentucky and Tennessee, is barred from shipment by way of the Great Lakes into the State of Illinois for sale, distribution, or use for domestic purposes.

Lake forwarders, dock owners, wholesale and retail dealers, and others are warned of severe penalties for violation of the orders in disposing of coal from the Lake ports for domestic uses where the coal has come from the prohibited districts to the Lakes for blacksmithing and byproduct uses as permitted by the zoning orders put into effect by the Fuel Administration and Railroad Administration on April 1.

Under the zone plan coal from these districts when shipped to the Lakes must be used for certain specified purposes and those coals named are among those prohibited under the zone plan for domestic use. The new regulations are designed to prevent the coal, after reaching the Great Lakes, from being transferred and distributed for domestic purposes. Both regulations are made effective at 7 a.m., May 27.

A third regulation issued today by the Fuel Administration widens the zone in which coal from the Lake Superior docks may be sold and distributed so as to include all points in the State of Montana, located along the line of the Minneapolis, St. Paul & Sault Ste. Marie Ry. between Westby, Mont., and Whitetail, Mont. This order is effective May 20.

To Curtail Use of Fuel Oil

No significance should be attached to the fact that the Fuel Administration has in mind the curtailment of the use of fuel oil in the States of Oregon and Washington, according to Mark L. Requa, the head of the petroleum division. Local conditions in those states, Mr. Requa says, probably will require such action. He explained, however, that it does not hold that fuel oil is to be denied consumers in other sections where coal is available.

Maximum Prices Fixed on Beehive Coke

Beehive coke made in Wise and Lee Counties of Virginia must not be sold for more than $7.25 a ton f.o.b. cars at the ovens. The price of 72-hour selected foundry coke is fixed at $8.25.

At the Howe plant in Oklahoma the price fixed for blast-furnace or smelting coke is $10.75, and for 72-hour selected foundry, $11.75.

Screened and sized crushed beehive coke made anywhere in Colorado is subject to a maximum price of $9.80, according to an order issued last week by the Fuel Administration.

Tonnage Lost Because of Car Shortage

A table, showing the full-time capacity of mines in the more important producing fields and the loss during the week ended Apr. 20, due to car shortage, has been compiled by the Geological Survey. It follows:

Producing Field	Full-Time Output Tons	Production Lost Because of Car Shortage—Tons
Illinois	2,370,000	322,000
Indiana	640,000	112,000
Southern Ohio	460,000	243,000
Northern and central Ohio	930,000	293,000
Western Pennsylvania	2,075,000	263,000
Central Pennsylvania	1,882,000	147,000
Somerset County, Pennsylvania	153,000	70,500
New River and Winding Gulf	413,000	114,000
High-volatile fields of Southwest Virginia	825,000	265,000
Fairmont, W. Va.	230,000	102,000
Cumberland and Piedmont	214,000	17,000
Northeast Kentucky	230,000	37,000
Western Kentucky	320,000	33,000
Southern Appalachian	428,000	20,000
	11,170,000	2,038,500

No Coke To Be Shipped to New England

New England must rely on itself for coke. An order has been issued by the Fuel Administration forbidding the shipment of coke, made in New England, outside of those states except to Albany, Cohoes, Green Island and Troy, New York. Shipments of coke into New England from other states are also prohibited.

Plan To Reorganize National Coal Association

A plan for the reorganization of the National Coal Association is to be presented at the annual meeting to be held in Philadelphia, May 28 and 29. The form of organization will be changed from a temporary one to a corporation. It is proposed to incorporate it under the laws of the State of Delaware. There are to be 37 directors, as follows:

Washington, Iowa, Indiana, Alabama, Michigan, Virginia and Maryland, one director each. Montana and Northern Wyoming, one director. Utah and Southern Wyoming, one director. Colorado and New Mexico, one director. Arkansas, Oklahoma and Texas, one director. Kansas and Missouri, one director. Tennessee and Georgia, one director. Western Kentucky, one director. Eastern Kentucky, one director. Ohio, two directors. Pennsylvania anthracite, two directors. Illinois, three directors. West Virginia, three directors. Pennsylvania bituminous, four directors. Eight directors at large also are proposed. An initiation fee of one-fourth of one mill on each ton of annual production will be charged.

Brief Washington Notes

Zone B regulations have been changed so that shippers may forward smithing coal into the area west of the western boundary of North and South Dakota, but not south of the southern boundary of Zone B.

No anthracite will be allowed to move west of the Mississippi or into the South, it is understood. It has been deemed necessary to restrict the consumption of anthracite to those sections of the country where it is most greatly needed and which are not too distant from the points of production.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The strike of the coal miners in the Huntingdon and Broad Top region of the bituminous coal field of Pennsylvania was not unexpected. The wage provided Dec. 4 of last year was arranged to end Apr. 1 of this present year. The operators apparently thought that December was not a seasonable time for resisting a strike and preferred to shelve their difficulties rather than to face them.

In effect they seem to have believed that Apr. 1 would find such a slackness of market as would make them and the public generally indifferent whether the mines worked or were idle. Some may have thought the war might by that time be at an end.

Early last winter there were in the country plenty of optimistic people who believed that the war game would never be played to a finish, that the players would lay their cards on the table, the Kaiser then conceding that it was useless to hope to win as against the full hand of Uncle Sam. We now know that the Kaiser was figuring on the man-power of Russia; we have recently seen two big salients driven into the British line, and we are now more ready than ever to admit that several Mitchell days may go by before the war comes to an end.

As the war excitement became greater rather than less, Apr. 1 found the demand for coal almost as great as on Dec. 4. Consequently the miners' strategic position is in many ways as good or better than in the year past; for the demand for coal is still severe, and now the miners can claim that the scale they are asked to accept is a reduction from the former scale. Had the higher scale never been granted that could not have been said.

The rate of mining per ton during the winter was $1.11. It is now $1.01. The yardage rate is also cut 8 per cent. As stated, the change in rate took place Apr. 1, but the mine workers did not strike immediately. They accepted one pay at the lower rate and finally quit on May 8.

CARS WILL GO TO IDLE MEN IN OTHER FIELDS

The laying idle of this small area need not reduce the output of bituminous coal. The cars it would normally receive can be shifted to other sections of the country where the men have been satisfied to fare as well as, and no better, than their fellows. The output of the region is not large, only 8500 tons a day. As some big single mines produce an equally large amount of coal it would be a small matter were the whole tonnage of the Huntingdon and Broad Top region lost to the country, but, as stated, this 0.45 per cent. of the whole national tonnage can be readily supplied elsewhere by miners who would otherwise be kept idle for lack of cars.

The fact that the Huntingdon and Broad Top miners got a larger wage than the rest of the miners in central Pennsylvania was the reason for the recent dissatisfaction in that large and important region. To give the miners in the Broad Top region what they ask is likely to make trouble in the larger area. To deny it to them is likely to result in greater satisfaction. Everything seems to show that the improvement in the strategic position of the Broad Top miners is offset by the knowledge that what they ask can only be conceded by raising up difficulties which cannot be dismissed with indifference.

On May 9 the only mine in the region still working was that at Jacobs. A meeting, called by Fuel Administrator Garfield, was to be held May 17 at Washington, D. C., but at the time of going to press the delegates to that meeting were not yet in session.

Another development of interest is the determination of the Consolidation Coal Co. to enter into contract relations with its men. The company has always been a model employer, but it has resolutely combated the unionization of its workmen, feeling that a union meant an organizing of discontent. Operators have feared that discontent became chronic wherever an institution was formed with the apparent purpose of keeping such discontent alive. Some men who read patent-medicine advertisements are ready to crawl into the grave, imagining they have all the ills described, and similarly some well-satisfied men who join a union begin to sense all manner of social ills as soon as they are suggested to them. A fear of something akin to hypochondriacism makes operators afraid of the spread of union activity.

On May 9, George T. Watson, president of the Consolidation Coal Co., at a meeting of the leading operators of the Fairmount region said as follows: "The war has changed everything. The get-together spirit is in the air. Labor and active capital are working together in a common cause—winning the war—and real democracy is sure eventually to triumph.

CONSOLIDATION COAL COMPANY GRANTS OPEN SHOP

"The Consolidation Coal Co. heads have, for some time, been engaged in formulating a plan of getting-together with their men. Consequently, the present action is not exactly sudden, though the determination to put it into effect came very suddenly, without giving the opportunity for such a general consultation as we would have preferred.

"The coal industry has never had a clear sky until now. It has been handicapped by conditions which are being remedied by the coöperation of employer and employed with the United States Fuel Administration."

The Consolidation Coal Co. is proposing to have mine committees at all its mines and plans to welcome the appointment of an umpire by the judge of the United States District Court, whose appointment will be subject to the approval of the United States Fuel Administration and who will be payable by the company and the employees conjointly.

On May 6 the aides of the United States Fuel Administrator, Rembrandt Peale and John P. White, proposed a solution for the Maryland trouble which solution follows closely along the lines of the Alabama settlement, namely: (1) Mine committee of three at each mine. (2) Secret balloting for that committee. (3) No grievances to be discussed during working hours by mine committees. (4) Reference of debated matters to manager and, if not settled in three days, further reference to an umpire. (5) Matters must be submitted to umpire within 30 days or right of appeal will be denied, unless an extension of time has been agreed upon. (6) All agreements shall be in writing, shall be final and not subject to appeal. (7) Umpire shall be appointed by Judge Rose of the United States District Court of Maryland and be subject to the approval of the United States Fuel Administration. (8) Should two nominees be found unsatisfactory, the administration itself is empowered to name the umpire. (9) The umpire shall be paid by operators and mine employees jointly each contributing one half of salary. (10) Mine committee members to be protected against discrimination except when using intimidation or coercion. (11) Right of reëmployment conceded to employees discharged for affiliation with the union. (12) Right to have a check weighman on each tipple where coal is weighed. (13) Checkweighman shall not be elected more often than once in three months unless a vacancy exists. (14) Checkweighman shall be paid by a check-off taken from the wages of hand and machine miners and loaders. (15) The turn shall be even. (16) Pay day shall be semi-monthly. (17) The penalty for

interrupting the operation of a mine or causing a strike is $1 per day for each day or fraction of a day the mine worker lies idle. (18) The penalty for a lockout is a dollar per day for each mine worker affected. (19) All fines are payable to the American Red Cross through the umpire. (20) The agreement shall continue in force at least two years or for the duration of the war, whichever is the longer period of time. Thereafter it shall be subject to revision upon 90 days' notice by either of the parties.

The action of the Consolidation Coal Co. and the anticipated action of the United States Steel Corporation seems to make the "open shop" in the mines of the United States almost an accomplished fact. A few ununionized sections will still remain in southern West Virginia and some in western Kentucky. Everywhere else the open shop will have full sway. Much water has passed over the wheel since the United States entered the world conflict.

The union and operators alike prefer to do business through the Fuel Administration and do not like to submit their differences to the so-called Labor Dictator, who bears the euphonious name of Felix Frankfurter. Mining men believe that they understand their own wants best. A meeting was held Thursday, May 16, to discuss the situation, Fuel Adminstrator Garfield, Advisers Peale and White, President Hayes, Vice President Lewis and Secretary Green being present.

The gradual unionization has done much to heal the differences between operators. The union and nonunion operators have always looked at one another somewhat askance. Propaganda suited to one field did not suit the other. Institutes found their members more or less at cross purposes. Coal associations spread with difficulty over the line which divided union from nonunion regions. Several companies were opposed to any entry into organizations doing business with the union. In fact they could not well associate themselves effectively with them.

The new labor conditions have had no little to do with the formation of the Central Pennsylvania Coal Producers Association with a membership representing mines producing 30,000,000 tons per annum. This has taken the place of the Coal Operators Association of Central Pennsylvania which represented about 8,000,000 tons of annual coal production and the Low Volatile Association, a newer body representing 20,000,000 tons.

Charles O'Neill, who has been vice president of the central Pennsylvania United Mine Workers, has been selected as general secretary of the Central Pennsylvania Coal Producers Association. O'Neill is a young man, but he has been quite influential in the union. He was for a number of years private secretary to Patrick Gilday, the president of District No. 2. When James Purcell succeeded Patrick Gilday, O'Neill became vice president of that district. For some months O'Neill has been in Washington taking the place of ex-president J. P. White, whenever the chief was touring the country for the Fuel Administration.

Reports about Liberty Bonds still come in and some will have to be deferred to the coming issue. In some instances there seems to have been some well-meant, but unfortunate, violence used by the bond sellers. It is just as well to avoid physical compulsion in the selling of bonds. If anyone thinks more should be subscribed let him buy more himself. If the Government had intended a forced levy; it would have provided for it by law. There are some arguments for the Government taking such a course; to many Australians, especially, this has seemed the best plan to adopt. However, till we make such a law there is no compulsion, and we certainly under no circumstances do well to haze or mistreat those who do not buy.

A more generous subscription would be a better way of meeting the issue, for the purchase of a big bond is a financial bargain for the investor. If he buys twice or three times as large a bond by that much is he the more benefited. When the verdict of the people is for compulsion, then let us have compulsion. At all times let us use alone methods that are lawful.

At a special convention held May 3 the Alabama mine workers ratified the new wage scale, details of which appear in our issue of Apr. 27, and on May 12 the Maryland mine workers approved of the working conditions already outlined in this review.

A 100 Per Cent. Liberty Loan Subscription

The Lehigh Valley Coal Co. has 17,496 employees. Out of this large number not one failed to subscribe in some amount to the third Liberty Loan. The average subscription was $57.01.

The employees of the company purchased $313,550 worth of the first Liberty Loan and $446,500 of the second, while the subscriptions to the third loan booked by the company for its employees lacked only $2500 of reaching one million. In other words $997,500 in third Liberty Loan bonds were sold by this company to its employees.

The men themselves took great interest in the loan and did much both individually and collectively to swell the number of bond buyers. Sometimes the arguments presented to the men who were reluctant in their purchases took forms bordering on the disorderly. "Slackers" were painted or placarded, and paraded through the villages where they resided.

In obstinate cases the mines were made so unpleasant for them that they either subscribed for a bond or quit work. So far as is known no actual violence or permanent injury was done either to person or property. In one instance the "patriots" conducted a miner to the brink of a reservoir and induced him to purchase a bond by threatening to "baptize him by immersion." Confronted with the certainty of a thorough ducking he finally consented to buy a bond. But after exacting this promise somebody suggested that he be given a ducking "just for luck," and he accordingly got his ducking, much to the delight of the crowd.

Throughout the campaign the coöperation between the local unions and the company officials has been close and cordial. Local union No. 458, at Maltby colliery, had $2000 which it decided to put into Liberty Bonds. The local banks got wind of the fact and several put in an application that the purchase be made through their institutions, but the union men wanted the subscription to be given through the company. Local union No. 1546, of Franklin colliery, with its investable fund somewhat depleted by a subscription of $1200 to the previous loan put $300 in the third issue, and gave the company credit for gaining the subscription. Local No. 1732 of Warrior Run colliery similarly invested $1000 in bonds.

Southern Anthracite Locals Also Buy Bonds

When the locals of the Lehigh-Coxe, the Delano and the Mahanoy & Shamokin divisions heard that the locals of the Lackawanna and Wyoming divisions were placing their subscriptions through the company they decided to do the same. In consequence Local No. 2848, of Sayre colliery, bought $500 worth through the company. Local No. 82, of Spring Brook colliery, took $100 worth, Local No. 961, of Spring Mountain colliery, $500 worth; Local No. 185, of Tomhicken colliery, $100 worth; Local No. 1381, of Lattimer strippings, $200 worth; Local No. 2631, of Oneida colliery, $100 worth and Local No. 2838, of Vulcan colliery, $250 worth, all through the Lehigh Valley Coal Company.

The company showed its appreciation ungrudgingly and in a little booklet it gives in greater detail the list we have just quoted in brief. The gracious act of the unions has strengthened the strong accord which is growing up between them and the company, and the good will is heightened by the Lehigh's recognition of the broad-minded attitude of its employees.

The company's record somewhat remodeled is as follows:

Division	1st Loan Amount	2d Loan Amount	3rd Loan Amount	3rd Loan Per Person
Treasurer and Controller's Dept., New York	$3,750	$3,100	$5,550	$132 14
Snow Shoe	8,850	12,400	22,000	60 27
Drifton Shops	10,050	6,350	15,900	58 45
Lackawanna Division	39,400	95,300	191,900	55 93
Mahanoy & Shamokin Division	75,300	42,800	175,200	55 58
Wyoming Division	56,600	118,700	211,650	55 30
Wyoming Valley Water Supply Co	950	200	3,150	55 26
Delano Division	34,850	28,850	106,550	55 20
Lehigh-Coxe Division	45,700	104,800	225,600	53 49

It will be seen that the one bituminous mine of the corporation led all the anthracite mines of the company in the generous size of its subscription.

EDITORIALS

Making Coke May Yet Be "Verboten"

NEW developments make new duties. In the coke industry manufacturing coke in "clamps" was the first development, and therefore the first offense against conservation. Only in China is that wasteful process still in operation. The beehive oven then followed as the ideal means of coke making, because it made better coke with less waste of fuel. Then came the Belgian oven, which saved labor, and the flue system, which supplied heat to boilers. Then, as what seemed a final economy, came the byproduct oven, or rather the series of byproduct ovens. To build anything else is now a crime punishable by unsuccessful operation and financial loss.

The article which we publish on page 912, "Bettering Coal by Heat and Pressure," awakens grave question as to whether we have any right to make coke at all. We are led to question whether instead of merely aiming badly we have been actually shooting at the wrong target altogether. This is almost certain if the experiments of Charles H. Smith are as revolutionary as they appear from the figures given in the article. However, it must be remembered that some mixtures of coal when coked in byproduct coke ovens give twice as much oil and tar as others and that the metallurgical value of carbocoal can only be determined by careful tests.

The following table is taken from Table II of Mr. Malcolmson's paper, but some of the information is consolidated and we think it reveals in consequence the value of the low-distillation process in a more striking manner. The last column shows the relative proportions of substances obtained by low-temperature distillation and by coking, the difference being most marked in the light oils. With carbocoal, according to the table, seven times as much oil is obtained as with byproduct coke.

RECOVERY OF LIQUID PRODUCTS PER SHORT TON OF RAW COAL PRODUCT

Product	Byproduct Coke Oven	Carbocoal	Relative Product
Light oil	0.27	1.583	5.863
Middle oil	0.44	3.326	7.559
Creosote oil	0.78	3.236	4.149
Heavy oil	1.26	11.365	9.020
Total oils	2.75	19.510	7.095
Pitch	4.66	10.190	2.187
Total products	7.41	29.700	4.008

The amount of carbocoal obtained is also quite high, and the ammonium sulphate produced 21 lb. per short ton of raw coal carbonized. Whether coke is to be a forbidden product or not is, of course, a question; but it looks as if a formidable rival had arisen. Our treatment of coal has always been ruthless. A body with such complex characteristics should have been handled with more circumspection.

In England low-temperature distillation of coal has made much progress, and it seems fully probable that the saving of byproducts will pay many times for the work involved, even should it be found that the improvement in the fuel was not enough in itself to pay the expenses of manufacture.

For the Worker, Work Is Patriotism

THERE is a complaint that some mine workers are of such a patriotic kidney that they take every opportunity to celebrate. It is hard to keep them at their work. A little celebration now and then does no one any harm. It puts vision into one's work and vim into one's labor, but it can easily be carried too far.

The purpose of celebration is to stimulate service, but with some the idea of celebration is divorced from the idea of labor and is associated only with pleasure or idleness. At Marion, Ill., a traveling war exhibit recently laid the mines idle. As coal is in great demand and the cars to move it are needed even more, it is incumbent on every man to load cars whenever opportunity is provided and to exhibit his patriotism on idle days when that is the only service he can render. Celebrating will not win any victories. If we do too much of it now, there will be nothing but defeat to commemorate when the war is over.

Naturalization vs. Americanization

IT IS interesting to note that the campaign about to be put into operation for the Americanization of foreigners is not laying any stress on the ceremony of naturalization. Too clearly we are learning that this legal status is often given to people who have never acquired the spirit of America. They have not our heritage of democracy; they have not our patient spirit which seeks to progress from precedent to precedent; they are suspicious of our institutions, and many of them are illiterate and so unable to enter into the purpose of our laws or to understand our business relations.

We do not need any more such Americans. We are surfeited with them now. If we give them citizens' rights, we shall find they control us and not we them. Let all those who are not pro-American remain foreigners, till they are brought to a new and better mind. We should be slow to welcome them to citizenship, for they do not welcome us to their fellowship.

The movement for Americanization, however, is based on broader, better grounds. If it were not we would do far better without it. The leaders of the movement do not scheme so much to make Americans as to make pro-Americans. The republic would be safe with 75 per cent. foreigners if that 75 per cent. was ardently pro-American and imbued with friendship toward the other 25 per cent.; but if the proportions were reversed and we had 25 per cent. naturalized foreigners whose only affiliation with America arose from an oath taken under economic or physical pressure, or even under earnest persuasion, the republic would be in considerable danger of disruption.

Americanization is a slower process than what we speciously term "naturalization." We can "naturalize" in an hour. Americanization takes some months. We can "naturalize" with a little violence, but it takes the rarest

sympathy and tact to Americanize. But like all things expensive and slowly acquired, Americanization is worth all that it costs in time, money and trouble.

The enemy alien is just now peculiarly susceptible to Americanization, especially if he is not of Teutonic but of Magyar, Slovak, Czech or Serb stock. He knows that in most countries he would be treated with far greater severity. If he is reasonable he realizes that he is being used with exemplary indulgence. He is ready therefore to become pro-American if only a little impulse is given. He cannot become an American. Few care much that he should. If we have his heart and his hand who cares if we are deprived of his ballot?

As for the alien from an allied nation, we could not find a better time to bring him under the spell of our affection whether he be Italian, Russian, Irish or British. But we do not do well to ask him too sedulously to seal that affection with a bond, nor will we make headway with him if we too suspiciously urge upon him on every available occasion that in the words of Charles Dickens: "Codlin's your friend and not Short."

Our readers will pardon the following simile: The care of a child passes to a foster mother, a mother whose care is perhaps unremitting, but whose justifiable pride refuses to be hidden. She tries to ingratiate herself with her protégé by suggestions that his former mother was not as generous, sympathetic and beneficent as is his foster mother. The suggestion is not tactful even when true.

Unfortunately, we do not always see Americanization in that light. We are continually asking for pledges and persistently urgent in the question "Don't you like America better than Transpontiana?" It suffices if we punish disaffection and disloyalty. Positive declarations of affection if obtained by pressure are apt to foster the very spirit we seek to quell. Patriotism is an affection of the heart; it has been the great offense of the Germans that they tried to plant that delicate flower in alien soil by dint of forced naturalization and repressive measures.

Lengthening the Worker's Stride

IN SOME companies the number of men who subscribed for the Third Liberty Loan formed a large percentage of the whole force employed, but it still seems possible to improve the record a little. If the 40,000,000 wage earners in the United States buy a $50 bond, the amount raised is only $2,000,000,000, about one-tenth of what we shall require annually when we get our war stride and half what we are raising by taxation. If, as was the case in the Third Liberty Loan, only 17,000,000 subscribe, the amount raised by a $50 subscription would be only $850,000,000, quite a little less than a billion.

For this reason it seems that the size of the taking has not been sufficiently emphasized. In some companies the subscription came so close to $50 per employee, though all subscribed, that assuming that no one bought more than $100 worth of bonds the number of men buying two bonds apiece cannot have been more than 6 or 10 per cent. of those buying $50. It seems therefore that the canvass was conducted on the supposition that $50 was all that a workman could or should be expected to take.

There are not a few stories told of men who came to the boss and asked to buy a bond. The employer offered to sell him a $50 obligation and the workman, not satisfied, finally demanded one of a $1000 denomination. In one case a boy turned in his father's order, and when the manager was informed he summoned the old man to the office, bent on explaining to the foolish fellow that he could never pay for a $1500 bond by installments from his slim pay. The workman however closed the argument by producing from the lining of his coat a roll of bills which was more than sufficient to buy all the bonds his boy had contracted for.

The operator needs a little more faith. He does not yet know the splendid spirit of the men whom he commands industrially. Unfortunately he too often comes in contact with the mere wastrels of the mines, but the main body of the men have the interests of their family, the country and the company at heart. Loyalty is a virtue they have in abundance. The operator has had many a time to fear that spirit of loyalty when it was used against him. It is now directed in favor of national unity and victory, and the miner is showing how powerful its appeal obsesses him, and if he is approached to buy in hundreds of dollars, that is how he will buy; for he never was a quitter.

Give Till It Hurts?

ONE of our national organizations for war relief has urged that we give till it hurts. But giving doesn't hurt. If you doubt that statement just look at the givers. They are the happiest, heartiest, liveliest and most desired of all our friends. Hurt? They are not hurt. The crabbed soul who never gave a cent, or gave it grudgingly and of necessity, is the man who is hurt; and that injury is vital. It has attacked the very soul of the man, and it can go no deeper. Slowly, all that was best in him has been destroyed. It is not giving, it is refraining from gifts that hurts.

The American Red Cross is making a drive for $100,000,000 for war-relief work. The men who are making the call—we purposely do not term it an appeal—the men who are making the call are business men, and they ask a generous people for generous gifts. They are in touch with the American heart, and they know it is not the shriveled organ of a curmudgeon. They do not come to us each month with a new appeal, but ask us for enough to keep them going handsomely for some months. And the American people, capitalists and workingmen, will not deny them.

No body is all heart. The human heart is but a part of the human body. Similarly, the whole body of American people is not all heart. There are a few among us who do most of the giving. From them the American nation receives its glory and the American flag its luster. They must give, not a fair share, but an abundant share. The factor of safety for them must be not one, but ten, or this great donation will not be fully subscribed.

Therefore give—not till it hurts—but till it helps, till an allopathic dose of giving clears the foul humors from your heart and brain, and leaves you convalescent from your surfeit of self-indulgence. By thus giving you can help our boys and at the same time help our land to beam with the happy smile of the generous giver.

DISCUSSION BY READERS

Men in Blind Alleys

Letter No. 3—I agree wholly with the ideas advanced by "Lumen," *Coal Age*, Apr. 6, p. 644, in regard to men who continue to live in "blind alleys."

In my opinion, every man is the architect of his own fortune. When one is content to live in a blind alley he is in a rut. Such a man makes no effort to get out and travel a new road or explore a new country, so to speak. I want to indorse the sentiment already expressed, that every worker in this country, today, must study the theory of his work. It is a great mistake for a young man to be so indifferent to his future welfare that he neglects to study the principles underlying his occupation.

Whether a man works in an office or in a mine, he has the same chance to advance and gain a higher position, from month to month and year to year. Employers are not slow to recognize that the men who study do better work, make fewer mistakes, and the cost of production is reduced, because more work is accomplished in the same time. This is true of all work outside or inside of the mine.

Let me say, in closing, that to every young man there comes the opportunity to climb. The ladder is before him, but he must mount it step by step before he can gain the top.

C. McMANIMAN.

Rawdon, Quebec, Canada.

Transportation of Coal by Canals

Letter No. 1—I was deeply interested in reading the article of W. W. Wotherspoon, state superintendent of public works, entitled "The Canal as a Carrier of Coal," which appeared in *Coal Age*, Mar. 2, p. 402.

The author of the paper says, "It is believed coal may be profitably transported in large volume via the canal at a rate of two mills per ton-mile."; but he does not tell how he arrives at that figure or what such estimated cost includes. It would be of interest to know if the expense of returning the empty cars to the mines is included.

In order to reach a right conclusion, one should know what the actual cost of transportation is, including maintenance and repair of the canal, and the locks and dams, and what is needed to cover interest and sinking fund charges on the bonds issued by the state to pay for the construction. If this two-mill rate does not include all of these items, then the public, or at least the taxpayers of New York State, indirectly pay a large part of the transportation cost of the coal.

That this was feared by the taxpayers of the farmer class is shown by an editorial in a recent number of the *American Agriculturist*, which says, "it has all worked out as the farmers of New York State feared some years ago when they voted so heavily against the bond issue. We showed that the canal, being mainly of national concern, should be improved by the nation. But the cities of the state overrode the farmers and the money was voted, the cost advanced 50 per cent. and the farmers' property will now be taxed for years to come, to pay heavily for the most colossal mistake ever foisted upon the taxpayers of the Empire State."

Kindly let me suggest to Mr. Wotherspoon that if the two-mill rate, per ton-mile, does not include the factors I have mentioned and the cost of carrying, the coal must then be paid for by the public, in the shape of taxes to cover these items, it would be of interest to have him revise his figures so as to include them and make the results public.

I fully believe that the public and the taxpayers of New York State, are entitled to know what is the *real total transportation cost* by canal, as well as the cost of the operation of the boats. With regard to this phase of the question, the following extracts from the Final Reports of the National Waterways Commission are enlightening:

> The amount of traffic available with a given equipment affects the cost of transportation by water in much the same way as it does the cost by rail. In both cases there are certain fixed costs on which interest must be paid, regardless of the amount of traffic moved, so that an increase of business, with the same equipment, results in a rapid decrease in cost per unit.
>
> When the waterway is a canal and is intended to be self-supporting, the analogy is perfect; but the same principle should apply to expenditures for the improvement of rivers. In determining the cost of transportation by water, each ton should be charged with its proportion of the cost of the improvement, even though in actual practice the expense is borne by the Government.

Cost of Transportation on the Erie Canal

The report then goes on to say regarding transportation rates and costs on the old Erie Canal:

> The average rate, per ton-mile, on the Erie Canal, is about 2.45 mills. Comparing this with the average freight rate, it is frequently stated that the cost on this canal is about one-third of that by rail. But no such exact comparisons can be made, for the reason that the rates compared do not include the same elements of cost. . . .
>
> The average cost of transportation on the Erie Canal includes only the bare cost of conveying the traffic, plus a small return on the equipment used. It contributes nothing for the maintenance, nor does it make any return on the capital expended for the construction and enlargement of the Canal. Both these expenses are paid by the State of New York.
>
> It has been conservatively estimated that if the canal traffic was charged with a toll sufficient to cover these additional expenses the rate, per ton-mile, would amount to 8.61 mills. The average rate for similar commodities, especially on the railroads in New York State, is probably not more than five or six mills, per ton-mile. . . .
>
> Any comparison between cost of transportation by rail and by water will be of value only when the two rates include similar elements of cost. Few such comparisons have ever been made.

The statements here quoted were made with reference to the old Erie Canal, which, according to the authority

of A. Barton Hepburn, in his book "Artificial Waterways and Commercial Development," cost $49,591,853.

If the figures given above, showing a cost of 8.61 mills, per ton-mile, on the old canal, which cost in round numbers fifty million dollars, are correct, how can the new canal, costing over three times that of the old, be operated at a rate less than one-quarter the cost, per ton-mile, on the old canal, when all the proper charges entering into the cost of operation are taken into account?

Can it be denied that if coal can be transported on the new canal at two mills, per ton-mile, with a profit to the boat owner, it is because the taxpayers of New York State pay all the other items mentioned above that go to make up the real total cost of operation? Would not this be equally true, even if the canal had been constructed by the National Government, as suggested by the editor of the *American Agriculturist*, except that all the transportation cost, over the actual cost of the operation of the boats, would be borne by the public at large, instead of the taxpayers of New York State?

Pittsburgh, Penn. W. G. WILKINS.

Mining Equipment

Letter No. 4—The letter of P. K. Howard, *Coal Age*, Apr. 13, p. 710, drawing attention to the importance of providing better axles for mine cars, interested me greatly, because for years I have felt that mine superintendents were restricting the capacity of their mines by the use of low-grade equipment.

Not being a technical man, I frequently fail to understand the details of the heat treatment of steel axles, such as advocated by Mr. Howard. But, as a stockholder in several important mining operations, I constantly visit the coal mines, and have often been impressed by the seeming loss in efficiency and the comparative short life of the average mine equipment.

This is largely due to the low-grade materials used and the fact that many mining companies, in buying equipment, hold the manufacturer to their own specifications. In many cases the manufacturer, by reason of his better knowledge of the proposition, is in a position to furnish much superior equipment at the same price if he was allowed to follow the methods and plans that his experience has shown him to be the best.

USE OF LOW-GRADE MATERIAL IN MINE EQUIPMENT

My impression gained from personal observation and by talking to practical mining men, is that the general run of equipment used in coal mines today is of a lower grade than that used in any other industry that is as important as that of coal mining. Every year sees tremendous strides in the improvement of machine tools. Careful redesigning, based upon experiment and continued research, suggest improvements in the kind and quality of material used, all of which goes to speed up the work produced by machine tools and makes it possible to turn out better tools at a lower cost for labor and there is less depreciation of equipment.

In the average coal mine of today, however, one can find mine cars that are essentially the same in design and materials as those used in the earlier days. But, as Mr. Howard says, this state of unprogressiveness is not the fault of the mine-car manufacturers, who are frequently in a position to supply a higher grade of equipment, but are forced by the demands of the operators to furnish cars of inferior material and design, at a low price.

DESIRE TO REDUCE FIRST COST

It is my honest opinion that the men who are responsible for the purchase of new equipment, are giving too much of their attention to the first cost of the mine cars they require, and disregard the ultimate cost, which is caused by the labor and materials used in making frequent repairs, the time lost when cars are in the shop and the depreciation charges, which are abnormally high on short-lived equipment. Any man who has ever tried it knows that one good suit of clothes will outwear three cheap suits and give much greater satisfaction throughout its useful life.

I am glad to learn from Mr. Howard's letter that heat-treated axles are being used by some of the far-sighted mine opertors, and believe that the coal-mining industry will benefit greatly by the constant improvement in the design and material entering into the construction of mine cars. Any results that practical mining men have obtained from the use of heat-treated axles and other improvements in car designs would certainly be of benefit to other mining men and all should come forward with their experiences.

An authorative article by an expert on steel for mine-car bodies and running gear could not fail to be of value to men who realize that their mining equipment should be improved, but who hesitate to change from their old style of equipment, because they do not know the possibilities of superior material and modern design.

Washington, D. C. MAVERETT ASHLEY.

Letter No. 5—I agree thoroughly with "Progressive" when he urges, in his letter, *Coal Age*, Mar. 9, p. 468, that coal operators who have bought and used certain types of mine equipment should discuss their merits and demerits for the benefit of the industry. The experiences of users must serve as a guide to prospective buyers, and this applies to all classes of mining equipment. The discussion of the actual performance of equipment it is desired to purchase is indeed most valuable to the prospective buyer.

Coal-mining executives, as a rule, however, decline to discuss the benefits received from the use of a new machine. *Coal Age* has, from time to time, called attention to the fact that the columns of the paper are always open for a discussion of this kind; but mining people have not generally availed themselves of this offer.

Letter No. 2, which appeared Apr. 13, p. 710, calls attention to the fact that coal operators hesitate to express their views for fear of giving away valuable information. Let me say that any manufacturer of worthy equipment should welcome a full and free discussion of the worth of such equipment when written by users.

Since this is not done, however, it remains for manufacturers to resort to advertising and personal solicitation in order to reach the probable prospect. Letters of endorsement substantiate the facts set forth in this way, and they are worthy of the most serious consideration on the part of people contemplating the purchase of the

equipment or product described. Such a letter is not given as a result of one or two days' trial; but, instead, after the equipment or product has undergone a severe trial and the user is convinced of its real worth.

It is to be hoped that operating officials will relate their experiences with mining equipment for the benefit of those who contemplate purchasing. Particularly is this true of roller-bearing mine cars and storage-battery locomotives.

In the same issue of *Coal Age*, page 710, P. K. Howard, speaking of mine equipment, discusses the use of heat-treated axles on mine cars. From my own observation, the use of heat-treated axles on mine cars has never been considered by the coal operators, in the bituminous fields of Pennsylvania, West Virginia, Ohio and Maryland. However, the adoption of 5- and 6-ton cars to take the place of the 1- and 2-ton cars formerly used, may make it necessary to use heat-treated axles, on these larger cars. But, their use can only be brought about as the result of education on the part of advocates of this type of axle.

Cars holding 6 tons of coal are used in the anthracite region of Pennsylvania, and these are subjected to severe service; whereas the cars used in the bituminous fields rarely hold more than 4 tons of coal, though they too are subjected to severe service.

I agree with Mr. Howard when he states that a discussion of this subject will prove of untold interest to coal operators. For myself, I must profess ignorance on the subject of heat-treated axles for use on mine cars and, for that reason, hope that someone will furnish light and illustrate the subject with sketches or photographs. K. J. WALTERS.

Pittsburgh, Penn.

Gathering Motors

Letter No. 2—In these days of national crisis, the mine operator and management are confronted with the ever-increasing cry, "Produce more coal." Every practical mining man knows that the installation of a successful haulage system, in a mine, goes a long way toward meeting the demand of increased production.

In this connection, I have been greatly interested in the several articles that have appeared in recent issues of *Coal Age*, regarding the storage-battery locomotive as being the best adapted to the gathering of coal at the working face. The merit of a mechanical haulage system over the old fashioned practice of mule haulage is freely admitted by practically all mining men of experience who have made any study of the haulage of coal in mines.

However, while admitting the advantages of mechanical haulage over mule haulage, I am hardly prepared to go as far as some claim, in respect to the comparative merits of the storage-battery locomotive and the trolley system of haulage. To my mind, each of these systems has its peculiar adaptation to different mining conditions, and they can hardly be regarded as belonging to the same class.

My experience convinces me that the trolley system of haulage is well adapted for use on the main haulage roads in mines, while the storage-battery locomotive is particularly fitted for the gathering of coal from the working face and placing it on the inside parting, in readiness to be hauled out of the mine.

The work of gathering was formerly done by mules, but so successful has been the use of the storage-battery locomotive at the face that it can be predicted, almost with certainty, that the mine mule will soon be relieved of his burdensome life in the mine, and permitted to pass the remainder of his days in a more congenial atmosphere.

Storage-Battery Locomotives Used on Main Haulage Roads

I do not wish to be understood as restricting the storage-battery locomotive wholly to the work of gathering cars at the face. In my opinion, in a large number of instances, this type of locomotive can be used with decided success on main haulage roads. The operation of the machine is so simple as to require no mechanical ability worthy of mention. It can be much injured by neglect and carelessness; but, with proper care in its operation and with suitable attention to the batteries and an occasional inspection of all working parts, the cost of upkeep will be reduced to a minimum and the efficiency of the machine maintained at a maximum.

In a number of mines recently visited, I have been greatly impressed with the working efficiency of this type of motor. A number of those observed I found were built by the Ironton Engine Co., of Ironton, Ohio, and it gave me pleasure to note the ease with which they were handled and how much they increased the general efficiency in the production of coal. SPECTATOR.

Meyersdale, Penn.

Letter No. 3—I read with much interest the letter by "Motorman" of Herrin, Ill., *Coal Age*, Apr. 27, p. 800, and desire to offer a few comments on his suggestion recommending the combination battery-and-trolley locomotive as being desirable for use in the mines. The several letters that have appeared recently in *Coal Age*, regarding locomotive haulage in mines have been very good and practical. They should prove a great help to coal operators and mine foremen, in choosing the system of haulage best adapted to their needs.

My personal opinion in regard to the combination battery-and-trolley locomotive, recommended by "Motorman," is directly opposed to that expressed in his letter. I have investigated a number of designs of this type of locomotive and observed its performance under different conditions in mines, and conclude that the combined type is not practical.

Why Combined Battery and Trolley Operation Is Not Practicable

In the first place, a locomotive operated by trolley or battery must have sufficient motor capacity for the given weight. This capacity, we will say, is, at least, 10 hp. per ton, in order to utilize the full tractive effort of the machine and avoid the slipping of the wheels on the rails. But, it is not possible to find a storage-battery locomotive with this capacity of motor, whether the machine is equipped with a pole or not.

My claim is, therefore, that the motor capacity of a storage-battery locomotive is not suitable for use on a trolley system, and such a machine cannot be adapted to that work by simply equipping the machine with a trolley pole. If the motors are made efficient for bat-

tery work, they are not suitable for good operation on trolley work; and if they are made of suitable capacity for operation by trolley, they will prove very inefficient for battery work.

Again, the combination trolley-and-battery locomotive is more complicated than the trolley machine, and would require to be looked after by the mine electrician. Also, the machine is more susceptible of abuse by the motorman, because of the battery being overcharged or discharged and run at exceedingly high temperatures.

Essential Features of Battery Locomotives

The best form of storage-battery locomotive, for gathering purposes, therefore, is one whose motors are designed for storage-battery work, having a low internal resistance and low iron loss. The machine should be designed to give equal efficiency at one-quarter full load as at full load. In other words, the losses in the motor should be so balanced that the motor will be equally efficient when hauling light or heavy loads.

The battery should have sufficient capacity to complete the necessary work of a full shift, so that all the charging, filling, cleaning, etc., can be accomplished at the battery-charging station where proper facilities are provided for that purpose, including switchboard and other measuring instruments.

While there are some practical installations of combination battery-and-trolley locomotives that are highly successful, such installations are not generally recommended because the simplest possible combination of mechanical and electrical parts, as we all know, are required in coal-mining conditions. In this connection, allow me to present the following little burlesque, which was written by a friend of mine when these locomotives first appeared on the market.

Columbus, Ohio Edison Marconi Ampere.

The Wonder Mfg. Co.
Cincinnati, Ohio
Gentlemen:—

I got your letter askin did the new combinashun troley and battery locomotive run. It does. When we got it we put it on the new circular track in no six entry and Bill Stevens which is our best motorman wanted to show off and he got on the locomotive and there is so many little hickies and dewdads on the durn buss an Bill evidently didnt know as much as he thought he did and he got bawled up and must have jimmied something and jammed the rong lever for the locomotive run steady through 19 shifts or nearly six days the track is circular as i sed before and when the battery run out the durn thing hit the troley wire and charged up the battery again and the locomotive stept along a little livelier and we were afraid we would have to shoot Bill to keep him from starving to deth.

Some ginnie in the power house tried to shut the power off and he hit the rong switch and we had forth of july and the last daze of pompey simultaneously and to oncet. We gobbed the ginnie. The locomotive kept on goin til it run off the track and Bill went up in the air and came down on the hot resistance burning his pantz an swore awful. When we got the locomotive in the charging shed say Bo you ought to have saw that battery it looked like a piece of limburger cheese what some one had carried in their hip pocket in hot weather it was some mess believe me. We had volts and kilowatts scattered around all over the place to say nothing of ohms. The locomotive is not what you call a success at least not on no circular tracks with a green motorman.

Yours truly,
Juan Hrdlika Pit Boss.
Circle City, Skiddoo County, Colo.

Selection of Mine Timber

Letter No. 1—Since reading the inquiry that appeared in *Coal Age* [Dec. 29, p. 1113], regarding the size and kind of timber required in mines, I have become much interested in the selection of timber that is best adapted to mining conditions, in respect to both the strength and life of the timber.

As is well known, the timber required in mines for different purposes, such as props, crossbars, caps, track-ties and lagging, ranges from mere saplings to large logs varying from 20 in. to 2 ft. in diameter. In the selection of mine timber regard must be had to the use intended, as all timber is not equally strong or equally durable under the severe conditions to which it is subjected in mining.

Timber that is not properly seasoned or dried before being taken into the mine may develop dry rot or be rapidly destroyed by fungus growth or worms. For mining use it should be cut in the winter season, say from the last of November to the first of March. During these three months of the year the sap has practically drained from the wood, and timber cut then is more readily seasoned for use.

When the trees are felled they should be cut at once into lengths suitable for use as props, crossbars, ties and lagging, while all waste ends should be split for cap-pieces to avoid undue waste. The cut timber should be stacked on end, in piles, to aid the process of drying, and the brush piled and burned.

In general it may be stated that the best timber is to be found on high ground where its slower growth develops greater strength in the wood. The weaker timbers, for the most part, grow on low ground where the moisture affords a more rapid growth.

The principal woods used in mining are the following: Oak, hickory, pine, cedar, spruce, tamarack, hemlock and cedar. These make the best mine timber, because they possess greater relative strength and durability than most of the other woods found in the states and Canada. Probably the strongest and most durable of the timbers named are the oak and hickory, which are commonly classed as hard wood. Allow me, now, to briefly summarize the character of each kind of timber named, as follows:

Character and Qualities of Mine Timbers

Oak—There are a number of different kinds of oak, as white oak, red oak, black oak, etc. These differ mostly in color, texture and grain. The white oak, so largely used in mining, is a heavy, hard and strong wood of a close, straight grain. It is used chiefly on main airways and haulage roads where timber of greater strength and durability is required. The red and the black oak are both softer and more porous than the white oak but still make excellent mine timber.

Hickory—This, also, is a heavy, hard and tough wood. Good, sound hickory is stronger than oak. The wood, however, is not durable, and its use in mines is chiefly limited to the timbering of rooms where the life of the timber is not so important as on the haulage roads and airways.

Pine—This is a good, light, soft wood that is easily handled and cut for use in the mine. It is straight

grained, comparatively free from knots and fairly durable. It is much used in lining shafts, building doors, air bridges and brattices in mines. When well seasoned it makes good prop timber and cap-pieces.

Spruce—Like pine, this is a soft, straight-grained light wood that is useful in the mine. It is slightly less durable than pine timber, being subject to dry rot, which may be largely prevented by chemical treatment. The variety known as white spruce is remarkable for its clear satiny appearance from the bark to the center. The spruce tree has many branches, which make the wood knotty and of inferior strength.

Tamarack—This is one of the most durable of all mine timbers. It is frequently found in the vicinity of lakes on low or middle land. In appearance it resembles the spruce with the exception only that, unlike trees of this class, it sheds its leaves in winter. The sapwood is white for about an inch in depth, while the remaining heartwood is a dark red in color. Tamarack makes an excellent mine timber. Its strength is almost equal to that of oak, and it breaks more slowly.

Hemlock—This is a soft but brittle wood of a coarse, uneven grain. It is light but not durable. When used in mines it is chiefly employed for props in rooms and for cap-pieces. Because it breaks quickly without warning, it is of no value for crossbeams or collars.

Cedar—This is a favorite wood in mining, because it is soft, light, with a generally fine texture, straight-grained and durable. The best cedar is not subject to dry rot. This variety is known as mountain cedar and is preferable to the growth found in valleys or swamps, which has a coarser grain and develops dry rot at the center. Valley cedar, however, is much used in room-work and in longwall mining, because it is easily worked to size.

Other soft woods used to a limited extent are the beech, chestnut, elm, locust, poplar and walnut. With the exception of the locust and walnut, these woods are much too soft and lack the necessary durability.

Rawdon, Que., Canada. C. McMANIMAN.

Mass Education Needed

Letter No. 3—There comes a time in the history of every nation when it becomes necessary to take account of its many activities, in order to ascertain its stability as a going concern, estimate on its rate of progress and determine what means of improvement there are in respect to future operations. It appears to me that such a time has arrived in respect to the education of men employed in the mining of coal in this country.

In the past, mining education here, has been confined very largely to the training of colliery officials. As a rule, little attention has been given to the education and training of the general body of workers on whom the safety of the mines so largely depends. Every boy and man employed underground and ignorant of the many causes of danger is a menace to safety—a state of things that ought not to be allowed to continue.

No system of education is complete that does not provide for the training of young workers to appreciate the dangers of their occupations and their individual responsibilities. The educational ladder, so to speak, must be so complete as to permit any intelligent man to gradually mount, step by step, until he has reached the top.

Mining classes should be in the hands of capable and sympathetic teachers, who should be supplied with the necessary books and apparatus to enable them to teach the underlying principles and make the course of study a practical one. The work should receive the hearty coöperation and assistance of the mine officials who should realize the increased efficiency and safety to be derved from this source.

When proper attention is given to the matter of education, there should be no difficulty experienced in securing the attendance of the majority of young men, in any mining district. The enthusiasm aroused by those attending the first session should be a strong factor in bringing others into the classes, which should include the study of English, drawing, practical mathematics, physics and chemistry.

Although the movement to educate the great body of mine workers is now widely established in the larger mining towns and districts, many of the smaller camps are without these advantages. It is a mistake to attempt to teach experimental physics or practical chemistry relating to mining, by means of a piece of chalk and a blackboard, as is still frequently done, with the result that interest lags and little good is accomplished.

Students Should Be Taught How to Perform

The teaching of science should be closely associated with the actual doing of what is taught. A man may know many things wthout beng able to do one of them. The mathematics taught ought to be such as can be applied to the working of practical mining problems and this should constitute the method employed in teaching. The same applies to drawing.

When the student has been taught how to handle his instruments, and the difference between a plan and an elevation or cross-section has been explained, and the purpose of each made clear, he should be drilled in acquiring accuracy and speed, in making simple drawings of such objects as he is familiar with in his work. In other words, the course should form a part of his mining training and not considered as a preliminary study to enable the student to gain a knowledge of things without performing the work.

Were this scheme of practical training generally adopted, not only would the mines be safer, but the work would be more efficiently done and the mining of coal would be a better investment. In my opinion, mine officials make a mistake in demanding the long hours the miner must work underground. Better work would be done in less time if a portion of these long hours were to be devoted to the training of men in practical work. Where a man is compelled to work from 12 to 13 hours a day, he has little ambition or time for study and training.

Observation would seem to show that there is far less interest being taken by many mine officials in the anthracite region today than was exhibited a few years ago. Some of these men are paid a lower compensation than the men who work under them, and this may be one cause for their discouragement and lack of interest in the work of education among their men.

Plymouth, Penn. JOSEPH R. THOMAS

INQUIRIES OF GENERAL INTEREST

Chart for Estimating Change in Declination of Sun

Kindly allow me to refer to the interesting chart given in the article describing the Ross meridiograph, *Coal Age*, Apr. 20, p. 732. The chart appeals to me as somewhat better than the one with which those who have used the meridiograph are familiar, and I am anxious to know how it is constructed.

It has occurred to me that the average engineer does not cover more than, say 10 deg. of longitude, and many are limited to the half of that. My idea would be to construct a chart on a larger scale arranged to read minutes of longitude and half-hours of time, besides drawing the declination lines for each degree or half-degree of declination. Kindly explain. H. M. K.

———, Penn.

The chart referred to by this correspondent is a simple diagram for estimating the change in apparent declination of the sun, for any longitude east or west of Greenwich and for any local time of observation, between the hours 9 a.m. and 4 p.m. The estimated change is that which has taken place in the sun, counting from Greenwich noon to the local time of observation.

By way of explaining the construction of the chart, attention is first drawn to the fact that the rate of change in the sun's declination varies with the angle that the plane of the ecliptic makes with that of the equator. A reference to the Ephemeris shows that the declination changes 23.7 min. in 24 hours, at the equinoxes, while at the solstices the change, in the same time, is practically zero.

As there is no appreciable error in assuming that the change in declination is uniform for 12 hours, a diagram is constructed on a pair of coördinate axes, by laying off the change, in minutes, for each degree of declination, as abscissas; and the corresponding time, in hours, as ordinates. This will explain how all the declination diagonals start from the origin of coördinates at the lower left-hand corner of the diagram. For the sake of convenience only, the vertical line in the diagram, representing the meridian of Greenwich, is marked 11.85, which is the maximum change in 12 hours, and the diagonal for a zero declination is drawn to that point. The scale of minutes is then divided accordingly.

The next step, after marking off this scale, is to find from the Ephemeris the amount of change in 24 hours, for any desired degree of declination, by subtracting two consecutive declinations embracing that degree, as given in the table. One-half this difference is the change for 12 hours, and the diagonal for that declination is then drawn from the origin of coördinates to the point, in the declination scale, corresponding to this change. In like manner the change in 12 hours for other declinations is found and the diagonals drawn.

For example: To find the change in 12 hours for a declination of 10 deg. Referring to the Ephemeris for 1917, which can be used with no appreciable error for a period of 10 or 15 years, the declination for Feb. 23 is given as 9 deg. 55.8 min., while that for Feb. 22 is 10 deg. 17.7 min. The difference between these two declinations (21.9 min.), divided by 2, gives the change in 12 hours, for that angle of the ecliptic as 10.95 minutes.

The next step in the procedure is to determine the time that has elapsed from Greenwich noon to the local time of observation. Clearly, this difference in time is made up of two parts: (1) The difference between local noon and Greenwich noon, which is 1 hour for each 15 deg. of longitude; (2) the time of observation, before or after noon. Hence, each hour diagonal must start from the corresponding hour on the meridian of Greenwich and incline upward at the rate of 1 hour for each 15 deg. of longitude.

From this construction it is clear that following the hour diagonal corresponding to the local time of observation to its intersection with the given longitude gives the proportional rise vertically above the datum line or horizontal axis and divides the declination diagonals, each in the ratio of the estimated difference of time to the full 12 hours of the declination scale.

Most engineers will agree that there is no advantage to be gained by constructing a local chart to cover, say 10 deg. of longitude. This can be done, if desired, by following the same method of procedure as that just explained. The chief difficulty encountered in the undertaking is the length of the chart vertically.

For example, to enable the accurate reading of the chart it is necessary that the hour diagonals cross the horizontal lines at an angle that will clearly define their intersection, say 25 or 30 deg. The difference of time for 10 deg. of longitude is two-thirds of an hour. Then, if the hour diagonals incline at an angle whose tangent is 0.5, two-thirds of an hour, on the vertical axis, will be one-half the length of the horizontal scale; or 1 hour on the vertical scale will be three-fourths of the width of the chart.

Starting the 9 a.m. diagonal from the lower right-hand corner of the diagram, and terminating the 4 p.m. diagonal in the upper left-hand corner, will make the height of the chart ($7\frac{2}{3}$ hours), $7\frac{2}{3} \times \frac{3}{4} = 5\frac{3}{4}$, or nearly six times its width. This, again, would make the declination lines present too close a parallelism with the vertical lines and make the accurate reading of the scale difficult.

When one considers that the maximum change in declination is only, approximately, 1 min. of arc in an hour; and the difference of time is 1 hour for 15 deg. of longitude, it is clear that there is no need for a closer approximation than the original chart affords.

EXAMINATION QUESTIONS

Bituminous (Penn.) Examination, Apr. 11-12, 1918

(Selected Questions)

Ques.—State where and under what conditions it is unlawful to use an open light in the mine.

Ans.—The bituminous mine law of Pennsylvania (Art. 10, Sec. 1) prohibits the use of open lights "in any entry, airway, travelingway, room or any other working place where explosive gas is being generated in such quantity as can be detected by an approved safety lamp; also in pillar workings where a sudden inflow of explosive gas is likely to be encountered.... [Also,] in all working places, roadways, or other portions of the mine through which explosive gas might be carried in the air current, in quantities indicating danger."

The same section further authorizes the mine inspectors, with the approval of the court, to prohibit the use of open lights in any section of the mine that, in their judgment, should be worked exclusively with locked safety lamps. Sec. 3 prohibits the use of open lights in the return air current of any portion of a mine where locked safety lamps are used.

Ques.—Are regulators necessary in the ventilating of coal mines, and, if so, where should they be placed, and why?

Ans.—The use of regulators is necessary, in the ventilation of any section of a mine, where more or less air is required than the quantity that is provided by the natural division of the current. Regulators must be placed in those splits that offer less resistance than what is required to provide the desired distribution of the air. As far as practicable, all regulators should be located either on the back entry or at the mouth of the split, but in such a position that they will not obstruct the haulage roads in the mine.

Ques.—After you, as fireboss, had completed your examination of a mine, how would others know you had examined all the working places? If you discovered danger, how and where would you place your danger signals?

Ans.—The mine law requires that the fireboss shall mark the date on the face and side of every working place examined, as evidence that he has performed his duty. The law further requires the fireboss to enter, with ink, the results of his examination, in a book kept for that purpose. This entry must be made immediately after the examination is completed and must show the time taken in making the examination and the nature and location of any dangers that may have been discovered. The fireboss must place a suitable danger signal across the entrance to any place where danger is discovered, and remove the danger sign from the mine entrance, showing that it is safe for men to enter for work.

Ques.—What instructions would you give workmen in regard to their safety, and what action would you take to see that your instructions were carried out? Explain fully.

Ans.—Every workman should be made to understand that he is personally responsible in the matter of securing his own safety and must report promptly any danger that he may discover in his own or any other working place. He must be instructed to withdraw from his place should danger develop while he is at work. He must report the same to the mine foreman or his assistant. The workmen should be instructed to obey promptly what orders are given them in regard to the timbering of their places or the mining of the coal. When intrusted with safety lamps, workmen should be given full instructions in regard to their use. The mine foreman and his assistant should visit the working places frequently enough to ascertain that their orders are obeyed.

Ques.—What is the pressure of one atmosphere equivalent to, in pounds per square foot?

Ans.—The normal or average atmospheric pressure, at sea level, is commonly taken as 14.696 lb. per sq.in. This is what is termed "one atmosphere," at sea level, and is equivalent to $14.696 \times 144 = 2116.224$ lb. per sq.ft. Or, taking the normal sea-level pressure as 14.7 lb. per sq.in., this is equivalent to $14.7 \times 144 = 2116.8$ lb. per sq.ft.

Ques.—What is the weight of a cubic foot of air, at a temperature of 60 deg., and a barometer reading of 29.5 in.?

Ans.—The weight of a cubic foot of dry air at a temperature t, in degrees Fahr., and a barometer B, expressed in inches, is calculated by the formula

$$w = \frac{1.3273B}{460 + t} = \frac{1.3273 \times 29.5}{460 + 60} = 0.0753\ lb.$$

Ques.—An airway 5 x 9 ft., 1200 ft. long, is passing 15,000 cu.ft. of air and gas per minute. The mixture contains one-half air and one-half gas. If one-half more air were added, what would then be the velocity of the current, in feet per second, and what would your lighted safety lamp indicate if placed in the current?

Ans.—The sectional area of this airway is $5 \times 9 = 45$ sq.ft., which gives a velocity when passing 15,000 cu.ft. of air and gas, $15{,}000 \div 45 = 333$ ft. per min., before any air is added. Since the original current is half air and half gas, there are 7500 cu.ft. of gas and the same quantity of air in the original current. After one-half more air is added, the volume of air will be $7500 + 3750 = 11{,}250$ cu.ft. The total volume of the current of air and gas is then $7500 + 11{,}250 = 18{,}750$ cu.ft. The velocity is $18{,}750 \div 45 = 416+$ ft. per min.

The percentage of gas in this current is $7500 \times 100 \div 18{,}750 = 40$ per cent. If a lighted safety lamp was introduced into this mixture it would be promptly extinguished by the gas.

COAL AND COKE NEWS

Harrisburg, Penn.

Arrangements to get greater service out of cars and railroad facilities in the handling of coal were made at a recent conference of Lehigh Valley R. R. and Lehigh Valley Coal Sales Co. officers in Hazleton. Shipments in solid trains are to be made up so as to avoid shifting.

The daily output of domestic sizes of coal from the Prospect colliery is to be sent to the Lehigh docks at Jersey City for transshipment to New England. If the output of this colliery is not sufficient for the purpose, that of the Dorrance colliery, or part of it, will be added to the Prospect shipment.

The Hazleton region is to furnish coal for the west to be taken from Drifton and Hazleton No. 1 collieries and the Hazleton shaft. Shipments are to be made four days each week. Egg, stove, chestnut and other sizes of anthracite going west are to be sent to Jersey City, Newark, and other points for distribution. This will greatly aid New York.

The action was decided upon following the notice sent out by the Director General of Railroads that solid trains should go from collieries to tidewater points in order to avoid the unnecessary shifting of cars by the railroads.

Holding that a man whose hands are frostbitten in the course of his employment is entitled to compensation, an interesting and important decision in the courts on May 10 sustains the decision of the referee allowing compensation. The decision promises to become a leading one in all states having compensation laws, also in Great Britain, as several English decisions are quoted and a difference pointed out to distinguish the phrase "in the course of his employment," as contained in the Pennsylvania law, and "arising out of the employment," as contained in the English law.

In appealing from the decision the defendant company had complained that frostbite was not compensable under the act of 1915, because the injury (1) was not received "in course of employment," and (2) was not "violence to the physical structure of the body."

Judge Fuller admits that both propositions are exceedingly close and that he found difficulty in reaching his conclusions. He proceeds, however, in a convincing manner to decide both in favor of the claimant and quotes American and British decisions to show that consideration of employer's lack of control of the weather and employee's lack of precaution were only pertinent on the question of negligence or contributory negligence, which the Compensation Act entirely eliminates.

Fairmont, W. Va.

A. W. Calloway, Director General of Bituminous Distribution of the Federal Fuel Administration, made some important statements at last week's meeting of the Fairmont Coal Club. Too large a percentage of the coal is not needed in the war program, was one of his declarations, which was followed by an intimation that if the present policy of the Fuel Administration did not solve the problems which confronted the Government there was likely to be some sort of a different arrangement "before Christmas."

Mr. Calloway mentioned a growing insistence on the part of those controlling the war industries for what the Government classified as "No. 1" coal, and his remarks indicated that it was possible that coals which were most essential in war work would be given priority. One of the many trite statements with which he dismissed subjects which had given the local coal association much worry was that "priority assignment of coal was more important than the priority assignment of cars" in the "war program," to which reference was made on frequent occasions, which emphasized the fact that the war program took precedence in the workings of the Fuel Administration.

Mr. Calloway referred to the fixing of the price of railroad fuel and the doing away with the assigned car policy by a mere statement, not emphasized in any way, that the Fuel Administration and the Railroad Administration were dangerously near a break six weeks ago. The decision reached will benefit the war program, he insisted, and will not hurt the individual operator. He stated that the Fuel Administration knew what it was about when it insisted that the matter of railroad fuel contributed more largely to the war program than any other problem which had arisen, and made the point that every coal man was a part of the Fuel Administration and therefore interested in its problems.

Mr. Calloway said that it was unreasonable to permit the railroads to choose the best coal when other coal was almost as well suited for their purpose and the coal that was their choice was essential to the work of war industries.

If an equal distribution of cars did not solve the coal problem he thought readjustment necessary, and believed that mines producing "No. 1" coal, imperative in the demands of the war industries board, would be called upon to provide such coal under modified arrangements.

The idea advanced that the coal operators are a part of the Fuel Administration was new here. He supported the declaration by pointing out that the operators selected their own District Representative. Every operator had a right to protest, he said, in event that the District Representative erred, but in the event of no protest it was presumed things were working all right. He insisted that the inspection system was also in the hands of the coal operators. He took a more drastic attitude in this connection and said that if any man sent out coal not fit to be shipped with transportation conditions as they are at present, he does not deserve to be classed with coal men as now known and that such men ought to be "wiped off the earth" if necessary.

Charleston, W. Va.

Reports from all the coal fields in this section reached by the Chesapeake & Ohio disclose the fact that the car supply continues to improve, the supply averaging from 60 to 75 per cent. of total requirements or cars asked for, running as high as 75 per cent. in Raleigh County, where there are a very large number of operations. The same is true as to the New River District, where the percentage, however, is not quite so high.

Operators in the southern section realize that it will be necessary to materially increase the present output in order not only to meet the demands of war but to show a production greater than the last few years. The efforts of the coal mine owners to speed up production will depend upon two factors—cars furnished and the ability to secure labor. Questions have elicited the fact that miners are not putting in full time in the mines but are working only a fraction of the week and for only a sufficient period each week to meet their living expenses. Unless miners are awakened to the necesity of producing a greater tonnage, it will be impossible, operators contend, to reach the average and to forge ahead of previous marks. The loss in tonnage earlier in the year was very heavy owing to an inadequate car supply, and the tonnage shortage lost in that way must be overcome before the producer can hope to increase the output so as to make such production felt throughout the country.

While here and there in this section opposition to the zoning system is manifested, most of the operators and particularly those whose mines are in a field producing coal of a quality which always finds a ready market are reconciled to the zoning system, so long as it saves transportation and permits the steady movement of cars back and forth. This is particularly true as to the New River and Pocahontas districts.

For the most part the car supply in the Fairmont field was good last week, the region receiving 1458 cars on Monday, or nearly a full quota. On Tuesday the supply was somewhat less. However, the supply was sufficient throughout most of the week to create some enthusiasm and sustained hope of better conditions in the future.

Companies in this section are planning to make a record for coal loading during the week of June 3, which according to published statements is to be known as "Coal Week."

The first step in a move to extend the coal trade of West Virginia so that this state might compete with the Hun after the close of the war was taken last Wednesday, when coal men representing the various coal operators' associations of the state met in conference with Governor Cornwell at his office here to discuss plans for obtaining a wider market for West Virginia coal. Governor Cornwell opened the conference with a short address in which he alluded to German business methods and the necessity of introducing more efficiency into American methods if the American is to compete successfully with the Hun producer at the close of the war. He spoke of the possibilities which lie in the South American trade and dwelt particularly upon the necessity of introducing American coal and especially West Virginia coal into this trade. Once introduced, he said, America would be able to hold the trade because of the superior quality of American coal.

Birmingham, Ala.

A new stripping coal mine will be added to the list of Birmingham mines within the next 15 days, it is officially announced. This mine is located in the Blue Creek region in the southern part of Jefferson County. J. C. Maben, president of the Davis Creek Coal Co., is directing the new project. Machinery, including steam shovels, is now being placed and coal about 12 ft. thick will be worked.

Modernizing of present blast furnaces, in time, building of new furnaces, construction of a byproduct plant and other developments are said to be included in ultimate plans of the Sloss-Sheffield Steel and Iron Co., discussed last week by President J. W. McQueen with the chairman of the Board of Directors, Waddill Catchings, in New York.

While great trouble is being experienced in getting material, which may serve to retard to a slight degree the work contemplated, the plans are to be carried out in relatively short time, it is reported. The contemplated improvements, it is estimated, will represent an outlay of several millions of dollars.

The coal-mining district at the close of the present week has a larger number of men at work than ever before, but the percentage of increase in production is rather disappointing. Investigations, however, fail to determine whether this condition is due to a "laying-off" on the part of the miners during the week or because of a deficiency in the labor.

The tonnage is increasing, but none too rapidly, for there are demands coming in from all sides which are not being met promptly. Accumulation of coal for next fall and winter, as suggested by the Fuel Administrator, has not yet started in, and there is doubt expressed among the producers whether there can be a great amount of coal put into bins or other places for use next year.

Miners and employees at mines begin this week at the new wage scale, advances in tonnage and day scales having been granted all along the line. The miners get 5c. additional for mining, while the day labor will receive a greater per cent. increase.

PENNSYLVANIA

Anthracite

Georgetown—By spreading the burning culm over a flat surface and covering it with sand and clay, the Lehigh and Wilkes-Barre Coal Co. has started to extinguish a fire which has raged for months on a large culm bank between the Blackmand and Stanton collieries.

Plains—Fear of extended caving of the mining property of the White Coal Co. at Pittston has caused the operation to remain in idleness since early last week, when 20 homes were damaged by a settling of the surface. James C. White, president of the company, is awaiting a decision from the State Mine Inspectors. John Conlon, president of the Conlon Coal Co., will pay for the rebuilding of Sacred Heart Church there after its damage by a cave-in work-

ings he controls. Mr. Conlon showed a generous spirit, as it virtually has been proved the cave was caused by mining conducted 20 years before he bought the coal tract. Residents of this town have refused the offer of the Madeira Coal Co. to repair 40 homes that were shaken and torn by settlings of the earth due to robbing of the coal pillars. They are in hopes of finding a law that will give them more than mere property damages.

Dickson City—Work started on May 1 by the Delaware, Lackawanna & Western R. R., Coal Department, in the excavation of ground a few feet west of the present Storr's breaker, for the erection of a new breaker. The breaker will not be an all concrete structure such as the one owned by the Lackawanna company at Taylor. However, when finished, it will contain the latest in breaker-building and will be one of the largest and best equipped in the anthracite region. It will be erected practically along the same lines as the wonderfully equipped Loomis breaker at Nanticoke, only the construction will be on a larger scale. Its capacity will be 4000 tons of coal per day.

Harrisburg—Approximately 2500 tons of river coal are taken from the Susquehanna River daily. There are 27 pumps working daily above the dam and about a score below. At least 50 tons can be drawn from the river bed daily by one pump. One of the largest fleets on the river is that of the Harrisburg Light and Power Co., including seven pumps, four steamers and fifty flats. Another operator has the contract to supply the state capitol building with its yearly supply.

Bituminous

Dubois—The large A. C. Hopkins coal holdings to the northwest of this city are about to be opened by the Hopkins Coal Co., some of the workings to be within city limits and beneath land already built over. The output will be hauled by way of the Harriger mine to the Hildrup tipple, or to a tipple to be built nearby, a two-mile tramroad being constructed up Slab run.

Indiana—The Two Lick Coal Co. has started the sinking of two shafts on the Ajax property, about 1½ miles from here. The new mines will be electrically equipped and will supply most of the commercial and local trade for Indiana. F. L. Neff is general manager of the new operations.

Punxsutawney—The Onondaga shaft just north of Punxsutawney and operated by the Buffalo & Susquehanna Coal and Coke Co. for some time, but abandoned by this company about ten years ago, has been leased to several capitalists of Buffalo, N. Y. They have begun to install new machinery, build houses, repair the tipple, power house, etc. The mine will be electrically equipped, and it is planned to start off with a production of about 600 tons per day. This will be increased until the production is 2000 tons per day, the requirements of the manufacturers who have charge of the property.

Savan—The Dormar Coal Co. of Indiana, has started work on the drifts, tramroad, incline plane, etc., on the tract of land known as the Hamilton farm. The tipple will be erected on the present siding, known as Leisure siding, on the Buffalo, Rochester & Pittsburgh Railroad.

West Lebanon—The stripping plant of the Corbett Coal Co. has begun to ship coal. The stripping of the overburden has been going on for the past year, and at the present time several acres of coal are ready to be loaded. The first day's shipments totaled 1000 tons. The shipments are made over the Buffalo, Rochester & Pittsburgh Ry., and the railroad cars are handled from the switch at the main tract to the operation over a switchback railroad by the company's private locomotive.

WEST VIRGINIA

Clarksburg—The Franklin Gas Coal Co. has begun shipping coal from its mine at Interstate, having recently opened a mine at that point.

Four different coal companies with as many openings are mining coal from a tract of only 12 acres, near Mt. Clare, in this county. The coal is hauled to the siding at Mt. Clare and shipped in box cars.

Former Sheriff Ross Stout is developing a 40-acre tract of coal near Mt. Clare, shipping about three cars a day.

Wayne—Having acquired 700 acres of coal land in Wayne County containing three excellent seams of coal, the Tri-Vein Coal Co. is opening a mine. As soon as a siding is completed it will begin the shipment of coal.

Fairmont—A ten million dollar byproduct plant is to be established here and the Fairmont Byproduct Corporation has been granted a charter for the purpose. The incorporators are O. F. Lough, C. E. Smith, E. B. Moore, F. B. Pryor and W. J. Wiegel, who represent the Monongahela Valley Traction Co. and the Greater Fairmont Investment Co., two important local interests of which Senator C. W. Watson is the dominant financial interest. Fairmont district coal will be turned into coke under this plan at Fairmont, which will materially relieve the railroad congestion. The plan contemplates the erection of 110 ovens at a cost of $50,000 each.

Fairmont—A new record was established at the Federal mine of the New England Fuel and Transportation Co. when in one day it hoisted 1206 mine wagons, representing 3800 tons of coal, or a tonnage sufficient to load 76 railroad cars.

Fayetteville—The Mill Creek Colliery Co.'s power house, which was washed out during the flood of March 13, is being rebuilt. New equipment has been ordered and a part of it is now on the ground.

ILLINOIS

Carlinville—Miners employed in sinking the three new mines of the Standard Oil Co. north of here are agitating the formation of a new local, in preference to joining the locals at Carlinville or Nilwood. They sent Michael Kelly, engineer at one of the mines, to see President Frank Farrington at Springfield about it. Farrington notified the State Board, which will make an investigation and probably grant the men at the new mines a charter, which will be the 301st in the state. It is expected that about 2700 men will be employed at the three mines.

O'Fallon—Work at Nigger Hollow mine No. 2 was halted one day this week while about 300 miners disciplined John Kupala, one of their number, for alleged disloyalty. Kupala has been earning $150 and $175 a month, but when asked to buy a Liberty Bond said that he had bought one. Some of the miners investigated and found that he had not. He was confronted and is alleged to have said something disloyal. He was permitted to go down, but later he was seized and taken to the top and tar and feathers were prepared. He fell on his knees and begged for mercy. A flag was brought and he kissed it. He was then permitted to leave.

Belleville—Fire believed to have been of incendiary origin recently destroyed the tipple and shaker house of the Little Oak mine, causing a loss estimated at $12,000 to $15,000. The fire started in the tipple and spread to the shaker house. There were large quantities of coal in both structures. The miners had departed 45 min. before the fire was discovered. The mine is owned by the Southern Coal, Coke and Mining Co. The 275 employees are thrown out of work. The mine was listed as 100 per cent. on third Liberty Bonds, but some of the miners bought with such manifest reluctance that they were threatened with a ducking. The State Fire Marshall has been asked to make an investigation.

Foreign News

Zurich—According to advices received from Vienna, the Austrian Minister of Railways recently announced the entire suspension of passenger traffic on the northern railways. This action was taken because of a shortage of coal, due to a strike of miners.

Brockville, Ont.—The St. Lawrence Coal and Freighting Co., Inc., was organized May 3 by the election of officers as follows: President, E. F. McCourt, Montreal; vice president, E. J. Burns, Ogdensburg; treasurer and managing director, J. A. Bresnahan, Brockville. The company will undertake to meet coal and freighting requirements at lake and river ports from Belleville to Cornwall, supplying a want which has for the past few years been a serious drawback to the coal trade.

Sydney, N. S.—Officials of the Dominion Coal Co. state that owing to the continued lack of shipping facilities it is quite improbable that much coal will be sent from Sydney up the St. Lawrence this season. The company finds it difficult to secure adequate vessel accommodation for the Maritime Province trade, and if coal is needed in any large quantities in Quebec or Montreal, purchasers will have to send their own ships to Sydney for cargo. This was done to some extent last year. Steamers will probably be sent by the Canadian Government Railways to bring coal to Levis, Que., to be distributed from that point.

Obituary

Carvin Pardee, Jr., general manager of Pardee Brothers & Co., Hazleton, Penn., widely known anthracite coal operators, died on May 13 from appendicitis.

Leo Miorelli, of Hazleton, Penn., 35 years old, national organizer of the United Mine Workers and member of the executive board of District No. 7, died after a long illness, on May 2. He worked for the miners' union in almost every state in the East and South.

Personals

C. E. Bockus, of Dante, Va., president of the Clinchfield Coal Corporation, has been elected a director of the National Coal Association, of Washington, D. C.

John Osborne, of Ashley, Penn., has been appointed outside foreman of the Maxwell No. 20 colliery of the Lehigh and Wilkes-Barre Coal Co., to fill the vacancy caused by the death of D. C. Tiffany.

Andrew K. Morris, superintendent of docks for the Erie Railroad Co., has been appointed director of tidewater coal traffic by the Anthracite Committee of the Fuel Administration and will have his offices at No. 50 Church St., New York City.

D. B. Wentz, of Philadelphia, Penn., president of the Stonega Coal and Coke Co., has been commissioned a lieutenant-colonel in the Quartermaster Corps of the Army. Colonel Wentz probably will be sent to France in the very near future.

Thomas Gambold, of Wilkes-Barre, Penn., who has been employed for a number of years as inside superintendent at the Stanton No. 7 colliery of the Lehigh and Wilkes-Barre Coal Co., has been promoted to the same position at Maxwell No. 20 colliery.

Charles O'Neill, formerly connected with the United Mine Workers of the central Pennsylvania District, and also the Fuel Administration, Washington, D. C., has been elected secretary of the Central Pennsylvania Coal Producers' Association, Altoona, Penn., recently formed.

C. F. Taylor, who was a member of the engineering firm of Harrop, Hopkins & Taylor, of Pittsburgh, Penn., has retired to take charge of the coal stripping operations of the Kehota Mining Co., of Zanesville, Ohio. H. S. Harrop and N. F. Hopkins will continue the engineering business as Harrop & Hopkins.

Charles Philip Coleman, who has been vice president of the Worthington Pump and Machinery Corporation, of New York, since May, 1916, was recently elected to the presidency of the company. The corporation, aside from pumping machinery, manufactures mining machinery, air compressors, gas power engines and blowers, crushing and cement equipment and water works engines.

D. C. Botting, of Seattle, Wash., former state mine inspector and now secretary of the Coal Producers' Association and Commissioner for the Washington Coal Operators' Association, has been appointed district representative of the Federal Fuel Administration. Until the Federal Government assumed control of fuel Mr. Botting devoted most of his time to working problems that arose between the operators and their men. He was largely instrumental in negotiating for the wage increases that were granted miners in the State of Washington last year and in effecting the latest agreement, which became effective last November, by which the miners and operators fixed a wage scale which is to be binding for the duration of the war. One of his principal duties in his new work will be to speed up production of coal in the state.

Trade Catalogs

Blasting Caps and Electric Blasting Caps. Aetna Explosives Co., Inc., New York. Booklet. Pp. 12; 3½x6 in.; illustrated. This little booklet contains in concrete form valuable information and data relative to the use of blasting caps. Precautions for the handling and storing of caps are given.

The Milburn Light. Alexander Milburn Co., Baltimore, Md. Catalog. Pp. 48; 6 x 9 in.; illustrated. An unusual feature of this well printed catalog is the embodying in the catalog itself of the complete directions for using the Milburn portable carbide lights. Several oxyacetylene torches and generating plants are also described.

Lower Pumping Costs with E-M Synchronous Motors—Electric Machinery Co., Minneapolis, Minn. Bulletin 183. Illustrated. 24 pp., 8½ x 11 in. The purpose of the bulletin is to demonstrate what the synchronous motor is now doing in the pumping field. Though not pretending to be an exhaustive analysis of the subject, anyone can gain from this bulletin an accurate idea as to the present status of centrifugal pump design and the duty required of the driving motors.

Coming Meetings

American Concrete Institute will hold its annual meeting June 24-26, at Atlantic City, N. J.

American Institute of Chemical Engineers will hold its summer meeting June 19-22 at Berlin, N. H.

Illinois Mining Institute will hold its next meeting May 23, 24 and 25, at Peoria, Ill. Secretary, Martin Bolt, Springfield, Ill.

Illinois and Wisconsin Retail Coal Dealers Association will hold its annual convention June 26 and 27, at Hotel Wisconsin, Milwaukee, Wis.

National Coal Jobbers Association will hold its annual convention at Buffalo, N. Y., June 4. Secretary, L. Romanski, Old Colony Building, Chicago, Ill.

American Institute of Electrical Engineers' annual convention June 26-28 at Atlantic City, N. J. Secretary, F. L. Hutchinson, 29 W. 39th St., New York City.

American Society of Mechanical Engineers will hold its spring meeting June 4-7 at Worcester, Mass. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

National Coal Association will hold a meeting May 28 and 29 at the Bellevue-Stratford, Philadelphia, Penn. Secretary, J. D. A. Morrow, 707 Southern Building, Washington, D. C.

Illinois and Wisconsin Retail Coal Dealers Association will hold its annual convention June 26 and 27, at Milwaukee, Wis., with headquarters at Hotel Wisconsin. Secretary, Isaac L. Runyon, Chicago, Ill.

National Retail Coal Merchants Association will hold its first meeting at Hotel Traymore, Atlantic City, N. J., Monday and Tuesday, May 20 and 21. Corresponding secretary, Jesse C. Suter, 1727 Pennsylvania Ave., N. W., Washington, D. C.

International Railway Fuel Association will hold a convention May 23 and 24, in Chicago, Ill., under the auspices of the United States Fuel Administration, and the United States Railway Administration. Secretary, J. G. Crawford, 702 E. 51st St., Chicago, Ill.

Industrial News

Charleston, W. Va.—The Dunlow Coal Co., of Williamson, Harry Scheer, president, has given notice of its intention to surrender its charter and discontinue business.

Philadelphia, Penn.—The Electric Service Supplies Co. annnounces that it has secured larger quarters for its New York office in the Hudson Terminal Building, 50 Church St., now occupying rooms 1771 and 1773.

Birmingham, Ala.—J. C. Maben, Jr., former vice president of the Sloss-Sheffield Steel and Iron Co., has announced that he will develop an extensive stripping operation in the Blue Creek field. Equipment is now being procured and placed.

Jersey City, N. J.—The Central Railroad of New Jersey, Communipaw Avenue, has contracted with the Robins Conveying Belt Co., 13 Park Row, New York, for the installation of a new belt conveying system at its coal pier No. 18, Jersey City.

Hazard, Ky.—The Industrial Engineering Corporation is the name of a new company that has been formed by R. L. Cornell, former general manager of the Kentucky River Power Co., to do all classes of electrical and mechanical consulting work and installation for the mining interests of this state.

New Lexington, Ohio—The Star Manufacturing Co., manufacturer of mine cars and mine-car equipment, is making a large addition to its plant, which will be ready for occupancy within 60 days. With its added facilities the Star company will be enabled to turn out 50 completed mine cars every day.

Wilmington, N. C.—The Cement Products Co., of Wilmington, N. C., manufacturer of the "Sanisep" portable sewerage disposal systems, announces the completion of its new electrically operated factory plant. This expansion of the manufacturing capacity is made necessary by the increased use of the "Sanisep" tanks in the coal towns as well as other industrial villages.

Altoona, Penn.—Substantial progress in furthering the organization of the new Central Pennsylvania Coal Producers' Association, which was launched at a meeting held in this city on April 24, was made at a meeting of the executive committee held here May 9, when Charles O'Neill was employed as general secretary and W. A. Jones as statistician, and John Lloyd, Jr., was elected permanent treasurer.

Russell, Ky.—Figures compiled here at the coal pool offices show that all records for movement of coal north have been broken since this coal pooling office was opened. The daily average number of loaded coal cars passing over the Chesapeake & Ohio during the first part of May was 1391 cars. The coal from the mines is shipped to Russell, from which point it is distributed in train loads, under the new Federal regulations.

Hazard, Ky.—The Electrical Supply and Repair Co. will begin at once the construction and installation of a large electrical repair shop and machine shop at this place. The concern, which is a new one, will also carry a large stock of electrical and mine supplies and equipments. L. B. Turnbull is president, and associated with him are R. L. Cornell and E. C. Carlin. It is understood that several well-known coal operators are financially interested in the new enterprise.

Fairmont, W. Va.—At a special meeting of the Central West Virginia Coal Operators' Association C. H. Jenkins, president of the district organization, was elected member of the executive committee for the West Virginia Coal Association, the state organization, the executive committee of which will organize at the Frederick Hotel at Huntington, June 1. At the same meeting J. H. Wheelwright and J. J. Tierney were named as directors of the National Coal Association.

Newport News, Va.—The Chesapeake & Ohio Railway Co., Richmond, is planning for the construction of a large new coal-storage plant at its local properties to have a storage capacity of 200,000 tons. The company has arranged for an extension to its trestle and trackage system to provide for an ultimate increase to 300,000 tons. Machinery for daily loading out to have a capacity for 6000 tons will be installed, this output to be ultimately increased to 12,000 tons.

Columbus, Ohio—Reports of loading at the Toledo docks during the week ending May 10 showed a large increase over the previous week. The Hocking Valley docks loaded 118,248 tons as compared with 85,810 tons the previous week. The total handled since the opening of the season is 250,150 tons. The Toledo & Ohio Central docks handled 47,000 tons as compared with 38,000 tons the previous week, making a total of 134,000 tons since the opening of the season.

Pittsburgh, Penn.—The E. J. Frauenheim Coal Co. calls attention to the fact that the item printed in the issue of May 11 relative to its operations reads as if the company was a recent organization about to start its development work. The E. J. Frauenheim Coal Co. has been organized for about one year, having already completed its two miles of railroad track. It is at the present time electrically equipped, the equipment being installed to handle 1000 tons of coal per day eventually.

Columbus, Ohio—An order has been issued at Washington changing the control of the Bureau of Coal Statistics, which has been operated in Columbus by all coal carrying railroads for more than 30 years. W. D. McKinney, a personal representative of the Federal Fuel Administration in southern Ohio, will be in charge. F. V. Davis, the present superintendent, will continue in that capacity. The bureau is regarded as one of the most valuable statistical collecting agencies in the Middle West, and a fight was required to keep it in operation.

Louisville, Ky.—Much interest has been shown by coal operators in the efforts of the Government to more evenly distribute labor through the opening of six Federal Labor Exchange Bureaus in Kentucky. One of these will be located at Fifth and Market Streets, Louisville; and others at Paducah, Henderson, Newport, Covington and Ashland. None of these offices are in the real coal districts, but several are not so very far removed. It is claimed that these bureaus will endeavor to prevent excesses in one place and shortages in others, and will work with the established bureaus and bureaus in other states.

Jefferson City, Mo.—The Missouri State Retail Coal Merchants' Association, at its first annual meeting here, indorsed the plan to pool all anthracite coal shipped into the state and have it distributed by the Missouri fuel administration. The opinion of the convention was that such pooling would result in each section of the state receiving its pro-rata supply, based on the business of 1916 and 1917. The following officers were elected: I. C. Knotts, St. Joseph, president; T. E. Williams, Springfield, vice president; E. J. Wallace, St. Louis, secretary and treasurer. Knotts and Wallace were elected delegates to the National Association, which will have its annual meeting May 21 at Atlantic City. Missouri Fuel Administrator Crossley and several prominent coal men delivered addresses.

Cincinnati, Ohio—The United States District Court has entered an order approving the contract entered into by John S. Jones, of Chicago, with the Hocking Valley Railway Co., for the purchase of $2,606,000 of bonds of the Sunday Creek Coal Co. at 25c. on the dollar, or about $626,531, thereby virtually holding that Jones now has valid title to the coal lands formerly owned by the Sunday Creek Co. in the Hocking Valley, about 25,000 acres. This is true because of the fact that the remainder of the company's $14,000,000 of outstanding bonds, held by several railroad companies, have been liquidated by the transfer of other properties covered by them. The Jones purchase was made as the result of an order of the court in 1914, requiring the railroad companies to dispose of all of their interests in the coal companies operating in the Kanawha and Hocking Valley fields. It is understood that large operations in the old Sunday Creek properties will now be pushed by Mr. Jones.

St. Louis, Mo.—Joseph W. Folk, general counsel of the Chamber of Commerce, has written to Attorney-General Gregory at Washington requesting that the Government institute contempt proceedings against the Terminal Railroad Association for violation of the United States District Court in enjoining the association from acting as an independent road between the east and west banks of the Mississippi River, and from making an arbitrary charge on traffic originating within the 100-mile zone that is not applied equally on traffic originating outside of the zone. The request is based on admissions in the answer of the Terminal association to the petition of the Chamber of Commerce to the Interstate Commerce Commission for the abolition of the arbitrary. These admissions are alleged to be that the Terminal association is an independent corporation and that the arbitrary of 20c. a ton on coal is imposed on shipments originating within the 100-mile zone and not on shipments originating outside of that zone.

Dallas, Tex.—C. W. Dawley, who owns much of the stock of the McAlester Coal Fields Co., of McAlester, Okla., is promoting a railroad to run from a point on the Rock Island near McAlester southeastward through a new coal field that is now being opened, and which promises to develop into one of the richest coal-mining sections of the state. The new railroad will leave the Rock Island between Dow and Bache, and will make use of what is now known as the Rock Island High Hill spur. The line will be of standard gage and its terminus will be about 3½ miles south of McAlester. Steel ties and other materials for its construction are now on hand and grading is going forward with all possible speed. Work of clearing away the overlying earth from the coal veins in the new field which will be tapped is now going forward, and it is desired to have the line completed and in operation before the winter sets in, as it is purposed to mine considerable coal and have it in storage for the early winter. Stripping operations will be carried on extensively in the new field, as the coal veins lie near the surface and the coal can be profitably mined with steam shovel.

MARKET DEPARTMENT

Weekly Review

Drive To Be Made for Coal Orders—Production Sufficient for Immediate Needs Only—Anthracite Restricted to Eastern Seaboard—Car Supply Still Factor in Bituminous Production—To Conserve Fuel in Power Plants—Lake Trade More Active

WE HAVE had Liberty Bond drives, Red Cross drives—and now there will be a drive for coal orders. During "Coal Week"—June 3 to 8—the Fuel Administration will redouble its already strenuous efforts to induce consumers to order their coal early. Thus the mines will be enabled to make immediate deliveries of all the coal that can be mined during the summer and to that extent help relieve transportation conditions next winter.

In the meantime coal production is barely keeping pace with the demand for fuel needed for immediate consumption. Some few plants here and there are accumulating reserve stocks, but a lack of sufficient storage space will prevent many from laying in much larger supplies.

Anthracite production is now at its maximum. The April shipments amounted to 6,368,372 tons, an increase of 776,074 tons over the corresponding month of 1917. Increased demands have absorbed the entire output, and no reserve stocks of any consequence remain in the hands of dealers. By order of the Director General of Railroads, shipments from the anthracite collieries to tidewater points are hereafter to be made up in solid trains, thereby doing away with the loss of time entailed by the unnecessary shifting of cars by the railroads. To further restrict the consumption of hard coal to those sections of the country where it is more urgently needed, no anthracite will be permitted to move west of the Mississippi River or into the South. The lifting of embargoes affecting New England, however, has resulted in the larger movement of much-needed coal to that quarter.

The steady increase in the production of bituminous coal recorded for three successive weeks suffered a setback during the week ending May 4, when 11,559,000 net tons were shipped. Telegraphic advices show that production for the week ending May 11 practically equals that of the week ending May 4. The greatest factor limiting production is the old one of inadequate car supply. Labor trouble in one Pennsylvania district further serves to diminish output, while in Alabama, where the car situation is fairly good, the miners refuse to work full time through inherent laziness more than anything else.

We still have with us the controversy regarding the price of railroad fuel. Owing to the illness of Mr. McAdoo this question remains unsettled. The railroads are buying coal on a hand-to-mouth basis and refuse to enter into contracts. The operator is thereby prevented from making contracts with other consumers, as the moment the situation clears the railroads will have the first call on the output of the mines. It can readily be seen that in the situation as it now exists there is no stimulus to production.

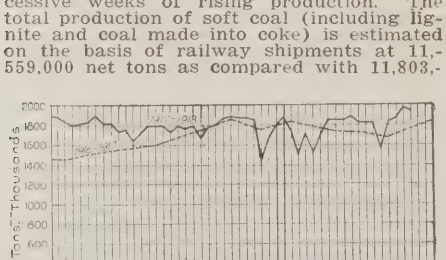
The necessity of keeping American industry going at high speed with the supply of coal that will be available this year has led to the inauguration by the Fuel Administration of a fuel-conservation movement in industrial power plants.

By the correction of firing and operating methods in industrial plants Dr. Garfield hopes to save at least 25,000,000 tons of coal. Each power plant is to be inspected by engineers appointed by the Fuel Administration. While no mention has been made to this effect, it is probable that plants with the lowest ratings will be the first to be cut off when there is not enough coal to go around.

The lake trade is becoming more active, as the ice is moving out of the upper lake passages rapidly. The vessel movement is better and considerable coal is now going to the Northwest. Coal-loading docks on Lake Erie are dumping an average of about 700,000 tons a week into lake freighters. The quantity loaded should amount to about 1,000,000 tons a week if the plans to supply the Northwest before next winter are to be realized.

COAL PRODUCTION

Bituminous output declined slightly during the week ended May 4, after three successive weeks of rising production. The total production of soft coal (including lignite and coal made into coke) is estimated on the basis of railway shipments at 11,559,000 net tons as compared with 11,803,000 net tons during the preceding week, or a decrease of 2 per cent. Production per working day is estimated at 1,927,000 net tons, considerably in excess of 1,829,000 net tons, the average during May, 1917. Production of beehive coke is estimated at 657,000 net tons, an average of 110,000 net tons per working day, as compared with 123,000 net tons during the preceding week. The decrease in production during the past week amounted to 11 per cent.



Byproduct Coke—The high standard of performance reported from byproduct operators last week was equalled and even exceeded during the week ended May 4. The ratio of production to maximum capacity rose from 89.1 per cent. the preceding week, to 89.6 per cent. Out of the 10.4 per cent. of maximum capacity which the operators of the country failed to realize in actual production, 3.7 per cent. was lost through lack of coal; 0.6 per cent. on account of labor trouble; 4.5 per cent. through repairs to plant; 0.3 per cent. because of "no market," and 1.3 per cent. for all other causes.

Operating conditions in the various states varied but little from the performance of the week before. Indiana reported the only material increase, the ratio of production to maximum capacity rising from 79.2 per cent. the week of Apr. 27 to 85.6 per cent. Increased supply of byproduct coal was the direct cause of the improvement. Kentucky was the only state to record a material decrease, the producing ratio declining from 90.3 per cent. the preceding week to 85.8 per cent. Repairs to plant was the cause given as limiting production. Pennsylvania, the largest producing state, is reporting the least favorable conditions and is now operating at 82 per cent. of capacity.

Beehive Coke—Shortage of yard labor limited production of beehive coke in the Connellsville and adjacent regions during the week ended May 4, causing a loss of potential capacity of 18.2 per cent. as compared with losses due to shortage of yard labor during the week ended Apr. 27 of 11.5 per cent. Sixty-three of the principal operators in the Connellsville, Greensburg and Latrobe Districts of Pennsylvania produced 324,100 net tons of coke, or 70.4 per cent. of their maximum capacity. Losses due to transportation conditions declined from 8.6 per cent. the week of Apr. 27 to 6.3 per cent. Mine disability was given as causing a loss of 3.6 per cent. The same operators produced 150,550 net tons of coal.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended Apr. 13	Apr. 20	Apr. 27	May 4
Bituminous shipments, 123 roads	188,311	193,667	204,527*	202,351†
Anthracite shipments, 9 roads	37,760	39,130	39,522*	40,570†

* Revised from last report. † Subject to revision.

Anthracite shipments during the week ended May 4 rose to 40,570 cars, the largest since the week of Mar. 30.

BUSINESS OPINIONS

Bradstreet's—Improvement in weather conditions, crops, trade, especially at retail; industrial outputs, general rail and water transportation, and last, but not least, in stock market sentiment and dealings, constitute a sextet of favorable features in the week's reports. With the Third Liberty Loan largely overscribed, the business world seems to have turned its attention back to trade and industry, this process being, no doubt, facilitated by better weather, more optimistic crop reports and insistent government demand for all sorts of materials.

American Wool and Cotton Reporter—There has been no great change in the woolen goods market during the week under review, and the situation is likely to continue much the same until the very pressing need for Government fabrics is more fully supplied. The question of greatest importance at the present is in regard to the supply of goods which will be available for civilian purposes. In the first place, the Government has taken all the wool available, and is naturally making provision for the consumption of whatever raw material seems necessary to supply the goods needed. Until the total amount required is more definitely known it will be impossible to determine what the quantity of civilian production may be, or even the general character of such production.

Dry Goods Economist—The shortage of supply of raw materials shows no sign of improvement. In consequence manufacturers of various textiles find themselves unable to continue production of goods on order, or to undertake to make up new goods. Cotton prices are receding slowly on the New York Cotton Exchange. The changes, however, only affect the short staple which is suitable for the production of various heavy fabrics. Therefore, there has been no reduction in the cost of finished fabrics for household use or for women's wear. Cotton fabrics, like those of wool, are much needed by the Government and therefore production for ordinary commercial uses is far below normal. Under these conditions no downward revision of prices can be looked for.

Atlantic Seaboard

BOSTON

Cancellation of "Storrow order" discloses large number of industries unable to secure coal in sufficient volume for current needs. Unless receipts improve there are likely to be shutdowns even this summer. Anxiety increases over outlook as it is realized that "priority" will probably be necessary in order to get coal this fall. Assigned cars still being placed for railroad fuel. Undue demands being made upon central Pennsylvania. Efforts to increase movement via Hampton Roads meet with obstacles. Coal still in excess of bottoms at Southern piers. Textiles placed on preferred list. Baltimore & Ohio deliveries still disappointing, and movement on foot to exclude coals on that road from New England all-rail. Anthracite rail shipments somewhat improved, but receipts by water are meager. Fuel authorities encourage use of buckwheat and other steam sizes.

Bituminous—The large number of industries that were practically dependent upon the regular movement of "Storrow coal" all-rail has been brought prominently forward since the Garfield order of Jan. 3 was cancelled ten days or so ago. It was emergency coal, destinations in some cases being changed from day to day to meet urgent cases, and the lack of this tonnage will soon be keenly felt. It not only supplemented shipments through the usual channels all-rail, but it also helped out many plants that ordinarily rely wholly upon water receipts, but this season could not have been kept in operation without help all-rail. The coal coming forward under this arrangement never amounted to as much as 300 cars daily, although the original authorization was usually referred to as the "500-car order." The average for about 100 days was slightly in excess of 100 cars, including those furnished to certain of the railroads under the same terms, and the order therefore was only about 20 per cent. effective. The 20 per cent., however, was of great assistance, especially during January, February and March, in keeping important activities in operation.

The New England situation is decidedly serious. Tidewater receipts from the Virginia terminals are meeting the requirements of the very largest industries that for the most part are within 40 miles of rehandling piers, but so far there has been no opportunity to stock up. The important plants usually served all-rail are hard put to it to keep a fortnight's supply ahead. Coal is sought from every possible angle and frequently a big mill will draw supplies from three or four different discharging ports, paying differentials regardless of cost, and seeking to "borrow" railroad fuel to help out slim receipts all-rail.

Another feature of the present situation is the undue demand that is being made upon the central Pennsylvania district. Labor conditions there are none too good, chiefly owing to the high wages paid, and it is doubtful if output could be much increased even if better car-supply were forthcoming. The shortage of boats for Hampton Roads loading and the excess of boats over coal at the New York piers, together with the large differential in price in favor of Pennsylvania coals, are factors in the heavy demand. A considerable number of low volatile coals in this district have been practically segregated for bunker fuel to be furnished at New York, and the requirements at that port on account of traffic being sent there for oversea transport is in much greater proportion than in normal times. Connecticut points reached via New Haven are also eager to get Pennsylvania low volatiles, and so great is the pressure that the Fuel Administration at Washington has intervened to say that large tonnages for that area should be furnished from Hampton Roads. The difficulty there, however, is transportation, and there seems no ready solution.

Notwithstanding rulings of the fuel authorities assigned cars are still being placed for engine fuel. Certain mines west of Altoona, Penn., were furnished no other equipment a week ago, and there are whole groups of mines where for weeks at a time there is no commercial coal available. Until railroad fuel is definitely adjusted and some working basis is devised there are bound to be inequalities in distribution.

At Hampton Roads there continues more coal on hand than there are steamers and barges to take it away. Shippers are casting longing looks in the direction of the Lakes, where 3000-ton steamers are beginning to start through the canals for coastwise service. A number of these boats are scheduled to load Dominion coal at Cape Breton for different New England ports in the effort not to waste transportation or to leave out any move that will secure coal for our industries. The latter are responding gladly, and it is certain that the 100,000 tons in view from this source will be readily absorbed.

Operations on the Baltimore & Ohio R.R. continue to be seriously hampered by poor car supply, although the past week there has been a slight improvement. A new difficulty faces consumers here who rely upon tonnage from that quarter, for this week there have been wholesale diversions to tidewater piers such as those at Curtis Bay and Port Covington of coal destined all-rail into New England. It has been customary for these coals to be confined rather rigidly to points on the New Haven road, but if from industries on this line this supply is to be thrown to tidewater on the assumption that boats will be forthcoming to move it a very serious mistake will be made. If the important plants of Connecticut are to be excluded from the Myersdale and Fairmont region as well as from central Pennsylvania they will be orphans in fact.

Anthracite—There is practically no change in the movement of anthracite, except for somewhat better volume all-rail now that the gateways are all open. Water shipments are still very low and sizes are not well assorted. Points along the Maine coast are being favored on account of the ruling of the distributing committee. It is an interesting fact that the first 10 days in May 31 per cent. of the total anthracite moving into New England was culm and steam sizes. The local fuel authorities are strongly encouraging the use of these coals to supplement bituminous in view of the shortage of bituminous that is certain to prevail next season.

NEW YORK

Anthracite market continues to be active with no let-up in demand. Dumpings at the local docks indicate larger shipments, but much of it goes to New England. Local retail dealers have plenty of orders to keep them busy for months to come. The bituminous situation serious, with bunker coals in good demand.

Anthracite—The situation continues to be active. Reports show comparatively little increase in receipts, while the coal goes direct from the dock to the consumer's cellar. As has been the case for some time, many yards are without coal, and this condition is not confined alone to the small dealer but involves some of the yards of the larger dealers as well. There is a persistent effort on the part of every consumer to get his winter fuel in his cellar, and he is being urged on by frequent statements from Fuel Administration officials, which in the opinion of some dealers are at this time unnecessary in the face of existing conditions. Local dealers are well supplied with orders, sufficient in most cases to keep them busy for some months, even though they received no more.

Conferences have been held during the past week between representatives of the Federal Fuel Administration, including Dr. Garfield, and the local forces regarding the situation, with particular reference to the desires of the city officials to store at least 300,000 tons of coal to be sold to the poor during the next winter. The chief obstacles in the eyes of those responsible for the carrying out of the plan, outside of securing the coal, is a place or places where the coal can be stored and then the work of distribution next winter.

Nearly a thousand cars more of anthracite were shipped to market during the week ended May 4, according to reports, than were shipped during the previous week, while the dumpings at the New York tidewater docks for the nine days ended May 13 were 8875 cars as compared with 7303 for the seven days ended May 4, an increase of 1572 cars. While these statistics indicate a large increase in dumpings, it must be remembered that considerable of this coal was for shipment by water to Eastern points, the amount of domestic sizes available for New York trade remaining only moderate.

The arrangement by which a part of the output of certain companies is to be sent direct to the local tidewater docks and nearby storage grounds ought to alleviate conditions.

The steam coal situation is easier. Buckwheat No. 1 continues in good demand, but rice and barley are such that some is being stored by large consumers.

The President of the Borough of Manhattan will open bids on May 20 for 7500 tons of buckwheat No. 1 and 36,000 tons of buckwheat No. 2, besides large tonnages of the other sizes.

The Board of Education will buy $65,000 worth of coal in the open market because of the nonreceipt of bids for furnishing the schools in Brooklyn, Queens and Richmond with fuel next winter.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.15	$6.90
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	3.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	.....

Bituminous—There has been little if any improvement in the local situation. Demand continues heavy with no coal to meet it, and shippers are unable to meet the calls made upon them; consequently there is comparatively no coal being stored in anticipation of next winter's needs.

Production for the week ended May 4, according to reports, was not so heavy as during the previous week, a decrease of 2 per cent. being noted, while at the New York tidewater docks 7810 cars were dumped during the interval between May 4 and May 13 inclusive.

Conferences have been held during the week which were participated in by representatives of the Railroad and Fuel Administrations and the Shipping Board, looking toward improvements in the situation, with particular references to shipping.

The question of pooling the boats in the harbor is again attracting much attention and is looked upon favorably by most shippers. Much complaint is heard regarding the holding up of boats for several days at the docks, meantime the demurrage charges are piling up and taking away whatever profits there might have been in the sale of the coal.

There has been practically no change in the car situation, but operators and shippers are hopeful and with higher temperatures due look for much better conditions.

New England buyers continue to urge shipments.

Bunker fuel is in good demand and complaint has been heard of some slight delay in sailings, because of its shortage.

BITUMINOUS PRICES

	F.o.b. New York Gross	Mine Price Net	Gross
Central Pennsylvania	$5.06	$3.05	$3.41
Maryland:			
Mine-run	4.84	2.85	3.19
Prepared	5.06	3.05	3.41
Screenings	4.50	2.55	2.85

PHILADELPHIA

Anthracite shipments unsatisfactory. Some hope of early improvement. Retailers fear labor shortage. Some complaint of preparation. Buckwheat order ignored by some. Storing of steam coals. All sizes fully taken, with some easiness in rice. Bituminous shipments do not increase. Small tonnage equitably distributed. Labor unrest again.

Anthracite—With slow shipments and slower deliveries by the railroads, conditions cannot be said to have improved. There is little coal in the dealers' yards, but this would be the case even if shipments had been heavier. It is just possible the dealers are more optimistic than last month, as they are beginning to believe they will receive much heavier shipments during the summer months. In normal times there is practically no family business during July, August and early September. This year, if the shipments are as substantial as the dealers are led to believe they will be, they will undoubtedly make heavy inroads on the large volume of business now on their books. It will mean an unusual summer for both men and teams, and at this time we hear as much fear expressed over the scarcity of labor as of coal. Many dealers have quietly increased the wages of their delivery forces, yet many of the men continue to be weaned away by the fancy prices being paid at the immense war plants hereabouts for the most ordinary labor.

Shippers of coal have been advised of the general embargo on carload freight which became effective on the 15th. While it is too early to note definite results, it is felt that it will do much toward relieving congestion on the railroads and hasten coal deliveries.

While the dealers continue to read about the greatly improved preparation of the coal they are to receive, due to Federal supervision, it is a fact that considerable undersize coal is coming to this market. Possibly the most general complaint is the percentage of pea in the chestnut. Dealers who refrained from even calling the shippers' attention to inferior coal during the great scarcity of the past winter say that when they were doling out their coal in lots of one ton or even a less quantity this matter of preparation was not so important. Now, however, they state their trade are inclined to be critical and are objecting to having their cellars filled with poor coal.

The shipping companies have received a notice clarifying the situation as to shipments to Canada. The National Administration stated that while the permits which had been issued specified the quantity, this was only to be construed to mean the maximum tonnage that they will be permitted to ship under any circumstances, and is not to be considered as an order; but that the distribution is to be controlled by the Administration as it may see fit, by instructions issued from time to time.

In the steam trade all sizes continue to be quickly absorbed, and while all the tonnage is not going for immediate consumption, yet even this is much heavier than last year. We notice that big consumers of steam sizes are receiving quite a little tonnage in excess of their current requirements and are stocking the coal in various open spaces throughout the city. This applies particularly to concerns such as department stores, etc., who formerly had not been accustomed to laying in reserve stocks. If there is one steam size easier than any other it is rice, and a few cars of this size are often obtainable by a new consumer, especially from the larger companies, who are operating big washery operations at this time.

The prices per gross ton f.o.b. cars for line shipments and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5.70	Rice	2.65	3.65
Stove	4.75	6.05	Boiler	2.45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—There has been no increase in the tonnage of bituminous coal received in this city. Rail congestion and car shortage continue to hold back production and little, if any, improvement has been shown recently. Your correspondent interviewed a prominent shipper this week who gives it as his opinion that a great proportion of the congestion is caused by the consignment of the enormous quantity of general freight to New York harbor piers for loading. The claim is made that the pier and loading facilities of other ports are not utilized to their utmost, due to the fact that in ordinary times railroads have discriminated in favor of the above-named port.

While the coal supply in the city has continued short, yet we do not hear of the closing down of plants as was common a short time since. There is no doubt that this is due to the equitable manner in which such coal as does reach here is distributed by the committee of coal men who have been working with the fuel committee for some months past. They have now got the plan in such a shape that they are prepared to meet almost any emergency. Of course, no one is able to accumulate a surplus under this arrangement, but the committee is able to see that every plant is receiving a proportion of coal coming into this market.

With the strike in the Huntingdon and Broad Top region the question of wages among the miners is once more coming to the fore. The present difficulty was caused by the fact that up to April the operators in that region had voluntarily been paying the men a bonus of 10c. a ton. However, the Federal authorities have ruled out this provision as a discrimination and as a consequence the men are asking for increased pay. The movement is spreading to other regions, although no definite steps have been taken by the men requesting an increase.

In the exclusively brokerage trade the houses still appear to be able to secure a limited amount of coal, and it is believed that a very large proportion of this is procured by direct solicitation in the region from the small mines, as much of the coal comes here loaded in box cars.

BALTIMORE

Supply of soft coal here better under the zoning plan, but cause seems a little irregular. Plan to have a hard coal order week interests trade.

Bituminous—There can be no doubt that the supply of bituminous coal here is at present considerably better than for some time past. In a general way the officials of the fuel administration and coal men aiding in the fuel distribution work are attributing it to the operation of the zone plan. The particular situation here, however, has had a rather odd influence in the fact that it is reported that large quantities of soft coal which reached the redesignating points in the Cumberland gateway were diverted here because they had originally been loaded for New England points under the zone ban. This influx of coal here, combined with some little that came through under direct consignment, was sufficient to give all the piers and line terminal points in this vicinity a busy week. A large quantity of fuel was handled for the Shipping Board, and the extra handling caused the Government to operate the Locust Point pier to such an extent as to practically preëmpt it for the week. This pier of the Baltimore & Ohio is usually the local harbor distribution point because of the fact that when the Western Maryland at Port Covington, or the Baltimore & Ohio pier at Curtis Bay, is used there is a considerable extra towage charge. No one seems to kick at extra charges just now when coal is badly needed, however, and the influx of fuel was readily cared for. While there is some ease-up in railroad congestion between this city and the mines, conditions are still far from satisfactory and much more coal could readily be absorbed here.

Anthracite—There is general interest here in the project to have a week set aside for the placing of domestic orders for hard coal. A good proportion of the business is already on the books, as a result of urging by the Fuel Administration, much more indeed than there is any possibility of covering even by two-thirds delivery before the end of June, but the effort to have practically all orders put on the books before midsummer is nevertheless generally approved. Even if it is not delivered before the fall it will give a line on what the coal men here will need in greatest bulk. Meanwhile deliveries here continue light.

Lake Markets

PITTSBURGH

Car supplies still far below requirements. Steel mills disposed to stock coal.

Car supplies at Pittsburgh district mines are showing but slight improvement, at long range, and from week to week there is but little perceptible difference. The general testimony is that supplies are quite insufficient for capacity production of coal in the district, and also quite insufficient to give all consumers the amount of coal they would readily take. The current needs of consumers are being well taken care of, but there is little excess for stocking purposes. While domestic consumers may need considerable urging on the part of the Fuel Administration to lay in stocks this spring against next winter's requirements, the steel industry requires no urging, but is anxious to accumulate stocks for power purposes, gas production and byproduct coking. Especial attention is being given to gas coal, for the mills had some particularly trying experiences last winter, when it was difficult to secure absolutely needed gas coal, the authorities apparently being unable in all cases to grasp the distinction between gas and steam coal. The Government steel inspectors, however, did not relax their diligence, and some mills had a hard time trying to use high sulphur coal for gas production at openhearth furnaces and still keeping the sulphur in the steel down to the requirements of the specifications for Government steel.

Occasionally there is coal to be had through brokers, who are fairly busy doing a maximum amount of work on a minimum amount of tonnage, as transactions are put through with much more difficulty than formerly. The market remains quotable at the set prices: Slack, $2.20; mine-run, $2.45; screened, $2.70, per net ton at mine, Pittsburgh district, with an extra allowance of 15c. which brokers are allowed to charge.

TORONTO

Coal situation unchanged. Dealers overwhelmed with orders which they cannot fill. Receipts light. Wood to be largely used as substitute for coal.

The coal situation remains practically unchanged. Owing to the determination of consumers to lay in their supplies for next winter early, the dealers are overwhelmed with orders which cannot possibly be filled for some time. Deliveries are generally confined to small lots sufficient to meet present requirements. Receipts by rail continue light owing to the quantities being shipped by water to western points. The question of providing substitute fuels is receiving much attention. The provincial Department of Lands, Forests and Mines is letting contracts for cutting 25,000 cords of hardwood in Algonquin Park for the supply of public institutions, and several cities are arranging for supplies from the same source.

Quotations per short ton for best grades are as follows: Retail anthracite egg, stove, nut and grate, $10; pea, $9; bituminous steam, $8.50; slack, $7.50; domestic lump, $10; cannel, $13. Wholesale f.o.b. cars at destination three-quarter lump, unprepared, $6.11; prepared, $6.31; slack, $5.18.

BUFFALO

State of coal trade not much changed. Dealers find bituminous hard to get, but the demand is rather light. The opinion continues that present conditions give no chance to jobbers. Heavy demand for anthracite.

Bituminous—The supply is light, but the demand is not heavy as the consumers do not generally follow the plan of the consumers of anthracite in insisting on stocking up all they can get. It is reported that the railroads have gone into the market more largely within the past few days, and if that demand continues it will take care of any surplus coal that may be on the market. Buffalo is well supplied, but there is no coal waiting on track. The situation here is easy all around, though the future of the jobber is still in doubt. Few if any of them are doing a normal business.

The reports of congestion in Canada continue, though it appears that shipments there will hold up awhile, at least till the coal on demurrage is sold. Much money has been lost by the effort to secure the seller's margin of 30c. a ton which is allowed there instead of the 15c. here. Quite a good many Buffalo jobbers have set up a Canadian office, mostly in Toronto, where the effort was to meet the demand on a basis that promised a little profit, but it was soon so badly overdone that it is doubtful if much advantage was gained.

The Allegheny Valley price of $4.45 for all sizes has not made coal plenty there, all reports agreeing that it is still scarce. Pittsburgh prices remain at $4.25 for lump, $4 for mine-run and $3.75 for slack, all per net ton, f.o.b. Buffalo.

Anthracite—The local supply keeps up at about par with former seasons, though it is of course far short of the demand, which would cover the entire year's needs if it could be done. No consumer is at all satisfied with the normal amount, and but for the regulation forbidding the distribution in any but a horizontal way, the coal would soon be a cellarful here and nothing there. Outside shipments, especially to Canada, are taken care of by the shippers

in the same way. They see the impossibility of preventing suffering in secluded districts, unless the supply now going out is divided so that nobody gets more than a just proportion.

The lake trade is not very active yet, but the heaviest shipper has not loaded anything so far, though preparing to do so now. For the week the amount was 67,850 net tons, of which 27,100 tons cleared for Duluth and Superior, 19,400 tons for Milwaukee, 8000 tons for Sheboygan, 7300 tons for Green Bay, 3050 for Lake Linden and 3000 tons for Hubbell.

Rates are unchanged at 55c. for Milwaukee, 50c. for Sheboygan and Green Bay, 48c. for Duluth and 45c. for Lake Linden and Hubbell.

DETROIT

Receipts of bituminous and anthracite continue below normal. Detroit Board of Commerce investigates margin controversy.

Bituminous—While Federal and state fuel administrators are supporting the campaign to induce consumers of steam and domestic coal to buy now, in providing for their next winter's requirements, the movement of bituminous coal into Detroit continues to fall short of shipments in preceding years at this time. The amount of coal received at present, according to some of the jobbers, is considerably less than should be coming to Detroit to provide for current requirements.

The supply of slack seems less plentiful than would be desirable, though it is expected the loading of lake coal will improve the situation shortly. The diminished volume of receipts is attributed largely to the deficiency in supply of railroad equipment for its transportation. The shortage of cars, which has been a troublesome factor in the market for months, has been made more pronounced by the needs of lake shippers, which has resulted in diversion of cars and motive power to facilitate and expedite movement of coal from mines to loading docks.

Detroit Board of Commerce has been probing merits of the controversy between W. K. Prudden, Michigan fuel administrator, and Detroit coal dealers in reference to the fuel administrator's insistence that a $2.50 margin is adequate for the dealers for delivery of domestic coal during the summer months.

Anthracite—Few of the Detroit retailers have anthracite in stock and in none of the yards is there any substantial amount. With household consumers clamoring to have orders for next winter's supply filled, the dealers are, in many instances, refusing to accept orders for hard coal, owing to uncertainty as to what supply they will obtain and when it will be provided.

Lake Trade—Coal loading docks on Lake Erie are dumping into lake freighters an average of about 700,000 tons a week. It is calculated that the quantity loaded should amount to about 1,000,000 tons a week, if plans of the shippers for supplying the Northwest before the coming of freezing weather, are to be realized. The supply of tonnage offered for loading exceeds the cargoes. So far the movement of iron ore is light and freighters wait to load coal which, because of shortage of cars, is slow in arriving at the docks.

COLUMBUS

Better production of all sizes is reported from Ohio mining districts. Lake trade is increasing in activity, and domestic and steam demand remains brisk.

The Ohio coal trade has showed rather remarkable activity during the past week. According to reports from various districts the output has been increased to a more hopeful figure. Car supply is now better in all mining districts, and on the whole the outlook is rather cheerful. Demand for steam and domestic sizes remains strong, and strenuous efforts are being made to supply the domestic demand in order to avoid a repetition of the stress of last winter.

Retailers are busy making deliveries to householders, who are heeding the frequent warnings sent out by the Federal and State Fuel Administration officials. Hocking and Pomeroy grades are the principal varieties in the local market, although some Pocahontas and West Virginia splints are arriving. Consumers who have been waiting for the fancy grades are now buying Ohio coal more freely than formerly. A considerable tonnage of Pocahontas was received recently and this was quickly disposed of. Retail prices are firm at former levels. Anthracite is quite scarce and is selling between $11 and $12. Domestic coke is also higher.

Steam business is more active as large consumers are again in the market with orders intended for stocking purposes. The smaller steam users are buying for immediate needs only, as they believe that their requirements can be taken care of by the surplus over lake requirements.

Production in Ohio fields has been much better and a better feeling is shown in operating circles. Eastern Ohio, which has been lagging behind because of lack of cars, is now producing a considerable tonnage, estimated at 80 per cent. of capacity car ratings. The Hocking Valley is producing close to 90 per cent. and the same is true of Pomeroy Bend. Other fields are rather active.

Lake trade is becoming more active as the ice is now moving out of the upper lake passages rapidly. The vessel movement is better and considerable coal is now going to the Northwest. All of the lower lake docks have been busy loading bottoms. Docks in the Northwest are in good shape and little is being carried over from last season with the exception of mine-run and slack. Many permits have been issued by the Ore & Coal Exchange for the shipment of Ohio and West Virginia varieties.

CINCINNATI

Improving receipts, both by rail and river, and mild weather, have encouraged the trade. Deliveries on orders for current consumption and storage are progressing well.

While the car situation is not yet all that could be desired, judging by reports from both West Virginia and eastern Kentucky, the situation has still shown enough improvement, measured by actual receipts of coal on this market, to furnish much encouragement to the trade and to enable better deliveries to be made to customers. If receipts by local dealers will permit, it seems probable that the entire winter's supply of most domestic consumers, as well as of many large industrial consumers, will be in storage by the end of the summer season, which will be an absolutely unprecedented state of affairs. The favorable stage of the river is permitting arrangements for large shipments by that route to proceed, and river companies are taking advantage of the fact to fill their bins from their barges and thence deliver coal as rapidly as possible to customers. Nothing whatever is heard in the way of price discussion now, as consumers are aware of the fact that Government figures are the only ones to be had, and anxiety to secure adequate supplies of fuel overtops all other consideration. The situation is an ideal one for the trade, from almost every standpoint.

LOUISVILLE

Steam demand a little draggy, with domestic sizes in good demand. Excellent demand for gas coal and coal for by-products plants. Car supply improving.

In summing up the situation in Kentucky it is found that there has been an active demand for domestic and byproduct coal, but that steam has been a bit dull. However, business is active as a whole and operators are not making any effort to accept more than about 5 per cent. of the new business that is now being offered, as many have contracted up in fair shape. In western Kentucky there has been a more active demand for steam coal than in eastern Kentucky.

The car situation has shown some improvement in eastern Kentucky, where about 60 per cent. of requirements is now being had. In western Kentucky about 45 or 50 per cent. of the needed supply is being received. There are inequalities in distribution, but that apparently can not be helped at this time. Much labor has gone to the farms, and the mines as a whole are probably held back about 10 per cent. on account of the labor shortage.

No anthracite is on the market, and Kentucky is now on the anthracite barred list. Coke is also scarce and hard to obtain, although numerous metal-working plants are securing supplies by going into West Virginia for requirements.

BIRMINGHAM

Domestic consumers are now buying steadily and much coal is being stored for winter use. Priority regulations made more stringent. Both domestic and steam supply continue far short of requirements. Production hindered by irregular work.

Consumers of domestic coal have at last more fully awakened to the necessity of laying in coal for the approaching winter. Local yards are unable to handle the orders tendered, and their stocks are kept almost depleted by current demand. This is one encouraging feature in the face of the apparent inability of retailers to accumulate coal on their yards; they are selling it as fast as it comes in, and therefore it will not be necessary to accumulate the large stocks heretofore made available for the fall and winter demand. Another evidence of the activity on the part of the householders to provide against any possible future shortage is the large number of permits being issued by the fuel board for carlots to be prorated among community consumers. Dealers are able to make but few contracts with the mines and therefore cannot promise definite deliveries to their customers.

The situation in the steam trade has been intensified further by instructions from the Fuel Administrator that any surplus over and above the full requirements taken by essential or priority consumers must be held subject to disposition as directed by the Government authorities. It would seem that this regulation will result in the gradual elimination of all nonessential industries from participation in the coal supply. The Southern Ry. during the past week took 47 per cent. of the output of the mines on its lines, which is an exceedingly heavy drain on the supply.

Production is heavy, but the tonnage taken out is not at all commensurate with the task that should be rightfully expected from the forces employed at the operations, and indifference and inefficiency are given as the prime factors responsible for this situation.

Coke

CONNELLSVILLE

Coke shipments increase slowly. Pig iron production increases more rapidly. By-product plants will help.

Car supplies in the Connellsville region continue to increase from week to week, on an average, but the increase is slow and the distribution through the week is quite irregular, works receiving more cars some days than they can load, and not nearly enough on other days. Such increase in car supplies as has occurred in the past three or four weeks has been due wholly to coke moving through more rapidly, and empty cars also getting better dispatch, so that the time of the round trip is reduced.

The slight increase in coke shipments has been attended by a proportionately greater increase in the production of pig iron, that being due to the furnaces now working to good advantage, while in the early part of the year the consumption of coke, per ton of pig iron produced, was very high, owing to irregular working, frequent bankings and poor quality of some of the coke, due to its having been held in ovens too long, awaiting cars. Pig-iron production in the country as a whole is now at the rate of over 41,000,000 tons a year, while late in January and early in February it was down to below a 30,000,000 rate. The Carnegie Steel Co. is operating 53 of its 59 blast furnaces, which is very nearly normal. It was down to 29 furnaces for a few days early in the year.

When the Clairton, Cleveland, Lorain and Ironton byproduct plants are running full, within a very few months, there should certainly be an ample supply of coke. The first three are Steel Corporation plants, Ironton being a merchant proposition, which has been making ten-year contracts with blast furnaces in the district.

Very little Connellsville coke is finding its way to the open market, shipments being readily absorbed by contracts. Some of these are at flat prices, averaging about $8.25, while some are based on the prevailing market and thus are settled at the Government price. The market remains quotable at the Government limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 3 at 333,455 tons, a decrease of 10,410 tons. Returns of rail shipments are temporarily interrupted. River shipments are given at 16,120 tons, against 17,620 tons the week preceding.

Buffalo—The movement of coke is light. Jobbers get no business as between the ovens and the furnaces, as there is no margin for them, so the furnaces buy of the ovens direct. The local byproduct coke plants are selling quite an amount of their surplus, partly at least through the jobbers, which competes with the regular bee-

hive coke. A considerable amount of fine "breeze" coke is also selling to steam plants, being obliged to compete with the small sizes of anthracite in that trade.

Birmingham—There is no change to be noted in the local coke market. Strong inquiry continues, but the supply of both furnace and foundry coke is short for the spot trade. Production is fair but not up to normal capacity. The supply of both rack and box equipment is satisfactory, and delayed deliveries are being caught up with rapidly.

Middle Western

GENERAL REVIEW

Size coal demand continues to be firm. Screenings and washed No. 5 moving slowly.

Well-prepared size coal is in unusually good demand throughout the Middle West. In fact in most all sections there is a struggle by the operators to come within gunshot of being able to produce anything like enough to supply their customers. Sections of the country that will be outside the zone limit after Nov. 1 have made, and are now endeavoring to get, a year's supply within the time limit. Former claims that they could not store coal seem to have been swept aside, and unusual activity is apparent. During the past week several large buyers from Minneapolis and St. Paul, Minn., have visited mining fields in their endeavor to pick up any loose coal. Fine coal has been soft the latter part of the week. However, little alarm is noticed, and the general feeling is that a better market is near for screenings and No. 5.

Labor conditions are still bad, and railroad equipment is short. Never in the history of some of the oldest mine men has there been so much grip and pneumonia as has prevailed throughout the coal field during the past month, and coal miners seem to have been special victims. Quite a number of deaths have been recorded. Coal-car equipment continues to be distressingly short in many localities, but as a whole transportation conditions show an improvement over corresponding weeks last year.

MILWAUKEE

Coal matters exceedingly quiet. Orders for future delivery coming in slowly. Organized effort to stimulate this phase of the coal problem.

Matters in the coal line are exceedingly quiet at present. Raw spring weather keeps dealers busy delivering small lots to piece out the waning season, but orders for next winter's supply are not coming in as freely as the coal administrators desire. It will follow psychologically, however, that when fires are out for good and bins are empty there will be a deluge of urgent calls. It would help matters in this respect if the summer schedule of prices were promulgated.

Interest just now centers in the coming supply. Since last week's report 12 cargoes aggregating 97,366 tons have reached port. Of this amount 20,366 tons were hard coal. The receipts for May, thus far, total 228,083 tons, of which 47,602 tons were hard coal.

Gov. E. L. Philipp, State Fuel Administrator W. N. Fitzgerald and Mayor D. W. Hoan have been in conference regarding the coal supply for next winter, and as a result there will be a meeting of representatives of the heavy coal-consuming counties of the state in the near future. Leading coal handlers will be invited to attend and discuss the matter from their viewpoint. Letters will also be sent to every business concern in the state urging them to get in their coal orders as soon as possible. It is believed that enough wood has been cut to run the creameries and dairies of the state during the coming winter.

Kenosha, Wis., has appropriated $20,000 for the establishment of a municipal coal yard. It is expected that 45,000 tons will be handled during the coal-burning season. William Rahr, Jr., has been named fuel administrator of Manitowoc County.

CHICAGO

Domestic demands continue to grow. Screenings easy.

The Chicago market has not shown any marked changes within the past week. The domestic demand has been growing and the steam demand is about stationary, as is also the car situation. The efforts of the Cook County fuel administrator to start a storage movement in many of the industries gave the steam demand quite an impetus, and has had a helpful influence. The anthracite situation is not as encouraging as it might be, the large companies that were able to get considerable coal last year at this time, having to content themselves with a much reduced tonnage, delivered in small lots, with a promise that more will be available later in the season. Retail dealers are not accepting orders for hard coal, simply noting them with the hope that their supply will be increased prior to the winter season. The ultimate users to some extent do not feel warranted in allowing their orders to stand and are willingly accepting anything they can get, whether it be anthracite or bituminous.

Because of the free movement of size coal, some of the larger users of screenings have thought that they would be able to break the screenings market and have put considerable pressure in this direction by refusing to buy, claiming they were loaded, when really they should have been absorbing all that was offered. No headway was made, and many of those that refused to buy two weeks ago are now in the market.

Quotations in the Chicago market are as follows, per net ton f. o. b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky
Domestic lump	$2.65@2.80	$2.65@2.80	3.10@3.25
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25
Egg	2.65@2.80	2.65@2.80	3.10@3.25
Small egg or nut	2.65@3.80	2.65@2.80	3.10@3.25
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00
Screenings	2.15@2.30	2.15@2.30	2.60@2.75

Williamson and Franklin County; Mt. Olive and Staunton; Standard

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@3.00	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@3.00	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 2 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 3 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 4 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 5 nut	2.15@2.40	2.15@2.40	2.15@2.40
2-in. scrgs	2.15@2.40	2.15@2.40	2.15@2.40
2-in. lump	.....	.....	2.25@2.50
3-in. lump	.....	2.50@2.65	.....
Steam egg	.....	2.35@2.50	2.25@2.40
Mine run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	2.65@3.00	2.65@3.00	2.65@3.00
No. 2	2.65@3.00	2.65@3.00	2.65@3.00
No. 3	2.65@3.00	2.65@3.00	2.65@3.00
No. 4	2.65@3.00	2.65@3.00	2.65@3.00
No. 5	2.15@2.30	2.15@2.30	2.15@2.30

ST. LOUIS

An improved situation on everything excepting steam. Car supply short in the Carterville field and transportation poor, with same condition to a lesser extent in other fields. Shortage of men, prevalent everywhere, causes decreased production. Domestic sizes in demand, excepting Standard grade. Light anthracite shipments.

Local conditions continue to show improvement except that the shortage is more acute, with nothing to indicate that there will be any relief. The domestic business continues to come in in greater volume than anticipated, with the exception of Mt. Olive and Standard coal, orders far exceeding the available supply.

Steam coal continues to drag, especially on screenings and the smaller sizes of nut. There is, however, a chance that this condition will get relief on account of the numerous railroad orders for mine-run being placed, which will lessen the production of domestic sizes, and consequently bring about a shortage of screened coal. The situation would be much better if a larger tonnage of the Standard field were mine-run, and this is likely to be the case in the future.

In the Carterville field the tonnage is light on account of labor shortage. Car supply is extremely poor and transportation is far from what it should be. Many of the mines are refusing to accept orders because they are already oversold, and there is no relief in sight for easier conditions here. The same condition is prevalent in the Duquoin field.

Mt. Olive conditions are perhaps the most satisfactory of any. The working time is good, car supply is better than it has been for a long time, and the movement of coal in this field seems to improve. The tonnage just about takes care of the demand.

The Standard field presents an entirely different problem, and the only thing that has prevented a panic here is the fact that the railroads have been buying heavily on mine-run.

Steam sizes in this field are unusually heavy and restrictions on equipment, even under the Government supervision, are unfair and have kept coal out of territories needing it and crowding into territories that cannot use it.

There has been little anthracite coming in, and local conditions are satisfactory, with the exception that there is a demand for Carterville field that is causing anxiety on the part of those who have sold ahead.

The circular here is per net ton f.o.b. mines:

SEATTLE

Washington mines will not be able to meet demands. Greater increase in consumption than production aggravated by withdrawal of fuel oil.

Estimates of the production of coal mined in this state this year as compared with the estimated consumption, together with the prospect of heavy withdrawals of fuel oils, indicate that contrary to expectations Washington mines will not only be unable to ship coal to Montana and Oregon, but will not be able to supply the needs of consumers in this state this fall and winter. Last year this state produced 4,002,749 tons of coal and consumed 4,161,402 tons, of which 356,000 tons were imported from British Columbia and the East. As over 150,000 tons of Washington coal were shipped to Montana, Idaho and Oregon, the mines of the state more than cared for local demand. But such is not the case this year. The estimated production is 4,600,000 tons, an increase of practically 600,000 tons this year, with a consumption of 4,836,800 tons, an increase of 675,000 tons. The state cannot expect very heavy importations from British Columbia, for the Province finds itself facing a similar problem—increased consumption as a result of industrial expansion and the withdrawal of fuel oil.

Recently the tanker "Schofield," with a capacity of 100,000 barrels of oil, was withdrawn from the local field, and advices state that two more tankers will be taken into the Government service before the close of the month. On top of the withdrawal of tank steamers which has been occurring for months past comes a reiteration of the statement from oil authorities in California that the supply in the South will not be large enough to meet demands. Within a year a daily shortage of 50,000 barrels is predicted. Anticipating this the fuel administrator's office here has urged the conversion of oil burners to coal with the result that a greater task has been placed upon Washington mines than they can fulfill. Indications are that Washington will be at least 250,000 tons shy on demand in this state, and how much more rests entirely with the amount of oil that is to be withdrawn. Coal producers, heads of industrial plants and transportation men conservatively estimate that before the winter is done fuel oil to the equivalent of 500,000 tons of coal will have been withdrawn from the local markets.

COAL AGE

Volume 13 NEW YORK, MAY 25, 1918 Number 21

Progressive Coal Plans

By Floyd W. Parsons

RAILROADS and power plants of the United States have made it a rule to burn the very best coal that they could obtain. Now that the Nation is at war, this practice must cease, and Uncle Sam's locomotives, as well as many industries, will have to use coals of a somewhat lower grade.

The reason for this necessity is the scarcity of fuel specially adapted for byproduct plants, metallurgical purposes, ship bunkering and domestic consumption. When the railroads, or other consumers, take their needed tonnage from coal particularly suited for the foregoing purposes, a crime is committed against the Nation in its hour of need.

Marine boilers give highest service when burning a low-volatile coal. Such fuel not only adds to the speed of our naval vessels and transports, but it is smokeless, and thereby less likely to attract the submarine assassins. In this grade of fuel the navy's needs are paramount, and all other consumers must come second.

Metallurgical works and coke ovens are essentially war plants today. They must have, as a rule, a high-volatile coal running very low in sulphur. Railroads are particularly fond of this grade of fuel; however, there can be no question as to who must get it. All locomotives should be furnished high-volatile coal, and it must be decently prepared; but there is no reason why the railroads should insist on having the best our mines produce. It is also necessary that gas works and retail coal yards get their proper share of those coals suited to fill these special needs, for our domestic life must go on.

This is no time, of course, to undervalue the importance of transportation. The problem is very like our food problem. We must live, but we can get along without all-wheat bread. The railroads, and many other consumers, can get along without using coal that is sorely needed to safeguard our ships and to manufacture war supplies.

Mr. McAdoo is still indisposed. The railroad-fuel question remains unsettled. Dr. Garfield has appointed Walter A. Marsh, formerly general manager of sales for the Pittsburgh Coal Co., to the position of manager of the railway fuel division under Mr. Morrow. It will be Mr. Marsh's job to see that certain coals go where they are best suited and most needed. This is quite a step forward and should help the situation materially.

It is already certain that next winter will usher in a serious fuel situation. There is real reason to believe that the present weekly production of coal is near maximum, and if that is true, the output for the year will fall far short of estimated requirements. There can be no such thing as "business as usual" if we carry through our scheduled war program.

Among other problems Mr. Marsh will have to discover a solution for the difficulties of coal users in the Middle West. In Chicago and the territory adjacent, past winters have witnessed the consumption of much anthracite and a considerable quantity of low-volatile bituminous coal. The consumers in this Middle West region have base-burner stoves and furnaces designed to use these high-grade coals. Just how they will be able to burn Southern Illinois coal without altering present facilities is something worth knowing.

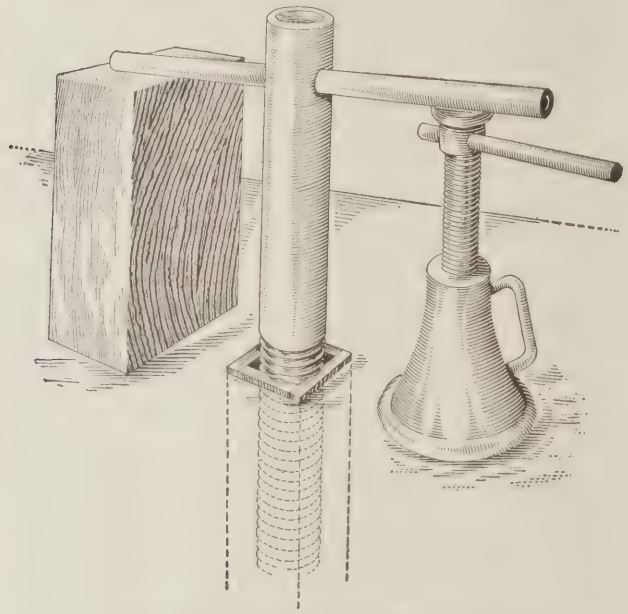
Wise people will now get what coal they can as quick as they can They will also make the necessary changes in their homes and their plants to burn the particular grade of fuel that is to be allotted for their needs. Don't be deceived into a sense of security by present summer breezes.

IDEAS AND SUGGESTIONS

Removing Bolthole Forms

BY L. V. LAUTHER
Guttenberg, N. J.

The wooden forms sometimes used for making the holes for bolts in heavy concrete foundations are often difficult to remove. In many instances such forms are made of rough lumber to which the concrete adheres



DEVICE FOR PULLING FORM BOXES

tightly. Even if made carefully of dressed boards coated with paraffine and slightly tapered, the boxes will sometimes stick tenaciously.

The accompanying illustration shows a means of pulling such form boxes. It consists of a piece of pipe of suitable length provided with a coarse thread and of such diameter that this thread will cut or "bite" deeply into the inside of the forms. After the pipe is screwed into place it may be pulled from the hole, bringing the wooden form with it, by means of the lever and jack as shown, or a clevis may be attached to its top and a set of chain blocks or a portable crane be used for lifting. In some instances a crowbar or other lever might be used to advantage.

Measuring Coal Areas and Making Coal Summary Sheets

BY "MINING ENGINEER"
Scottdale, Penn.

For the purpose of keeping a record of the area of coal already mined as well as that in process of development and recovery, it is necessary to use a fairly exact and rapid system of map measurement at least once a year. The system here described is exact to a reasonable degree, and in addition to being rapid is easily checked.

The mine map is divided into two parts—namely, gob areas and narrow work. A planimeter is used to measure the gob area in the usual manner, and this needs no description. A specially constructed scale is used for the narrow work. By narrow work I mean all excavations made by headings, rooms, cross-cuts, etc. This scale is made of tracing cloth $\frac{1}{4}$ in. wide and 30 in. long, with divisions every $\frac{1}{10}$ in. This will give a 100-ft. scale that is 3000 ft. long with divisions every 10 feet.

Before measuring the narrow work, this must be divided into classes, each of uniform width. This makes it necessary to separate headings from rooms, and wide headings from narrow headings. I have arranged the classes of narrow work, as shown in Fig. 2, in a manner that would apply to a majority of mines. The widths have been obtained from widths measured in dozens of different parts of the mine; the lengths from actual measurements of the maps; and the

Calculated Life of Plant..... .....Mine

Summary of Coal Mined to .....

Township	Tract No.	Name of Tract	Total Area of Tract	Barren Area	Unmerchantable Coal	Reservations	Area Assigned to Other Mines	Net Area	Total Area Mined to	Mined Area From..... To.....	Squeeze Area	Coal Remaining in Barriers	Coal Remaining in Stumps to Protect Rts. of Way, Roads, Streams, Etc.	Net Coal Remaining

FIG. 1. SELF-EXPLANATORY FORM WHICH GIVES MUCH VALUABLE INFORMATION

Johnson Tract

Headings			Hdg. Cross Cuts			Rooms			Room Cross Cuts			Gob Increase	Total Gob Area
Width	Length	Sq.Ft.	Width	Length	Sq.Ft.	Width	Length	Sq.Ft.	Width	Length	Sq.Ft.	Sq.Ft.	
10.1 ×	9,600 =	96,960	9.3 ×	2,200 =	20,460	15.2 ×	8,000 =	121,600	12.2 ×	4,000 =	48,800	750,000	.....
15.2 ×	3,600 =	54,720	.....			25.3 ×	3,000 =	75,900	.....			.....	.....
Total.....		151,680	Total.....		20,460	Total.....		197,500	Total.....		48,800	Total 750,000	925,000

151,680
20,460
197,500
48,800
750,000

Grand Total = 1,168,440 = Mined area (sq.ft.), Jan. 1, 191—, to Jan. 1, 191—.

NOTE.—A chart of this kind should be made for every tract.

FIG. 2. CHART FOR SHOWING CLASSES OF NARROW WORK IN EACH TRACT

gob increase by measurements with a planimeter. Every office will have to adjust this classification to its own particular needs, as some mines drive headings of different widths, and some probably drive headings and rooms of the same width. The classification is immaterial so long as a standard or several fixed standards are adhered to.

Both for convenience in checking and for use on the summary sheet, as explained later, it is expedient to measure all maps by tracts. For instance, taking the Johnson Tract, measure all headings of a certain width in it, being careful to exclude all work outside of the property line; do the same with all the narrow work and the gob area, and then start in on the adjoining tract.

How to Measure Narrow Work

To measure narrow work, taking roomwork as an example, place zero of the 30-in. tape on the face of, say No. 6 room, and laying the tape along the room towards the entry or room mouth, place a needle point on the 0 + 00 of the room. Now, keeping the needle point fixed on the tape at this point, slide the tape over to No. 5 room and measure it in the same manner as No. 6. Continue in this manner until all the rooms are measured. After noting the total reading on the tape, start in to measure the cross-cuts.

At this point it might be well to state that tinting of maps should only be done as often as the maps are measured, for it is much easier and more rapid if you know that the work to be included in the latest measurement is that which is not tinted.

To go to the trouble of making a yearly measurement and then not have it recorded in good shape on a coal-summary sheet would be a waste of time. The mining engineer is called upon daily to give an estimate of the coal already mined in certain tracts; to give an estimate of the coal remaining; to tell what township the tract is in; what acreage is barren, and what is unmerchantable coal; how many acres are held in reservations; what amount will be mined from one mine and what from another. Fig. 1 shows much indispensable information and is self-explanatory.

All data is expressed in terms of acres, unless otherwise noted, and the sheet should show the tons per acre for that particular mine. Solid coal is that coal which has not been developed by headings and rooms, and by coal remaining in ribs is meant that which has been developed and which lies between rooms, between headings, air courses, etc.

The amount of coal remaining in ribs which can be recovered will of course vary with regard to local conditions, but will approximate 85 per cent., and the tons per acre will likewise vary according to the height and character of the coal.

Calculated by..... Date.....

Checked by..... Date.....

.....191....

Solid Coal Remaining	Coal Remaining in Ribs	Coal Remaining in Ribs Which Can Be Recovered	Estimated Solid Equivalent for Coal Remaining in Ribs	Estimated Total of Solid Coal Remaining and Solid Equivalent for Coal Remaining	Estimated Tons of Coal that Can Be Mined from Area in Ribs	Remarks

WHEN FILLED OUT PROPERLY

Shellac

By R. A. Lyons

Shellac is one of the most valuable varnishes in use about electrical shops. It has the advantage of being a splendid insulator. It dries rapidly and it can be made almost any color desired. Shellac may be made by dissolving about 5 lb. of shellac gum in one gallon of 96 per cent. proof alcohol. This composition gives a rather thick mixture, which is desirable for painting coils, for insulation and like services, but it is too thick to use as a varnish, for which use it should be thinned.

In buying shellac gum, or resin, it is desirable to purchase a good grade. Frequently the shellac resin is adulterated with ordinary rosin, which is much cheaper and inferior in every way. The rosin adulteration can frequently be detected by crushing the mixture—the odor and feel of the rosin will then be apparent.

For coloring shellac varnish (which is to be used in insulating) black, one of the well-known makes of black, air drying, alcohol finishing varnishes should be used. It should be mixed into the clear shellac mixture to an extent that may be determined by experiment. Lampblack, which is finely divided carbon and hence a good conductor, should not be used in coloring shellac to be used for electrical purposes.

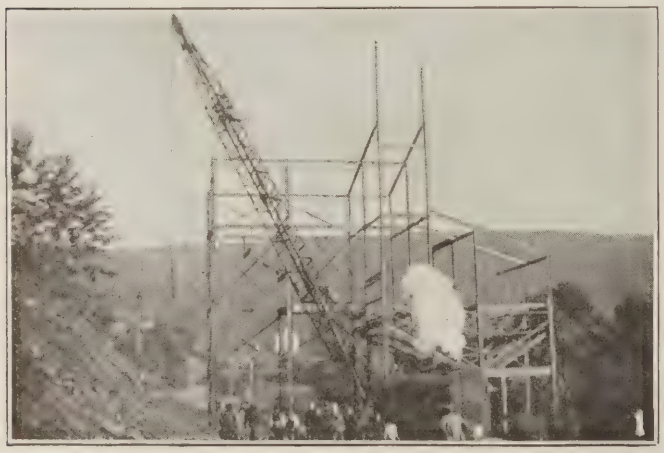
New Steel Washery of the Locustdale Coal Company

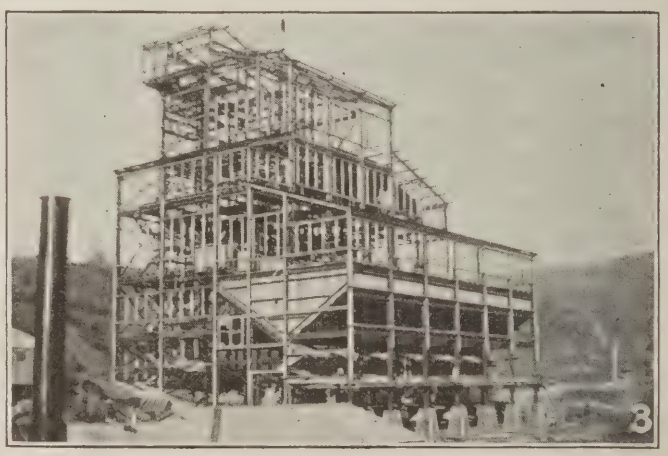
By WILBUR L. CROSS, Jr., E. M.
Superintendent, Locustdale Coal Co., Ashland, Penn.

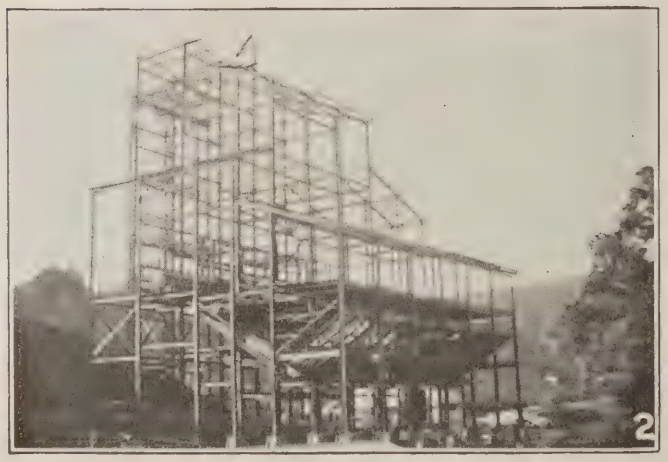
DURING October, 1917, what is believed to be a record in the erection of the steelwork for any coal preparation plant in the anthracite region was made in the erection of the Locustdale washery for the Locustdale Coal Co., at Germantown, near Ashland, Penn. This structure, containing 437,500 lb. of structural steel, was erected by 10 men and a crane in 8 working days of 10 hours each. This time includes the unloading of steel from the railroad cars. Erection does not mean completion, for the steel framework of the structure was not entirely completed at the end of this time. All the bolts were not in place nor were they all tightened up. However, the pockets were completed so that the carpenters could start right in with their work of planking, and the men bolting up kept ahead of the carpenters at all times. Owing to the comparatively short life of the property, the steelwork was bolted together so that it could be taken apart easily when the bank was exhausted. The progress of erection of the washery is shown in Figs. 1 to 4, inclusive. Fig. 1 notes the amount of material assembled at the end of the first day; material erected at the close of the eighth day is shown in Fig. 2. Fig. 3 shows progress in pocket lining and studding for window sash. Some siding and sash are in place in Fig. 4. A general view of the washery and surroundings is given in Fig. 5. A detailed view of the washery framing, including the diagonal bracing, is illustrated in Fig. 8; some of the chutes, jig casing and other interior work are also shown.

The Heilner banks are being prepared by this washery, and they are located west of Ashland near Locustdale and Germantown, Penn., about one-half mile north of the Potts colliery of the Philadelphia & Reading Coal and Iron Co. They are the property of the Lehigh Valley Coal Co., but are being prepared by the Locustdale Coal Co. on a royalty basis.

These banks are not by any means "refuse," in the sense that this word is used today, for the coal was put down 50 or 60 years ago when standards were much different from what they are today. Tests of the coal prepared show that the broken coal and a good deal of









FIGS. 1, 2, 3 AND 4. LOCUSTDALE WASHERY AT DIFFERENT STAGES OF CONSTRUCTION
Fig. 1—Amount of material assembled at end of first day. Fig. 2—Material erected at close of eighth day. Fig. 3—Shows progress in pocket lining and studding for window sash. Fig. 4—Shows some siding and sash in place



FIG. 5. GENERAL VIEW OF LOCUSTDALE WASHERY

the egg coal found in the bank is either bony (which they throw out) or good coal missed in the former preparation. To some extent this is also true of the stove coal, although in this case a large percentage of good coal went to the bank with the bony. Nut coal is as clean as the average run-of-mine. Pea coal and buckwheat from the bank need not be jigged, as the slate percentage is far below the limit.

Due to peculiar surface conditions, it is necessary to load the bank into cars by means of a steam shovel; hoist the cars up a plane 700 ft. in length on a pitch of 14 deg.; thence by locomotive 3500 ft. to a trestle, located about 600 ft. west of and at the same elevation as the top of the washery. The cars are dumped here and the coal slushed down a chute of terra cotta pipe on a pitch of 2 in. to the foot, into the bottom of the ele-

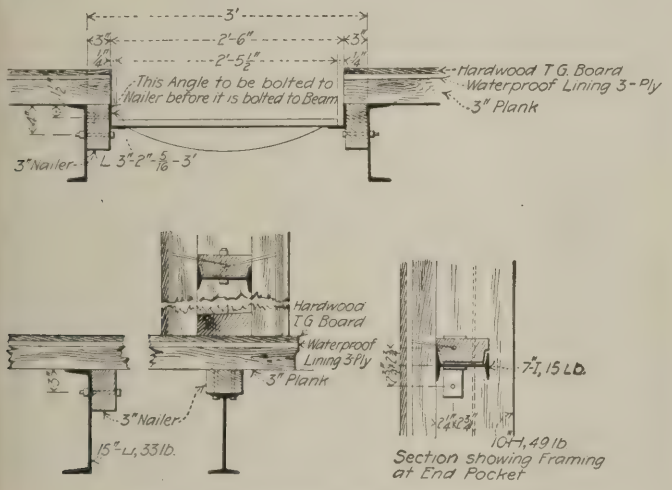


FIG. 6. DETAILS OF CONSTRUCTION

vators. To have delivered this material at the top of the structure in cars would have been the ideal plan. This could have been done, but only at an expense not justified by the life of the property. The trestle dump and slushing method has its advantages in that it permits the storage of a large quantity of material, thus allowing constant operation of and constant feed into the washery in case of delayed transportation or delays at the steam shovel.

Water for slushing and for use in the washery is obtained from the old Heilner mine workings, the original source of this coal. A Worthington type B. S. single-stage centrifugal pump delivers this water at the rate of 1000 gal. per min. against a total static head of 125 ft. through a 10-in. wood pipe to the hose used for slushing and to the tank in the washery. This pump is belt-driven by a 60-hp., 2200-volt, three-phase, 60-cycle slip-ring induction motor. With the exception of the steam shovel and locomotives, this operation depends entirely on electric current purchased from the Eastern Pennsylvania Light, Heat and Power Co. and uses 2200-volt motors.

The hoist used to pull the cars up the plane is an old balanced plane hoist put in for emergency use and geared to a 125-hp. Allis-Chalmers slip-ring 2200-volt motor. This hoists three cars of 120 cu.ft. capacity at one time on the level. A new Flory hoist now being

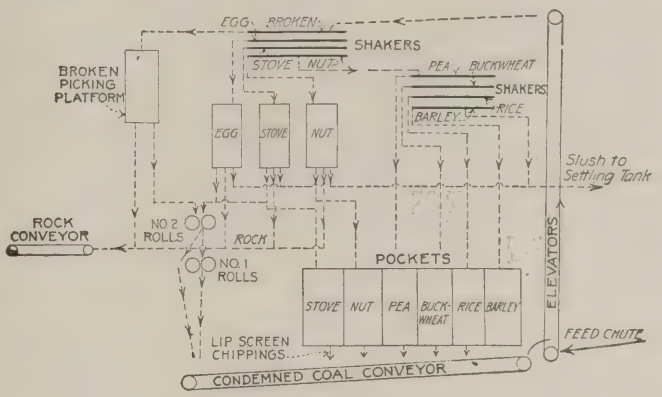


FIG. 7. LOCUSTDALE FLOW SHEET

erected will replace the old hoisting plant. It will be driven by a Western Electric 200-hp., slip-ring, 2200-volt motor and will hoist four cars per trip on the balanced plane.

The washery is driven by a 150-hp., 2200-volt, three-

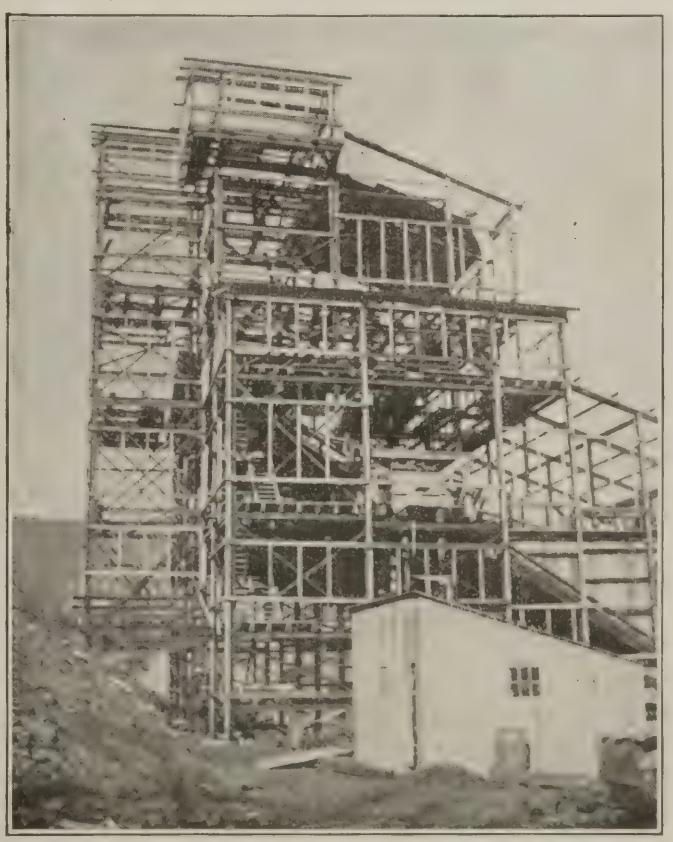


FIG. 8. DETAILED VIEW OF FRAMING

phase, 60-cycle, slip-ring Westinghouse induction type H. F. motor. This is rated at 37 amp. full load. To put coal through at the rate of 1000 tons per day requires from 100 to 125 hp. In starting under full load momentary overloads of from 200 to 250 per cent. are caused. This overload the motor carries without any trouble whatsoever.

The design of this plant, specifications for all machinery, motors, etc., and all details in the construction and operation of the plant were made under the direction of the writer. The maximum capacity of the plant is 1500 tons per day of 8 hours. The steelwork was designed by the Guerber Engineering Co., of Bethlehem, Pennsylvania.

The building is covered with corrugated iron and, as can be seen from the accompanying photographs, has a large amount of window space. Floors are of wood, as this is a fairly temporary structure, but all chutes and hoppers are made water-tight to prevent any water from coming in contact with the steel. Details of pocket construction and methods of attaching wood to the steel are shown in the accompanying sketch (Fig. 7). A longitudinal section of the washery showing the machinery in position is shown in Fig. 9.

All of the machinery, with the exception of a few pulleys, was furnished by the Wilmot Engineering Co., of Hazleton, Penn. The chain in the elevators is the extra heavy 9-in. pitch Keystone rivetless chain. The buckets are 30 x 24 x 15 in. spaced every 27 in. on this chain. The chain speed, originally 88 ft. per min., has been increased to 108 ft. per min. to take care of the excess water which comes down the feed chute with the slushed product. The distance center to center between the driving wheels at the top and the take-up wheels at the bottom is 81 ft. All gears, shafts and boxes are of extra heavy construction.

The elevators discharge their product over the top bank of four prepared coal shakers, making broken, egg, stove and nut coal. These shakers are of the standard Wilmot construction, wooden sides reinforced with angles. The arms are removable hickory spring pieces which are bolted fast to the sides of the shaker. The eccentrics have a 6-in. throw and are of extra heavy construction. A flywheel pulley on the shaker shaft helps wonderfully in maintaining a constant shaker speed under varying loads. These shakers are 24 ft. long, 5 ft. wide and are set on a pitch of 1 in. to the foot. Running at from 142 to 145 r.p.m. the 6-in. throw of the eccentrics keeps the shaker jackets reasonably clear of the long pieces of coal which ordinarily lodge in the holes in the jackets.

Large lumps of coal and rock are removed outside the washery by means of bars in the slush chute and do not get into the elevators. The product, therefore, of

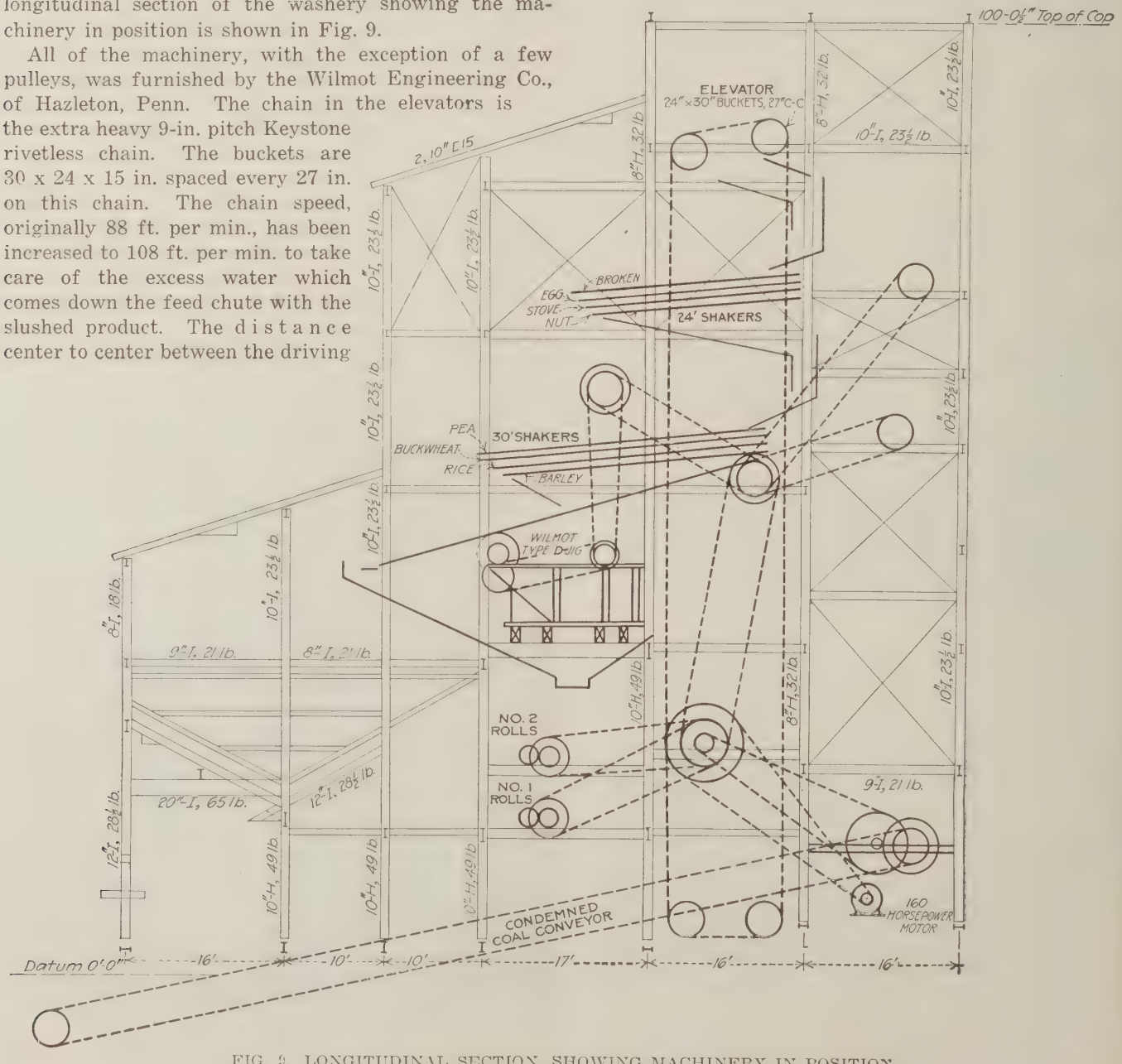


FIG. 9. LONGITUDINAL SECTION, SHOWING MACHINERY IN POSITION

the upper deck of shakers is broken and small steamboat. The percentage of rock is high and the tonnage low. Two boys pick the coal and bony from this size and send it down a spiral chute to the No. 2 rolls.

Egg coal has a large percentage of rock and bony coal in it. From the shaker it goes to the jig pockets and thence to two Wilmot type D Simplex jigs. Part of the coal delivered by the jigs goes to a small pocket for use in the locomotives. The remainder goes to the No. 2 rolls to be broken down. There is too much bony and flat coal of bad appearance in this size to permit of direct shipment.

Stove coal from the shaker goes to the jig pockets and thence to two Wilmot type D Simplex jigs. There is too much light bony and coal of a bad appearance in the jigged coal to permit of its being loaded under strict inspection. Two boys pick this bad stuff from the coal. The pickings are sent to the No. 1 rolls and broken to pea and smaller. Nut coal from the shakers goes in a spiral chute to the jig pockets, thence to three Wilmot type D Simplex jigs. The coal from these jigs is excellent and needs no picking.

The slush product from the upper bank of shakers goes to the lower bank of shakers—pea, buckwheat, rice and barley sizes. These shakers are of the same type as the prepared shakers but are 30 ft. long. The "Beaver" type of spray is used over all of the shakers. Pea coal, buckwheat, rice and barley from their respective shakers go direct to the pockets. Pea coal averages about 6¼ per cent. of slate, buckwheat rarely runs over 8 per cent., with rice and barley looking fine.

An inspection of the flow sheet (Fig. 7) shows that coal from the No. 2 rolls goes either to the condemned coal conveyor or is rebroken in the No. 3 rolls. There are certain parts of the bank which contain an unusual percentage of bony coal. When coal is coming from those sections, the broken and egg are put through both sets of rolls to keep the bony out of the stove and nut coal. Although it is not a good plan to run from roll to roll without an intermediate screening, this is done so infrequently and the character of the coal is such that there is really little if any loss. Coal from either or both sets of rolls goes to the condemned coal conveyor, discharging into the chute and elevators.

All of the rock goes to a common rock chute which discharges into the rock conveyor line. This line takes it across the railroad track to a hopper, from which it is conveyed in dumpers to the rock bank. Although the plant is run by electricity, a small boiler must be maintained during the winter for heating purposes. This boiler is supplied with boiler coal by means of the rock line during noon and after quitting time. This is done by having a removable pan in the rock line and a chute from this point in the rock line to the boiler house coal pocket. This plan saves an extra conveyor line. This conveyor line is made up of Wilmot light 9-in. Keystone rivetless chains with 8 x 18-in. flights. The plates in the bottom and sides are cast iron and are interchangeable. The condemned coal line is a duplicate of the rock line. This rock line, which is detached from the washery, is driven by a General Electric 35-hp., 2200-volt, slip-ring motor with variable speed control. It is 185 ft. in length, and when well loaded the motor is taxed to its full capacity.

The slush and water from the hopper under the lower deck of shakers flows into the main slush trough under the jigs, thence out to the slush bank. In the near future it will go to a settling tank now under construction.

The force on preparation is as follows: One breaker boss, 1 jig boss, 1 jig runner, 1 oiler, 1 machinery attendant, 1 motor runner, 2 pickers on broken coal, 2 pickers on stove coal, 1 cleaner up—a total of 11 men and boys. On the car road are 1 loader boss and coal inspector and 3 loaders—a total of 4 men.

The water for preparation is forced by the centrifugal pumps (previously mentioned) to a 5000-gal. wooden storage tank at the top of the washery. The four outlets are all 3-in. pipe governed by Eynon-Evans special brass body globe valves. Line No. 1 feeds the sprays on the upper shakers; No. 2 the sprays on the lower shakers; No. 3 the car road sprays and No. 4 the jigs. To save valves a trough was built behind and above the jigs, which is fed by line No. 4. A special inexpensive casting is inserted in this trough, and a wooden plug fits in this casting. By pulling the plug, the jig may be quickly and easily filled. An automatic arrangement was tried here depending on a float in the water of the jig. It was not satisfactory, owing to the continual disturbance of the jig water. With the trough on the same level as the jig, an admirable automatic feed can be easily installed.

Research Fellowships in the College of Mines, University of Washington

The College of Mines of the University of Washington offers five fellowships in Mining and Metallurgical Research in coöperative work with the Bureau of Mines. The fellowships are open to graduates of universities and technical schools who are properly qualified to undertake research investigations. The value of each fellowship is $720 per year of twelve months, beginning July 1, 1918. Fellowship holders are required to register as graduate students and to become candidates for the degree of Master of Science in Mining Engineering, or Metallurgy, unless an equivalent degree has previously been earned.

The purpose of these fellowships is to undertake the solution of problems in mining and metallurgy which are of special importance to the State of Washington, Alaska, and the Pacific Northwest. For the year 1918-1919 the following subjects have been selected for investigation: (1) Washington mining problems. (2) Ore concentration, including flotation and electromagnetic processes. (3) Electrometallurgy; electrothermic and electrolytic investigations. (4) Coal washing. (5) Utilization of the nonmetallic resources of Washington.

Applicants should send a copy of their collegiate records from the registrar's office of the college where they have been, or will be, graduated. They should also state their professional experience and give the names and addresses of at least three persons who are familiar with the character, training and ability of the applicant. Applicants liable for military service should state their classification and other pertinent facts relating to the draft. Applications are due not later than May 30, and should be addressed to the Dean, College of Mines, Seattle, Washington.

Graphic Determination of Prices

By J. D. SKINNER
Rocky Mountain Fuel Co., Denver, Colo.

SYNOPSIS—*Varying prices for the different sizes of coal produced at the mine make it advisable to be able to determine which should be sold—run-of-mine, or lump and slack. The accompanying curves make such determinations easy.*

WHEN varying prices are received for run-of-mine, lump and slack coal and certain percentages of the two latter are made, it is somewhat difficult to determine quickly whether it will be advantageous to sell the mine output with or without preparation. And in whatever condition the coal is disposed of, it is advisable to know both "why" and "how much."

To provide a means and basis for quickly comparing the prices of these three grades of coal and determining which will yield the greatest return, I have constructed the accompanying charts. These are based on the following simple calculations:

Let

P = Price of mine-run per ton;
x = Corresponding price of lump per ton;
y = Corresponding price of slack per ton;
A = Percentage of lump made;
B = Percentage of slack made.

Hence $A + B = 100$.

Problem—Given P, A and B to find x and y.

In one ton of mine-run there is an amount of lump represented by the decimal fraction A and an amount of slack represented by the decimal fraction B. Hence, when the portion A of a ton of lump is sold at x dollars per ton, and the portion B of a ton of slack is sold at y dollars per ton, the total receipts will be P dollars; and we have the relation

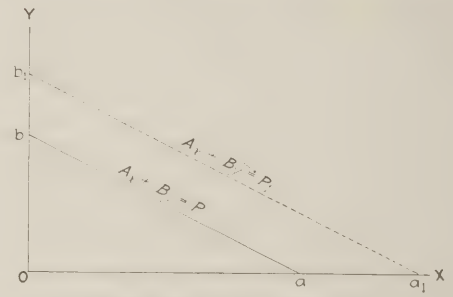
$$Ax + By = P \qquad (1)$$

Since equation (1) is of the first degree, its graph is a straight line.

Letting $x = o$, the intercept on the Y-axis is $Ob = \frac{P}{B}$.

Letting $y = o$, the intercept on the X-axis is $Oa = \frac{P}{A}$.

Hence, for given values of A, B and P, the graph of (1) can be drawn by connecting the intercepts. If A and B are supposed to be constant and x and y have



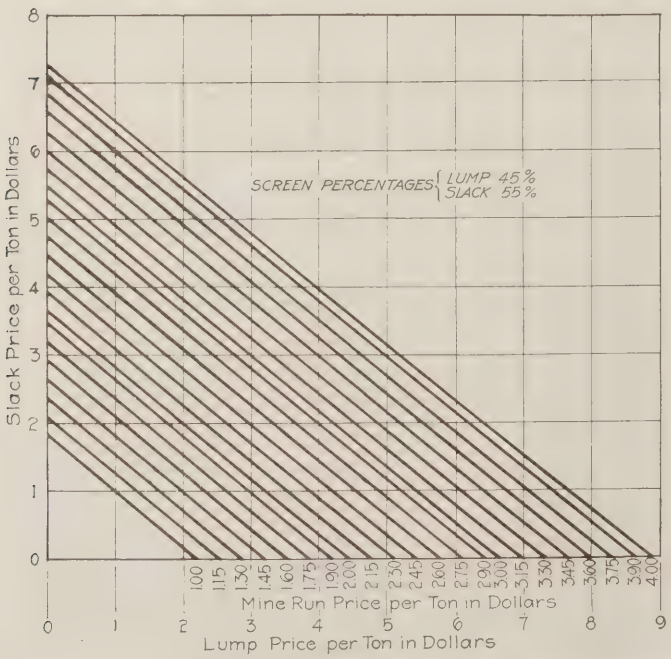
THE GRAPH OF EQUATION (1)

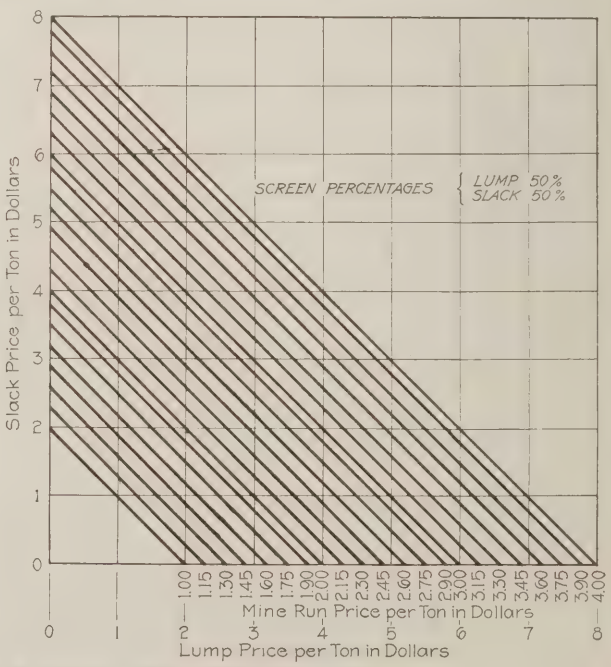
different values, a series of graphs may be constructed for different values of P. That these lines will all be parallel may be shown as follows:

Transposing (1) and dividing both terms by B to put it in the slope-intercept form:

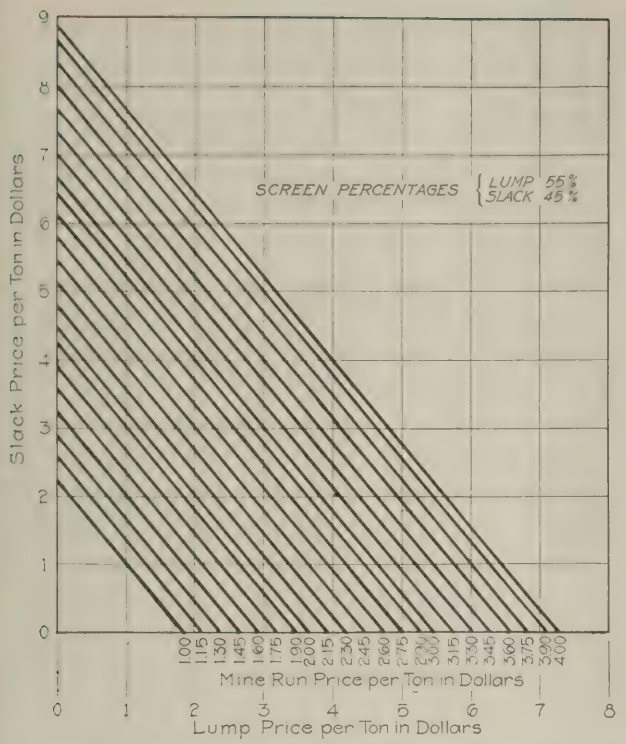
$$y = -\frac{Ax}{B} + \frac{P}{B}$$

Hence, the slope of (1) or $M = -\frac{A}{B}$.





COAL PRICES SHOWN GRAPHICALLY FOR 45 AND 50 PER CENT. OF LUMP

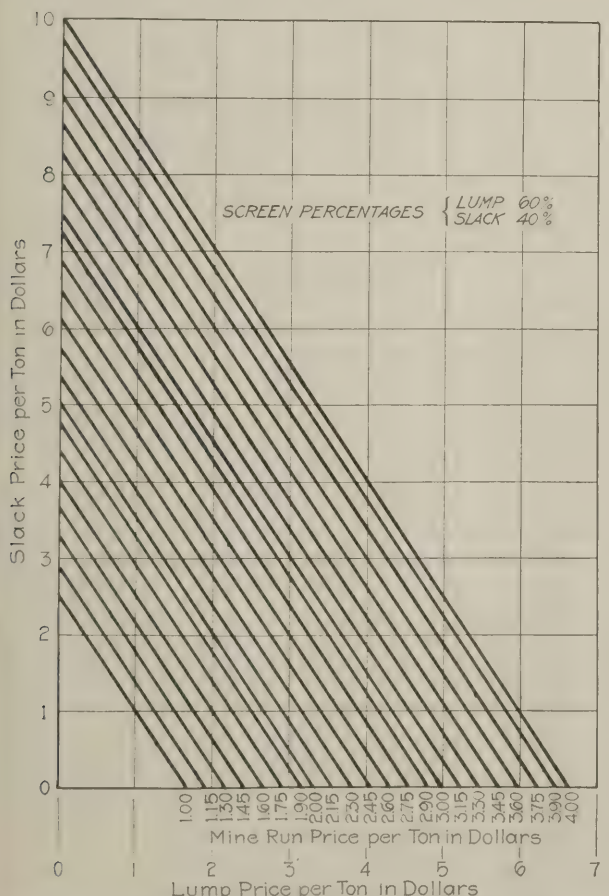


PRICE DETERMINATION FOR COAL CONTAINING 55 PER CENT. LUMP

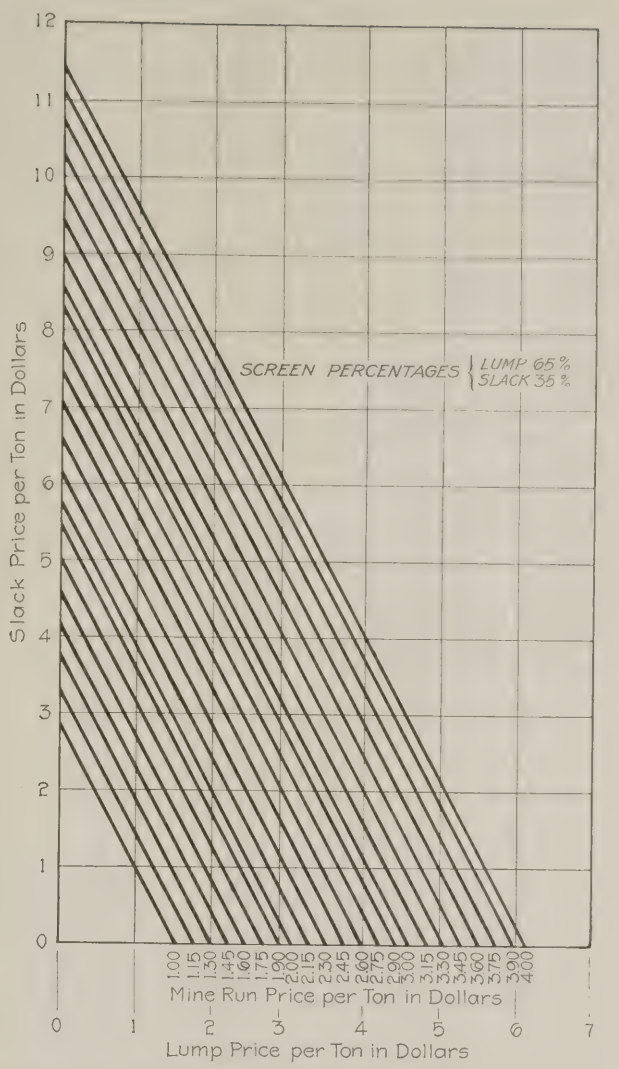
Now the equation of any other line having a different value of P, say P_1, is

$$y = -\frac{Ax}{B} + \frac{P_1}{B} \qquad (2)$$

Since the slope of (2) is likewise $-\frac{A}{B}$, (1) and (2)



GRAPHIC PRICES FOR COAL CONTAINING 60 PER CENT. LUMP



GRAPHIC PRICE DETERMINATION OF A COAL CONTAINING 65 PER CENT. OF LUMP

make the same angle with the axis of X and hence are parallel.

The following illustrates the method of finding the intercepts:

Screen percentages { Lump 70 per cent. Slack 30 per cent.

Hence $A = 0.70$ and $B = 0.30$

Price of Mine-Run P	Intercept on X-Axis $Oa = \frac{P}{A}$	Intercept on Y-Axis $Ob = \frac{P}{B}$
$1.00	$1.43	$3.33
1.15	1.64	3.83
1.30	1.86	4.33
Etc.	Etc.	Etc.

Method of Using the Diagrams

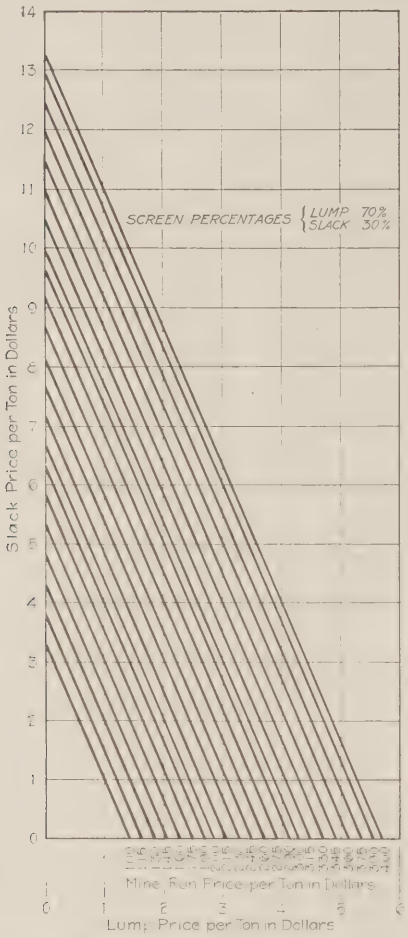
Example 1. Given cost of mine-run f.o.b. railroad cars at mine (including cost of screening lump and slack) = $2.30 per ton. Profit 15c. per ton. Selling price of lump f.o.b. mine $3.20 per ton. Screen product: 70 per cent. lump; 30 per cent. slack.

Find corresponding price, f.o.b. mine, that slack must be sold for in order that the combined profit on lump and slack will be 15c. per ton on a mine-run basis.

Solution—On the diagram for 70 per cent. lump and 30 per cent. slack follow along the diagonal line marked $2.45 (the selling price of mine-run) until it intersects the vertical line through $3.20 (the selling price of lump to the scale marked on the axis OY). The dis-

tance this point of intersection is above *OX*, measured along the line through $3.20 and perpendicular to *OX*, is the corresponding price of slack, which, by the scale on the axis *OY*, is $0.70. If the price of slack had been given instead, the corresponding price of lump could be found in a similar manner.

Example 2. Given selling price of lump = $4.10



GRAPHIC PRICE FOR MINE-RUN CONTAINING 70 PER CENT. LUMP

f.o.b. mine. Selling price of slack = $1.20 f.o.b. mine. Cost of mine-run (including screening, etc.) = $2.90 f.o.b. mine. Screen product 65 per cent. lump; 35 per cent. slack.

Find profit per ton of mine-run sold as lump and slack.

Solution—On the diagram for 65 per cent. lump and 35 per cent. slack find the intersection of the line perpendicular to *OX* at $4.10 with the line perpendicular to *OY* at $1.20. This point of intersection lies a little over halfway from the diagonal marked $3 to that marked $3.15, which gives $3.08 for the corresponding selling price of mine-run. Hence the profit per ton mine-run at the mine is $3.08 — $2.90 = $0.18.

Example 3. Given selling price of mine-run, including operator's profit = $2.90 per ton f.o.b. mine. No market for slack, which therefore has to be wasted. Screen product: 50 per cent. lump; 50 per cent. slack.

Find corresponding price, f.o.b. mine, at which lump must be sold to obtain the given price for mine-run.

Solution—On the diagram for 50 per cent. lump and 50 per cent. slack follow along the diagonal marked $2.90 until it intersects the axis *OX* (on which the selling price of slack is zero). This point of intersection is at $5.80, which is the required price of lump.

Mine-run prices between those given may be secured by laying a transparent ruler between and parallel to the proper diagonal lines and reading its intersections with the vertical and horizontal lines.

These diagrams also can be used to compute costs as well as selling prices.

Record Tonnage in British Columbia

By Robert Dunn
Victoria, B. C.

The demand of the Dominion authorities for more coal continues to meet with good response from the operators of British Columbia. The latest official returns show that the total output of coal for British Columbia for the first quarter of the year was 673,044 tons, which is a gain of 19,213 tons over the same period of 1917.

The production by districts is given as follows:

	Tons
Vancouver Island	425,759
Crow's Nest Pass	199,700
Nicola Princeton	47,585
Total	673,044

The production of the various companies was as follows:

	Tons
Vancouver Island:	
Western Fuel Co	198,467
Canadian Collieries (D) Ltd	189,560
Pacific Coast Coal Mines	25,779
Nanoose Collieries	11,953
Crow's Nest District:	
Crow's Nest Pass Coal Co	175,378
Corbin Coal & Coke Co	24,322
	199,700
Nicola Princeton District:	
Middlesboro Collieries	30,071
Fleming Coal Co	4,152
Princeton Collieries	13,362

The Vancouver Island collieries have produced upward of half a million tons during the first quarter in spite of the fact that three producing mines have closed down; namely, the Jingle Pot mine, which has not been operated on account of a fire in the underground workings; the South Wellington mine of the Pacific Coast Coal Mines, which, being worked out, has been abandoned; and the No. 4 mines of the Canadian Collieries, abandoned for the same reason.

The Western Fuel Co. produced 29,967 tons more in the first three months of 1918 than in the opening quarters of the previous year; the Nanoose Collieries show an increase of 9172 tons; while the output of the Canadian Collieries and the Pacific Coast Coal Co. has fallen off slightly. This, however, is expected to be more than offset by the opening of two new mines, which now are being developed and equipped, one at South Wellington by the Canadian Collieries (D) Ltd. and the other at Cassidy's Siding, Vancouver Island, by the Granby Consolidated Mining, Smelting and Power Company.

In the Crow's Nest District, the Crow's Nest Pass Coal Co. produced 24,708 tons more in the first quarter of this year than in the first months of 1917, while the Corbin Coal and Coke Co. also has increased its production to the extent of 8716 tons.

The collieries of the Nicola-Princeton District show a similar improvement, the Middlesboro Collieries were increasing their output 14,963 tons, although the Princeton Collieries have dropped about 3000 tons.

Pulverized Coal for Industrial Purposes*

By JOHN CUNLIFFE
Vancouver, British Columbia

THE employment of pulverized coal in various industrial processes offers many advantages over the use of other fuels. Industries of the western provinces of Canada that now rely largely on California crude oil will sooner or later, through stress of circumstances, be compelled to adopt some substitute. Of the available fuels powdered coal offers the most promising solution.

BROADLY speaking, coal may be described as the stored-up heat of the sun of former ages. To describe in definite words the meaning of the word "coal" is not simple. However, coal may be defined as a solid stratified substance, capable of undergoing combustion in contact with oxygen, and not containing sufficient earthy impurities to prevent its being applied as a source of heat in furnaces and fireplaces. It varies in color from brown to black.

There is nothing authentic in history to indicate by whom or how the heating value of coal was discovered. It was probably due to chance or accident, with all records lost in antiquity. The Indians of Nanaimo, Vancouver Island, knew of the heating power of coal many years before its exploitation there by white men, and termed it in their jargon "the black rock that burns." Further north on the east coast of that island the Indians discovered coal many years ago, and named the stream on which it was found "Suquash River." Interpreted, the Indian word "suquash" meant "the rock that burns." It is probable our ancestors discovered the heating value of coal in a similar manner.

The heating value of various coals was determined by scientists many years ago, and public attention from time to time has been called to the great waste in our crude methods of burning it. The furnaces and fireplaces of today are but little improved from those of our grandfather's time. It has remained for 20th century science to solve to some small extent this problem of waste. To illustrate how serious this waste is, let us take for example the case of steam generation and its application today.

Work Done by One Pound of Soft Coal

A single pound of good bituminous coal contains about 14,000 B.t.u. of heat, and each unit is capable of conversion into 778 ft.-lb. of mechanical work. The measure of mechanical work known as a horsepower is equal to 33,000 ft.-lb. per minute, or 1,980,000 ft.-lb. per hour. The heat units in one pound of coal, if it were possible to completely convert them into mechanical work, would equal 5½ hp.-hr. At that rate, 1000 hp. could be generated for 10 hours on less than one ton of coal. In practice, the best modern steam engines use from 8 to 10 tons of coal to maintain 1000 hp. continuously for 10 hours, and the average small steam plant requires from 20 to 30 tons or more.

The foregoing is only a single instance of the many waste problems engineers are grappling with, and hope to solve, or at least reduce as far as possible. The successful use of pulverized coal for industrial purposes is a step in the right direction. Its demonstrated safety and economy augur well for an early solution of a large slice of the vexed heat waste problem. The advance is made on correct principles, and as soon as the production and application of powdered coal is better understood, it is safe to predict that its sphere of usefulness will be greatly extended.

Pulverized Coal as an Industrial Fuel

The price of fuel for manufacturing purposes is an important factor in the cost of production, especially in the case of large consumers, such as smelters, iron and steel manufacturers, railways, steamships, etc.

The high price of coal, legislation curtailing the spark nuisance, the economy and ease of handling oil for steaming, are the chief reasons advanced by the railways, the mercantile marine, and the owners and managers of apartment houses for changing from coal to oil fuel for steaming and heating purposes. It is not proposed to question the accuracy of those statements, nor can they be conceded correct in many particulars. The industries which have made the change were no doubt satisfied before doing so that the step was a wise one. In any case the use of pulverized coal has been demonstrated beyond doubt to give better results than any other fuel for many manufacturing purposes. It is more economical than oil fuel, producer gas, or coal burned in the ordinary manner for many purposes; its milling, distribution and burning can be done at a low cost, it is simple to use and does not call for laborious work or any particular skill in operation; furthermore, if properly applied a great economy in fuel can be effected.

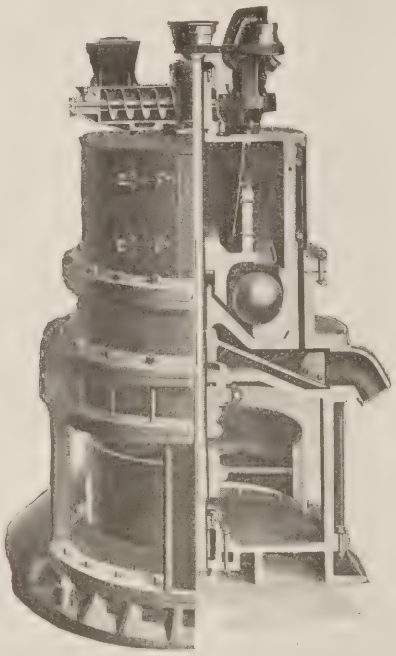
Engineers have known for many years the great waste of heat which takes place when coal is used direct for manufacturing purposes. Because of the wide application and long use of the steam engine, this is more noticeable in the production of steam than in many other uses. The work delivered by the ordinary steam plant of our time seldom exceeds 10 per cent. of the total energy of the coal consumed, and in many cases much less. The conversion of coal into "producer gas," and its application to industrial uses, was a great step forward. The heat returns from producer gas generated from a given amount of coal were several times greater than could be realized from burning the raw coal, and

*Paper read before the Vancouver Chamber of Mines.

where conditions are suitable for its application this gas is a highly economical fuel. In districts commanding a market for the residual products, producer gas is a source of cheap power, particularly if the capacity of the plant is large and adjacent to some large city or cities to which the surplus gas may be piped and sold. The great distances separating the centers of population of British Columbia do not lend themselves to the economical establishment of such plants beyond the cities of Vancouver and Victoria.

Ostensibly, because of the high price of coal, fuel oil has replaced it to a considerable extent for manufacturing purposes in this province. Fuel oil gave more heat volume for volume, reduced the labor in firing, and is supposed to prevent forest fires (long attributed to sparks from locomotives burning ordinary coal) along the routes of railways. Oil fuel has been extensively applied to industrial uses in the eastern United States, but the supply failed to keep pace with the expansion in consumption.

Improved methods of distillation reduced the quantity of residual fuel for manufacturing purposes, research work has shown that quite a number of the components of crude oil are far too valuable for such use, and the scarcity and uncertain supply caused engineers and manufacturers to cast about for a more permanent supply of cheap fuel. As on many previous occasions science solved the difficulty, surmounted it by the use of pulverized coal, and made a permanent and cheap supply of good fuel available to manufacturers for all time. Smoke in industrial cities has been a recognized nuisance for a long time, and has from time to time attracted considerable attention. Legislation to curtail it is in effect in several of the industrial centers of the United States, and is now being grappled with by the government of the city of Vancouver. Mr. Bird, chief smoke inspector of Chicago, where the smoke nuisance is much less than in Pittsburgh, estimates the loss due to wear and tear of clothing, house and building, cleaning, etc., as equivalent to $17,600,000 a year, or a per capita tax of $8 for that city. This estimate neglects entirely the injurious effect of smoke on the health of the people, and the direct loss of fuel energy.



HALF SECTIONAL VIEW OF A COAL PULVERIZER

Smoke is the direct product of incomplete combustion and has been the bugbear of all large fuel consumers. For years their best efforts have been directed to train firemen to prevent it. So long as firing is done by hand, and smoke elimination calls for better attention on the part of the stoker, with the human element a variable factor, it is doubtful if any radical improvement can be expected.

The mechanical stoker promised an improvement and was a step in the right direction. But even here considerable difficulty is experienced in gaging an accurate air supply for the fuel, securing proper furnace construction, in the varying qualities of fuels at different localities and works, as well as from many other causes too comprehensive to enumerate in a brief paper of this kind. Pulverized coal, properly prepared and burned, promises a satisfactory remedy for the smoke nuisance, and when its merits are better understood by the public and its use becomes more widely extended bids fair to make the cities of the future smokeless.

To John V. Culliney, superintendent of the American Iron and Steel Co., is due the credit of being the originator of the first really successful system of burning pulverized coal as a fuel for metallurgical purposes. By perseverance, he worked out and perfected a fuel-controlling device that turned failure into success, and from a small beginning over a decade ago, the use of this fuel has extended to large proportions at the present time.

This company alone is now operating 77 furnaces with this fuel, is doing the work of puddling, busheling, rod heating, upsetting, etc., and consumes in its operations over 150 tons of coal per day.

Preparation, Application and Burning

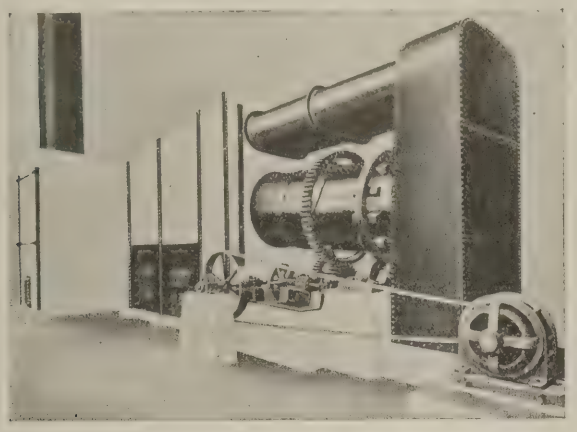
The value of any fuel depends on the amount of its heat that can be converted into useful work. No fuel is a cure-all. Results from different coals vary according to the composition and traits inherent in each, and consequently this applies to coal in the pulverized state as well as that burned in the ordinary form.

Speaking generally, if a good supply of bituminous coal is available at reasonable cost, and the fuel consumption will warrant the installation of a coal handling, milling, distributing and burning equipment, the use of pulverized coal will effect a large saving. To obtain the best results, powdered coal must be dry and fine; and by "dry" is meant that it must not contain more than 1 per cent. of moisture. This has a double advantage; dry coal requires less power to pulverize, and better results are obtained in burning it.

By "fine" is meant that 93 to 95 per cent. should pass through a 100 mesh sieve, or 80 to 85 per cent. through a 200 mesh. In this state the particles are so finely divided that in a properly constructed burning apparatus each one is surrounded by the amount of air necessary for perfect combustion and the entire fuel energy of the coal is liberated instantly. It is obvious the finer the coal the faster it will burn, since coal in a finely divided state exposes a much greater surface to the action of the flame and air than lump coal. The volatile gases of the pulverized coal ignite instantly upon the entry of the fuel into the combustion chamber; the fixed carbon in suspension is consumed by the heat of the volatiles, and to the casual observer the flame resembles that of oil or gas. By the addition of more air or fuel the flame can be varied at the will of the operator, the control simply consisting of opening or closing the valves that regulate the supplies. The fire is under ab-

solute control at all times, and the entire combustible content of the coal is converted into heat.

Without going into details of specifications or costs, a general description of a plant necessary for the preparation and burning of powdered coal is approximately as follows: From the source of supply the coal



COAL DRYING KILN WITH DRIVING MOTOR

is delivered to a crusher and reduced to a suitable size for delivery to a pulverizer. In passing from the crusher to the pulverizer it is subjected to magnetic separation, to insure the removal of any tramp iron or steel it may contain. After passing over the separator, it is raised to a storage bin from which it is fed to the dryer and thence to a dried coal bin. From here it is led to the pulverizer. The finished article is elevated to a suitable bin or receptacle, from which it is distributed by a conveyor to individual hoppers at each furnace and thence fed to the burners. The complete operation is nearly automatic and under absolute control all the time.

The controller or device which regulates the feed to the burners is to the powdered coal furnace what the carburetor is to a gasoline engine. It must be flexible in adjustment, and since it determines the amount of fuel supplied to each burner it is attached to the bottom of the coal hopper at each furnace. It consists of two screws, the upper one propelling the coal forward to a certain point, at which it falls in a steady stream before an opening through which issues a jet of low pressure air, and by which it is carried to the burner. If the quantity delivered by the upper screw is greater than the air supply can carry, the excess falls into a cavity beneath in which another screw of a greater pitch works in an opposite direction. The overflow is thus returned to the hopper.

The construction of the whole apparatus makes it impossible to jam. It is practically foolproof and permits any portion of the falling stream of coal up to the capacity of the screw being used at the will of the operator, simply by turning on more or less air.

The quantity of air passing the controller is about one-seventh the amount required for complete combustion. The balance is of much lower pressure and enters the furnace at the burners. The controller screws are operated by chain drive, or connected direct to variable speed motors as conditions may require.

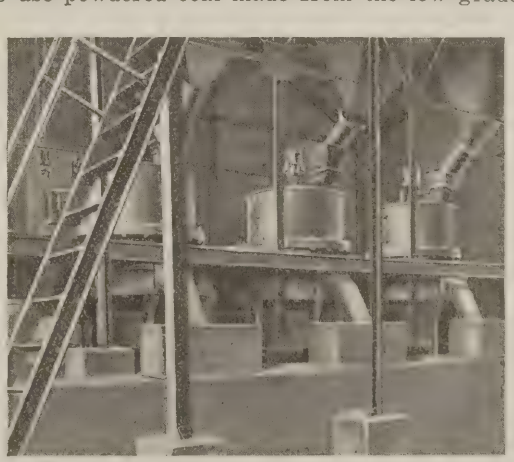
The current of controller air serves a double purpose. It not only forces the coal to the burner, but in picking it up gets intimately commingled with it, and both enter the furnace in a well-mixed cloud. This cloud is ignited immediately upon its entry into the combustion chamber, and meeting there the balance of air necessary for complete combustion bursts into a clean flame. The length of the flame can be changed by simply adjusting the burner to suit any desired purpose. The volatile content of the coal has also a material effect on the length and nature of the flame, but proper adjustment may be made therefor immediately. The use of this new fuel has been so simplified that operators soon become accustomed to it, and have no difficulty in regulating the furnaces to meet any necessary requirements.

For small furnaces, where a more or less uniform class of work is done, such as rod-heating, heating small forgings, in nut and spike furnaces, etc., the controller is so speeded as to give the maximum amount of fuel required for each heat, and is so arranged that the operator cannot exceed this amount. In large furnaces such as openhearth, continuous billet, reheating, etc., a variable change-speed device is employed, and is usually capable of a wide range of operations.

There are some cases where it is desirable or even necessary to maintain a constant degree of heat in the furnace, and variation would interfere with results. In others, such as puddling furnaces, etc., it is necessary to push the furnace at one period and slack off or hold the heat uniform at another. All these conditions can be satisfactorily accomplished in the control of a pulverized-coal fire.

The following extracts are from papers by H. R. Barnhurst, mechanical engineer, of the Fuller-Lehigh Pulverizing Co., read before the Engineers' Society of Pennsylvania, and the American Institute of Mining Engineers, at New York:

In 1912 the Missouri, Kansas & Texas Railroad Co. installed at the power house of its new shops at Parsons, Kan., eight 250-hp. O'Brien boilers of the Heine water-tube type, equipped to use natural gas or oil as fuel. Because of difficulties in getting supplies of gas or oil, it was decided to use powdered coal made from the low grade coals



VIEW IN A COAL-PULVERIZING PLANT

of the neighborhood instead. These coals ranged from 41 to 47 per cent. of fixed carbon, 26 to 32 per cent. volatile matter, and ash from 14 to 20 per cent. This equipment now in operation is giving better results than was obtained from gas or oil, and promises to be a pronounced success.

The cost of preparing pulverized coal depends to some extent on the quantity handled, the cost of dryer fuel, and the cost of power necessary for operating. The quantity of fuel required for drying depends on the amount of moisture

to be driven off; usually, 1 lb. of coal will evaporate 6 lb. of water in a well-constructed dryer.

The help necessary in using pulverized fuel is small. One man can operate a dryer of 6 or 8 tons hourly capacity, and one man can attend mills capable of grinding and delivering the same amount of coal to the furnace hoppers. The cost of repairs will not exceed 2c. per ton, and the power necessary for the complete operation is about 17 hp.-hr. per ton of product delivered.

Because with pulverized coal all the heating value of the fuel is available, considerable economies are manifest over other fuels. In continuous billet-heating furnaces a saving of 24 per cent. is made. In openhearth furnaces, 30 to 35 per cent. is saved as compared with the same furnaces fired with producer gas. In copper smelting a saving of 30 per cent. is effected, and for steaming, both locomotive and stationary boilers, a saving of from 20 to 30 per cent. is attained.

Regarding its effect on furnace brickwork and other linings, this is similar to what would arise from equal heat generated from coal or oil firing. Deterioration may be reduced to a minimum if short-flame firing and its corresponding low gas velocity is adopted. As with gas firing, the effect upon the brickwork is mostly confined to points where the path of the heated gases is diverted, as through vertical ports from horizontal passages.

This account would not be complete without speaking of the ash, most of which goes up the chimney or outlet for the products of combustion. In puddling and heating furnaces the small amount of ash left is carried off with the slag. It has given no trouble in the checker-work of openhearth furnaces. In steam-boiler firing the ash is best disposed of through a hopper bottom in the furnace.

There is no particular danger in the milling or use of pulverized coal if rational precautions are taken, and certainly the hazards of handling are not greater than those accompanying the use of oil or producer gas. Pulverized coal is subject to spontaneous combustion only in a degree similar to the coal from which it is manufactured. All well-constructed milling plants are made dust-tight, and open lights should be forbidden in such buildings. It may be safely stored in proper receptacles for five or six days without trouble; in practice, this has been done on several occasions. Storing for any appreciable time is not recommended, it is advisable to mill in about 10 hours all that is required for 24 hours. Much has yet to be learned about the best methods of milling, storage, handling and burning this new fuel, and like all other new things it remains for practical use to discover where improvements can be made.

Objections to Storage of Pulverized Coal

The use and manipulation of pulverized coal are now much better understood than in 1912 when Mr. Barnhurst contributed the foregoing paper.

The objections put forward against the storage of pulverized coal over long periods are that coal in a finely divided state, even when inclosed in air-tight receptacles, loses much of its occluded gases, and a considerable part of its value as a fuel. Further, difficulty may be experienced from caking due to excessive weight in the bins, and the material may not run freely.

Our remarks so far have been confined to the dry method of pulverizing and burning coal. However, the preparation and burning of coal in the powdered form is not confined to the dry method alone.

There is another machine on the market for doing this kind of work known as the "Aero pulverizer," so called because of the fact that an exhaust fan causes an induced current of air to circulate through the pulverizing machine. The coal is fed to the machine, powdered and delivered to the furnace without artificial drying.

I am informed this machine was first designed to meet the needs of a long flaming cheap fuel for cement making and that it has been applied later to various other industries and is reported to have proved highly successful. In construction it differs from the dry pulverizer, inasmuch as neither outside drying, milling nor storage is necessary, and the finished product is delivered direct to the furnace as made. The machine is compact and reduces to a minimum the floor space for installation. Its low price and large capacity are strong features to recommend it for many purposes in which the more massive equipment required for the dry method would not be suitable.

The makers report that this machine has been better tried out than any other form of pulverizer and that results are entirely satisfactory wherever it has been installed. It is offered in stock sizes with capacities varying from 600 lb. to 5000 lb. of pulverized coal per hour. All wearing parts can be duplicated from stock at any time. It is so compact that it may be installed on a locomotive tender, or adjacent to each furnace on steamships, and the fuel fed to the furnace as it is pulverized.

Pulverizers in Many Different Sizes

The smallest size occupies a space 5 ft. long, 2 ft. 6 in. wide and 2 ft. 6 in. high, and has a capacity of 600 lb. of pulverized coal per hour. The large size occupies a space 10 ft. long, 4 ft. wide by 5 ft. high, and has a capacity of 5000 lb. per hour. There are a number of intermediate sizes and capacities between the two quoted.

This machine may be set up either at the front of a furnace, on either side or above, and attended with little labor by the ordinary fireman. Neither dryers, elevators nor storage bins are necessary; the mechanism is dust-tight and self-contained, has few parts to get out of repair, and the principal wearing parts are easily accessible and may be quickly replaced from stock duplicates by any ordinary mechanic.

For manufacturing purposes in the eastern United States the use of pulverized coal has made remarkable strides in the last few years. Firms using it report that it is more efficient and economical than any other fuel they know of, and all are agreed that when it is better known by manufacturers and workmen it will have a wide industrial application.

This method of coal consumption opens a market for the immense lignite deposits of the prairie provinces, which have hitherto been considered of little commercial value, and bids fair to provide a cheap supply of good fuel for those prairie cities now depending on costly Pennsylvania coal. Apparently there is nothing to prevent it from being used for heating apartment and office buildings, at an equal or less cost than oil. It has the added advantage of removing to a great extent the present smoke nuisance. For this purpose the dry methods appear to be most adaptable. Coal could be pulverized at some suitable point in the city and distributed in a manner similar to that employed with the fuel oil now used. The capacity of the smallest plants of this type yet on the market are in excess of the needs of most apartment buildings in Vancouver, and hence a centralized pulverizing plant would be needed. The furnace changes necessary would be small and cost little, and the expense principally confined to the pur-

chase and installation of a small compressor plant to furnish an air supply.

The coal-mine operators of this coast should take up this matter seriously. They are likely to find it an efficient instrument to combat competition from foreign fuel oil, and might be well advised to install it for steaming at their works and for locomotive use on their branch railways. Large coal consumers are naturally shy of experimenting with a fuel they know little about. As a matter of business the mine owners should make the necessary tests at their works and show their customers the benefits to be derived from the application and use of pulverized fuel.

The majority of the coals of British Columbia are of a high volatile character and suitable for making a high-grade powdered fuel. Much has been heard in the last year or two of the great value that is likely to accrue to Canada from the work of a bureau of research, instituted by the Canadian Pacific Ry. at Montreal. If this bureau is as interested as its members would have us believe in the conservation of the resources of the country the fuel question on this road in British Columbia affords them ample chance to prove the worth of the bureau. Surely this is of equal importance and as worthy of attention as the solution of the waste straw problem of the prairies now engaging attention.

Further, take the anomalous case of the Grand Trunk Pacific Ry., a road built with the money of the people of Canada, traversing several coal fields on its route through British Columbia—proved steam coals of high quality—yet for some inexplicable reason using California fuel oil for motive fuel.

Three out of four of the public railways traversing British Columbia use oil as fuel. Even the Esquimalt & Nanaimo Ry., whose route passes through the principal coal fields of Vancouver Island, burns foreign oil for motive power. It is natural to ask if an abundant supply of coal is available and is as cheap as oil, why this preference for a foreign product?

To do justice to this subject the explanation would be so extended as to prolong this paper beyond reasonable limits. In short, it is in part due to the fact that the principal coal mines on the coast are controlled by a rival road, and it is too much to expect any party to encourage its competitor, except under exceptional circumstances. Furthermore, the new railways traverse sparsely populated districts for long distances, and although good coal is found at many points little market for it exists. As a consequence coal mining is not being done. If the new railways wished to use coal for steaming purposes they would be compelled to mine their own fuel. There are also several contributory causes, such as an inability of the new roads to finance coal-mining operations at this time; the fact that it is easier and more convenient to buy oil than mine coal to replace it, and many other considerations.

However, the day is at hand when the industries of this country must rely upon coal fuel. The oil supply becomes more uncertain each year. Modern methods of fractionation have shown that crude oil is too valuable to be used for ordinary fuel purposes. Even if available (unless the price is much lower than at present) it will be unable to compete commercially with coal, more particularly if this is used in the pulverized form.

Byproduct Coking

By M. Meredith
Liverpool, England

Since 1900, when coke ovens of the retort type were little in use in Great Britain, a revolution has taken place in the system of coking and large numbers of retort ovens with apparatus for the recovery of byproducts are now in existence. This number furthermore is being constantly added to. The war having stimulated the demand for hydrocarbon explosives, these are now commandeered by the government and the coking apparatus necessary for recovery of the explosives is under the control of the ministry of munitions.

Although the principle of the external heating of the retort oven as originally introduced by Evence Coppée remains the same, considerable modification in detail has been gradually introduced by various builders as the result of experience. The object of these modifications has been chiefly to increase the rapidity of the coking process by the application of more intense heat, and by the heating of the air for combustion. Convenience and economy in operation have also received much attention.

The recovery of byproducts has been greatly developed, and many experiments have been made with more or less success for achieving the "direct" recovery of sulphate of ammonia. One of the most important developments has been the utilization of the surplus gases in internal combustion engines and also in town illumination, metallurgical furnaces and for other manufacturing processes.

Legal Department

When Negligence of Employer Is Presumed—If a mining company's employee was injured through the coming off of a car wheel, negligence of the company in failing to discover and repair the defective condition causing the accident may be inferred from the fact that the wheel was considerably worn and was loose for some time before the accident. (Alabama Supreme Court, Ross vs. Sloss-Sheffield Co., 77 Southern Reporter, 686.)

Evidence in Mine Gas Explosion Case—In a suit to recover damages against a coal-mining company on account of death of a miner who was fatally burned in an explosion of gas in the company's mine, it was error for the trial judge to permit a witness, although experienced in mining operations, to give an opinion to the effect that he was satisfied from his examination that the deceased man knew how to use a safety lamp, to rebut plaintiff's claim that the company was negligent in entrusting a safety lamp to decedent. It was for the jury to determine from all the evidence in the case whether the circumstances justified so entrusting decedent with the lamp. Under the Alabama statute which requires that satisfactory evidence must be furnished a mine foreman of a miner's ability to use such a lamp, the foreman is not sole arbiter of the fact. The statute means such evidence as would reasonably satisfy an ordinarily prudent and careful foreman that the miner understood the proper use of such a lamp. But, in any suit wherein there is a dispute as to whether an injured man's own negligence contributed to the accident on account of which he sues, declarations made by himself just after the occurrence of the accident are admissible insofar as they constitute admissions of self-carelessness. (Alabama Supreme Court, Alverson vs. Little Cahaba Coal Co., 77 Southern Reporter, 547.)

Rules for Electric Wiring in Mines

THE West Virginia Engineering Co., of Charleston, W. Va., is promulgating the rules for electric wiring given below. Although it is difficult to lay down specific instructions in all instances, the rules here given cover the vast majority of cases and may well serve at least as a groundwork upon which, if necessary, more elaborate and detailed rules may be built up.

1. All power circuit mine wiring must be done with approved mine type insulators and pins, 20 ft. to 25 ft. apart where the roof is low, and where the roof is sufficiently high to permit it, 30 ft. to 35 ft. apart.

2. One wire only may be placed on an insulator, securely tied with at least five turns of No. 4 copper tie wire on each side of the insulator.

3. Where conditions are such as not to permit the hanging of wire on the roof, cross timbers not smaller than 3 x 4 in. must be used, placing them so as to bring all insulators as near as possible to one height.

4. The cold or negative wire must be put up and maintained with the same care as the positive, and in no instance thrown down along the entry or placed underneath the road or track. All wires when erected must be put up with care and pulled up snug and taut, so as to remove all kinks and slack. They must not be allowed to touch slate, coal or timber, but must be erected and maintained at a safe distance therefrom and not less than 10 in. apart. The practice of wedging insulators between wires or between wire and coal, etc., should not be followed.

5. Butt entries must be wired with the same care as face and main entries and provided with two S. P. switches of not less than 200 amp. capacity. No breakers or fuses will be permitted at these points.

6. Where face entry wires leave main line, switches should also be used.

7. Where entries advance beyond the limit of the machine cable, No. 4 copper wire should be used for a distance of about 600 ft. or the length of a longer roll of wire. This wire is to be replaced with wire of larger size as soon as the entry has advanced sufficiently to allow the use of a complete coil without cutting.

8. Under no conditions are live coils to remain hanging at the head of entries or at the ends of any wires, and a No. 4 wire must not be employed for a greater distance than 800 ft., but must be replaced promptly with wire of larger size.

9. No rooms or working places are to be wired.

10. Entries must not be wired beyond the last breakthrough.

11. Power circuits should not be permitted in return air courses.

12. The amount of wire in mines must be minimized as much as possible, and where circuits are no longer necessary the wire should be disconnected at once and removed as soon as possible.

13. The practice of allowing wiring to remain in old breakthroughs, crosscuts, etc., should not be permitted, and old tie wire, broken bonds, scrap wire, old cables and coils of wire must be gathered up and kept in an orderly manner under lock and key where it may not be accessible to everyone. All scrap wire, etc., must be disposed of promptly and not allowed to accumulate in quantity.

14. The terminal ends of all large wires must be securely anchored and thoroughly insulated with a turnbuckle and strain insulator. Dead ending on wood crosspieces or posts without the use of an insulator should not be permitted.

15. Whenever there is danger of a wire being touched, as for example where it crosses an entry, the roof should be trenched at least 10 in. deep and the wire securely placed on insulators. The trench should then be covered by 1-in. boards fastened to wooden pegs driven into the roof. The wires must not touch the board but must be thoroughly insulated and well separated from it.

16. The use of jumpers should not be permitted.

17. All wire joints 2/0 or larger must be made with brass sleeves thoroughly and neatly soldered. For smaller sizes use Dossart "A" or regular Western Union joints with no less than six turns on each and thoroughly soldered.

18. Where wires go through wooden or brick brattice work or other partitions, they must be thoroughly protected with porcelain tubes. The tubes, if in wood partitions, must be held in place with tape; if in brickwork, they must be cemented so that they cannot be moved.

19. Where partitions, brattices, etc., are built after wires have been erected, split tubes must be used to avoid the cutting of wires.

20. In wiring entries where a metallic circuit is used, care must be taken that the positive or hot wire is always placed next to the rib, the negative or cold wire being placed 10 in. on the outside of the hot wire.

21. The hanging of wires on nails, whether wire is insulated or not, should not be permitted, and wood cap pieces, etc., must not under any circumstances be used to keep wire away from the ribs.

Trolley Wire and Bonding

1. Trolley wire may be suspended inside the mine on hangers, lag screwed to cross timbers, or where the roof will permit, from expansion bolts fastened to the roof.

2. All new trolley will be of the standard grooved or figure 8 pattern; care must be taken that no kinks, sharp turns or dents from come-alongs are made in it.

3. The center of each hanger should be plumbed 7 in. outside the outer edge of the rail. Hangers should be placed about 20 ft. apart on straight entries in low coal and 35 ft. apart in high coal. Considerable latitude will have to be allowed, as no specific rule can be made for distance apart of hangers, but the above is a fair average when wire is erected and maintained properly. On curves the distance should be 8 ft. to 10 ft. between hangers.

4. Barn hangers are provided with four holes, while two holes diametrically opposite are sufficient. Use ½ x 2½-in. gimlet point lag screws, drilling holes for same with ⅜-in. twist drill. Do not use track spikes or nails for fastening hanger bodies to timbers.

5. Frogs should be placed 2½ ft. in advance of point of latch and held in horizontal position by properly placing hangers on line near frogs.

6. Frogs must be placed at each point where branches leave main trolley and when properly placed will not necessitate the holding of pole when passing over frog at ordinary speeds.

7. Automatic trolley switch and signal lights must be placed at all partings where mules will pass under the trolley. Automatic switches are not expected to sustain severe stresses and should be relieved of such by proper disposition of strain ears and hangers.

8. The ends of trolley wire must be securely anchored and thoroughly insulated with turnbuckle and strain insulator. A three-bolt galvanized clamp should be used for fastening the end of the wire when it is bent on itself through the strain insulator.

9. Care must be taken that the trolley wire clears the roof, so that the trolley wheel will not touch the roof at any time.

10. Where feeders are necessary they must be erected the same as main lines and tapped in at proper intervals by means of feeder ears. Hooking a jumper around an ordinary hanger should not be allowed.

11. At the end of the motor road where machine lines ground to rail or at the point where the rail circuit returns to the plant, it is well to use several bonded wires leading to return and to bond each individual wire into the rail in more than one hole, also to provide a cross bond at this point.

12. Bond both sides of track, using pin expanded or compressed terminal bonds.

13. Be careful to drill holes exact size, using nothing other than a twist drill.

14. Bonds must be placed on inside of rails and extended beyond the fishplates to such lengths as will allow removal of the fishplates without disturbing the bond.

15. Cross bond every fifth rail, making bond of sufficient length that it may be bent down below the top of the ties so as not to be interfered with.

16. Where rails are shipped with bond holes already drilled, ream out these holes $\frac{1}{32}$ in. and use a bond the proper size of terminal.

17. All switches must be cross bonded just back of the frog, all four rails being connected.

18. When drilling bond holes do not use oil as this acts as an insulator to a certain extent and does not allow the best contact.

19. The following length of bonds should be used for different weights of rails:

Weight of Rail, Lb.	Length of Splice Bar, In.	Length of Bond, In.
30 to 35	16½	22
40 to 45	20	26
50-55-60	24	30

Cross bonds should be 6 in. longer than the track gage.

Mine Lighting

1. Where it is necessary to wire partings, slopes, curves, pump houses, etc., use receptacle and No. 12 triple braid, weatherproof wire and No. 4 porcelain knobs.

2. No rosettes, snap switches or ordinary sockets should be used in the interior of the mine.

3. No switches or fuses will be required. Where a large number of lights are used fuses and switches can be used to advantage.

4. The practice of hooking ends of light wires over power circuits should be discontinued and connections made in such a manner that vibration of the line will not form arcs, burning the large wire. Screw connections must be used.

5. Where it is necessary to turn lights on and off frequently in interior of mine, knife switches should be used.

Substitutes for Coal

BY FRANK HALL
Harrisburg, Penn.

THE incalculable value of coal as the source of power in the industrial world, and the source of comfort in domestic life, gives rise periodically to the query, How long will the coal supply last? and the natural corollary, Can any substitute be found when the coal supply is exhausted? The answer to both questions is indeterminate and unsatisfactory. The vast unmined deposits of coal, however, give assurance of a plentiful supply of fuel for at least 100 years to come, even with a constantly growing demand.

In the United States, including Alaska, the deposits are placed at 4,231,352,000,000 tons, or half of the total of the world. A great part of the deposits, however, lie below a practical mining depth. In Pennsylvania, the unmined anthracite deposits are by one authority estimated at 10,638,902,809 tons, half of which may be available, or 5,319,415,404 tons. Another computation shows that 6,512,167,703 tons are available. Estimating the annual production at 70,000,000 tons, the duration of this industry in one case would be about 73 and in the other about 93 years.

In the bituminous region, according to the latest estimate of the Federal Government, there still remain about 109,000,000,000 tons unmined, or an amount sufficient to continue the present rate of production for 500 years. This estimate, however, is deemed extravagant by the best informed mining men. The 26 counties of Pennsylvania now being exploited comprise practically all of the coal-bearing measures of the region, and from some of them the greater part of the coal has already been extracted. It is probably nearer the mark to say that another hundred years at the present rate of production will no doubt bring to the point of exhaustion the rapidly diminishing deposits of the bituminous region of the state.

If the estimates given above can be accepted as reliable, the tremendous quantity of reserve coal at the disposal of future generations should effectually dispel for many years to come any apprehension as to the possibility of distress resulting from a lack of fuel. It must be borne in mind, however, that the most trustworthy estimates are after all merely estimates, and the actual deposits when exploited may prove disappointing in volume.

The extended and rapid increase in consumption must also be considered. Almost incredible has been the growth of the coal industry in recent years. One authority declares that if the acceleration continues, the coal supply in the United States will probably not last 100 years. It may be accepted, however, as highly improbable that the increase will continue indefinitely at the same ratio in the future as in the past.

After considering the subject from various angles and comparing the many estimates of the coal deposits still unmined and the probable consumption in the future, it would seem that at least for the next 200 years the coal supply in the United States will be ample for the needs of the population.

These conditions make imperative the ultimate finding of a substitute for coal, but what it will be, its nature or character, no one can predict. There are no natural substitutes for coal to be found in Pennsylvania, but in some of the Northeastern states, as well as those near the Great Lakes and also along the South Atlantic coast, there are large deposits of partially decomposed vegetable matter commonly designated as peat, which has a fuel value per pound equal to about one-half of the value of the higher grade coals and nearly equal to the lower grade coals or lignites.

This material can, with proper treatment, be made to serve as fuel, but the process of preparation is rather complicated and expensive. The product when ready for the market is really a manufactured article. Peat has been used for centuries in Europe as a domestic fuel, but it has only been within the past decade that it has reached any importance as a fuel for power plants in competition with coal and lignite.

The manufactured substitutes for coal in this country, so far, are briquets or boulets made from the refuse of anthracite or mixtures of anthracite and bituminous, bituminous slack or sub-bituminous or lignite. Some of these manufactured products are gradually winning favor with the public and may in time, when more perfectly made, prove commercially successful and be a

real factor in conserving the coal deposits. With the increasing demand for fuel, especially of the better class for domestic use, in connection with the increasing cost of labor both in the mines and in transportation, the growth of the briquet industry will no doubt be rapid and substantial.

We have not as yet reached the time, however, when the briqueting of all fuels will prove profitable. It is almost out of the question to briquet good coking coals for either industrial or domestic purposes, for the reason that the briqueting of these coals does not change their nature. If ordinary binder is used, it may increase their smoke-producing qualities during combustion, so that fuels of this nature can be better treated by carbonization or coking, especially if the byproducts are saved.

The best field for this industry is in the briqueting of fuels possessing poor or no coking qualities—the slack and fine coal at the mines and shipping centers, which is practically useless or of little value for any other purpose. Of this large quantities are produced in many parts of the country and are either left at the mines or sold at a price considerably below the cost of production. This class of fuel can be converted, if smokeless in its natural state, into an entirely smokeless and odorless product by the use of proper binders. Even fuels containing a considerable percentage of volatile matter, which are more or less objectionable for domestic use in their natural state, can be converted into briquets that will be superior to the prepared and screened sizes of the natural product, from the dust or breakage of which they are made. The latest product now on the market to bid for favor as a coal substitute is what is called carbocoal, a fuel produced from bituminous coal by a method of distillation at relatively low temperatures in which there is simultaneously obtained a sufficient quantity of valuable byproducts to largely offset the cost of converting the raw coal into a refined, smokeless product which will substitute satisfactorily for anthracite. Carbocoal is claimed to be a near approach to a perfect fuel. It is said to be smokeless, ignites with comparative ease, burns freely and completely under all draft conditions and is dense, dustless, clean and uniform in size and quality. It remains to be seen what place this highly eulogized fuel will take in comparison with bituminous and anthracite.

Substitutes for coal in the way of briquets and boulets, no matter how satisfactory they may be as a domestic or power fuel, are in the last analysis merely substitutions of coal in one form for coal in another, the basis of all the manufactured fuels of this type thus far placed on the market being coal. Hence they serve the purpose only of conserving in a small degree the raw grades of fuel. If the coal supply should become exhausted, the many forms of substitutes now clamoring for public approval would also cease to exist.

What is wanted, and what the scientific thought of the world must devise, is a genuine substitute for coal, one that can be manufactured independent of coal as a chief ingredient. Unless this is done, the world will some day face a real and permanent heat famine, the horrors of which can scarcely be imagined.

DRAFTED!

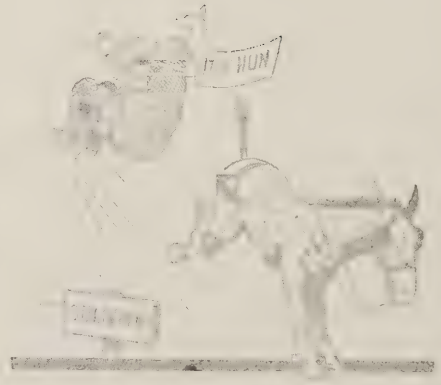
By Rufus T. Strohm

Goodbye, old mule!
It's mighty tough to see you go,
But Uncle Sam—who ought to know—
Has found he needs you over there
To help the nation do its share.
You'll probably be hauling guns
To blow the brain-pans off the Huns.
Well, show them that you're not a fool—
Goodbye, old mule!



Goodbye, Old Mule

Goodbye, old top!
I used to rave and swear at you
Until the very air was blue,
And every second word I spoke
Was wreathed in clouds of sulphur smoke.
I reckon, after you are gone,
And I've no one to practice on,
My cussing days will have to stop.
Goodbye, old top!



Knock a Hundred Boches Out

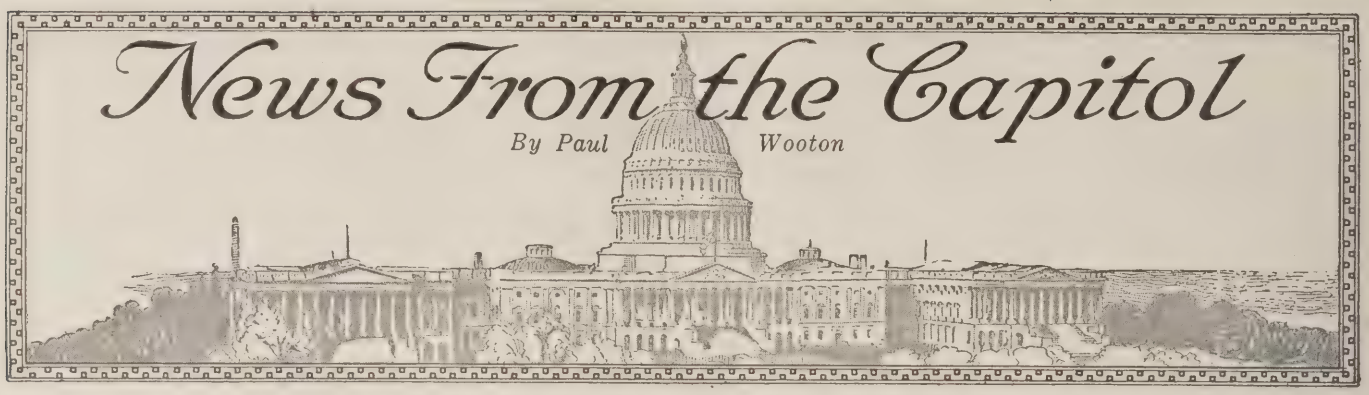
Goodbye, old pal!
You needn't have a pang of fear
That Fritz will finish your career.
No missiles made of steel or lead
Can ever dent your thick old head.
If it could yield to any blow,
Why, I'd have cracked it long ago.
You'll always have a strong morale.
Goodbye, old pal!

Goodbye, old scout!
I've put the quartermaster hep
That you've a fierce, unlovely rep
For impish tricks of every style
That make a mine mule's life worth while.
So, if they mix you in the fray,
Put both those frisky heels in play
And knock a hundred boches out.
Goodbye, old scout!

Every Pound of Slate Keeps a Pound of Coal Out of the Market



The Railroad Administration can only supply us with a few cars. Let us do our best to keep slate from taking up the space that should be occupied by coal. Otherwise, this winter Uncle Sam will have only a small poke of coal for each person, and all will go cold.



Weekly Production Statistics

Production of bituminous coal during the week ended May 18 bids fair to pass the 12,000,000-ton mark. Telegraphic advices to the Fuel Administration indicate that that week will surpass the production performance of any week during the twelve months preceding.

Production increased during the week ended May 11, when 11,806,000 tons were mined. This is a slightly better showing than was made during the record week ended April 27. Beehive coke production during the week ended May 11 was 655,000 tons, which shows a slight increase over production during the week preceding. Byproduct coke production was 536,544 tons. Production was cut somewhat by a labor shortage at the Bethlehem steel plant at Northampton and at the Cambria steel plant at Johnstown.

Anthracite forwardings showed a decrease of more than 5 per cent. over the week preceding. During the week ended May 11 they were 38,314 cars.

During the week ended May 4, the coal mines of the United States were operated at 75.6 per cent. of their full-time capacity. The loss was distributed as follows: Car shortage, 13.1 per cent.; labor shortage and strike, 5.4 per cent.; mine disability, 2.9 per cent.; no market, 0.9 per cent.; other causes, 2.1 per cent.

The figures given above are those compiled by C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

Fuel Administration Takes Over Statistical Bureaus Dropped by McAdoo

To continue the collection of absolutely essential figures, the Fuel Administration, at an expense of $3000 per month, has been forced to continue the Ohio Bureau of Coal Statistics and the statistical end of the Illinois-Indiana Coal Traffic Bureau and the St. Louis Coal Traffic Bureau. The Railroad Administration recently cut off the appropriation for the maintenance of statistical bureaus. It is probable that the Fuel Administration will have to reëstablish other of these bureaus. The action of the Railroad Administration is being criticized by some from the fact that no actual saving will be made as the Government will have to pay for the collection of these figures. It will have the effect, of course, of making a better financial showing for the railroads.

The bureau which has been charged with the collection of statistics regarding coal moving to tidewater has been taken over by the Tidewater Coal Exchange.

New Prices for Arkansas Anthracite

Prices for Arkansas anthracite at the Bernice mines at Russellville and at the Spadra mines at Spadra have been announced by the Fuel Administration as follows:

Bernice Mines—Grate, $7.75; egg, $8; stove, $8.75; No. 4 nut, $8.75; pea, $6.75; buckwheat, $2.85; slack, $2.50.

Spadra Mines—Grate, $7.25; egg, $7.25; No. 4 nut, $7.75; pea, $5.25; slack, $2.50.

The prices are subject to a reduction of 75c. during May; 60c. in June; 45c. in July; 30c. in August and 15c. in September.

May Investigate Shortage of Coal Cars

An investigation of the shortage of coal cars probably will be made by the Senate Committee on Interstate Commerce. The Fuel Administration has been asked to furnish the committee with such data as it may have which have a bearing on car shortage. It is not the intention of the Senate committee to open up an extended investigation. It hopes to get at the high points of the situation and take prompt action in an effort to better conditions.

War Industries Get Good Coke Supply

War industries are better supplied with coke at present than at any time since last October. This assertion was made by Dr. Garfield in a letter to coke operators thanking them for their coöperation in increasing the movement of coke to furnaces and foundries. An extract from the letter is as follows:

It is not enough merely to maintain the present movement of coke. We must work still harder to take care of the constantly increasing demands and to establish conditions which will enable us to avoid in the future any slowing down of war industries.

We all recognize that the most serious difficulty has been lack of transportation facilities. There has been possibly more disposition on the part of some to find fault with the railroads and with railroad men than to coöperate with them in their efforts to remedy conditions. Permanent improvement may be brought about by coöperation, not by fault finding.

There have been many serious wastes of transportation facilities which, if eliminated, would make it possible to increase materially the movement of coke. Much has been done along these lines, but there is still great room for improvement. Unnecessarily long hauls should be eliminated. Coke operators should endeavor to dispose of their coke in the district to which such coke can be most readily moved. Cross hauls should be avoided where possible.

To Circumvent "Commercial Bribery"

In order to reach what the Federal Trade Commission calls "commercial bribery," Representative Sims, chairman of the Interstate and Foreign Commerce Committee of the House of Representatives, has introduced a bill which provides for a fine of not more than $2000 and imprisonment for not more than two years for any "person, firm or corporation engaged in interstate or foreign commerce or in any competition with other persons thus engaged to, personally, through an agent, attorney, servant or employee, or by the use of the mails or otherwise, give, offer, promise or loan to any such employee or the employee of a customer or prospective customer, any money or other thing of value for himself."

Getting Ready for "Coal Week"

Every effort is being made by the Fuel Administration to make the week beginning June 3 one of notable accomplishments in the way of securing orders for coal. In view of the important advantage to producers and dealers, if they have accurate knowledge of requirements, Fuel Administration officials feel that this is an important step in relieving next winter's situation. It is expected that state and municipal authorities will coöperate actively in the drive which will continue throughout the week. Women's clubs will coöperate and will be in charge of a house-to-house canvass. Four-minute men will appear in theaters and picture shows. The drive has as its object not only the securing of orders from the domestic consumers, but from all industries as well.

Brief Washington Notes

Virginia operators have protested to the Interstate Commerce Commission against the granting of the request of the Chesapeake & Ohio R.R. to increase coal rates.

Malcolm G. Chance, of Providence, R. I., has been appointed Fuel Administrator for Rhode Island. He succeeds George H. Holmes, who was forced to resign by the pressure of personal business.

Awaiting such time as the Director General of Railroads may find it possible to go personally into the matter, the railroad fuel situation, during the last week, remained entirely without change.

Provision probably will be made in the near future to insure larger movement of coal to North and South Carolina. The operation of the zone system in providing large quantities of fuel to tidewater ports has absorbed a considerable portion of the supply which would normally have moved into the Carolinas.

Government coal en route to an army post can not be diverted by state fuel administrators, according to an opinion of the Judge Advocate General of the Army. Such officials, he says, have no jurisdiction with respect to such property and railroads should disregard such orders.

Dr. Garfield's efforts to persuade A. H. Wiggin to continue as state fuel inspector for New York have been unsuccessful, and Mr. Wiggin's resignation has been accepted. He will retain his place, however, as chairman of the Fuel Administration's advisory board for the State of New York.

The Fiend's Soliloquy

By George M. Lantz
New Straightsville, Ohio

□

I AM THE PRINCE OF DEVILS, one of the Great Powers of the World.

Kings, judges, statesmen, warriors are at my command. Yea, there be ministers, teachers, doctors and even editors who dare not oppose me.

But among these I work only for pastime; my real mission is to enslave the producers of the world's necessities—to pervert the men who till the fields, who build bridges, who tunnel below the surface of the earth.

Where strong men, pioneers, are needed, there I go; I beckon for the saloon, the gambling den, the brothel, and retard the establishment of the church, the school and the home.

I sow poverty, insanity and disease and reap broken bodies, vacant minds and deformed babies.

I poison the brains of my victims, steal their strength, blunt their perceptions and then send them reeling into the mine or the factory. There is a slight miscalculation, a fall of roof, a misstep, and they are mine.

Men gather about the mangled remains and speak in awed whispers about unavoidable accidents and acts of God.

The Prince of Darkness Laughs!

An Act of God Indeed!

I promise men that which is not within my gift—wealth, power, courage, beauty. I introduce men to crime and immorality, and when they have been disillusioned I promise forgetfulness.

I lead men to the Chasm of Destruction, and when they have drained the dregs of misery and pain, with my foot I push the miserable fools across the brink.

I destroy all that is noble in men. All that they might become, all their possible achievements, I hang as trophies at my belt. Their savings, their homes, their families, their souls are offered up as sacrifices before me.

I direct those who prey upon their daughters; I steal the milk from their doorsteps; I strangle Hope in the breasts of wives and mothers, and in its stead I implant Anguish and Despair; children shudder at my approach. In my moments of calm I tremble at my own iniquity. Some day I will be banished from the earth; the beasts that I have created will become men again. In that day the most exalted throne in Hell will be my seat, for my followers will outnumber all others.

□

I Am Alcohol

EDITORIALS

Suppress or Reform Alien Papers?

THERE are lots of papers published in this country in the languages used almost exclusively by our enemies. Many of them are admirable exponents of real American principles. But, whether they are good or bad or merely indifferent, we do ill to suppress a single one of them. But this we may do with profit—we may modify their policy to accord with the national purpose.

If their editors prove recalcitrant we can put others in their places who are more to our liking. The man who reads a paper in an enemy language should not be permitted to absorb from it enemy-alien Kultur, certainly not during the war. We should not interfere with the freedom of our loyal press, but the right to be fed with a foreign Kultur in a foreign language during a war which is trying our national existence may appropriately be denied.

But we may go further even than just suggested. We can require those editors we retain to publish articles and editorials written by the Government laying down the national viewpoint, not particularly excoriating the enemy, but placing the facts before the readers of these papers. We can urge in those journals the need that all foreigners learn the language of this country to take the place of the enemy tongue.

And it does not follow that the papers will not be read. We fume cloudily about the enemy aliens, but for the most part they know that they ought to be with us, and really would be with us, if they could only gently root out their preference and predilections for their fatherland.

It is no small matter this regeneration, but careful propaganda in the alien tongue would eventually do the work and do it better than even our national journals could perform it if the enemy alien could read them, for during the heat of a war our native press naturally does not spare the feelings of those with whom we are contending. Of course, some would refuse to read the enemy-alien press after it had been thus renovated, but they would certainly not read our papers if we suppressed theirs, and when we suppress the enemy-alien newspapers we prevent the kindly and the unfriendly enemy alien alike from reading about the war, and we lose the opportunity of inculcating in the friendly enemy alien the spirit of Americanism.

Open an English School for Foreigners

IT HAS been the custom to inveigh against the foreigner because he uses the language of his native land and because he foregathers only with those of his own race and language. But he is not wholly to blame. How can he learn English with the few facilities that are offered him in most towns and villages? There is no one to teach him English. How can he associate with others when he has not had a chance to learn the language that they speak?

A large movement is being initiated to induce the foreigner to learn to speak and read English. It will utterly fail unless the opportunities for instruction are offered. There is, and of this we may be proud, no rooted objection to the English language, such as exists against the German language in Poland. The people who come here are no more prejudiced against English than the Welsh people were prejudiced against it; and we know that Welsh has almost entirely died out, though no one wished it so unkind a fate. The immigrant wants to learn our tongue. He feels like a deaf-and-dumb man until he does, for he is disadvantaged in all his operations till he can talk to those with whom he has to work. It is only a small percentage who use their "No forestay" for purposes of guile.

The foreigners, both men and women, are willing to go to school and learn English. The language of this country, fortunately, has not been made hateful to them by unfair treatment and jealous discrimination. There are countries where years of suspicion and traditional hatreds have made all attempts to introduce a new language hateful.

In such cases an organized opposition exists to the introduction of the language of the state. We may gratefully declare that it is not so here, and if we will give the foreigner half a chance he will do his best to rattle off English with the rest of us, at his work, on the street and in his home.

That there is no objection to the use of the English language is shown by the readiness with which the sons of immigrants accept it. Only on the farms will you find an immigrant's son who can speak his father's language with facility. When the boys mingle morning, noon and night with young folk no other language than English can they roll glibly off their tongues.

A school for foreigners is a wonderful investment for the operator. The men working for him will always be able to understand the manager and the foreman. There will be less dissatisfaction and lost motion. Americanized men can be put in good houses with the assurance that the homes will not be spoiled. When notices are posted the Americanized foreigners will be able to read them. They will do it for practice in the language if for no other purpose.

With training in English, accidents will be less numerous; the labor turnover will be reduced; strikes will be less frequent. What is more, there will be less need for strikes. The worst of all these troubles, the longest and most destructive, are those caused by mine workers who cannot be argued with and so cannot see any point of view but that of the agitator of their own race who happens to have their ear. At any mine the best foreigner of all those who come from a country where English is not spoken is apt to be the one who can speak English best. Few patriotic duties are clearer than this: To put plans in operation at once to establish schools for teaching English in every mine village.

Alaska Is Still Hermetically Sealed

NO ONE expected that the spoon-feeding methods of the United States Government would ever develop a large and thriving coal industry in Alaska. Men will go to the remotest portions of the earth to make a fortune, as the history of gold mining well shows. But granted that it takes more capital, attention and risk to make a small profit in Alaska than, for example, in Illinois, we shall unquestionably find the operator going to Illinois and not to Alaska. He will seek a field where conditions are not so rigorous, where so many strings are not tied to his activities and where there are not so many indeterminate factors to meet.

The Government has built a railroad from Anchorage, a tide-water port, to the Matanuska fields. It has opened the coal fields to the public in a carefully regulated degree. Coal has been arriving at Anchorage, but the price is discouraging. Instead of that price being $5 or $6 per ton, it has stood around $11 at the point of loading, before any shipping and unloading charges have been added. There are large deposits of coal in the Matanuska field, but private capital is not content to risk itself under the leasing provisions laid down by the Federal Government. For this reason the great field is being developed but sparingly, and Alaska is still importing British Columbia coal, though that province of the great Dominion has dire need for all it produces. There is every indication that it will soon cease exporting coal to the north. Thus there will soon be a great need for coal in Alaska, despite the fact that the territory's coal resources are greater than those of the State of Pennsylvania.

Coal at $11 per ton at Anchorage cannot be delivered at Seward, Valdez or Cordova, the towns nearest the coal fields, at a price within $2 or $3 per ton of the present price of imported coal. Therefore, unless some vital changes are made in the law under which these fields are being developed, and unless there are some inducements offered to capital to develop these fields upon a commercial basis, with a reasonable maximum price fixed for the product, the expenditure of $35,000,000 for the Government railroad is practically wasted, so far as providing fuel to the territory and the Pacific Coast is concerned. Yet the coal is badly needed there at this time.

If the Government desires to cheapen fuel in the territory and produce tonnage for its railroad, it should take down the bars and make it possible for private enterprise to develop the fields. Cheaper fuel is needed for the comfort and convenience of the people of Alaska, for furnishing the steam used in the mining of frozen ground, for the general development of Alaska and for industrial purposes all along the Pacific coast.

The urgency of these many needs make changes in the leasing law imperative. The present laws are not liberal enough; they do not permit a man to purchase the coal land, nor provide area enough to interest a rich man in opening a mine. The rental is too high for the poor man in view of the risk of the venture. There is greater risk in Alaska than in probably any other coal field. All things considered, the restrictions are such that the requisite capital cannot be secured to make the heavy expenditures found necessary in the development of these far northern coal-mine properties.

Who Are Free in the Land of the Free?

FOR GOOD and sufficient reasons, the mine worker in most fields is fined if he will not, on demand, sell his labor to the operator at the specified rate. In many states he is even jailed if he will not sell his labor to anyone. But these are war times, and such provisions are excellent.

For good and sufficient reasons, the operator in most fields is fined if he will not buy the mine workers' labor at the specified rate. It is well understood that if, for insufficient reason, he refuses to operate his mine, it is quite apt to be taken from him. These are war times, and no one can complain.

Who, then, is free in the land of the free? Why, the Railroad Administration. It has been refusing to buy the product of the operator and miner unless it can get its own terms. Despite the fact that the Government has named a fair price, the Railroad Administration regards itself as empowered to buy or to refrain from buying as it pleases. In the winter, when it needs coal, it can compel a sale; in the summer, when it is not in immediate need of coal, it can delay purchasing it for the winter. That is a wonderfully advantageous position to occupy, and the Railroad Administration is making the most of it.

Beside the Railroad Administration there are the free manufacturers of nonessentials and the free purchasers of the same. They buy and sell nonessential products at their pleasure, but they are coming gradually within the net; they are much less free than they were. As far as coal is concerned, the manufacturers of nonessentials are, beyond cavil, the most ardent of purchasers. They cannot commandeer coal and they tremble for fear that later on they may not be allowed to buy it at all. So they come readily into the market, are anxious to store coal, and would even buy railroad cars in which to haul it if the possession of cars would insure them a coal supply.

The Railroad Administration alone is indifferent. When, by the Administration's refusal to buy, a mine worker is laid idle, shall we fine it a dollar a day, payable to the Red Cross? Some such course would seem quite logical and advantageous, even though the public would have to meet the burden; for the Railroad Administration does not like unnecessary expenses because they cause it to make a bad showing. As it is not generous to the Red Cross, like some of our "soulless" corporations, a fine levied on it for the benefit of the Red Cross would rectify that matter and, furthermore, would put it on the same level in the conduct of its operations as the mine worker and operator, who are required to pay the Red Cross a dollar as often as they, in a moment of spleen, refuse to shoulder their reciprocal burdens and so fail to perform their whole duty in this national emergency.

We do not like to speak so plainly about the Railroad Administration's derelictions. We are sure its purposes are as excellent as that of any other organization. But we would like it for a while to look at the field of its activities from another hill and see its responsibilities with the light at a different angle. The interest of the railroads is not inimical to that of the public, and the public's interest is clearly not to be found in any delay in the buying of the coal for the coming winter.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The anthracite mine workers seem to be losing the high sense of obligation that has impelled them hitherto to work unremittingly and to "shell out" generously in the Liberty Bond campaign. The specter of the winter's shortage of anthracite ceases to haunt them as it should. Let them never for one moment forget that the long lines of waiting women and shivering children will form again if they relax their efforts.

A strike of 700 men and boys at the Maxwell No. 20 colliery of the Lehigh and Wilkes-Barre Coal Co. at Ashley, Penn., caused a complete shut-down of the works. The union called a meeting on May 16 and there was a tumultuous session, the officials of the union vigorously condemning the strike. The men eventually voted to return to work May 17 and to let their grievance be settled by the regular grievance committee.

The quarrel between the men and the company relates to an interpretation of the contract regarding yardage. If they are right in their contention that a larger allowance is due them, they can get the difference for the past as well as for the future from the commission appointed to adjudicate such grievances.

A button strike occurred at No. 5 colliery of the Delaware and Hudson Co., at Larksville, just outside Wilkes-Barre, Penn., on May 17. The trouble was caused by several men objecting to the payment of 50c. instead of 25c. a month to the union. It shows how strong the support of the union is in Luzerne County that the action of these men resulted in a strike. In some parts of the southern anthracite field whole unions are opposed to the change in dues, whereas in this colliery in the northern field a large majority is ready to resent by a strike any attempt to avoid payment of the higher poll tax. The strike laid idle 1200 employees and entailed a loss to the market of at least 900 cars. It is unnecessary to again condemn these button strikes as violative of contracts and as a restraining hand laid on the war activities of the nation.

In the rest of the country the news largely relates to Red Cross activity. The mine worker is being slowly educated to saving, while giving is an atmosphere in which he has long lived. The Red Cross consequently has a marvelous appeal to him, as a special article on this subject appearing in this issue will fully attest.

At the time this review is written the strike in the Huntingdon and Broad Top region is still continuing. It must be conceded that though the coal of that region is a high grade low volatile fuel the field is not an important factor in the coal industry. Consequently the fire of discontent will probably be allowed to burn itself out. The union is not backing the mine workers, for they are violating their contract. The Fuel Administration, it need not be said, is not favorable to the strike method of settling grievances.

No one is worrying about the situation. The cars which should go to the Huntingdon and Broad Top region will afford a pleasing addition to the scant supply of cars elsewhere. Profits are not high in the Broad Top field, and as a result operators will be content to have their mines remain idle. On the whole the only unsatisfied people will be the idle miners. Left alone and unnoticed in their quiet hill country they will begin to realize that after all the lack of their tonnage will not bring the country to their feet.

If the nation never heard of the miners of that region any more, the war would be just as effectively waged against Germany, and some men now idle would be making a better wage than they are today, and out of their plenitude doubtless they would be managing to save many dollars for Liberty Bonds and the Red Cross.

Cost-Plus Factories Filch Miners

Now that the dissatisfaction about the wage scale is removed the mine workers of Alabama are expected to work more regularly. The increase became effective May 15. The situation is nevertheless far from encouraging. An increase of wage may well make for contentment, a contentment such as makes some men, at least for a time, work harder, but also of a kind that makes some men content to work only a few hours where they worked a full day before.

James Bowron, president of the Gulf States Co., in an open letter, explains why Alabama producers cannot provide more iron and steel, but much of what he says about the iron industry of Alabama would not be any less apt if applied to the coal industry of the same state and region, and much of his statement applies specifically to the mining conditions at coal-producing plants.

"We are not in a position today to take any action toward an increased output. We could furnish the money for it, the good will and the executive ability, but there our power ends.

"We need an adequate supply of raw material and a conservation of our men. Raw material of every description is scarce in this district and what is produced is of an inferior quality. Many miners, both in ore and coal mines, are openly indifferent to the production of clean ore and coal. The volume of slate and dirt which goes through the coke ovens and the blast furnaces of the district makes necessary the use of additional limestone to flux the mix and additional coke to fuse it. In this manner the impurities in the coal and ore decrease the production of pig iron and increase the output of slag.

"On account of their high wages, many of the miners do not care for continuous work and many others, of course, have accepted the call of their country and have gone into military service. Men are scarce and in some cases the efficiency of those remaining is reduced.

"In addition to this, the pirating of labor seriously interferes with industry. There is hardly an industrial operation in this district that is not daily attacked by labor agents who try to take the men away to other places. The contractors, particularly the DuPont people, are building nitrate or powder plants for the Government on the cost-plus system and are offering any wages that may be necessary to induce the men to leave their present employments, and I submit that this system should be sternly controlled by the Government, as every man taken from one job to another at the expense of the Government is adding to costs at both ends and on the whole decreasing the efficiency of the nation's work."

Colorado Plan for West Virginia

To secure the fullest coöperation between operators and miners, and to remove all possible causes of friction, coal operators of central and northern West Virginia attended a meeting held at Fairmont, May 15, at the offices of the Federal Fuel Administrator for West Virginia. They, then and there, agreed to adopt what is known as the Colorado Industrial Plan of 1916 and this the miners will doubtless readily indorse. Each individual mining plant, under the plan, is to permit its employees to form an organization which will appoint a committee to meet with representatives of the company whenever any grievance is in controversy. Should such committees fail to reach an agreement the matter in controversy would then be referred to a central umpire.

About 69 different operations were represented at the meeting, the large attendance being due to the importance,

to the region in the northern part of the state, hitherto unorganized, of the new policy, the initiative in its adoption being taken by the Consolidation Coal Co. It is said that fully 95 per cent. of the tonnage of the Fairmont region was represented at the meeting.

Among the companies represented were the Consolidation Coal Co., the Hutchinson Coal Co., the Federal Coal and Coke Co., the Elkins Coal and Coke Co., the Clark, the Hite, the Jones and the Tom Arnette interests. The operators along the Coal & Coke Ry. and the Grafton & Belington division of the Baltimore & Ohio R. R. were also represented.

While many of the operators were not markedly enthusiastic regarding the plan which the Consolidation Coal Co. is to put into effect, yet nevertheless all the companies agreed to coöperate, the plan being finally approved by the Central West Virginia Operators' Association which recommended that individual operators adopt it.

Following the action taken by the operators, the employees of the mines in the Fairmont district are holding meetings and electing committees as provided under the plan of agreement.

Enthusiastic Liberty Bond Sellers

From Logan County, West Virginia, the information comes that the 175 employees of the Gay Coal Co. purchased on Saturday, May 11, between four and six o'clock, $12,000 worth of bonds, about $68 per employee. One man, Shade Nelson, the stable boss at the mine, who made good money and was in comfortable circumstances refused, it is said, to buy a bond. Every other man and many women and children had their names on the honor roll. When on Monday Nelson was found to have persisted in his refusal to buy a bond, a committee of mine employees waited on H. S. Gay, Jr., the general manager, and insisted that a bond-buying boss handle the stable or they would not go to work.

And now a report from Illinois. Miners employed at the Kortkamp mine, near Hillsboro, refused one day last week to be lowered into the mine or hoisted out of it by an engineer who was not loyal enough to buy a Liberty Bond. They took the position that a man who would not purchase a bond when working steadily at a good salary, was not only dangerous to the community but a source of danger to the men who placed their lives in his hands every time they entered or left the mine. They were frank to say that such a man might be disloyal enough to wreck the workings. The situation became so tense that the engineer called for his pay and left, and a bond-buying engineer was put in his place.

On May 11, Chairman Harry W. Coffin, of the Liberty Loan Committee, announced to the Alabama Coal Miners Association that the coal miners of Alabama had purchased more than $500,000 worth of Liberty Bonds of the third issue, showing that Alabama is not lacking in good citizenship.

One Day's Work for the Red Cross

The mine workers and operators of the Island Block Coal Co., of Island, Ky., a concern in the western part of that state, have already contributed a day's output to the American Red Cross. The miners put in a full day without pay, and the company donated 500 tons to the Red Cross funds. Not a single man failed to be in his place and the production for the day testified to the intense patriotism of the men.

Ostel Bullock, of Cleaton, Ky., furnishes the following story regarding some mines in Muhlenburg County, western Kentucky, which shows that the hearts of the miners are as tender as their hands are hard:

"Some time after the United States entered the war a difference arose between the mine workers and the operators as to the wage to be paid. In many cases strikes were the outcome and the production of coal was in consequence greatly restricted. The public censured the miners roundly, and some even said that the industry was a 'slacker.' This cut the miners to the bone, for they were more than willing to give their whole-hearted assistance to their country.

"They determined to show their patriotism and resolved at one of their union meetings to work one day without pay if the company would give to the Red Cross the equivalent of the selling price of the coal that the mine loaded on that occasion. There are four mines near Cleaton, Ky., and the output of the 'Red Cross day' was about 3325 tons. Sold at the Government price, this coal will net about $8000.

"One man who had not worked in the mines for several years decided to come back for one day to participate in this good cause. He loaded out 22 tons of coal, the record tonnage for the day. At least one mine, the Lam operation at Bevier, broke all its previous records. Every dog on the endless rope was working and only one dog during the entire day passed up the incline without its load of coal.

"The mine lost 35 min. by a derailment, and toward evening the loose coal in the mine was all loaded out so



MURPHY AT THE BAT FOR UNCLE SAM

that the plant had to be shut down 40 min. before the proper quitting time. Any one who failed to work on 'Red Cross day' by reason of sickness was to give his next day's work, and all were warned that if any man quit just before the day he would be required to contribute the largest day's pay still accruing to him.

"Every man, however, came out to work and stayed in the mine till he had loaded a full turn of coal. The Rogers Coal Co.'s mine, which is the 'Lam mine' aforesaid, donated 1280 tons; the Crescent Coal Co., 650 tons; the Bevier Coal Co., 225 tons, and the Holt Coal Co., 480 tons. All this shows that District No. 23, comprising western Kentucky, has some patriotic mine workers in its membership.

Perhaps here is a good place to rectify a statement regarding the western Kentucky miners of District No. 23, appearing on page 550 of the issue of Mar. 23, 1918. It ran as follows:

"The mine workers also recommended that the Government intervene to secure that powder be sold them by the operator at a lower cost. At the present prices no one but operators will sell miners powder, but that is not enough, they want the operator to accept an even larger loss in handling powder than that which they now sustain."

H. H. Vincent, secretary-treasurer of the district, declares this a misrepresentation, the prices ranging from $2.25 to $3 per keg and the average price being $2.50. He says that the wholesale price of powder does not exceed $2.15. On inquiry we learn from one union operator that the actual cost of powder as received by him is $2.12½ per keg. He assumes the cost of unloading it, the fire risk, the cost of hauling it into the mines and the cost of distributing it to the working places and charges the miners $2.50 per keg. He does not figure that any profit is made on the transaction. There is no agreement as to the price, but the operator informs us that the price seems to be general throughout the district and adds that the men are satisfied with both the price and with the way the powder is distributed.

A nonunion operation puts the price to the company at $2.15 to $2.25 and the selling price at $2.50. "The selling price of $1.75 per keg remained in effect for more than six months after the wholesale price of powder had increased to more than that figure. It was changed to $2 per keg July 15, 1917, at which time powder was again advanced to $2.50 without protest on the part of the miners."

Margins used to be about 75c. per keg, powder selling at $1.75 per keg that could be purchased delivered at 95c. to $1. The margin then was three times as large as it is today. In many mines competition had made it difficult or impossible to operate without loss, and the profit on powder, 75c. to 80c. a keg, helped the company to secure a safer balance sheet.

The mine workers it would seem should be willing to pay the 25c. to 37½c. per keg that is asked for the handling of this merchandise. It is only a small charge. On few sales of merchandise is so little as 10 per cent. charged for selling and distributing. Even the larger figure that we have noted—17½ per cent.—is not unreasonably large. Where $3 a keg is charged the companies demanding it might well be restrained by the Fuel Administration from such a course.

But this does not extenuate the misstatement made, and District No. 20 and its polite secretary-treasurer, H. H. Vincent, are entitled to a retraction. Surely one should not withhold apology from men who are so generous to the Red Cross.

Union Threatens Coal-Price Cutters

The United Mine Workers of America in Illinois and elsewhere have long suffered because they have had to work for "hardly-able" coal companies. It must be conceded that they got their pay invariably and on time, but the mines were not run as they would have been had the operators been successful business men instead of "pikers."

Everywhere things were skimped and allowed to run down. Further, the operators, in many cases opposed or were indifferent to the passage of laws regarding safety, because they knew that if the laws were passed the coal in neighboring states with less restrictive legislation would drive their coal out of the market.

Moreover, on every occasion in which the mine was idle the day men were laid idle also. The miners are fully convinced that they do not want to work any more for poor corporations, and the attempt of the railroads to buy coal at cost or less than cost finds the mine worker almost as much up in arms as his employer.

Frank Farrington, president of the Illinois United Mine Workers, has sent a warning to the presidents of the three operators' associations in the state that any cut in coal prices by the operators will be looked upon with suspicion by the miners, adding that price cutters may expect trouble from the organization. He points out that the prices made by the Fuel Administration have been carefully considered and adjusted and that a cut in prices would mean either that the operator must suffer a corresponding loss in profits or meet the reduction in price by lowering wages or by making the working conditions of the miners less favorable.

He says that the prices fixed by the administration are necessary if the operators are to be enabled to meet the legitimate cost of production and at the same time reap a reasonable profit. "In order," he says, "that the mine owners may keep their mines in the safe condition required by the state mining law, pay the wage scale provided in our joint agreement, furnish the miners with the working conditions they now enjoy, pay the indemnities provided by our compulsory compensation law in the event of injury or death occurring during the course of employment, and meet other legitimate items that enter into the cost of production, and, finally, reap a reasonable return on their investment, they must receive the prices designated by the Fuel Administration.

"At the present time thousands of miners in this state are working only one or two days per week, because many large consumers of coal, particularly some of the railroads, are withholding their purchases with the obvious intent of creating a competitive condition that will enable them to get their coal at a price lower than that designated by the Fuel Administration. This tends to create a panicky feeling among the mine owners causing a reduction of selling prices."

Frank Farrington adds that if consumers will begin now to lay in next winter's coal supply, instead of holding off with the hope of getting it at a lower price than that designated by the Fuel Administration, their action will furnish work to thousands of men in the state during the summer months who are now lying idle and who are extremely anxious to do their bit. It will also enable many men who have been liberal purchasers of war bonds and stamps and contributors to war funds to continue to perform their duty in this respect. They cannot do so if they are compelled to lie idle the greater part of the summer. He concludes as follows:

"As president of the 90,000 men employed in and around the coal mines of Illinois, I hereby warn you that any operator in this state who is guilty of any act that places the wages and the interest of the men who mine the coal in jeopardy will be regarded as being an enemy, and we shall be constrained to take such action as may be within our power to protect ourselves against his act of enmity."

Who Is "Within the Peace of the People"?

Slow progress is being made in the selection of a jury to try seven coal miners and four other men on the charge of murdering Robert P. Prager, the mine worker who was lynched at Collinsville, Ill., Apr. 5.

Better progress is now being made with the trial, for Sheriff Jenkins and his deputies and bailiffs have been disqualified. State Attorney Streuber made an affidavit that the sheriff, who was formerly a coal miner, and his men were prejudiced in favor of the defendants and had summoned as talesmen only those believed to be favorable to the interests of the defendants. Special deputies appointed by the court are bringing in better jury material.

The questioning of veniremen has disclosed that the defense is to be based on the unwritten law of patriotism. Attorneys for the defendants say they will prove that Prager was a German spy and will contend that Prager was not killed "within the peace of the people," as the statute reads, and being engaged in a disloyal enterprise took the same chances of being killed that the burglar takes. The attorneys contend that the defendants had the same right to kill Prager that a householder has to kill a burglar. State's Attorney Streuber says the state will show by Supreme Court decisions that the protection of the law extends, without any question whatever, to alien enemies, criminals and all others.

The defendants wear the national colors on the lapels of their coats. Many miners are attending the trial, including local and district officers. They have promised to show that Prager was a spy, but so far have not revealed the evidence on which they base their declaration.

The Dauphin County court awarded damages to the amount of $350 to three miners of the Susquehanna Coal Co., of Philadelphia, Penn., who sued the corporation for sums deducted from the pay for hard coal mined which the company declared to be below standard.

DISCUSSION BY READERS

After the War, What?

Letter No. 1—To a much interested though unbiased traveler in the anthracite and bituminous coal fields, a large number of the medium-sized and mostly all of the smaller operations appear to be adopting a restricted policy, which cannot but prove unwise, in respect to the future development of the coal industry, in that no provision is being made for the increased demand for coal that will unquestionably occur when the war has ceased. This prediction is particularly true, I believe, in respect to the bituminous mines.

Let me be perfectly frank and say that a great many of the mine operators, including some of the larger ones, have adopted the policy of saying that they do not know what the future holds for them, and, therefore, they will let well enough alone and make no plans whatever for the development of the properties they are now operating and much less for those in prospect.

Pessimism Among Some Coal Operators

Many coal operators take the viewpoint that the present government-regulated price of coal is only temporary. They predict that when the war is over the bottom will drop entirely out of business and the country will suffer a period of inactivity for a considerable length of time. They believe that this will greatly reduce the demand for coal and that the tonnage produced will exceed the consumption.

This line of argument, I am happy to say, is quite opposed to the thoughts of some of the leaders of American business enterprise, particularly the leading manufacturers of steel and its allied products. For instance, John Wanamaker (though I am quoting a leader in the merchandising business), addressing a meeting of the representatives of a certain trade organization, stated, "When the war is won there will unquestionably be a slight lull in business, until a certain readjustment is made," adding, however, "Such a readjustment will be necessary; but the cessation of big business will be very, very slight. Indeed, for at least four years following the cessation of hostilities the volume of business in this country will be greater than ever before, and the United States will enjoy an era of unprecedented prosperity."

Optimism of Large Manufacturers

Referring now to the largest steel manufacturers in the country, permit me to review briefly what they are doing. The steel corporation interests in West Virginia and Kentucky are making wonderful enlargements in the scope of their operations. The Youngstown Sheet and Tube Co. and the Inland Steel Co. are each opening up a large operation in western Pennsylvania. I might mention, besides, a number of other large new operations such as the Mather Coal Co., the Pursglove-Maher Coal Co., the Bertha Coal Co., etc.

One cannot fail to observe that the far-seeing business people and leaders of industry are preparing, at the present time, for the years of activity that are bound to follow the allied victory. To such will come the reward by reason of their ability to then produce what the world will demand, and that, in their judgment, will exceed the need of the present time.

If these larger corporations can, with entire safety, appropriate large sums of money for the development of new and old operations alike, it certainly follows that the managers of smaller propositions can proceed with entire safety to lay their plans for a large volume of business in the future.

In my opinion, the coal-mining industry should look forward to a large volume of business, for years to come, and should feel a positive assurance that the prices for coal will remain as high as they are at present, with a possibility of going even higher at a later date.

The subject is one worthy of the most careful consideration by coal operators of every class, and I express the hope that there will be a further discussion along this line, which I firmly believe will prove the truth of my conviction. If such is the case, operators must increase the efficiency of their haulage systems, by providing up-to-date motive power and other mine equipment that will be needed in the new development work required to meet an unprecedented demand for coal.

P. H. KENNEDY.

New York City.

Employment of Mine Labor

Letter No. 1—At a recent meeting of the American Institute of Mining Engineers, as reported in *Coal Age*, Mar. 23, p. 554, the members discussed the question of the utility of an "employment manager," charged with the duty of hiring all the men employed by a large industrial organization. The discussion presented some interesting phases applicable to the management of a large mine, and it would be interesting to know what the readers of *Coal Age* think of the suggestion.

Such an employment manager must be a person of ripe experience and judgment, who would be able to size up a man, so to speak, and determine his capability to perform work of a given character. He should know the organization and its requirements from A to Z, in order to determine an applicant's fitness for any position from janitor or office boy up the scale.

The scheme possesses the advantage that an employment manager would have the time and facilities to investigate the merit and worth of each applicant. Foremen know what kind of men they need, but their duties in the mine will not permit them to devote any time to look up a man's previous record. As a consequence, when a foreman hires a man he is obliged to test his capability by the manner in which he performs his work in the mine. At times this may result in serious loss.

A special feature to be considered in connection with the hiring of men, by the employment manager of a large coal-mining company, is the fact that such a company will generally have more than one mine in operation. A man found not adapted to the work or not satisfactory to the boss in one mine can then be sent to another mine, where he may have less difficulty in making himself useful.

While centralized hiring of men may be impracticable in certain large manufacturing plants, it occurs to me that the scheme can be successfully applied to large coal-mining corporations. In my opinion the superintendent of a large coal company, by reason of his long experience and responsibility, would be well fitted to select and hire the men required in the various branches of the work. It should not impair the foreman's authority in the mine when his men are hired by the superintendent, and it would relieve the foreman of that responsibility and permit him to devote his whole time and energy to the supervision of the work underground.

Foreman's Right To Discharge His Men

There will, no doubt, be those who will differ with me in regard to a foreman's right to discharge a man whose work is not satisfactory to him; but I believe such a man should be sent back to the superintendent for whatever disposition that official chooses to make of him. Unless the man is wholly irredeemable, he can generally be used to advantage in another position.

A motorman who may be incapable of performing his work properly under the conditions in one mine may prove a valuable worker in another mine where the conditions are more favorable. Likewise, a miner who fails to load clean coal in one mine or under one boss may be found wholly tractable when working in another mine where the boss is more affable.

When a man's work is unsatisfactory to the foreman, there are frequently two sides to the difference existing between them. The man may say that he cannot get along with the boss, while the boss will claim that the man will not do the work as he wants it done. If it is a question of the man persisting in having his own way and refusing to obey the instructions of the boss, it would indeed be a poor policy to allow such a man to go to work under another boss employed by the same company. Such a proceeding would destroy the authority of the first boss, whose men would soon learn to override him and do as they pleased.

Under the conditions just named, it would be natural for a boss to conclude that it was of little use for him to strive to make his mine a paying proposition if men who persist in having their own way can appeal to the superintendent and be sent to another mine or put to work on another job. However, I believe that such matters can often be handled with diplomacy and the difference adjusted by the superintendent, without the necessity of the company losing the man. It may be even within the range of possibility that the man could be reconciled to perform the work in the manner in which he was asked.

In closing, let me say that, notwithstanding these difficulties, I still believe that the hiring and discharging of men by the superintendent would place the labor problem on a more successful and scientific basis than it is under the present system. A foreman of sufficient experience and hardened to his work is usually fair-minded enough to want to see everybody get along. He is glad to see somebody else dispose of his unsatisfactory labor and is just as well pleased that someone else will hire the man.

W. H. Noone.

Thomas, W. Va.

Echoes from the Mine and Camp

Letter No. 2—The letter on this subject, *Coal Age*, Apr. 20, p. 756, signed "M.P.H.," interested me greatly. The writer explained many points that only a man working around the mine and living in mining camps knows. Speaking of the many respects in which the miner is capable of improvement, let me say that a volume could be written on that subject, but there are two points that are of special importance, and these relate to his improvement morally and socially.

In considering the means that can be adopted or the methods that can be successfully employed in the moral and social advancement of the miner, I would class these under the following heads: Education, Economy, Industry and Independence or Self-Reliance.

We will assume that the miner is a person capable of being educated. It is freely admitted that, as a general rule, the coal miner is not well informed on matters pertaining to his own uplift. Owing to the want of an early school education, the average miner today possesses little knowledge of the most simple elements and requirements for his own success in life. Nevertheless, I claim that he has far more intelligence than many are willing to give him credit as possessing, although there is much room for his improvement, both morally and socially.

Education the Greatest Factor

The greatest factor in one's moral and social advancement is education. By close study a man learns many facts that give him a broader outlook on life and a deeper insight into his surroundings. But this is not all of education. By close observation of others, a man learns much that will assist him to elevate his own standard of living.

The miner, like every other individual, must have a desire to educate himself by adopting these means. The desire for education is the sure foundation for its success. Where there is no desire on the part of the individual, efforts for his betterment can only end in failure. The first endeavor, therefore, must be to create the desire for education.

It is true, as stated in the letter to which I have referred, that there is too great a tendency to classify men according to their occupations. The result has been that the miner who toils underground is too generally regarded as little better than a serf, by many people who do not know that, among all the toiling millions in the United States, the coal miner is the most generous and liberal-hearted of men. The rank and file of miners are, today, proving their loyalty by the purchase of Liberty Bonds and subscription to the Red Cross and Y.M.C.A. movements.

The news of strikes and disturbances in coal mining camps and districts comes, to those unacquainted with

the conditions under which this class of toilers exist, as echoes of what they wrongly assume is the true character of the miner. In many instances it must be admitted that his false ideas of economy are responsible for these results.

Let me illustrate my meaning here, by saying that a miner obtains employment to mine coal at a fixed rate, per ton or per car, on condition that he will securely support the roof in his working place and throw out the bony coal and other impurities and load only good coal in his car. Like the rest of us, however, the miner is anxious to make big pay; and, to economize his time, he hurriedly sets but a few props in his place, and fails to give close attention to separating the impurities from the coal when loading his car. Contrary to his agreement to abide by the rules of the mine, many a time the miner will rob his pillar to obtain cheap coal.

Such acts and misdemeanors lead to trouble, and a strike is proclaimed. The real cause of the disturbance and seat of the trouble is the lack of education on the part of the miner and his false ideas of economy, which it is our duty to overcome and eradicate as far as this is possible. The miner must be taught that his interests and the interests of his employer are common.

Speaking of industry, the average coal miner is a hard worker. Practically the only exception to this rule is to be found in that class who are enslaved by the drink habit, and spend their time in the saloons, for days and weeks following pay at the mine. This is another echo from the mining camp, which gives a wrong impression of a true miner's character.

To save the miner, in this respect, the saloon must go. No success in moral or social advancement can be attained as long as it remains. Every effort must be put forth to accomplish this end, if we would better the miner's condition and educate him to be the industrious, independent and self-reliant worker that is needed.

Kingston, Penn. FRED B. HICKS.

Mass Education Needed

Letter No. 4—I recall reading a letter published some time ago on the need of educating the great mass of the miners employed in the mines. The letter set me to thinking on my own experiences in life during the past four decades.

When a very young man, full of energy, I commenced at the grass roots, in assisting to sink some very difficult and very deep shafts. When the shafts were down I continued to assist in opening and developing the mine. The work gave me some idea of coal mining, as there were clay veins and other difficulties encountered. In one instance, a dyke cut out the coal completely, necessitating the driving of a stone drift to again reach the seam. Various kinds of pumps were used to drain the mine, including one of the old Cornish type. Over a decade was spent in those mines, but in all that time I learned little and had no technical knowledge regarding my work. Let me say that what technical knowledge I now possess was gained from a school of mines where I studied later the principles of mining.

After coming to this country, I studied and obtained a first-class mine foreman's certificate, under the Act of 1893. This success gave me a renewed ambition, and I said to myself, "Here goes for lots of theory." But, pressure of circumstances robbed me of my opportunity to improve myself in a theoretical way. At times I was reasonably well located, and, at other times, I was forced into a very uncongenial situation.

Thus passed twenty years or more of hard study and labor. At one place I attempted to redeem a large abandoned machine mine. It took three or four years for me to discover that it was a useless undertaking. At another time, fortune favored, and I took hold of a new plant. Though I worked as hard as King Solomon's men in building the temple, I failed for the lack of a sufficient knowledge of theory.

My advice, in closing, is that young men should study to acquaint themselves with the principles of coal mining, while they are gaining experience in the practical work of the mine. Perseverance and hard study are sure to bring success in the end.

Perryopolis, Penn. R. W. LIGHTBURN.

Men in Blind Alleys

Letter No. 4—The writers of the several letters following the Foreword on this subject, which appeared in *Coal Age*, Nov. 10, 1917, have without exception brought to light the most abominable practice existing in the industrial world today.

A superior in office or an employer who intentionally keeps his men in the same rut, without permitting them to advance original ideas or make suggestions of possible improvements in methods and equipment, is so narrow that he has no right to be clothed with authority to superintend a department or direct work.

The man who lives in fear that the men under him may possess an ability that will enable them to rise to his position; and who on that account, limits their activities, ignores their suggestions, or treats with contempt their efforts to improve his plans and methods, is an enemy to progress. No broad-minded superintendent or employer can afford to suppress the display of ability in men under his charge. They should be urged, on the contrary, to acquaint themselves with every phase of the work, both theoretical and practical.

I cannot agree with "Lumen" when he says "A young man is seldom willing to listen to the advice of an honest well-wisher, who has traveled the road before him and whose words should be an inspiration." My belief is that young men are quite generally willing to listen to the advice of older men whose experience is valuable.

YOUNG MEN ARE ANXIOUS TO LEARN

The young man, as I have observed him, thirsts after knowledge and asks to have explained what he does not understand. The young learn fast and one finds it difficult to fully satisfy their desire for knowledge. It is possible that the reference I have quoted alludes to a few specimens that one occasionally meets, who know it all and need to be told nothing. It is true that these, like the poor, we have always with us.

Organizations controlled by men who limit the activities of their workmen, by keeping them in ignorance of knowledge that will enable them to coöperate more successfully, quickly gravitates into an organization of slow, patient, plodding workers who show little vitality or "pep," as we say.

Compare such an organization, for a moment, with one that fosters the desire for knowledge on the part of every employee. Here, we find men being trained for doing better work and reaching a higher position. Every worker is fired with an ambition to know all about his own work and something of the other fellow's. The superintendent or employer invites suggestions from his men and, in some cases, offers bonuses for ideas that are accepted. It is not strange that an organization of this kind increases its business and its assets, year by year.

If progress in business is desired, every worker must learn the theory and practice of his work. Each man must be encouraged to advance, step by step, toward the next higher position, which will give him the ambition to perform well his present duties. The natural products of such a system are the development of executives who have a thorough working knowledge of the entire system, which alone insures the success of the undertaking.

Fair-minded men must see the merits of educating their workmen. The superintendent who is big enough, fair enough, and has the ability to perform will be promoted to a still higher position when the man under him rises to his place. Progress demands leaders who are clear-headed, thorough-going men. The march of progress automatically weeds out the weaker and more fearful men, whose places are quickly filled by stronger and broader-minded workers. FRED L. SERVISS.

Golden, Colo.

Explosion in Compresor Cylinders

Letter No. 1—Regarding the reference to the possibility of an explosion occurring in the compressor cylinder, made in a correspondent's letter, *Coal Age*, May 11, p. 893, I want to endorse the editorial comments following that letter as being well worth while.

Experience in the compression of air has taught me that carbonization takes place quite rapidly on the compressor valves and cylinder walls of the small portable compressors used in mine service. This can only be prevented by giving proper attention to the selection of a high-flash test oil and by a thorough cleaning of the compressor at frequent regular intervals.

Allow me to suggest that master mechanics and mine foremen will do well to make frequent inspection of the valves and cylinders of these portable compressors and see that they are kept clean and free from deposit. As a rule, these small, portable, motor-driven compressors are almost automatic in operation, and mine officials fall into the habit of giving them little or no attention, generally permitting them to run themselves, until their action gets so bad that complaint is made, in regard to the efficiency of the drills or coal-cutters. The result is that, in nine cases out of ten, the manufacturer is blamed.

Let me add, in closing, that if poppet, inlet and discharge valves on compressors, in the engine room, should be inspected and cleaned at frequent intervals, it is even more important that this should be done on the smaller portable compressors operated underground.

S. B. KING,

Chicago, Ill. Sullivan Machinery Co.

Working 10-Ft. Inclined Seam

Letter No. 3—Kindly permit me to offer a few suggestions that may assist "Superintendent" to solve his difficulties, which he has described in the inquiry, *Coal Age*, Mar. 23, p. 561.

The inquiry states that the coal is pitching from 15 to 20 deg., the seam being 10 ft. in thickness and troubled with faults and pinchouts. I understand from the description that the roof is of a shelly nature, making it weak and difficult to support, while the floor is a sandy shale.

It is unfortunate that the area of the coal property is not given, as that is an important factor in deciding on the plan of working and method of ventilating a mine. This is especially true when there are surface streams that must be considered in the development of the mine. Such features are liable to cause much trouble and expense in pumping if sufficient precautions are not taken to avoid this dfficulty.

GENERAL PLAN OF WORKING SUGGESTED

My first suggestion is to open the mine on the split-air system, so that it will be possible to ventilate each district of the mine separately and thereby control the circulation according to the need in each section. I would drive the main slope on the full dip of the seam, in the same manner as described by Andrew Bain, in his letter, Apr. 27, p. 803, driving three slopes abreast and making the center one of the three the main intake and haulage road for the mine. This would, in my opinion, be the most practical scheme for ventilating the mine safely and economically.

My second suggestion is to leave 3 ft. of coal up for a good roof, while driving entries and rooms in the first working. The coal being 10 ft. high, if 3 ft. is left for roof coal, the height of the openings will be 7 ft., which will give a good headroom for mules and cars after timbering the places. The cross-entries should be driven on a 1 per cent. grade in favor of the loaded cars. This will not only facilitate hauling but will afford good drainage for the mine.

In working the rooms, I would arrange to have two tracks in each room, so as to install a self-acting incline or gravity plane for lowering the coal from the working face to the entry. To do this I would make use of a rope and sheave by which the loaded car in descending would draw up the empty. The rooms can be driven from 18 to 20 ft. in width, but should have 30-ft. pillars between them. This will give plenty of room for double tracks, with a space for gob between them. MINER.

Springfield, Ill.

First Aid to the Uninjured

Letter No. 5—At this time, when every available unit of our resources must be hurled against the common enemy, the conservation of life and health is extremely vital, and the question of giving first aid to the uninjured grows in importance. Every mining man can well afford to heed the suggestion and give such aid to men who are yet uninjured, but whose careless-

ness and neglect go far to increase the accident rate in our mines.

In rendering such aid to the uninjured, we are performing a real service to Uncle Sam and helping to do our bit in the great struggle. At the same time, we are performing a lasting service to the man who is yet uninjured and to his family. The country calls for this service in the preservation of life and health, particularly at the present time. Though the men we strive to help may not appreciate our solicitude in their behalf, the task before us is not altogether a thankless one.

In the past few years volumes have been written on the subject of "safety first," and numerous campaigns have been conducted with the same aim and purpose. There are but few instances in which the efforts thus put forth have failed to bear fruit; but, still, the carelessness and neglect of the average miner continue to exact an appalling toll on life and health, although these are of the first importance to the industry and to mankind in general.

All will agree that it is our duty to concern ourselves more seriously with this important matter. Attention has often been called to the fact that statistics show that a larger number of lives are lost annually by reason of falls of coal and roof, at the working face, than from any other cause in coal mining; or, indeed, from all other causes combined.

If one takes the trouble to observe carefully, however, he will find that this class of accidents is less common at certain mines than at others working under the same conditions. He will find that the reason for this is evidently the lively interest taken in first-aid and welfare work by the mine officials at such mines. They are all making earnest efforts to reduce the accident rate to a minimum and the result is gratifying.

One observes with pleasure and satisfaction that, almost without exception, in mines where it is the custom of one or more of the mine officials, superintendents, mine foremen and his assistants, to visit every working place one or more times each day and instruct and discipline the men, the latter as a class become more conscientious in their efforts to avoid danger.

Where such efforts are put forth by the mine official, the miners are not slow to appreciate the fact that this interest is taken in their behalf, and they show a greater interest in their own safety. In such mines we find an enduring safety-first movement. The truth of these statements can be verified by anyone who will take the trouble to investigate those neighboring mines where such a policy is pursued and the working places are invariably inspected, each day, by conscientious mine officials. In my opinion this is the surest and most practical way in which we can render first aid to the uninjured.

SUPERINTENDENT.

Thomas, W. Va.

What Caused the Explosion?

Letter No. 2—An inquiry in *Coal Age*, Apr. 6, p. 645, asked for suggestions as to the possible or probable cause of an explosion, which is said to have occurred in a mine that had been standing idle for a period of two months. It is stated, further, that no one was in the mine at the time the explosion occurred, but it was found, later, that the blast started in a wet portion of the mine, which had been supposed to be free from gas and where natural ventilation only was employed.

Kindly permit me to suggest that sufficient gas may have been generated in this mine to have caused a considerable accumulation of firedamp, during the long period of idleness, when it is natural to suppose no attempt would be made to ventilate the workings by extending brattices to cause the air current to sweep the working faces and the many void places where gas might lodge. It is possible that this accumulated gas may have been carried to the foot of the 32-ft. shaft where it was possibly ignited by a lighted cigar stub or match thrown carelessly into the shaft.

Explosion Caused by Lightning

In one instance, I remember an explosion occurred in a mine when nobody was underground, and the cause of the explosion appeared a mystery until it was found that the iron pipe, standing a considerable height above the surface of the ground and which served to drain the gas from the mine through a 6-in. borehole, had been struck by lightning. It was assumed, in that case, that the lightning ignited the gas and caused the explosion underground.

Again, it may be supposed that firedamp had accumulated in the waste and that the falling roof striking some sulphur balls in the gob may have caused the sparks that ignited the gas and caused the explosion.

Ignited Gas Feeder Causes an Explosion

A remarkable instance of a mysterious explosion was reported a few years ago as occurring in a mine in western Pennsylvania. It was said that no one was in the mine at the time of the explosion, which occurred on Sunday. Neither had anyone been in the mine the Saturday night previous. Such was the force of this explosion that overcasts were blown out and several mine cars were broken into fragments, the remains of which I saw later. Most remarkable of all, however, was the fact that the blast tore loose, from its place where it was spiked, a 40-lb. engine-road frog, which was never found afterward.

This disaster was not discovered until early the following Monday morning, when the fireboss entered the mine to make his examination. In explanation of the probable cause of the explosion, it was decided that a small feeder of gas had been ignited by a shot of black powder and had escaped attention and been left burning when the miners left the mine Saturday night.

It was the custom, at this mine, when quitting to shut off the steam from the fan engine, upon which the speed of the fan was reduced from 75 to 18 r.p.m., the fan being run at this speed by reason of a condensing arrangement, which was operated by a small head of water supplied by a nearby creek. The reduced speed of the fan was insufficient, however, to keep the mine clear of gas, which it is thought accumulated and was carried by the air to where it became ignited by the burning feeder.

LUMEN.

Perryopolis, Penn.

Contributors are cautioned not to omit giving their names and addresses, which will not be published if so requested, and to write on one side of paper only.

INQUIRIES OF GENERAL INTEREST

Detection of Mine Gas

In the course of our work here much interest has been aroused in regard to the detection of mine gas, in daily practice. The question as stated is as follows:

Suppose a man with a standard safety lamp goes 60 ft. into a gangway and his lamp is put out by gas. Is there any positive way by which one can detect with certainty the nature of the gas that extinguished the lamp? It has been claimed, in arguing this question, that a body of methane will extinguish a lamp as quickly and as surely as blackdamp. INQUIRER.

Upper Lehigh, Penn.

It is true that a body of pure methane unmixed with air will extinguish a lamp as quickly as an accumulation of carbon dioxide or blackdamp. Indeed, the lamp may be extinguished by a mixture of methane and air, when a high percentage of the gas is present and there is not sufficient air to support combustion. Such a mixture is above the higher inflammable limit of the gas. It is even possible for the lamp to be extinguished below this point if the oxygen of the air has been depleted.

In general, pure methane or methane mixed with air, owing to its lesser density, is found at or near the roof in mine workings, while carbon dioxide and blackdamp, being of greater density, accumulate at the floor. In practice, the position of the lamp at the time it was extinguished will often show what gas is present.

However, this is not a universally safe rule, since it is possible for diffusion of these gases to take place in a manner that will alter the density of the mixture and cause the gases to assume a position in the entry contrary to their nature when pure. A similar effect is produced by the relative temperature of the gas and air currents; the warmer medium always seeking the roof, its density being less by reason of its higher temperature This feature of testing for gas was fully treated in answer to an inquiry, *Coal Age*, May 11, p. 894.

In reply to the question asked, it may be stated that, in order to determine the nature of the gas by which a lamp is extinguished, it is necessary to take into consideration not only the position of the lamp in the entry but the temperature of the currents passing at the roof and the floor, and to observe carefully the action of the flame previous to its extinction.

When a lamp is extinguished by carbon dioxide, or by blackdamp (which is generally a mixture of carbon dioxide and nitrogen, the oxygen of the air being depleted), the flame of the lamp is gradually dimmed for a considerable time before it is finally extinguished. On the other hand, if the extinction of the lamp flame is due to sharp gas, pure methane, or a flashdamp mixture of methane and carbon dioxide with more or less air, the action of the flame previous to its extinction will show a tendency to "capping." The cap produced in a flashdamp mixture must be observed quickly as it disappears almost as soon as formed, and the extinction of the lamp can only be prevented by withdrawing it from the mixture. The extinction of the lamp by a mixture containing methane occurs quickly, while the flame will often show a considerable disturbance or be elongated before it is put out by the gas. It is these appearances previous to the extinction of the flame that reveal to the experienced fireboss the character of the gas present.

Force of a Hammer Blow

A question that was much discussed in our meeting, recently, is how to figure out the force of the blow of a steam hammer, knowing the steam pressure, the area of the piston and the weight of the hammer head. Does the force of the blow change according to the kind of material struck by the hammer? Also, allowing a greater piston travel, would that affect the striking force of the hammer? We would like to see these questions discussed in *Coal Age*. SECRETARY.

Upper Lehigh, Penn.

It is possible to calculate the energy stored in a hammer at the moment of striking a blow. This stored energy, however, is expressed in foot-pounds. It shows the capacity of the hammer for performing work, and work is the product of two factors, force and distance. In the case of a hammer, the stored energy at the moment the blow is struck is equal to the force of the blow multiplied by the distance through which the hammer moves while being brought to rest by the resistance of the material struck.

For example, if a 2-lb. hammer strikes the head of a nail with a velocity of 10 ft. per sec., the energy stored in the hammer at the moment the blow is struck is

$$\frac{Wv^2}{2g} = \frac{2 \times 10^2}{2 \times 32.16} = 3.109\ ft.\text{-}lb.$$

Now, if it is found that the nail was driven in ¼ in., which is 0.0208 ft., the force of the blow is 3.109 ÷ 0.0208 = say 150 lb., nearly.

In the case of a steam hammer the total steam pressure on the piston is found by multiplying the area of the piston by the unit pressure of the steam, and to this product must be added the weight of the hammer head. The combined pressure and weight, expressed in pounds, multiplied by the distance, in feet, through which the hammer falls, will give the foot-pounds of work performed. But, to find the force of the blow delivered, it is necessary to divide the foot-pounds of work stored in the hammer by the distance the hammer moves while its motion is being arrested by the resistance of the material struck. A greater piston travel gives a greater striking force to the hammer; but the actual force of the blow delivered will depend on the density of the material struck, as this will determine the distance in which the hammer is brought to rest.

EXAMINATION QUESTIONS

Illinois Mine Manager's Examination April 2, 1918

(Selected Questions)

Ques.—There are 125,000 cu.ft. of air per min. passing through an airway 7 x 9 ft. in section. The temperature of the air is 62 deg. F., barometer, 30 in.; what would be the horsepower producing ventilation, less the friction?

Ans.—The meaning of this question is not clear, as it is customary to estimate the horsepower producing a circulation of air in a mine or airway, from its frictional resistance, by multiplying the resistance due to friction, expressed by the formula ksv^2, by the velocity of the air current and dividing by 33,000.

The energy represented by a given *weight* of air moving at a given velocity, in the ventilation of a mine or airway, has no significance in determining the horsepower producing the circulation. In the given instance, the velocity of the air is $125{,}000 \div (7 \times 9) = 1964+$ ft. per min. The weight per cubic foot of this air, at the given temperature and barometer, is

$$w = \frac{1.3273 \times 30}{460 + 62} = 0.0762\ lb.$$

The total weight of air passing per minute is therefore $125{,}000 \times 0.0762 = 9525$ lb. The energy stored in this weight moving at a velocity of 1964 ft. per min. (32.73 ft. per sec.) may then be calculated as follows:

$$H = \frac{Wv^2}{2g(33{,}000)} \qquad \frac{9525 \times 32.73^2}{2 \times 32.16 \times 33{,}000} = 4.8\ hp.$$

This may be considered as the horsepower absorbed in setting the air in motion; but it is not the horsepower producing the circulation, which is very much greater.

Ques.—With a 50-hp. fan we are producing 110,000 cu.ft. of air per min., what quantity will be produced with 75 hp.?

Ans.—Assuming that the efficiency of the fan remains constant when its speed is increased to produce more air, the conditions in the mine remaining unchanged, it is customary to estimate the volume of air as varying with the cube root of the horsepower. In other words, the volume ratio is equal to the cube root of the power ratio. Hence, calling the required volume of air x, we have

$$\frac{x}{110{,}000} = \sqrt[3]{\frac{75}{50}} = \sqrt[3]{\frac{3}{2}} = \sqrt[3]{1.5}$$

$$x = 110{,}000\sqrt[3]{1.5} = 110{,}000 \times 1.145 = 125{,}950\ cu.ft.\ per\ min$$

Ques.—Define a "dead hole," as described in the mining laws. Describe the duties of shotfirers in mines where more than two pounds of powder is used in one blast, also, in mines where marsh gas is generated in dangerous quantity.

Ans.—The definition of a "dead hole," as given in Sec. 19 (f), is quite vague as to its meaning. The law states that a "dead hole" is a hole where the width of the shot at the point, measured at right angles to the line of the hole, is so great that the heel is not of sufficient strength to at least balance the resistance at that point. The meaning of the law is not clear.

A better definition of a "dead hole" is that already given in *Coal Age*, Vol. 9, p. 511, which reads as follows: A "dead hole," in blasting, is one in which the charge is so located that it cannot perform the work intended, or a hole in which the line of least resistance corresponds more or less closely to the axis of the hole.

The duties of shotfirers in both the classes of mines mentioned is to inspect and fire all blasts that have been prepared in a practical workmanlike manner, in the mine. Immediately after completing this work, the shotfirer shall post a notice in a conspicuous place, at the mine, stating the number of shots fired and the number not fired, if any, specifying the number of the room and the entry and giving the reasons why such shots were not fired.

The shotfirer is also required by law to keep a daily record of the number of shots fired, the number of shots failing to explode and the number that, in his judgment, were not properly prepared and which he refused to fire. This record shall be given in charge of the mine manager (mine foreman) and be available for inspection at all times, by interested parties. The law forbids the firing of any shots by the shotfirer before all the workmen have left the mine, and makes it unlawful for a shotfirer to fire any shot that, in his judgment, is not a workmanlike and practical shot.

Ques.—The velocity of air passing through a coal mine is 225 ft. per min. The entry, at the place of measurement, is a concrete arch 10 ft. high, 8 ft. to the springing line and 8 ft. wide. What are the perimeter, area and quantity of air passing per min.?

Ans.—The rectangular portion of this airway is a square 8 ft. on each side. The arch has a rise of $10 - 8 = 2$ ft. The radius of a circular arc whose chord is 8 ft. and center ordinate 2 ft., is found by dividing the sum of the squares of the half-chord and the ordinate, by twice the ordinate, which gives, in this case, $4^2 + 2^2 \div (2 \times 2) = 5$ ft. The angle subtended by half the arc is an angle whose sine is $\frac{4}{5} = 0.8$, or 53° 08′, or 53.13 deg. The length of this arc is, therefore, $53.13/180\ (3.1416 \times 10) = 9.27$ ft. The total perimeter of the airway is, therefore, $8 + 8 + 8 + 9.27 = 33.27$ ft.

Likewise, the area of the sector subtended by the same arc is $53.13/180(0.7854 \times 10^2) = 23.18$ sq.ft. Then, deducting the area of the triangle, formed by the two radii drawn to the extremities of the chord, which is $\frac{1}{2}(3 \times 8) = 12$ sq.ft., gives $23.18 - 12 = 11.18$ sq.ft. for the area of the segment under the arch. Adding this to the area of the rectangle, $8^2 = 64$ sq.ft. gives $64 + 11.18 = 75.18$ sq.ft. for the sectional area of the airway. The quantity of air passing in this airway is then $75.18 \times 225 =$ say 16,900 cu.ft. per min.

COAL AND COKE NEWS

Harrisburg, Penn.

The departure of several hundred miners from the anthracite region on May 16 was followed by a protest from members of the anthracite operators' committee, who express themselves as alarmed over the possibilty of a severe coal shortage resulting from the drain on highly technical labor.

In a statement issued by the operators attention was called to the fact that every miner taken away means the training of another able-bodied man to fill his place, a course of training requiring two years. The two-year apprenticeship is required by the state law before a miner can obtain a certificate or license.

The present number of miners, it was said, is barely sufficient to maintain a maximum of 275,000 tons daily. There are now 153,000 miners, or 24,000 fewer than there were before the war. In describing the effect of constantly drawing mining labor away to other service, the operators said: A miner with his laborer, with effort, can get out eight tons of anthracite daily. A miner being taken away, the laborer cannot work and the resultant loss in output means 208 tons for 26 working days, or 25,000 tons a year for 312 working days. Allowing ten tons of anthracite for winter consumption, means also that 2500 families would be deprived of coal for every registered miner lost to the industry.

An estimated 1,000,000,000 hp. has gone to waste in the past ten years in the 2,000,000,000 cu. ft. of mine gas that is known to have escaped from a single borehole in the vicinity of Luzerne Borough, Luzerne County, according to reports made to W. S. Tompkins, of Wilkes-Barre, by engineers he specially engaged to inquire into the waste of mine gas, which it is proposed by Governor Brumbaugh to put to use in the future as a substitute for coal in various sections of the anthracite field.

This gas has been escaping from the top of the Snake Island vein, which at that place has not sufficient rock cover to permit the mining of coal. This offers substantial proof to what has been asserted before, that there is a large territory in the anthracite fields where the upper vein has not sufficient rock to remove the coal, but does contain methane or mine gas in large quantities.

Great interest is being shown in the investigations that are being made. It has been well established that there are millions of cubic feet of mine gas going to waste daily in the anthracite fields. Experts have declared that this gas can be mixed with air and used successfully for commercial and domestic purposes.

Charleston, W. Va.

In the field covered by the Kanawha Coal Shippers Association, according to figures recently compiled, in the period from May 1 to May 16 there were 19,572 empties received and 18,350 loads delivered. A wreck at Huntington about the middle of the week, however, disrupted coal traffic on the Coal River division of the Chesapeake & Ohio, and the car movement there was at zero, the same cause operating to tie up coal traffic to some extent for two days — Wednesday and Thursday — in the Kanawha region elsewhere.

Just at a time when it seemed the number of cars furnished would enable the coal producer to speed up, the operators met with further discouragement when the Virginian Power Co. caused a shutdown in three fields in this section of the state through failure to furnish power. The shortage was so generally felt that T. L. Lewis, secretary of the New River Association, sent a telegram to Dr. Garfield, United States Fuel Administrator, explaining the situation, in the course of which he said: "Coal mines in New River and Winding Gulf districts of West Virginia idle and supply of navy and bunker coal is endangered. Miners compelled to climb out of shafts of mines, and mules and horses cannot be hoisted out of the shafts. Reported the Virginian Power Co. responsible for closing mines by their failure to furnish power and to keep employed sufficient number of electricians to equip power plant on account of refusal to pay electricians more than $75 per month. Conduct of the management of the Virginian Power Co. is an outrage because it closes the mines and denies the miners an opportunity to work and reduces the output of coal required for the United States navy and other Government purposes. Virginian Power Co. has been granted two 10 per cent. increases in their rates for power supplied to the coal mines."

Operators in the New River district report a marked improvement on both the Virginian and the Chesapeake & Ohio railways. The supply within the last 10 days has increased, and the mines as a result have been shipping more coal. The Virginian R.R. has just received five new locomotives, and some attribute the increased supply of cars to such additional power, as the old locomotive equipment was in poor condition.

Operators on the line of the Coal & Coke are receiving a better supply of cars now than has been the case for some time, the Kanawha & Michigan Ry., for instance, having turned over 50 cars to the Coal & Coke at this point last Friday night. Inability, however, of the Kanawha & Michigan to accept loads from the Coal & Coke may delay the distribution of the cars received by the Coal & Coke. The great trouble among the Coal & Coke operators has been that when the car supply was good the labor supply was short and vice versa.

There was a most decided slump in the car supply in the Fairmont region last week, conditions there resembling conditions during the first two weeks of April, when the slump was so discouraging. While at the beginning of the week with a supply of 1427 cars, it looked as if there might be a good week, the shipping facilities afforded steadily declined from day to day, until the latter part of the week, when the number of cars furnished had dwindled to 642. For instance, on Thursday, of 166 mines reporting, 50 were closed, there being 4418 men out of employment and the production loss being 39,900 tons.

Fewer new operations may be looked for in the future, owing to the order of the railroad administration placing restrictions upon the authorization of new sidings, according to both coal men and railroad officials. In cases, however, where companies have taken out charters and invested in plants, entering into contracts with railroad companies for the placing of sidings, it is believed that special dispensation will be granted by the railroad administration and that such concerns will eventually be able to operate. Such special dispensation is the exception rather than the rule, however, and the new ruling is already making itself felt in West Virginia, questions put to operators eliciting invariably the reply that there are no new concerns venturing to open up due largely to the fact that they are unable to secure sidings from the railroad company.

Birmingham, Ala.

Among development announcements gaining circulation during the week is the reported plans of the Railway Fuel Co., which provide for the enlargement of the concern's coal-mining operations at Parrish, Ala. The company's mine at that place will be remodeled and equipped for electrical operation. W. E. Leake, vice president of the company, will be in charge of the work.

The Davis Creek Coal Co. announces the opening of a coal mine near Adger and a new coal company, under the name of the May & Phillips Coal Co. has been organized at Dora, Ala. John D. Phillips is president of this latter concern.

W. H. Ebsary, of Buffalo, N. Y., has been awarded the contract for the brick construction for the furnaces and buildings at Ensley, to be erected by the Tennessee Coal, Iron and Railroad Co. This contract represents an outlay of $100,000, and it is estimated that 6,000,000 brick will be used in the construction work.

Information gathered from the coal-mining section during the week indicated that the producers expect to be able to announce material improvement in production and quality of coal during the remainder of the current month. The miners started to work May 17 under the advanced wage scale, and beneficial results are looked forward to. Shortage of workers and inefficient labor, however, is still complained of in many quarters and will operate against material increase in production.

J. B. DeHopper, named by the Government as coal inspector to see that the cleanest coal possible is mined and shipped, has got to work and results are already being noted. However, reports reaching Birmingham indicate that while labor at many of the mining camps in Alabama appears to be as plentiful as it ever was, there seems to be some sort of depreciation in the quantity of the work accomplished and the results attained in actual production.

Winnipeg, Man.

The announcement of T. R. Deacon, fuel controller of Manitoba, that no American anthracite will be shipped to points west of Winnipeg, has created considerable alarm among consumers. Much attention is being devoted to the question as to whether a sufficient supply for next winter can be secured from Western operators. Local representatives of the Coal Sellers, Ltd., the largest wholesale coal distributors of Western Canada, which handles the output of seven Alberta mines with a yearly tonnage aggregating about 1,000,000 tons, state that the company could ship 500 tons daily to Winnipeg and increase this tonnage to 800 or 1000 tons daily in a short time. These coals could be stocked without serious deterioration and are high-grade domestic coals. The company has already stored in Winnipeg some $100,000 worth of coal for next winter. The Winnipeg dealers, however, are withholding their orders as they still entertain hopes of procuring hard coal. W. J. Dick, a western coal expert, formerly mining engineer for the Canadian Conservation Commission, and now fuel engineer for Coal Sellers, Ltd., states that the talk about Western coal not possessing the necessary heat required for a Winnipeg winter is absurd. He is prepared to prove this by a public demonstration, and to furnish data on government tests showing the high heating value of the Western coals handled by his company. He can also supply data respecting the testing of practically identical American coals in domestic heating furnaces. Jesse Gouge, president of the Newcastle Coal Co., of Drumheller, Alta., states that for the next 100 days Western Canadian mines will be in a position to supply large quantities of coal to Manitoba and Winnipeg. After that time it will be more difficult to ship coal on account of the increased demand and transportation difficulties. Western domestic mines have enough miners to operate steadily, and many of them are putting in coal-cutting machinery and car-loaders to take the place of man-power. He said in regard to deterioration from storage that if Western coal were stored in basements, or under cover, the best grades could be kept for a year without any deterioration. Western coal had eliminated the competition of anthracite in Saskatoon and Regina, where the winters were fully as cold as in Winnipeg.

Atlantic City, N. J.

The first annual convention of the National Retail Coal Merchants' Association ended a two-day convention at the Hotel Traymore, on Tuesday night, May 21, with a banquet at which the speakers included Joseph B. Dickson, of the Anthracite Committee of the Fuel Administration; A. W. Calloway, in charge of bituminous distribution for the Fuel Administration, and F. A. Lewis, Fuel Administrator for Philadelphia.

Mr. Calloway told the diners that the estimated requirements of bituminous for this year totaled 650,000,000 tons and that this might be increased to 680,000,000 tons by July 1.

Mr. Dickson urged rigid conservation owing to the lack of man-power and increased demand. He said that about 79,000,000

tons of anthracite had been distributed during the year 1917-1918, of which about 30 per cent. was steam sizes. Referring to the lack of supplies, Mr. Dickson said that at the beginning of last year there were 3,200,000 tons in storage, while there was none this year.

The convention was attended by coal men representing at least 20 states, and its membership includes 75 per cent. of the dealers of the country. It was organized about six months ago.

Resolutions were adopted strongly protesting against "Coal Week" as advised by the Fuel Administration, and a telegram was sent to Dr. Garfield, the National Fuel Administrator, stating that there was not coal enough to warrant such a demand for fuel as will result from the efforts of the Fuel Administration to have orders placed for coal.

Resolutions were also adopted advocating a uniform price for domestic anthracite coals, allowing a fair profit to every producer and not restricting output.

W. Albert Smoot, Jr., of Alexandria, Va., was reëlected president; John E. Lloyd, of Philadelphia, vice president and Jesse E. Sutter, of Washington, D. C., secretary and treasurer. An executive committee, of which Arthur F. Rice, Commissioner of the Coal Merchants' Association of New York, is a member, was also elected.

PENNSYLVANIA

Anthracite

Parsons—Baltimore No. 5 breaker is almost completely razed. The structure was damaged by fire some time ago and the Delaware and Hudson Co. decided to tear it down.

Shamokin.—In keeping with its policy to centralize clerical work and conserve male labor, the Susquehanna Collieries Co. has announced sweeping changes in its office staff and handling of business. Men employed at the headquarters office for a number of years have been assigned to the collieries, where new offices will be erected for the transaction of all business. The main office will serve as a sort of clearing house for the most important matters. At the same time the company announced the appointment of William P. Caldwell as paymaster, succeeding Galen P. Hanley, retired, and of Byron W. Kriher, as chief clerk. William Geise, one of the engineers in charge of the reconstruction of the Government docks at Newark, N. J., has been engaged by the Susquehanna as constructing engineer.

Bituminous

Connellsville—The new coal shaft of the Mather Collieries, at Jefferson, Greene County, has reached the Pittsburgh vein at a depth of 340 ft. and is completed. Fifty miners' houses have been completed in the new town site, all equipped with bathrooms and electric light. Bids are now being received for street grading. The construction of the railroad along Ten Mile Creek between Millsboro and Waynesburg is being pushed as rapidly as possible, as is also the work of constructing the West Penn Power Co.'s pole line to the new mining operations.

WEST VIRGINIA

Algonquin—The Algonquin Coal Co. has let contract for the construction of 25 new frame houses for mine employees. G. B. Farrier, superintendent, states that the company intends doubling its present production. This company has loading facilities on both the Norfolk & Western and Virginian tracks.

Dott—The Turkey Gap Coal and Coke Co. will build 25 new frame dwellings to house its mine employees.

Fairmont—The election of E. B. Moore, as president, Frank B. Pryor as vice president and O. F. Lough as secretary-treasurer of the newly chartered Fairmont Byproduct Corporation, is generally construed to mean that the company is a Monongahela Valley Traction Co. project. J. O. Watson, president of the Monongahela Valley Traction Co., stated a few days ago that negotiations for the byproduct plant had been practically completed and that contracts would be executed in the near future. E. B. Moore, general manager of the traction company, and president of the byproduct company, having gone east for a conference with engineers and plant builders. It is said that the plant will consume over 2000 tons of coal a day including Sundays.

Buckhannon—As soon as a tramway which the company is installing is completed, the Barbour-Upshur Coal Co. will begin the shipment of coal from its mines in Harrison County, probably about the first of June.

Charleston—The Peytonia Mining Co., of which E. B. Snider is general manager, will open another mine in the Coal River field in the near future.

Thirteen miners who were caught behind a wall of fire when the main entry of the Mill Creek Cannel Coal Co.'s mine at Villa burst into flame from some undetermined cause on May 20, were found dead in the workings.

Mannington—Four hundred miners recently escaped death from flames or suffocation by means of a ladder 200 ft. in length leading from the depths of the mine of the Rachel Coal Gas Co., near here. The fire was at the mouth of the main pit and destroyed the compressor and power house, with a loss estimated at $65,000. The cause of the fire is unknown, but is believed to have been started from a spark from one of the dynamos. The mine will be out of commission for several months.

Wheeling—The large, new tipple of the Triadelphia mine, capable of loading from 60 to 80 cars per day, has been placed in commission. The old tipple will be removed in a few weeks.

Logan—Automatic sprinklers are being installed by the McGregor Coal Co. at its mine at Slagle, Logan County.

A tract of coal in Logan County will soon be developed by the Carr & Hall Coal Co., recently organized at Stollings. W. W. Hall, of Huntington; A. D. Carr and Frank Harman, of Logan, being interested in the new enterprise.

TENNESSEE

Nashville—J. S. Denton, chairman, and W. W. Baird, of the State Board of Control, recently returned from a trip to the mines in Herbert Domain and Brushy Mountain mines at Petros. It was reported that operation of these mines was greatly curtailed in April through an epidemic of la grippe that involved more than one-half of the prisoners working the mines, numbers being confined to the hospital wards, while three deaths resulted from pneumonia. Production was reduced greatly, and also profits. However, profits for the month ran over $37,000, as against $50,000 in March. It is believed that profits for the year will run about $500,000 if they continue as high as during the first four months. Preparations are being actively pushed for installing new power machinery, but this advantage may be largely offset by the constant reduction in the volume of prison labor through paroles, expirations, pardons, etc., and by the falling off of the number of prisoners received due to better conditions and the war.

KANSAS

Pittsburg—Mine workers employed in the Cleremont Coal Co.'s mine No. 16 have voted on an assessment of $5 per man for the support of the American Red Cross. This amount is to be paid $1.25 per month for four months. Thereafter the men will contribute, by reason of the same vote, the sum of $1 a month per man during the continuation of the war.

ILLINOIS

Springfield—Operators and board members of the United Mine Workers held a two days' joint board meeting here during the past week. Minor disputes were thrashed out in a manner satisfactory to both sides. Friends of Frank Farrington, president of the Illinois United Mine Workers, headed by C. J. Daly, started a boom during the past week for his nomination for the United States Senate. When Farrington, who is in Washington, was apprised of the movement he wired that he had not been consulted and declaring his purpose to continue serving as president of the mine workers.

The miners of Sangamon County have agreed to give $10,000 to the Red Cross. The 290 men employed at the Tuxhorn mine near Springfield have pledged to give $1 each a month as long as the war lasts. The money will be taken out of the men's pay, 50c. each pay, and turned over to the Sangamon County branch of the Red Cross. The first payment, however, May 30, will be $1 from each man. The mine was 100 per cent. on the Third Liberty Loan. The men employed at the Klondike mine near Springfield voted $550. The Jones & Adams men voted to give 50c. a pay for the duration of the war, a total of $250 to $275 a month. The men at Citizens' Mine A and Mine B voted $2 a man. At other mines the men voted to subscribe their pro rata of the $10,000.

Banners were presented to Local No. 2654 of Springfield, Local No. 6060 of Cantrall and Local No. 1908 of Auburn, for having made 100 per cent. in the Third Liberty Loan drive. Nigger Hollow Mine No. 2, near French Village, has won a 100 per cent. flag by subscribing for $37,500 Liberty Bonds.

Belleville—An injunction petition has been filed with Circuit Clerk J. F. O'Flaherty by Joseph E. Brehet against the Lattman-Reeb Coal Co. of Belleville. Brehet rented some coal land to Lattman individually, who in turn leased it to the coal company. The petition seeks to prevent the removal of the coal.

Miners in each of the 11 newly organized subdistricts of Illinois voted Tuesday, May 14, for president, vice president and secretary-treasurer. The subdistrict plan of organization was abandoned several years ago, when there were eight subdistricts, but the growth of membership necessitated adopting it again and it was done in accordance with action taken at the State convention at Peoria. The results have not been announced. Contrary to precedent, no general holiday was taken for the voting.

Foreign News

Coal Spur, Alta.—On May 14th an explosion at the Oliphant Munson collieries, caused by the blowing up of the powder magazine from some unknown cause, killed John Brownrigg, manager, and one of the mine blacksmiths, and seriously injured three others.

Nanaimo, B. C.—The Granby Mining, Smelting and Power Co., Ltd., is installing a new mining plant at Cassidy Siding, near here. Roberts & Schaefer Co., of Chicago, has been awarded the contract for the installation of the tipple equipment, which will include a Marcus picking table screen.

Edson, Alta.—The Grand Trunk Ry. will install a coal-mixing plant in order to combine three different grades of Alberta coal into a standard fuel to be used on all the locomotives of the system between Winnipeg and Prince George. This will increase the consumption of domestic coal by 200,000 tons per year. The plant, which will employ about 50 men, will be in operation early in August.

Queens County, N. B.—Active development is being carried on in the coal areas, where every effort is being made to mine coal in sufficient quantities to relieve the shortage. A large amount of Montreal capital has been invested in this field, which is 800 miles nearer the St. Lawrence markets than the New Glasgow mines. In addition to the Minto Coal Co., which is producing over 3000 tons of coal weekly, the following companies are operating in the Minto-Newcastle district: Avon Coal Co., Ridge Coal Co., Reed Construction Coal Co., McDougall Co., Midland Coal Co., Northfield Coal Co., Grand Lake Coal Co., and Smith & Merrithew, Ltd. The scarcity of labor is not seriously felt. Miners are receiving from $8 to $12 per day and ordinary laborers $2.50. Plans are being made for the opening of many new mines and a great increase in the output this season is anticipated.

Personals

R. E. Bowen, formerly assistant engineer for the Harlan Gas Coal Co., Harlan, Ky., has enlisted in the 27th Engineers for Government work in France.

L. A. O. Gabany, formerly with the Alabama Consolidated Coal and Iron Co. and the Southern Steel Co., of Birmingham, Ala., is now coke expert with the Peabody Coal Co., of Chicago, Illinois.

J. L. Perdue, for several years mine foreman for the Turkey Gap Coal and Coke Co., Dott, W. Va., has resigned to accept a similar position with the Solvay Collieries Co., Springton, West Virginia.

Justus E. Altmiller, general manager and engineer for the Diamond Coal and Land Co., Hazleton, Penn., has been elected president of the Hazleton Chamber of Commerce, succeeding H. A. Schmoll.

Melvin I. Bowen, formerly geneal superintendent for the Cambria Coal Mining Co. at Briceville, Tenn., has resigned that position and leased the Middleridge mine, operating for himself. He has moved his family to Coal Creek, Tennessee.

J. B. Simonton has been appointed superintendent of mines 88, 89, 90 of the Consolidation Coal Co. at Wyatt, W. Va.; vice George DeBolt, Jr., resigned. Mr. Simonton has been in the employ of the company for a number of years and his promotion came as a reward for the faithful performance of his duties.

Dan Franklin has resigned his position as mine foreman for the S. J. Patterson Pocahontas Co., Arista, W. Va., to engage with the Solvay Collieries Co., Marytown, W. Va., in the same capacity. This brings Mr. Franklin back to his former employers, he having worked for this concern for years as mine foreman at Springton, West Virginia.

H. B. Walbridge, lately of New York, has been appointed agent for the following companies: The Pawama Coal and Coke Co., Matoaka, W. Va.; Algonquin Coal Co., Algonquin, W. Va., and Deparren Anthracite Coal Co., Parrott, Va., with headquarters at Parrott, Va. Mr. Walbridge will serve principally as assistant to J. H. Parrott, general manager of these companies. Mr. Walbridge served for a number of years as secretary of the American Coal Co., New York.

Obituary

William W. Craig, a prominent business man of Montreal, Can., died on May 12. He was well known in connection with the stripping business and was the Montreal representative of the W. H. Bradford Coal Co., of Philadelphia, Penn. He was in his 73d year.

William Hamer, mine foreman at Jeanesville, Penn., for nearly 40 years, died at his home in that town on May 14. He began work as a boy of eight on the old Spring Mountain breaker, and continued at the same colliery through its changing fortunes until his death. He was one of the first students of the now famous School of Mines of Scranton, and had been mentioned by his company recently as having a clear record of no accidents for three years.

Coming Meetings

American Concrete Institute will hold its annual meeting June 24-26, at Atlantic City, N. J.

American Institute of Chemical Engineers will hold its summer meeting June 19-22 at Berlin, N. H.

Illinois and Wisconsin Retail Coal Dealers Association will hold its annual convention June 26 and 27, at Hotel Wisconsin, Milwaukee, Wis.

National Coal Jobbers Association will hold its annual convention at Buffalo, N. Y., June 4. Secretary L. Romanski, Old Colony Building, Chicago, Ill.

American Institute of Electrical Engineers' annual convention June 26-28 at Atlantic City, N. J. Secretary F. L. Hutchinson, 29 W. 39th St., New York City.

American Society of Mechanical Engineers will hold its spring meeting June 4-7 at Worcester, Mass. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

National Coal Association will hold a meeting May 28 and 29 at the Bellevue-Stratford, Philadelphia, Penn. Secretary, J. D. A. Morrow, 707 Southern Building, Washington, D. C.

Southwestern Interstate Coal Operators Association will hold its annual meeting June 11 in the Keith & Perry Building, Kansas City, Mo. Secretary, C. N. Fish, Leavenworth, Kansas.

Illinois and Wisconsin Retail Coal Dealers Association will hold its annual convention June 26 and 27, at Milwaukee, Wis., with headquarters at Hotel Wisconsin. Secretary, Isaac L. Runyon, Chicago, Ill.

Recent Coal and Coke Patents

Coal Car Cover. A. G. Kahn, Centerville, Md., 1,258,576. Mar. 5, 1918. Filed Aug. 27, 1917. Serial No. 188,412.

Coal Skip. T. Dingley, Parnell, New Zealand, 1,259,374, Mar. 12, 1918. Filed July 12, 1917. Serial No. 180,182.

Coal Car Cover. J. H. Bruce, Whittington, Ill., 1,258,314. Mar. 5, 1918. Filed June 12, 1917. Serial No. 174,315.

Electric Switch for Mines. E. Leach, Rathmel, Penn., 1,257,255. Feb. 19, 1918. Filed Apr. 12, 1917. Serial No. 161,454.

Miners' Lamp—Carrying Means. L. Smith, Caretta, W. Va., 1,257,037. Feb. 19, 1918. Filed May 24, 1917. Serial No. 170,584.

Automatic Grate for Boilers. A. L. F. Lefevre, St. Denis, France, 1,257,257. Feb 19, 1918. Filed Sept. 11, 1916. Serial No. 119,536.

Pulverized Coal-Burning Furnace. W. M. Oliver, Parsons, Kan., 1,257,103. Feb. 19, 1918. Filed Mar. 2, 1917. Serial No. 152,086.

Combined Coal Shovel and Ash Sieve. J. F. Wynne, Atlanta, Ga., 1,259,333, Mar. 12, 1918. Filed July 16, 1917. Serial No. 180,876.

Coal Mining Machine. J. F. Conrad and J. Walker, Nettleton, Penn., 1,257,582 Feb. 26, 1918. Filed Feb. 9, 1917. Serial No. 147,689.

Feed Mechanism for Stokers. D. F. Crawford, Pittsburgh, Penn., 1,258,397. Mar. 5, 1918. Filed June 10, 1914. Serial No. 844,211.

Coal Pile. A. C. Johnston, assignor to Link Belt Co., Chicago, Ill., 1,256,569. Feb. 19, 1918. Filed Dec. 21, 1916. Serial No. 138,184.

Mining Machine. C. E. Davis, assignor to Goodman Manufacturing Co., Chicago, Ill., 1,256,524. Feb. 19, 1918. Filed May 11, 1915. Serial No. 27,347.

Hopper Car. A. Campbell, assignor to Enterprise Railway Equipment Co., Chicago, Ill., 1,257,270. Feb. 19, 1918. Filed Jan. 22, 1916. Serial No. 73,571.

Ash Conveyer Elbow. L. A. Griffin, assignor to American Steam Conveyer Co., Chicago, Ill., 1,258,893. Mar. 12, 1918. Filed Nov. 9, 1917. Serial No. 201,166.

Mining Machine. F. S. Washburn, assignor to Goodman Manufacturing Co., Chicago, Ill., 1,256,619. Feb. 19, 1918. Filed July 21, 1911. Serial No. 639,712.

Publications Received

Among the Coal Miners. International Committee of Young Men's Christian Associations, Industrial Department, New York. Illustrated, 20 pp., 6 x 9 inches.

The College Man's Opportunity. International Committee of Young Men's Christian Associations, Industrial Department, New York. Illustrated, 24 pp., 5 x 7 inches.

Cannel Coal in the United States. By George H. Ashley. Department of the Interior, United States Geological Survey, Bulletin 659. Illustrated, 127 pp., 6x9 inches.

Americanization Through Christian Leadership. International Committee of Young Men's Christian Associations, Industrial Department, New York. Illustrated, 12 pp., 5¼ x 8¼ inches.

New Views of the Combustion of the Volatile Matter in Coal. By S. H. Katz. Department of the Interior, Bureau of Mines. Technical paper 183. Illustrated, 13 pp., 6x9 inches.

Initial Priming Substances for High Explosives. By Guy B. Taylor and W. C. Cope. Department of the Interior, Bureau of Mines. Technical Paper 162. Unillustrated, 24 pp., 6 x 9 inches.

Monthly Statement of Coal Mine Fatalities in the United States, January, 1918. Compiled by Albert H. Fay, Department of the Interior, Bureau of Mines. Unillustrated, 21 pp., 6 x 9 inches.

Use of Permissible Explosives in the Coal Mines of Illinois. By James R. Fleming and John W. Koster. Department of the Interior, Bureau of Mines. Bulletin 137 Illustrated, 103 pp., 6 x 9 inches.

Effects of Moisture on the Spontaneous Heating of Stored Coal. By S. H. Katz and H. C. Porter. Department of the Interior, Bureau of Mines. Technical paper 172. Illustrated, 23 pp., 6 x 9 inches.

Determination of Unsaturated Hydrocarbons in Gasoline. By E. W. Dean and H. H. Hill. Department of the Interior, Bureau of Mines. Technical paper 181, Petroleum Technology 42. Unillustrated, 22 pp., 6x9 inches.

Oil-Storage Tanks and Reservoirs. With a Brief Discussion of Oil in Storage and Methods of Prevention. By C. P. Bowie. Department of the Interior, Bureau of Mines. Bulletin 155. Petroleum Technology 41. Illustrated, 70 pp., 6 x 9 inches.

Lighting for Production and Safety. By William A. D. Evans. Cooper Hewitt Electric Co., Hoboken, N. J. Illustrated, 20 pp., 7 x 10 inches. Comprising the study and selection of a system of illumination with a view to ultimate efficiency of the plant.

Geology of the Oamaru District, North Otago (Eastern Otago Division). By James Park, F. G. S., Dean of the Mining Faculty, Otago University, Dunedin. New Zealand Department of Mines, Geological Survey Branch. Bulletin No. 20 (new series). Illustrated, 119 pp., 8½ x 11 inches.

Mineral Industries of the United States—Sulphur: An Example of Industrial Independence. By Joseph E. Pogue, Division of Mineral Technology, United States National Museum, Smithsonian Institution, United States National Museum. Bulletin 102, Part 3. Illustrated, 10 pp., 6¼ v 9½ inches.

Mineral Industries of the United States—Coal Products: An Object Lesson in Resource Administration. By Chester G. Gilbert, Curator of Mineral Technology, United States National Museum. Smithsonian Institution, United States National Museum. Bulletin 102, Part 1. Illustrated, 16 pp., 6¼ x 9½ inches.

Mineral Industries of the United States—Fertilizers: An Interpretation of the Situation in the United States. By Joseph E. Pogue, Division of Mineral Technology, United States National Museum. Smithsonian Institution, United States National Museum. Bulletin 102, Part 2. Illustrated, 22 pp., 6¼ x 9½ inches.

Mineral Industries of the United States—Coal: The Resource and Its Full Utilization. By Chester G. Gilbert and Joseph E. Pogue, Division of Mineral Technology, United States National Museum. Smithsonian Institution, United States National Museum. Bulletin 102, Part 4. Unillustrated, 26 pp., 6¼ x 9½ inches.

Trade Catalogs

"Puzzledmuch" meets "Sellemfast." International Motor Co., New York. Pp. 14; 9x6 in.; illustrated. Talking points on Mack trucks, cleverly illustrated by cartoons.

Coupled and Belt Types of Alternating-Current Generators. Crocker-Wheeler Co., Ampere, N. J. Bulletin 185. Pp. 4; 8½ x 11 in.; illustrated. Covers two- and three-phase, 50 kv.-a. and up.

Direct-Current Lighting and Power Generators. Crocker-Wheeler Co., Ampere, N. J. Bulletin 184. Pp. 4; 8½ x 11 in.; illustrated. Covers direct-connected and engine types (25 to 3750 kw.).

CR 3100 Drum Type Controllers. General Electric Co., Schenectady, N. Y. Bulletin. Pp. 4; 8 x 11 in.; illustrated. Specifications and details for series, shunt or compound wound motors; reversing or non-reversing, starting or speed-regulating duty.

CR 3202 Drum Controllers. General Electric Co., Schnectady, N. Y. Bulletin. Pp. 4; 8 x 10 in.; illustrated. Description of these controllers for slip ring induction motors, 110 to 550 volts, two- or three-phase.

Proper Care of Belts. Joseph Dixon Crucible Co., Jersey City, N. J. Booklet. Contains helpful suggestions for getting maximum results from belts, and in addition has several pages devoted to useful information of a general character.

Satisfaction or —. Armstrong Cork and Insulation Co., Pittsburgh, Penn. Folder. Pp. 4; 3½ x 6¼ in.; illustrated. Deals with the subject of industrial drinking water systems and shows the relation of drinking water to a satisfied force of employees.

Copes Boiler Feed Regulators. Erie Pump and Equipment Co., Erie, Penn. Booklet. Pp. 16; 5½ x 3 in.; illustrated. Data on this method of feed control, which enables peak loads of short duration to be carried with a more uniform working of the furnace.

Link-Belt Silent Chain—the Efficient Drive for Machine Tools. Link-Belt Co., Philadelphia. Book No. 312. Pp. 40; 6x9 in.; illustrated. An excellently prepared booklet, well illustrated, giving reasons and showing why the Link-Belt silent chain drive is the most efficient transmission for operating machine tools.

Economy in Cold Sawing. Earle Gear and Machine Co., Philadelphia, Penn. Bulletin. Pp. 16; 4x9 in.; illustrated. Describes the Lea Simplex cold metal saw. In the fore part is pointed out the points of superiority of design and operation of this machine. Machines are built in four sizes, both belt and motor driven.

Liquid Roofseal. Manhattan Paint Co., Cleveland, Ohio. Circular. Pp. 4; 6 x 9 in.; illustrated. Describes what is said

to be a genuine asbestos roofing in liquid form. It is claimed by the manufacturers that liquid Roofseal renews and reclaims old, worn-out roofs of every description by giving them a new top covering.

The Alleviation of Suffering. Williams Improved Stretcher Co., Wheeling, W. Va. Booklet. Pp. 8; 5 x 7 in.; illustrated. Describes an improved first aid and ambulance stretcher. The many improvements embodied in the design and construction of this stretcher have earned for it the title of "the most humane, portable, convenient and sanitary stretcher made."

Imperial Catalog No. 142. Imperial Brass Manufacturing Co., Chicago, Ill. Describes in detail the full line of Imperial welding and cutting equipment, and Imperial burning and lead-burning outfits. Reviews the history of welding and cutting and its relation to industry. Several different sizes of Imperial outfits are illustrated and described fully. The catalog will be sent free to any reader writing for it.

Industrial News

Charleston, W. Va.—Authority has been granted by the secretary of state to the Quaker Splint Coal Co. to increase its capital stock from $25,000 to $150,000.

Williamsburg, Ky.—The Star Gem Coal Co., of Williamsburg, has been incorporated with a capital of $1000. George T. Vaughan, Mary E. Vaughan and Robert H. Davis are the incorporators.

Chattaroy, W. Va.—The West Thacker Coal Co., of Williamson, has been organized and is planning for the immediate development of about 60 acres of coal lands, to have a capacity of about two cars daily.

Glen White, W. Va.—The E. E. White Coal Co. is considering plans for the erection of a new steel coal tipple at its plant to have a capacity of about 5000 tons of coal daily. The structure is estimated to cost $150,000.

Pittsburgh, Penn.—The Petrolia Coal Co., of Kittanning, has been incorporated with a capital of $50,000. The incorporators are A. L. Sheridan, John W. Robin, J. W. Fletcher, H. G. Gates, of Kittanning and William Leslie, of Parkers Landing.

Centralia, Penn.—The Lehigh Valley Coal Co. has awarded a contract for the construction of a new one-story coal washery to be located near Centralia, to cost about $20,000. A. H. Ramberger, Girardville, Penn., is the building contractor.

Alger, Wyo.—The Amalgamated Development Co. has placed a contract with Roberts & Schaefer Co., Chicago, for the construction of its new reinforced-concrete tipple, to be built at this place, and which will include a Marcus picking table screen.

Cleveland, Ohio—The Lincoln Bonding Co. has purchased outright and consolidated here the business, patents and good will of the Atlantic Welding Co., of New York City. The Lincoln Bonding Co. manufactures an electric bond-welding machine that is meeting with much favor in the coal fields.

Weston, W. Va.—The P. C. Lynch Coal Co. has acquired about 1077 acres of coal lands on Stone Coal Creek in Lewis County in addition to the 750 acres recently acquired on the Baltimore & Ohio R. R. between Weston and Gaston. The company is planning to expend about $200,000 for the installation of the necessary equipment for development.

Columbus, Ohio—For the first time in a long while wagon mines in the Hocking Valley along the line of the Hocking Valley railway were being supplied with open-top cars. This was in accord with an agreement by the railroad to furnish such equipment when cars for regular mines reached 100 per cent. of requirements.

Wheeling, W. Va.—Judge A. G. Dayton of the United States District Court has issued an order against the Elm Grove Coal Co. restraining that company from refusing to supply coal to the Wheeling & Elm Grove company on the ground that if the source of the fuel were stopped street car service would have to be discontinued.

White Star, Ky.—The White Star Coal Co., 120 Broadway, New York, has filed notice of an increase in its capital from $120,000 to $300,000, to provide for expansion. At the present time the company is developing approximately 1500 acres having a daily capacity of 1000 tons, and it is planned to increase the output to about 1500 tons per day within the next six months. W. L. Hammond is general manager.

Charleston, W. Va.—Clarksburg men are chiefly interested in a million dollar coal company just chartered by the Secretary of State to be known as the Mountain State Coal & Coke Co., which will operate mines and coke ovens in Athens and Morgan Counties, Ohio. The incorporators are H. W. Kopp, E. D. Tucker, Joseph L. Walton, J. H. McKelvy and B. E. Maxwell, all of Clarksburg.

Charleston, W. Va.—Shippers of coal in this district have been notified by A. H. Land, district representative of the United States Fuel Administration, that the order which provided that all coal mined east of Charleston must be shipped to the shipping board, has been rescinded and that operators are now free to ship their product anywhere within the zone into which they have been placed by the Fuel Administration.

Louisville, Ky.—At no time since automobile trucks came into use in the retail coal field have their advantages been as great as at the present time, when it is impossible to obtain drivers, men to store coal, unload coal, etc. Locally the retailers are making practically no effort to supply men for storing coal for customers, as all men that can be had are needed in unloading from cars and handling the delivery end.

Columbus, Ohio—The Colonial Coal and Supply Co. has opened a new retail yard on Cleveland Ave. which is a modern plant in every respect. Storage capacity for 8000 tons has been provided. One of the features of the plant is a loading machine by which cars can be loaded from the storage pile for steam purposes. The plant occupies a tract of land 250 x 1000 ft. The equipment will be of sufficient capacity to unload or load 2400 tons in 24 hours.

Hellier, Ky.—The Allegheny Coal and Coke Co. has been bought up by the Peabody interests and is now known as the Manufacturers Coal and Coke Co. The new concern intends to build 200 rectangular coke ovens in addition to the 150 ovens now in operation. The Peabody company, one of the largest individual coal producers in the United States, has mines and virgin coal fields in the states of Illinois, Indiana, Oklahoma, Washington, Virginia and Kentucky.

Columbus, Ohio—Activity at the docks of the lower lake ports is gradually increasing as the lake season gets under way. The Hocking Valley docks at Toledo loaded 117,249 tons and 2223 cars for the week ending May 18 as compared with 118,248 tons the previous week, making a total of 367,399 tons since the opening of navigation. The Toledo and Ohio Central docks loaded 64,000 tons the week ending May 17 as compared with 47,000 tons the previous week, making a total of 198,000 tons for the season.

Pittsburgh, Penn.—Declaring that the law of the nation must be upheld and that coal men and food men, together with other merchants affected by wartime legislation, should familiarize themselves thoroughly with the laws, Judge Thompson in the United States District Court on May 15 fined John E. Robbins and Frank H. Stewartson, local coal brokers, each $500 for violation of the fuel act by selling above Government price. The defendants pleaded guilty and said they did not understand the order. The fines were paid.

Columbus, Ohio—The State of Ohio is probably the only large consumer which has neglected to lay in its coal supply for the coming winter. But this is due to legal requirements, which prevents the Ohio Board of Administration to contract for any supplies before the money to pay for the supplies is in the treasury. The money for the fiscal year 1918-1919 will not be available until after July 1. At that time Purchasing Agent Lyons of the board will start contracting for several hundreds of thousands of tons for the 23 state institutions.

Charleston, W. Va.—The Big Hurricane Coal Co., a Wayne County corporation, with principal offices at Hubbardstown, was adjudicated bankrupt last week after a hearing before Thomas R. Shepherd, referee in bankruptcy. The hearing was brought on the petition of the Emmons-Hawkins Co. of Huntington, and other alleged creditors, who declared the company committed an act of bankruptcy in assigning certain tracts of lands and mining equipment to Randolph Bias, of Williamson. The company has been operating on Big Hurricane Creek in Wayne County.

Charleston, W. Va.—The Liberty Collieries Co. has been incorporated with a capital stock of $150,000, the incorporators being Herbert Hannigan and S. G. Smith, of New Lexington, Ohio; C. A. Smith, of Chillicothe, Ohio; M. E. Moore and C. H. Hetzel, of Charleston. The company has announced that it plans to specialize in the production of byproduct coal, having purchased a large tract of coal land on which it expects to start development in the near future. S. G. Smith, one of the incorporators, is auditor of Perry County, Ohio, and has other mining properties in which he is interested in this state.

Louisville, Ky.—Wiley B. Bryan, fuel administrator for Kentucky, in a recent report stated that the mines of Kentucky loaded out 5000 cars of coal more in April, 1918, than was loaded out in April, 1917, showing that consumers are stocking for winter requirements, or else the yards and steam consumers were generally short and laying in surplus stocks. However, if the mines have been able to produce that much coal over last year's production, it would go to show that the labor and car situation is somewhat better than it was at that time, although in the spring of 1917 the demand was somewhat off.

St. Louis, Mo.—At the first annual convention of the Mississippi Valley Waterways Association, held here recently, United States Senator James A. Reed of Missouri, the principal speaker at the convention, strongly urged the utilization of the Mississippi and other rivers in the transportation of coal as a solution of the car shortage. He said it was plainly the duty of the Government to increase the efficiency of the railroads and establish barge lines without counting the cost. The establishment of the barge lines, he said, would relieve the railroad congestion and the coal mines would be able to obtain the cars that they need.

Indianapolis, Ind. — The Indianapolis board of education has made a contract with the J. R. Morris Coal Co. of this city for the delivery of approximately 20,000 tons of coal for heating the school buildings of the city for the school year beginning in September. The price will be $4.98 a ton, a total expenditure of practically $100,000. The coal will come from the Tuxhorn mines at Keyes, Ill., and will be delivered first to a school coal yard to be established on property belonging to the school board between Wilkins and Ray Streets on the Illinois Central R.R. tracks. Later, it will be delivered to the school buildings as needed. The contract provides that all coal shall be in the yard by October.

Columbus, Ohio—The Federal Fuel Administration is taking up the price question in all producing sections of the Buckeye State with the exception of Pittsburgh No. 8 vein. Last week W. D. McKinney, commissioner, and James Pritchard, secretary, of the Southern Ohio Coal Exchange, presented the cost figures from the Hocking Valley, Pomeroy Bend and Crooksville districts. J. L. Lawler and Edward Evans represented the Jackson district, and A. A. Augustus looked after Cambridge. The Federal Fuel Administration is figuring on a new system of computing costs of production and it may result in an entire redistricting of the state for price-fixing purposes. No decision will be announced for some time.

Kingwood, W. Va. — With a view to greater coöperation in securing a better car supply and to an improvement of conditions in general, the West Virginia Northern Coal Operators' Association was organized at a meeting held in the courthouse here at which a number of operators who have mines along the line of the West Virginia Northern Ry., which runs from Morgantown to Rowlesburg, were present. E. G. Smith, of the Inland Fuel Co., was selected as temporary chairman and presided during the election of the following permanent officers of the association: A. T. Carnahan, of the Deaker Hill Coal Co., president; Guy Bonafield, of the Loubert Coal Co., vice president; E. G. Smith, assistant secretary and treasurer.

Madison, Wis.—The University of Wisconsin has issued a bulletin prepared by the Bureau of Municipal Research upon the general topic of municipal coal yards, with suggestions for their erection and operation. Oshkosh is the only city which has made appropriation for a coal yard, but Kenosha, Madison, Sheboygan, Eau Claire, Fond du Lac, Green Bay, La Crosse and Racine are also interested. Ashland built a temporary coal yard last winter when the situation became acute, and Eau Claire did the same. Marinette started a municipal wood yard as a fuel relief, and Wausau has taken certain steps toward municipal sale of coal. In all, 30 cities have been interested in one way or another in the supply of fuel as a municipality, and the bulletin sums up the experience of these 30 cities.

MARKET DEPARTMENT

Weekly Review

Coal Production Now Near Maximum—Must Conserve High-grade Fuel for Use of Essential Industries—Labor Situation Serious—New England Outlook Gloomy

WITH an increase in the number of empty cars furnished by the railroads, the bituminous mines shipped 11,806,000 net tons of coal during the week ended May 11—a showing slightly better than was made during the record week ended Apr. 27. Telegraphic reports indicate that for the week ended May 18 the output of soft coal bids fair to pass the 12,000,000-ton mark. Anthracite shipments for the week ended May 11 totaled 38,314 cars, a decrease of more than 5 per cent. when compared with shipments the week preceding.

The foregoing figures show nearly maximum production. But even if continued at this rate for the rest of the year, the country will still be faced with a fuel shortage unless immediate steps are taken to conserve every single ton. Railroads, power plants and other consumers that formerly burned high-grade coals should readjust their equipment and use the coals allotted their respective districts by the Fuel Administration, even if the coals so available are of an inferior quality. Only in this way will the vitally essential bunker, metallurgical and by-product demands be met and the domestic requirements be satisfied. Furthermore, it is becoming more and more apparent that plants other than those directly at work on supplies to aid in winning the war will receive little consideration so far as fuel is concerned.

The question of labor is now one of paramount importance. Sadly depleted by the draft and the return of many of its workers to the farms, the coal-mining ranks are being still further demoralized by the enticing appeals of war industries. Working on a cost-plus basis, munitions plants and shipyards offer almost any wage in order to get enough men. It would be well for the Government to put a stop to the havoc and labor unrest being wrought by this system in the coal fields. Otherwise we will be confronted by a shutdown of industries due to lack of coal that will make "fuelless Mondays" appear a godsend in comparison.

The railroad fuel question remains unsettled. Another month will see the termination of nearly all contracts for railroad coal, and both railroad purchasing agents and operators are in a quandary over what course to pursue.

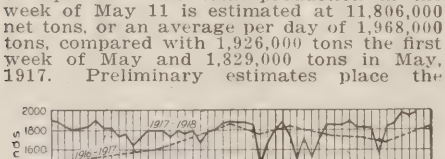
Market conditions are strong and active in every way, with the demand for coal for storage purposes sufficiently large to take care of all the available fuel. While early in the season it was proposed to ship no domestic sizes of anthracite to manufacturing plants, it has already become necessary to make exceptions to this to the extent of over 2,000,000 tons for war work. The allotment for cantonments is also sure to be enormous, and probably much larger than at first considered necessary. It would be well, therefore, for domestic consumers who have not already done so to order their coal immediately, if they wish to make certain of getting a supply before cold weather.

Coal shipments into New England are falling down at the rate of about 20,000 tons a day. The railroads are doing all they can, and only by shipping more coal by water and the strictest kind of conservation will a fuel famine be averted in this highly important manufacturing section next winter.

The movement of coal to most of the lower Lake ports, for forwarding to Northwestern points, has reached a good volume. The ore movement is increasing also under the influence of a better coal movement. Practically all Lake shippers have now received their permits and are ready to go ahead in earnest.

COAL PRODUCTION

The continuation of favorable operating conditions, both of transportation and mining, during the week of May 11, are reflected in the production of coal, which gained 2.2 per cent. over the week of May 4 and exceeded slightly the record week of Apr. 27. The total production in the week of May 11 is estimated at 11,806,000 net tons, or an average per day of 1,968,000 tons, compared with 1,926,000 tons the first week of May and 1,829,000 tons in May, 1917. Preliminary estimates place the



week's production of beehive coke at 655,000 net tons, as compared with 647,000 during the week of May 4. The average daily production is estimated at 109,000 net tons, an increase of 1000 net tons per working day over last week. Improvement in transportation and better market conditions was reported for the country as a whole, although such improvement was partly offset by shortage of labor.

Beehive Coke—Repairs to plants effected a material improvement during the week ended May 11 in production of beehive coke. The yard labor situation, however, which limited production during the previous week, failed to record any material improvement. The principal operators in the Connellsville and adjacent districts of Pennsylvania report production of 388,395 net tons of coke. The ratio of tonnage produced to maximum capacity was 74.1 per cent. as against 70.4 per cent. the week of May 4 and 75.2 per cent. during the week ended May 11. The same operators shipped 140,150 net tons of coal.

Byproduct Coke—Operators of byproduct coke plants report production during the week ended May 11 at 89.2 per cent. of maximum capacity. The ratio of production to maximum capacity was lower than during the preceding week, and the slight decline is attributed to labor shortage at the Bethlehem steel plant at Northampton and the Cambria steel plant at Johnstown. The shortage of labor at these plants caused losses of potential capacity for the country as a whole to rise from 0.6 per cent. the week ended May 4 to 2.3 per cent. Losses attributed to lack of coal declined from 3.7 per cent. to 2.8 per cent., and losses due to repairs to mines and "no market" remained constant, the former at 4.5 per cent. of potential capacity and the latter at 0.3 per cent. Pennsylvania was the only state to report a material decrease, caused as previously stated by labor shortage, and these operators continue to report the least favorable conditions, operating at only 77.1 per cent. of their capacity. Considerable improvement is reported by Alabama, Kentucky and Maryland operators. Increased production of the operators in the two states first named is attributed to repaired plants, while the cause of the improvement in Maryland was not reported.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended Apr. 20	Apr. 27	May 4	May 11
Bituminous shipments, 123 roads	193,667	204,527	202,558*	207,159†
Anthracite shipments, 9 roads	39,130	39,522	40,570*	38,314†

* Revised from last report. † Subject to revision.

Anthracite shipments declined from 40,570 carloads during the week ended May 4 to 38,314 carloads during the week of May 11, a decrease of over 5 per cent.

Dry Goods Economist—The between seasons period now setting in finds many branches of the textile industries welcoming a breathing spell. The wool and worsted goods manufacturers are waiting to learn what quantities of raw materials will be left for them when the needs of the Government are finally determined. Cotton is still in ample supply, with prices of short staple fully 10c. under levels of two weeks ago. Fine cotton, such as is needed in the making of most dress fabrics, is not so plentiful, as is shown by the fact that prices have only receded 2½ to 3c. per pound. Linen is practically out of the reckoning for the time being.

Bradstreet's—Growth in war business, broader demand for civilian goods, improved retail trade, further ease in transportation, and excellent crop reports stand out as the principal factors in a budget of encouraging news. But governmental operations, ranging from the construction of ordinance plants, ships and warehouses down to the buying of the most common products, figure to a greater extent than heretofore. As the Government buys, as it continues to commandeer goods in being or in prospect, various kinds of supplies for non-militant consumers necessarily grow

scarcer. In short, the country's movements are being adjusted to a true war basis, and with few signs of friction.

American Wool and Cotton Reporter—Little activity is seen in the woolen goods market. Interest is largely centered in what will happen to civilian contracts now held by mills. Production is largely for Government requirements and prices are being regulated, not by the supply, but by the Government. In the cotton goods market there has not been the tendency towards a decline that there had been previously, and a much steadier tone of buying and selling has been in evidence. The outlook is uncertain. The market is in the balance and probably will continue so until some definite change in fundamental conditions.

The Iron Age—The most serious factor in the situation is the loss of three months' time in the placing of locomotive and car orders—a delay costing the Allies thousands of tons of steel that by no possibility can now be delivered in 1918. Some of the steel for the new cars has been allocated this week, including 135,000 tons of plates to the Steel Corporation. The total of plates, shapes and bars for cars is 922,110 tons, deliveries to be made in 120 days, beginning June 20. Important among the price adjustments announced on May 21 was a $6 per ton advance on cast-iron water pipe, a reduction of 25c. per 100 lb. for structural and ship rivets and 15c. for boiler rivets (a differentiation now being made) and a reduction of about 5 per cent. on smaller rivets. Copper-bearing low-phosphorus pig iron was advanced $2 per ton.

Atlantic Seaboard

BOSTON

Output continues disappointing. Car supply and railroad fuel questions still unraveled. Manufacturers not on preference list most anxious over outlook. Renewed efforts to close contracts on water coal, but those not already "covered" all-rail are discouraged. District representatives have hands full. State administrators busy lining up "requisitions." "Storrow coal" all-rail order not yet renewed. Hampton Roads coal not in even supply at piers. Boats still short. Some Lake-built steamers begin to arrive. Market for coke has bearing on West Virginia output. Latter likely to fall short of 1917. Whole situation beset with difficulty. Receipts by water quite irregular, and yet Washington wonders why coal is consigned all-rail to points adjacent to Tidewater. Anthracite deliveries continue to show falling-off as compared with a year ago. Large movement of steam sizes and a noticeable favoring of water shipments to Maine ports.

Bituminous—Notwithstanding the rosy reports that issue from Washington summarizing output all over the country, the regions from which New England draws the major part of its supply are steadily falling behind last year's marks. There have been days lately when car supply in central Pennsylvania showed real improvement, the proportion placed for general commercial purposes, including preferred industries, having risen to something over 50 per cent. It can no longer be urged that a New England "priority order" is chiefly to blame for the small tonnage available.

There is a new drive now upon the New River and Pocahontas agencies to get commitments on water coal. Those shippers who have not sold all the tonnage they are hoping to get are being besieged to take on new business. The line is very closely drawn, however, and those factors who own their own wharves and boat facilities have practically ceased making sales. Others who are partly or wholly dependent upon bottoms on trip-to-trip charters are careful not to undertake orders until the coal is definitely en route to the discharging point here. Instances multiply where industrial buyers are unable to make any arrangement either by rail or water, and to this small army of the "uncovered" should be added a large number of others who have contracts but are getting only small deliveries.

The volume of coal at the Virginia terminals continues quite uneven. Days there are when coal is not on hand to load boats, but generally speaking there are more instances of coal waiting for vessels than of vessels waiting for coal. Under the joint pool arrangement now in force a shipper having ample credits at one pier or another is permitted to draw from the supply at a pier other than where it would usually be furnished. This has led to misunderstanding among some of the coal people, especially when the present relative prices of Pocahontas and New River show a differential of 35c. The shortage of boats is still a great factor in making buyers consider seriously all suggestions for decreasing the quantities consumed. Not only did representatives of the Shipping Board scale down Mr. Storrow's estimate of the coastwise tonnage needed, but actual receipts of coal are far short of the smaller amount they fixed. At times a whole week goes by without a single cargo being available at Boston for distribution inland. Rehandlers who took contracts and made their estimates on the basis of steamers and barges then in hand are not getting coal in the volume expected, and there is much anxiety on the part of some of the largest steam users, who had reason to think their needs for the present at least would be comfortably supplied.

The first of the new lake-built 3000-ton steamers are now reaching here with cargoes of Cape Breton coal. This will help slightly, but not more than 100,000 tons can be counted on in this way; and this is really a much smaller tonnage when the quality of the coal is taken into account. The cargoes have been placed mainly with large plants at points adjacent to Searsport, Portland, Portsmouth and Boston, and probably in every case the coal will be turned in for immediate use.

The strong demand for coke has an important bearing on the output to be expected from the smokeless fields in West Virginia. Particularly is this true of Pocahontas operations, where years ago coke ovens were installed on a liberal scale for the purpose of increasing the car rating for individual mines. With the present authorized price of coke, to make a ton of which requires only 1.6 tons of slack, every ton of the latter so used will show the operator an extra profit of $2 per net ton over the fixed price for slack when shipped as commercial coal. The result is a big decrease in the volume of shipments from certain mines, a decrease which will spread to other operations sufficiently equipped with coke ovens. It almost seems as if this item should be given attention before too much tonnage is lost. While coke has got to be had for blast furnaces, yet it is easy to see how coke production in some districts can be overdone.

Another subject calling for prompt treatment at the hands of the fuel authorities is the order allowing a premium on coal "mechanically cleaned." The present regulation is much abused and a lot of unfairness results. Operators who need picking tables to make the coal merchantable are collecting the premium while others who have always been able to keep their output clean through rigid inspection and handpicking are denied the bonus. And both coals are pooled when shipped to tidewater!

Certainly the present state of the trade is alarming for New England. In no direction is there hope of adequate service. The areas ordinarily served almost wholly by water-borne coal would show shutdowns in considerable number were it not for the volume of coal coming all-rail that at present is just about enough to make up the shortage at tidewater for current consumption, but far behind what is needed to give a reserve for increased consumption and diminished receipts next fall and winter. And yet the regulating power in Washington continues to speculate just where an imaginary line should be drawn between an all-rail "zone" and a tidewater "zone." Surely if the central Pennsylvania district, for instance, is to cut down even the smaller quotas furnished for New England in 1915 and 1916 we have a hard time ahead of us.

A sign that the Fuel Administration means business is a recent circular sent through district representatives to operators and shippers. The latter are required to make shipments to industries on Preference List No. 1 and on requisitions issued from Washington or by the district representatives until such industries and individual plants that are on Preference List No. 1 are supplied with the necessary coal. Shipments going forward outside of the above classifications will be diverted and reconsigned.

Anthracite—While anthracite receipts all-rail are keeping up measurably well with the volume of the last three weeks, the showing is still unfavorable as compared with corresponding weeks in 1917. About 30 per cent. continues the proportion of steam sizes as compared with domestic. By water the tonnage shipped from Philadelphia and New York begins to show the result of instructions to favor eastern ports, particularly those on the Maine coast. While there is much pressure on retailers, the attitude of the latter is perhaps a shade more hopeful than a month ago.

Rates on certain anthracite-carrying barges from New York to Boston, and owned by anthracite shippers, were advanced May 11 from $1 to $1.50, making this rate the same as on anthracite in Reading barges from Philadelphia.

NEW YORK

Shipments of anthracite far below requirements, but dealers are optimistic. Sufficient orders booked to keep them busy for months to come. Appointment of Mr. Wiggin's successor urged by trade. Coal men and merchants confer. Trade urges retention of men in mines. Car supply improves in bituminous fields, but labor is short.

Anthracite—There has been practically no change in the movement of coal to this market, and while two months of the coal year are almost over and conditions serious, there is an optimistic feeling among most of the trade that there will be plenty of coal to go around between now and October.

The appointment of a successor to Albert H. Wiggin, who resigned as state fuel administrator a few weeks ago, is being urged by local coal men. Several names have been suggested, among them Reeve Schley, fuel administrator for New York County, Harry T. Peters, of Williams & Peters, who was chairman of the State Fuel Conservation Committee under Mr. Wiggin, and Wilber A. Marshall, of Marshall & Co.

Several conferences have taken place the past week, all looking toward securing for this city a sufficient supply of coal. One was a conference in the Chamber of Commerce attended by members of that organization's committee appointed to look into the coal situation, and several members of the trade, among whom was J. B. Dickson, of Dickson & Eddy, who is a member of the Anthracite Committee of the United States Fuel Administration.

Shipments during the week ended May 11 show a decrease of 2256 cars, or 5 per cent. over the preceding week. This decrease is reflected in the dumpings at this port for the week ended Monday, May 20, when 6346 cars were dumped as compared with 7546 cars for the week ended May 13.

With shipments prohibited to 24 states, it is expected that receipts here will gradually increase. However, until more bins are filled and the public is assured that there need be no anxiety regarding coal for next winter, dealers expect a steady demand.

Egg and stove are the sizes most wanted, and consequently the shortest in stock. Many householders use no other size and the result is that while dealers are able to deliver either chestnut or pea, they have none of the other larger sizes.

Buckwheat No. 1 is nearly as scarce as the larger coals, but rice and barley are easy with prices being held tight, except on some of the cheaper grades.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.15	$6.90
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	3.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	.....

Bituminous—An improved car supply has not had an appreciable effect on local conditions. Demand continues far ahead of supply and the desire to get coal remains strong. Free coals are scarce at this port and what is to be had is said to be the inferior grades.

A serious condition exists in the bituminous mines with regard to labor. Workers are scarce, and even with the improvement in cars operators find it difficult to increase their output sufficiently to load the cars given them. It is fast becoming apparent that something must be done to induce the men to remain at the mines, otherwise operators believe the shortage next winter will be greater than it was last.

While production figures for the week ended May 11 show an increase of 252,000 tons, or 2.2 per cent. over the previous week, the dumpings at the local docks for the week ended May 20 were 6625 cars as compared with 6484 cars for the week ended May 13, an increase of 141 cars.

The local trade is eagerly awaiting a decision from Washington as to railroad fuel. Another month will see the termination of nearly all contracts for railroad coal, and the trade is desirous of knowing if the railroads will be permitted to get their fuel at prices below what the general public will be asked to pay.

Delay in shipping coal from the mines to tidewater is complained of by some shippers who handle good grades of bunker fuel. This delay, they say, in many instances causes them heavy losses owing to the failure of the railroads to forward cars promptly. When the coal does arrive it

may be that the vessel for which it is intended has already sailed, or is about to do so. Then it becomes necessary for the shipper to seek another customer while the coal may have been loaded into a barge, which results in additional costs to the shipper.

BITUMINOUS PRICES

	F. o. b. New York Price Gross	Mine Net	Gross
Central Pennsylvania.....	$5.06	$3.05	$3.41
Maryland:			
Mine-run.....	4.84	2.85	3.19
Prepared.....	5.06	3.05	3.41
Screenings.....	4.50	2.55	2.85

PHILADELPHIA

Anthracite shipments not up to expectations. Customers clamor for coal. Rail movement expedited by freight embargo. Domestic coal for manufacturing. Labor supply decreasing. Operators quizzed on shipments to utilities, etc. Steam coal all taken. Bituminous shows some improvement. Cars still short. Some stocking by plants. Coke price increase rumored.

Anthracite—With the big companies making heavy consignments to New England, the Philadelphia trade is naturally being neglected for the present. During April the market received close to its full quota or one-twelfth of its proportion, based on the 1916-17 receipts. The dealers fully expected as much or more this month, but judging from the present outlook the tonnage will run behind locally. The shippers, especially the larger ones, appear strong in their determination not to exceed their allotment in any case, and for the present at least the dealers who receive that much are considered as having received fair treatment.

The embargoes on domestic freight which became effective the middle of the week it is believed will greatly aid in the delivery of coal after it leaves the mines. This will be a big relief, as for the past two months the notice of a shipment meant little to the dealer, as he had no idea when to expect the coal.

At a meeting this week of the anthracite distribution committee and those most interested in that work, including a representative from Dr. Garfield's office, it was learned that while early in the season it was proposed to ship no domestic sizes of coal to manufacturing plants, it has already become necessary to make exceptions to this to the extent of over 2,000,000 tons for war work. The allotment for cantonments is also sure to be enormous and probably much larger than at first considered necessary.

It has been proposed to ship New England's quota for twelve months during the next nine months. This would mean a repetition of the plan suggested last winter, when because of this city's proximity to the mines it was presumed this market could be cared for almost overnight. It may be that the expected increase in the railroads' equipment, both in cars and engines, would by that time prevent a repetition of last winter's troubles, or at least lessen the severity. It must be said that those close to the situation here profess little optimism as to the future and can see only a season of discontent ahead.

All shippers of anthracite have recently received a communication from the Fuel Administration at Washington in reference to shipments to public utilities and certain essential manufacturing industries. The operators are directed to furnish a list of orders of commitments made with any gas company, manufacturing plant or public utility for the year from Apr. 1, 1918, as well as a similar list giving shipments as made in the year from Apr. 1, 1916. With the latter a list of plants is given and to these concerns the operators are directed to continue shipments without fail.

Gradually new freight tariffs covering anthracite coal are reaching the shipping offices. Practically most points outside of the state are now covered and recently tariffs have been coming in showing increases to nearby points. These increases are in accordance with the ruling of the Interstate Commerce Commission some months ago granting a raise of 15c. a ton. It was thought by some that this increase would not affect the rates within the State of Pennsylvania, but they are now becoming awake to the fact that the above commission has the power to make a general increase in rates regardless of the various state commissions. Up to this time the rates to points in strictly Philadelphia territory have not been increased, but there is no doubt that these tariffs will be received in a very short time. The first notice that many dealers had of the new rates was when they received their freight bills from the railroad company. Of course, all this adds to the retail price of the coal, and it is somewhat difficult to convince the consumer at times that the increasing cost of coal is justified.

In the steam-coal trade there is very little free coal to be had and every car of whatever size soon finds a buyer. It is noticeable throughout the city that heavy users of steam sizes are beginning to accumulate fair stocks of the small sizes, especially rice, and numerous vacant lots have been rented for this purpose and coal is rapidly pouring in.

The prices per gross ton f.o.b., cars for line shipments and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken.....	$4.90	$6.05	Buckwheat..	$3.15	$3.75
Egg.....	4.50	5.70	Rice.....	2.65	3.65
Stove.....	4.75	6.05	Boiler.....	2.45	3.55
Nut.....	4.85	6.10	Barley.....	2.15	2.40
Pea.....	3.45	4.35	.....		

Bituminous—It is difficult to give an accurate statement as to the soft coal trade. Of course, the operators still continue to cry for more cars. We are inclined, however, after a careful canvass of a number of shippers, to the opinion that conditions are improving. Of course, in a way, this is more or less of a general statement and is predicated a good deal upon the quantity of coal one sees upon the tracks these days. Utility plants in particular seem to be faring quite well just now and are putting away good stocks of fuel in excess of their immediate requirements. Quite a good bit of coal is being received in box cars, which would indicate that shipments in this district from wagon mines are growing, as the other mines are not allowed to load box cars in this direction.

BALTIMORE

Bituminous supplies here fairly easy. Anthracite dealers complain of poor receipts, while official fueldom urges consumers to buy at once.

Bituminous—With official Washington undoubtedly fearing a serious coal famine the coming winter, and issuing statements apparently intended to prepare the public for trouble ahead, Baltimore and the surrounding district for the time being is in fairly good supply of soft coal. Diversions here to clear railroad congestion at Cumberland and other points west brought the first element of relief to a rather strained situation, and since that time there has been enough natural flow at tide for all lines to enable a pretty fair distribution to industries here. There is no extra supply of coal on hand. Few industries have any stocks ahead of the time when the next shipments should be due.

Anthracite—All the hard coal dealers here are complaining of poor receipts. Official Washington is urging consumers to order early and insist on early deliveries, and this is being backed by the fuel administrator here. One prominent dealer here said he had more business on his books already than he could possibly supply by October, and that it was useless for him to book more at this time as he could not promise the coal. Many persons have appealed to the Baltimore Coal Exchange, saying they can not get promise of deliveries from dealers. All are being told to place their orders and wait their turn; that their dealers will deliver two-thirds of their orders as soon as they can get the coal. Small dealers especially have been hit by light arrivals recently, and their customers have been the most clamorous for relief.

Lake Markets

PITTSBURGH

Record production in district. Car shortage not serious. Open market for coal.

The Pittsburgh district shared fully in the rise in production reported by the Geological Survey for the week ended May 11, the record week for the country thus far, and conditions since then have improved a trifle more. The Pittsburgh district is easily shipping more coal than ever before in its history. A considerable contribution is made by the river mines, which are getting out a large tonnage, but the railroad mines are also doing well.

Car shortages averaging 15 to 20 per cent. are reported, but the trade is not disposed to regard it that production is actually restricted by this amount by car shortage, for while the supplies run under ratings by that amount it is far from clear that the mines would be able to load cars equal to their ratings in all cases. Indeed, some operators frankly admit that they could not load any more cars than they are receiving, though in most cases they attribute the difficulty to labor shortage.

There is now a fairly open market for Pittsburgh coal, there being a moderately large tonnage of free coal offered openly. As a rule this is taken up by brokers, who are doing a satisfactory business. Their turnover is not so large as it was a year ago, their margin per ton is somewhat less, and there is more work involved in putting through transactions; still the comparison with pre-war conditions is extremely favorable. In the case of Pittsburgh coal there is practically none offered at below the set prices, even to jobbers, and the jobber obtains only the 15c. allowed him, and receives it from the ultimate buyer. In the case of Ohio coal there are occasional offerings at less than the set prices, but not to such an extent that the broker could make more than 15c. a ton, as to do so he would have to buy at more than 15c. below the set price and sell at a correspondingly higher figure.

An open market is quotable at the set maximum prices, $2.20 for slack, $2.45 for mine-run and $2.70 for screened coal, plus 15c. in the case of coal sold by brokers.

BUFFALO

Receipts of bituminous slowing up. Still too much of it in Canada. Eastern embargoes hold up movements badly. Anthracite normal by Lake. More wanted locally.

Bituminous—It is generally held that the production is not much in excess of consumption, if it is equal to it, and yet jobbers find that consumers are holding off as soon as they get a moderate supply. It is again reported that Canada is pretty full of coal. Shippers have paid so much demurrage that they are more cautious, but they still manage to get a big supply across, mostly because they cannot sell it readily here. Locally the situation is easy. Consumers can get what they want without much difficulty.

The Government prices of bituminous continue without evasion, so far as can be observed, being $4.45 for all sizes of thin-vein Allegheny Valley, $4.25 for Pittsburgh lump, $4 for Pittsburgh mine-run and $3.75 for Pittsburgh slack, all per net ton, f.o.b. Buffalo.

Anthracite—The main new feature of this branch of the trade is that lake shipments have again gone above the 100,000-ton mark, where the movement ought to stay till the upper lake ports get as much as they need. All of our water shippers who are commonly active through the season are now loading vessels, and they will no doubt go on as usual. There are several occasional shippers, but they did little or nothing last season and they may not enter that branch of the trade now. It will all depend on the amount of coal they get out and how heavy the eastern demand turns out to be.

The local demand continues heavy, so that the authorities have to parcel out the coal in small lots as it comes in. Some of the more calculating people think it would be better to give everybody a full winter's supply as fast as possible and take them off the list. As it is now, with only a partial supply distributed everybody is trying to get more. The size is nearly all chestnut. How big furnaces are to burn it is not explained.

Lake shipments for the week were 101,500 net tons, of which 44,050 tons cleared for Chicago, 29,100 tons for Duluth and Superior, 3700 tons for Hubbell, 3500 tons for Green Bay, 3200 tons for Lake Linden, 14,300 tons for Milwaukee, 2200 tons for Sheboygan and 550 tons for Marinette. Rates were $1 to Marinette, 60 and 65c. to Chicago, 55c. to Milwaukee, 50c. to Sheboygan and Green Bay, 48c. to Duluth, 45c. to Hubbell and Lake Linden.

DETROIT

With steam coal supply fairly plentiful there is a deficiency of domestic, both bituminous and anthracite. Lake shipments diminish.

Bituminous—There is a comparatively free movement of steam coal into Detroit, according to local jobbers, who qualify this statement with the explanation that the larger part of the coal of this description received here is mine-run. Nut, pea and slack sizes are included in the receipts, but in each case the quantity is small. This is especially so as regards slack. The expectation that slack would be provided in larger amount with the opening of navigation on the lakes is not being fully realized.

There is a marked deficiency in supply of domestic sizes of bituminous. Whether this is the result of shipments of such coal to ports at the head of the lakes is not quite clear. Retail dealers complain they are experiencing considerable difficulty in covering their requirements for lump, suitable for household use.

Anthracite—No improvement in supply of anthracite has developed during the week. Shipments received by dealers are small and wholly inadequate for filling orders from customers. Practically none of the retail yards have more than a few tons on hand and most of them are declining to accept orders for later delivery.

Lake Trade—Instead of increasing in volume the lake movement of coal appears to be shrinking. About 100,000 tons a day is the average loading and the bulk of the traffic is handled by contract carriers. Small freighters, operating without contract, find cargoes difficult to find. One result is that many ships are making the upbound trip without cargo.

COLUMBUS

Activity in mining is gradually increasing with a better car supply. Demand is strong all along the line.

The coal trade in Ohio has continued strong and active in every way during the past week. Production was larger than in former weeks, and the movement generally was good. Retail demand continues strong and the same is true of steam sizes. The lake trade is gradually increasing. With a continuation of the better car supply it is believed that production will be kept at a high level. Prospects are for continued activity in every department of the trade.

The retail trade is now attracting considerable attention from producers and distributors. While the lake trade is taking a considerable tonnage from the retail trade, still a large tonnage is going to retailers. Dealers are anxious to accumulate stocks in order to take care of the heavy retail demand. Consumers are heeding the campaign on the part of the Fuel Administration to buy now for next winter, and consequently dealers are busy. Consumers are not waiting for the fancy grades but are taking any variety available. It is reported that little Pocahontas is expected to arrive in this territory. West Virginia splints are coming in better, but the amount is not so large as in previous years.

Steam business is active, as larger users are again trying to stock up to guard against a shortage if an increased tonnage goes to the Northwest. The smaller users are also showing a disposition to stock up. Consequently all steam grades are quickly snatched up, and there is no surplus mine-run on the market. Railroads are taking a larger tonnage.

The lake trade is active and all lake shippers are rushing a large tonnage to the lower lake ports. Loading machinery is busy and vessels are moving smoothly. The ore movement is increasing also under the influence of a better coal movement. Practically all lake shippers have now received their permits and are ready to go ahead in earnest.

The output in Ohio districts is increasing to a nice extent. This is especiallly true of the Hocking Valley section, which is producing about 90 per cent. of the average. In the Pomeroy Bend district the output is also large, and the same is true of Crooksville and Cambridge. In eastern Ohio the car supply is better, but there is still a serious shortage and the output is estimated at 80 per cent.

CINCINNATI

Maximum activity prevails in connection with supplying storage demand and forwarding coal to Lakes, this movement being very heavy.

With a good car supply and a correspondingly increased production, there is still hardly enough coal coming forward to take care of all the demand which now exists, since the movement to the Lakes for forwarding to Northwestern ports has reached a good volume. The usual situation, in which virtually all of the coal passing through this point during the late spring and early summer months was permitted to go onto the Lakes, does not now exist, as the demand for coal for storage by local consumers, both industrial and domestic, is sufficiently large to take care of all the available fuel for some time to come. However, the trade is taking its time in the matter of supplying this demand, and while deliveries for storage are increasing in volume, it is felt that as there are several months in which to satisfy the requirements of consumers for storage there is no cause to worry. Whether there will be difficulty in future in making up the deficit which now exists in the matter of production as compared with total requirements is another matter. Distributors feel that they are handling the situation now as well as possible, and that if the volume of coal moved forward from the mines can be increased as the season advances there will be no difficulty in caring for the demand from all quarters.

LOUISVILLE

All coal a little long, with exception of domestic. Steady demand for domestic for stocking purposes, with retailers unable to secure surplus yard stocks.

The general demand for all grades of coal is fair at this time, but steam coal has not been so active as domestic coal, which is moving much better than ever known at this time of year. However, operators are having no difficulty in disposing of mine production.

In the eastern Kentucky district the car supply has improved materially, and mines are now getting about 80 per cent. of their car requirements. However, the mines are not able to operate more than 50 per cent. full time, due to the shortage of labor, which is being intensified by the draft and the agricultural demand. The use of farm tractors has relieved the agricultural demand to some extent, but with improved weather conditions many men have deserted the mines for work in the open fields.

BIRMINGHAM

Domestic and steam coal demand active. Heavy tonnage required by the railroads menaces supply for industrial plants. Brokers besieged with orders which they are unable to handle. Production badly off, which makes the situation more tense.

The shortage of coal to supply the demands on the local market is the most serious factor in the situation here—which applies to both the domestic and steam product.

Domestic dealers are clamoring for shipments and are only getting about half the tonnage they desire, which is being promptly distributed to their customers, in some instances being loaded direct from the cars into the wagons. All sections of the zone are making insistent requests for coal, and the output of the domestic mines is being prorated over the whole territory. However, one reassuring feature is that every consumer that possibly can do so is laying in coal for next season's use. Dealers cannot see far ahead in respect to the amount of coal they are to receive from the mines, as few contracts have been made, shipments being made principally on verbal understandings covering a limited period.

All rail lines in this district are drawing heavily on the coal supply, particularly the Southern and Louisville & Nashville, claiming the full tonnage taken is used in current operations, no effort at stocking being made. The Southern's quota is 46.84 per cent. of the output of the mines on its lines, aside from operations of furnace companies and strictly domestic producers. During the past week cotton factories, which are quite numerous in this zone, were added to the priority list. Brick plants and other less essential operations are receiving a restricted supply.

Coal production is not satisfactory, complaint being general that miners and mine workers are showing a disregard for regularity at work, which is seriously curtailing the output. Increased wage schedules, as in the past, have not proved a panacea for this ill.

Coke

CONNELLSVILLE

Slightly increased shipments. Less complaint of car shortage. More Connellsville coal to be shipped. Iron industry fairly well supplied. Little coke surplus for open market offerings.

There has been only a slight increase in the shipments of Connellsville coke, but there has been a larger increase in the shipment of Connellsville coal, partly against new byproduct coking operations about to begin operations. While there remains much complaint as to car shortage, there is less than there was, and there is more complaint about labor shortage, particularly along the line that now that the men are offered more steady work they take more days off, as they can spare the money. Two or three months ago men were hanging around the works in hopes that cars might come in and give them work, while now some of them do not report when work is assured.

On the whole coke conditions are rather satisfactory as compared with conditions up to a few weeks ago. This is reflected in the operation of blast furnaces, as practically all the furnaces in blast are receiving adequate supplies and are operating at capacity, the only curtailment in pig-iron production being through a few furnaces remaining out of blast waiting for coke to accumulate.

It has become fairly clear that Connellsville coke production is unlikely to increase materially over the rate of the past few weeks, say 325,000 to 350,000 tons a week, but there will be increases in the coal shipped to byproduct operations. The production of coke in the United States in the ten weeks ended May 11 was at the rate of 10 per cent. above the rate in 1916, while the present blast furnace capacity is only between 10 and 15 per cent. in excess of the actual pig-iron production in 1916, from which it follows that with a slight further increase in coke production, with the diversion of as large a proportion of the coke to blast furnaces as formerly, which of course is to be expected, and with coke of as good quality as formerly, the iron and steel industry should be fully supplied with coke.

Shipments continue to be rather fully taken up by contracts, but some furnaces are reaching a point where they are disposed to have shipments under contract curtailed somewhat, and in the course of time this may result in general offerings in the open market. At present such offerings are rather exceptional. The market is quotable at the set maximum prices: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended May 11 at 341,110 tons, an increase of 7655 tons.

Buffalo—The supply is light and is obtained mostly from the ovens direct. If any is controlled by jobbers here it goes to Canada, where a commission is allowed. In fact the trade is not restricted there, so the supply is rather good. Shippers say that quite an amount of coke-ash siftings is coming this way. It is fit for nothing but to mix with coal for making steam. It is sometimes so low in value that it has to be sold to the railroads at very little more than the freight. Furnaces are running actively and ore is coming in freely by lake.

Birmingham—Coke market conditions are ideal so far as the demand for the product goes, but the supply during the past week or so has been crippled by labor shortage and other operating disabilities. One of the larger foundry-coke producers reported his output about 40 per cent. off; others much under normal. Transportation facilities are now good and ample cars are being furnished for both district and foreign use.

Middle Western

GENERAL REVIEW

Car supply shows some improvement, but miners fail to respond to their opportunities.

In most sections of the Middle West there was an improvement in the supply of equipment during the past week, but miners failed to avail themselves of the opportunity to increase production. Semi-monthly pay day occurred on Wednesday the 15th, and the fact that the miners are now making more money than ever before causes many of them to support the saloon without regard to the country's needs for higher efficiency in coal production. The immediate stopping of the sale of intoxicants would measurably increase coal production, and also render a beneficial service to both the miners and their families, reduce accidents to the lowest possible unit, and redound to the good of the public generally.

Market conditions continue to be satisfactory on all grades with the exception of No. 5 and screenings. These two grades are giving sales managers some worry. This is particularly true of the central and northern Illinois group as well as of Indiana. Prices continue to remain on a level with established maximums. In some instances, it has been noticed that the producer was compelled to give the jobber 10 and 15c. per ton margin in order to move screenings and No. 5. This margin was not reflected in any reduction to the ultimate user, the only difference being that the Government pit mouth price was paid to the jobber instead of to the operator. Such sales were limited and had little effect on general market conditions.

The railroads are not buying in excess of their immediate needs, and the movement of prepared coal to the householder continues to be gratifying. Mines in Franklin, Saline, Williamson, Perry, Jackson and many other Illinois counties, as well as a large number of Indiana operations, have sufficient orders ahead for size coal to keep them going for some time to come. Retail dealers everywhere are unable to accumulate any storage stock and are able to unload from the car and haul direct to the customers' basement all the coal they can get.

CHICAGO

Conditions indicate some improvement. Screenings troublesome in some cases.

In many respects the coal market shows some improvement over conditions 30 days ago. The unusual demand makes all efforts to supply size-coal orders seem insignificant. The buyers seem willing to absorb everything in sight and indicate their willingness to place orders for months in advance. On the other hand, producing companies hesitate to load themselves with contracts for any grade other than fine coal, which grade they are compelled to make if they are able to supply the trade with lump, egg and nut. Operators contend they may be compelled to load railroad mine-run in order to protect their operation against an accumulation of no-billed cars of fine coal, unless there is a heavier buying of the latter grade. Although a slightly better average can be maintained by separating and selling at Government prices, no operator is willing to accept large orders for size coal unless he has fine coal contracts enough to take all his screenings.

The movement of anthracite showed some improvement during the past week but is still short of expectations.

Quotations in the Chicago market are as follows, per net ton f. o. b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La. Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky
Domestic lump	$2.65@2.80	$2.65@2.80	3.10@3.25
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25
Egg	2.65@2.80	2.65@2.80	3.10@3.25
Small egg or nut	2.65@3.80	2.65@2.80	3.10@3.25
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00
Screenings	2.15@2.30	2.15@2.30	2.60@2.75

MILWAUKEE

Federal agents investigating the cost of handling coal over Milwaukee docks. Dealers holding back deliveries of hard coal until a price schedule is fixed. Receipts by Lake slow and not up to last year's record.

Six special agents of the Federal fuel administration office are in Milwaukee studying the cost of handling coal over the docks. Their findings will determine the price of coal to Milwaukee consumers. No attention will be given to the cost of transferring coal from cars.

State Fuel Administrator Fitzgerald admits that dealers are disinclined to make deliveries of hard coal until prices are fixed by the Government, but he urges consumers to place their orders promptly nevertheless, as deliveries will be pushed as soon as a scale of prices is promulgated. He also enjoins users of soft coal to put in supplies before the season of car shortage begins and to keep a 60-day stock on hand. He reports that Illinois producers are so swamped with orders that no deliveries are promised until six weeks after receipt of orders.

Coal cargoes are slow in arriving, and the record thus far is considerably behind that of last year, up to this time. Since last week's report 13 cargoes have been received at Milwaukee, amounting in all to 87,376 tons, of which 11,370 tons were anthracite. Cargo receipts up to and including May 20 aggregate 303,359 tons, of which 58,972 tons were anthracite.

The city of Eau Claire has abandoned its plan to establish a municipal fuel plant until after the war, because an issue of bonds to the amount of $10,000 would be necessary to carry out the project.

ST. LOUIS

A somewhat strenuous market on high-grade coals. A heavy demand with no supply to meet it. Standard market easier. Car supply short on many roads, and transportation unusually slow. No steam demand and railroad buying light.

There continues to be a demand for Carterville district coal that cannot be met, and operators are having orders forced on them that at the present time means some time in July before they will be shipped. A determined effort is being made by the Fuel Administration and dealers to prevail upon the public to buy the coals that are most available, but the demand for Carterville continues in spite of these efforts.

In the Carterville field cars are short and nearly all mines are showing a decreased tonnage on account of labor shortage. The railroads are falling down miserably in a general way on transportation. The Iron Mountain and the Illinois Central are especially bad, and in the St. Louis terminals conditions are beyond description.

Embargoes are on daily to certain parts of the city and surrounding territory on account of the congested manner in which coal and other freight is being handled in the terminals. The Fuel Administrator's office has been obliged several times in the past week to order embargoes against coal released.

Coal yards are without coal for as long as three or four days, and then have enough coal put in on one switch to last for almost a week. In the Duquoin field conditions are somewhat similar to those in the Carterville field.

Mt. Olive district presents normal conditions at this time. The production, which is being pushed to the utmost, is just about equal to the demand, except on steam coal, which is dragging here, as everywhere else. Working conditions are good and the car supply is fair.

In the Standard fields the Mobile & Ohio is in bad shape for cars and the Illinois Central comes next. Transportation on most all the roads is extremely bad, excepting on the short lines. Labor conditions are not all that they might be, but it is because of a scarcity of men accounted for by the draft and by those who leave to take positions that pay better.

The Illinois Southern transfer at St. Genevieve, after being out of commission for the past few months, is again working, thus getting a supply of coal for the southeast Missouri lead mines, and is relieving the congestion at East St. Louis.

There is, however, a better tone to conditions in the Standard field, and just as soon as the railroads start to buy, which ought to be pretty soon, this is going to improve.

Domestic demand is as great as can be handled at this time, and yet there is an over-production of coal in the Standard field. Railroads should be taking this for storage, but they are not doing so. Later on, when the poor of the country must have coal, the railroads will come in and have it confiscated.

There is practically no anthracite coal coming in and very little Arkansas.

The circular here is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@3.00	$2.65@2.80	$2.65@2.80
3x6-in. egg	2.65@3.00	2.65@2.80	2.65@2.80
2x3-in. nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 2 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 3 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 4 nut	2.65@3.00	2.65@2.80	2.65@2.80
No. 5 nut	2.15@2.40	2.15@2.40	2.15@2.40
2-in. scrgs	2.15@2.40	2.15@2.40	2.15@2.40
2-in. lump	.....	.....	2.25@2.50
3-in. lump	.....	2.50@2.65	.....
Steam egg	.....	2.35@2.50	2.25@2.40
Mine run	2.45@2.60	2.45@2.60	2.45@2.60
Washed:			
No. 1	2.65@3.00	2.65@3.00	2.65@3.00
No. 2	2.65@3.00	2.65@3.00	2.65@3.00
No. 3	2.65@3.00	2.65@3.00	2.65@3.00
No. 4	2.65@3.00	2.65@3.00	2.65@3.00
No. 5	2.15@2.30	2.15@2.30	2.15@2.30

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

General Statistics

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of February, 1918, as compared with the corresponding month of the previous year:

	1918 Tons	1917 Tons
Coal	3,225,974	2,471,359
Coke	225,258	203,766
Total	3,451,232	2,675,125

APRIL SHIPMENTS OF ANTHRACITE

The shipments of anthracite in April, 1918, as reported to the Anthracite Bureau of Information, amounted to 6,368,372 tons, an increase of 776,074 tons, or almost 14 per cent. over those of the corresponding month of last year. Despite several record-breaking months during the coal year ending Mar. 31, and the remarkable showing for the entire year, the April, 1918, shipments are close to the high monthly average maintained during the year. The shipments by carrier companies in April 1917 and 1918, were as follows:

	April, 1918	April, 1917
P. & R. Ry	1,233,512	1,004,028
L. V. R.R.	1,175,027	988,873
C. R.R. of N. J.	649,621	626,501
D. L. & W. R.	1,008,018	893,458
D. & H. Co.	771,553	639,495
Penna. R.R.	448,374	433,314
Erie R.R.	695,186	664,609
N. Y. O. & W. Ry	185,650	145,179
L. & N. E. R.R.	322,167	298,220
	6,489,108	5,693,677
	120,735*	101,378*
	6,368,373	5,592,299

* Deduction: Tonnage reported by both C. R.R. of N. J. and L. & N. E. R.R.

CHESAPEAKE & OHIO

Following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for the month of March, 1918, and the three months ending Mar. 31, 1918:

COAL

To	March 1918	March 1917	Three Months 1918	Three Months 1917
Tidewater (bituminous)	528,670	599,147	1,344,756	1,625,050
East (bituminous)	275,247	248,930	955,950	773,325
West (bituminous)	1,365,126	1,079,451	3,347,498	3,121,346
Company's fuel (bituminous)	209,216	260,701	579,073	654,869
From connections (bituminous)	135,432	171,150	347,715	454,975
Total	2,513,691	2,359,379	6,574,992	6,629,565
Anthracite	784	1,590	7,046	2,934
Total coal movement	2,514,475	2,360,969	6,582,038	6,632,499

COKE

To	March 1918	March 1917	Three Months 1918	Three Months 1917
Tidewater	.....	.....	.....	.....
East	22,663	10,150	68,325	37,773
West	15,769	25,808	52,212	73,457
Total	38,432	35,958	120,537	111,230
From connections	7,668	7,499	15,903	19,884
Total coke movement	46,100	43,457	136,440	131,114

COAL AGE

Volume 13 NEW YORK, JUNE 1, 1918 Number 22

Americanizing the Foreigner

PATRIOTISM is the oil that lubricates the machinery of victory. Lacking vision or ambition, we shall find ourselves unready to do our utmost at this time of the country's great need. We must be enabled to sense our citizenship, or we will not work hard enough and steady enough and live rigorously enough to buy a fair quota of Liberty Bonds and do our part for the Red Cross.

Flag Day, which will occur on June 14, offers us another opportunity to rededicate ourselves to the purposes that we recognize are noblest in our national life and to deepen the pure spirit of Americanism in the hearts of all Americans. It also gives us another occasion on which we can show to those who have come to this land from beyond the seas the aims that animate our hearts and regulate our lives.

But let us beware of some of the dangers of Flag Day. That day for the foreigner should be a time of welcome and not of reprobation. The foreigner will never be made a good citizen by condemnation of his friends across the ocean. The bitternesses aroused by unfavorable comparisons have done not a little to vex and disgust those who have come among us.

Only a little while ago our orators were repeatedly and unctuously thanking the Almighty that we, unlike the nations of Europe, were not engaged in slaughter. We are now, as we should have been from the first, fighting in the advocacy of Democracy and Justice. Let us not spend our time, therefore, in vain comparisons, which are always unfortunate and sometimes not fair. Worse than boasting is the disparagement of others.

We have much to be proud of and much to be grateful for. Let us congratulate ourselves on what we have. Let us not be like a certain large generality of people who can only get happiness out of the peace following a thunderstorm by rejoicing that some other man's barn was hit and not theirs. They cannot rejoice in a good crop unless they are able to say that some other man's field suffered from a drought. They find no points for admiration in their own trotter unless they can point to some poor cripple that it passed on the road.

It may be that the foreigner is the man of the stricken barn, the blighted field and the crippled horse, but no good will come of reminding him of his misfortunes. In the language of the street, "Have a heart." What a foreigner wants more than your praise of America or your denunciation of his fatherland or motherland is the grip of your hand, the tremor of your voice and the exaltation of service that your patriotism evokes.

Much Flag Day oratory is like the red flag waved in the eyes of a bull. It is utterly undiscerning and unsympathetic. "Come with us," should be the message of the day to the foreigner. "Come with us, and we together will make this America a new earth—a country full of sympathy and understanding, a land of domestic peace and helpfulness, a land of unity and good works. We have given an earnest in the past of our good will to all men. It is our purpose that in the future the measure of our intentions shall be no less inclusive and generous."

On Flag Day there will be some mines in the bituminous fields without opportunity to work. Let such mines hold an all-day celebration. Other plants in the same district, with the promise of cars for Flag Day, can make their commemoration after the day's work is finished.

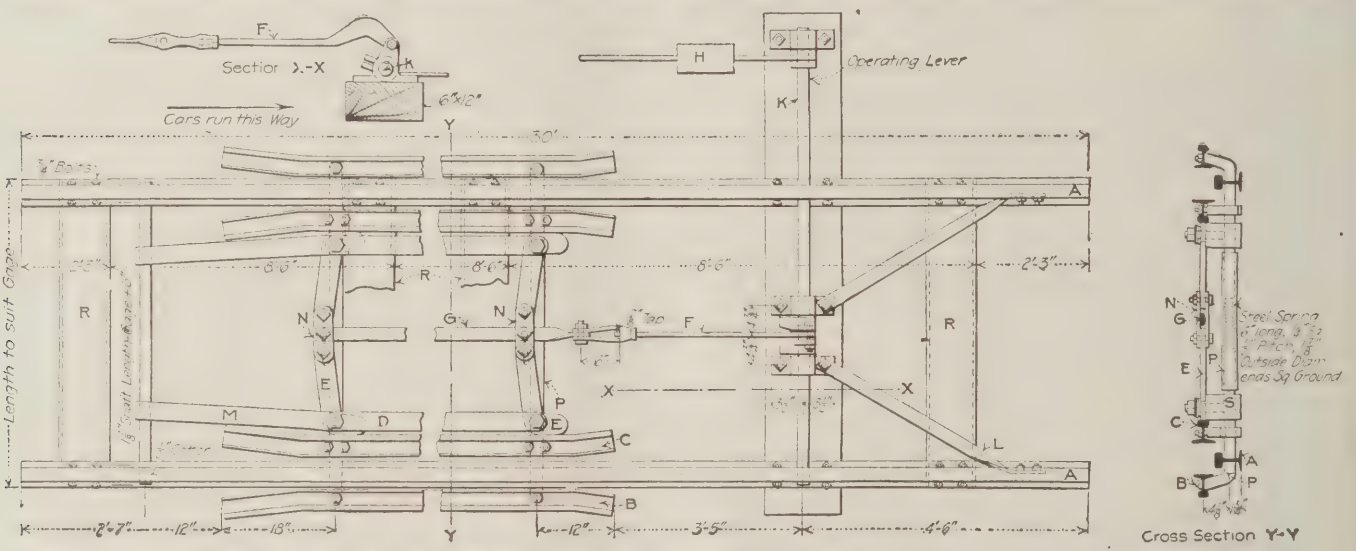
The operator should not fail to give his fullest support to the national movement now being made for the proper observance of this important holiday. A celebration may cost him some money, but if he hesitates to give a little to the performance of this patriotic duty he is lacking in the spirit of a true American.

IDEAS AND SUGGESTIONS

Piatt Car Spragger

At certain points around collieries where trips of mine cars are handled, it is essential that the movement of a car or a trip of cars be checked within a car's length or even less. It is readily seen that, at the foot of car hoists or planes at breakers, for example, where loaded cars are feeding in continually, they must be controlled absolutely. It is rather unfortunate when a loaded trip piles up in the shaft bottom.

An official at the Franklin colliery of the Lehigh Valley Coal Co., near Wilkes-Barre, Penn., has worked out a scheme for spragging or retarding cars which is shown in detail in the accompanying illustration. It is known as the Piatt car spragger and is the invention of James Piatt, outside foreman at the Franklin colliery. It is installed at the foot of the car hoist of the Franklin breaker, among other applications, and was



CAR SPRAGGER IN USE AT FRANKLIN COLLIERY OF LEHIGH VALLEY COAL CO., NEAR WILKES-BARRE, PENN.

doing effective work at the time the writer saw it in operation.

By reference to the accompanying illustration, its method of operation may readily be seen. Briefly, the rims of car wheels are clamped in a vise at the rails on either side at the mine car by the simple throw of a lever. Its action is positive and entirely reliable. As to the details of the device: The mechanism of the retarder is attached to the track rails *A*, within a few feet of the bottom of the hoist. *B* and *C* are rails which constitute the clamp holding the rims of mine car wheels. These rails *B* and *C* have their base vertical and are so adjusted as to come in contact with the rims of wheels when thrown into engagement.

The outside clamp rails *B* are rigidly connected by the linking iron *P*. Their position relative to each other is capable of adjustment. Thus when the rails *C* are thrown into clamping position they move toward the rails *B*. If the space between the rails *B* and *C*, in clamping position, is not such as to hold the rims of wheels firmly, then this space is reduced. This is done by bringing the rails *B* closer together by the adjusting link *P*.

The movable rails *C* are operated by simple mechanism. At intervals along the rails *C*, on either side, are the cams *E*; the short arm of these cams engages the rails *C*. The other ends of the cams are connected by the yokes *N*, the reach rods *G* and the toggle iron *F* to the lever shaft *K*. The forward movement of the operating lever *H* on the shaft *K*, through the foregoing connections, produces a movement of the rails *C* toward the rails *B*. The pivot of the cams *E* is rigidly attached to the iron *P* by means of the irons *S*, which are shrunk on *P*.

The track rails *A* are tied together by the 8-in. channels *R*. The lever shaft is mounted on a 6 x 12-in. oak tie; and the toggles, with their operating mechanism, are held in position by the strap irons *M* and *D*. In the illustration the retarder is shown in "open position"—cars can now pass through. When the lever *H* is thrown forward (in the direction loaded cars run), the connecting-rods move the toggles, which force the rails *C* closer to the rails *B*. This vise-like action tends to clamp the rims of car wheels and stop their movement.

When the lever *H* is in its extreme forward position the toggle is on a "dead center," which tends to lock the mechanism in its clamping position. Under the conditions noted the lever *H* rests on the ground and is largely held in that position by the disk weight attached to it, as shown in the illustration. This retarder has the power to hold a trip of loaded cars. If little work is to be done, as is often the case when only a few cars feed in slowly, then ordinary sprags are frequently used. Sometimes sprags do not hold well in wet weather when the rails are slippery. In such cases, and when a long trip gains momentum, then the Piatt spragger comes to the rescue and will do the work well.

Makeshift Rail Bender

By J. A. Smith
Albert, W. Va.

Mr. Dalton's article in *Coal Age* of Apr. 27 brought to mind a makeshift rail bender used in mines where the thickness of the coal bed is less than 6 ft. In many mines using 12 to 16 lb. steel rail in rooms the trackman lays the switch at the foot of the room, after which the miner is required to lay his track and any "turns" necessary. As soon as the first crosscut is driven far enough in to require a turn, if no rail bender is available the miner curves a turn as follows:

He cuts a prop a few inches shorter than the height of seam and then marks the rails at points where curves are to begin. The prop is set vertically and the rail laid between the top of the prop and the roof, with the end of the rail extending through until the point where the curve starts is just over the prop. By bearing down on the long end the rail is bent without difficulty. Rail is then pushed through 12 in. or thereabout and again bent. This is continued until only 4 ft. remains uncurved.

The rail is now spiked in place and the final 4 ft. is curved by slipping a pipe sleeve over the rail and inserting a claw bar therein, when sufficient leverage is obtained to bend the rail to within 12 in. of the end. Both rails of a turn can be curved in 15 min., or less time than it takes to procure a regular bender. The sleeve mentioned is also useful in straightening a rail which is bent close to the end.

Precautions in the Use of Gasoline

In order to minimize the risk of fires, observe these precautions:

1. Keep open lights away from all gasoline cans or tanks, feed pipes, and engines.
2. Use only closed cans or tanks for carrying gasoline into the mine.
3. Use only a closed can, like an oil can, for priming with gasoline, and keep the can where it cannot be knocked over.
4. Never store more than five gallons of gasoline or as much more as is required for one day's work in the mine.
5. Do not let oily waste or rags lie in the engine room. Put them in a metal pail. Use sand to absorb oil drippings.
6. Never use water to extinguish a gasoline fire. Always use a chemical fire extinguisher or smother the fire with sand. Keep a supply of sand in the engine room and the storage room.
7. Use as little wood as possible for fittings in engine room. Where possible cover wooden posts, etc., with asbestos board.

To minimize the danger of explosions:

1. Have the engine room and the storeroom well ventilated.
2. Never let gasoline stand in open cans or tanks.
3. Do not pour gasoline from one container into another near open lights.
4. Do not spill gasoline.
5. Do not use gasoline for cleaning in a closed room.
6. Unless all the openings of empty cans or barrels are closed, always store them with the openings down so that the vapors may escape.

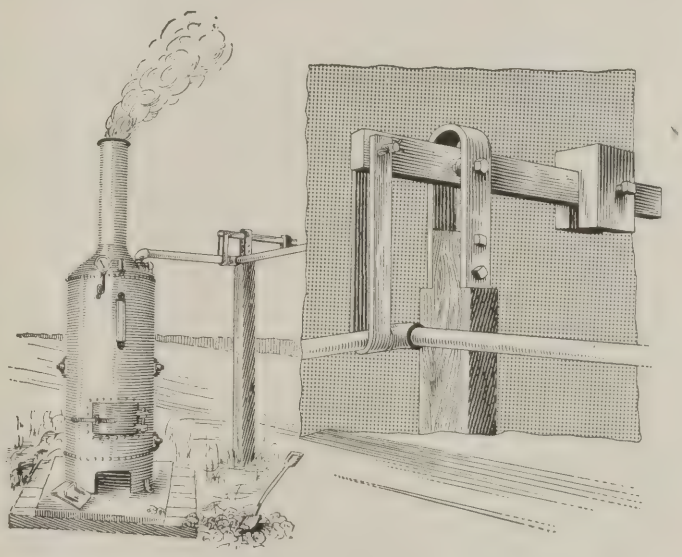
To minimize the danger from the exhaust gases of a gasoline engine:

1. Set the carburetor, or mixing valve, to give as lean a mixture as will run the engine.
2. Pipe the exhaust gases out of the engine room.
3. Do not work or even stand near the end of the exhaust pipe when the engine is running.
4. Do not try to purify the exhaust by turning it under water.
5. Unless the ventilation in the place where the engine is used is ample and positive, pipe the exhaust gases to some point where there is such ventilation, or pipe them to the surface.—*Technical Paper, No. 174, U. S. Bureau of Mines.*

Unique Expansion Joint

By L. V. Lauther
Guttenberg, N. J.

The vertical boiler of an 8-hp. hoisting engine expanded nearly ¾ in. when the fire was started in the cold boiler in the morning. Owing to the climatic conditions, the fire was permitted to go out every night and



GENERAL VIEW AND DETAIL OF PIPE SUPPORT

the water also was blown off. No outside insulation was provided on the entire outfit. The repeated expansion and contraction soon exerted an injurious influence on the pipe joints. The latter became loose and steam began to leak from the pipe line from almost every joint. The prospector, either because he was not familiar with power-plant equipment, or was adverse to incurring extra expense, rigged up an ingenious device which tided him over his difficulty.

This outfit, shown in the accompanying illustration, possessed the advantage that it not only provided for expansion, but also took the weight in such a manner that it was always in right proportion to the height of the boiler.

Of course, the right position for the counterweight was found by experiment. The pivot was well greased with graphite. The drawing is sufficiently clear to make the device comprehensive to anyone dealing with this kind of steam boiler.

Centrifugal Mine Pumps

By OTTO HAENTJENS
Hazleton, Penn.

WITH the increasing number of centrifugal pump installations in mines, a thorough knowledge of the principles of theory and design of these machines becomes necessary. Centrifugal pumps vary in many ways from direct-acting pumps and are a puzzle to men not familiar with their construction and their sometimes peculiar behavior. Really they are quite simple machines, consisting only of a few parts.

Although the theory of these pumps is complicated, it can be reduced to one simple formula, from which can be derived the principal laws that govern the construction and operation of centrifugal pumps. As this article is written not for the designer but mainly for the mining engineer it is not necessary to show how this formula was derived and lengthy theoretical discussion is omitted.

PRESSURE in a centrifugal pump is produced by centrifugal force and by transforming velocity into pressure. The peripheral speed of the impeller determines the centrifugal force and the outlet opening

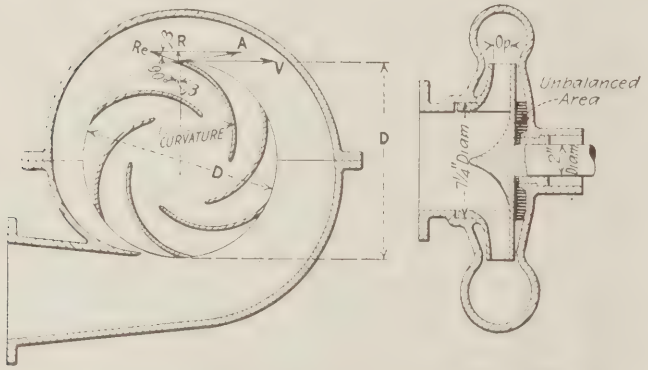


FIG. 1. OUTLINE AND FORCE DIAGRAM OF A CENTRIFUGAL PUMP

of the impeller and the curvature of the blade determine the absolute velocity to be transformed into pressure. Referring to Fig. 1:

D = Impeller diameter, in inches;

O_p = Impeller opening, in inches;

V = Peripheral velocity of impeller, in ft. per sec. $= \frac{D}{229} \times$ r.p.m.;

R = Radial velocity, in ft. per sec. $= \frac{\text{G.p.m.}}{3.12 \times \pi \times D \times O_p}$;

R_e = Relative velocity along the blades $= \frac{R}{\sin \beta}$;

A = Absolute velocity at which the water is discharged from the impeller, in ft. per sec. $= \sqrt{R^2 + X^2}$;

β = Blade angle.

The theoretical head H which a centrifugal pump develops is

$$H = \frac{V \times \left(V - \frac{R}{tg\ \beta}\right)}{g}$$

or

$$H = \frac{V \times X}{32} \quad \text{(See Fig. 2)}$$

The theoretical horsepower required to raise 1 gal. of water H feet high per minute is

$$Hp. = \frac{1}{3960} \times H$$

Doubling the speed of the pump doubles R (see Fig. 3) and therefore the capacity, as R is a direct function of the capacity. Doubling the speed also doubles X, and the head H therefore increases to:

$$\frac{2V \times 2X}{32} = 4 \times \frac{V \times X}{32} = 4 \times H$$

Doubling the speed increases the horsepower to:

$$2 \times \frac{1}{3960} \times 4 \times \frac{V \times X}{32} = 8 \times \frac{1}{3960} \times H$$

If a centrifugal pump, running at 1200 r.p.m. and delivering 1000 g.p.m. against a 100-ft. head and requiring 50 hp. be speeded up to 2400 r.p.m., the capacity would increase to $2 \times 1000 = 2000$ g.p.m., the head to $4 \times 100 = 400$ ft., and the horsepower to $8 \times 50 = 400$ hp., or, generally speaking, *if the speed of a centrifugal pump is changed, the capacity changes in direct proportion to the speed, the head as the square and the horsepower as the cube of the speed.*

If the speed of a centrifugal pump is kept constant, but the capacity is reduced or increased by throttling or opening the discharge valve, R changes in direct proportion to the capacity. As R decreases, X increases and therefore the head produced by the pump will increase. If the discharge valve is shut entirely so that no water can be discharged, R becomes zero and $X = V$ and $H = \frac{V \times V}{32} = \frac{V^2}{32}$ (zero capacity, maximum head).

If the discharge valve is fully opened, R becomes a

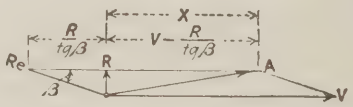


FIG. 2

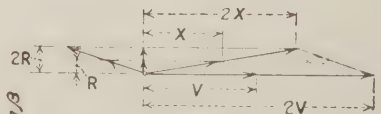


FIG. 3

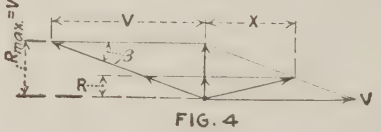


FIG. 4

FIGS. 2, 3 AND 4. VARIOUS PUMP DIAGRAMS

maximum $= V \times tg\ \beta$ (see Fig. 4) and X becomes zero and the pump would theoretically produce a head

$$H = \frac{V \times O}{32} = 0 \quad \text{(maximum capacity zero head)}$$

The maximum theoretical capacity is:

$V \times tg\beta \times 3.12 \times \pi \times D \times O_p$ *gal. per min.*

Having determined the maximum head and the maximum capacity, in plotting these points on cross-section paper (see Fig. 5) all intermediate points must fall

on a straight line connecting these two. This line may then be called the theoretical head-capacity line.

The horsepower curve corresponding to this head-capacity line can easily be figured and represents a parabola, as shown in Fig. 5.

The curves known as characteristic curves indicate the head developed at different deliveries (head-capac-

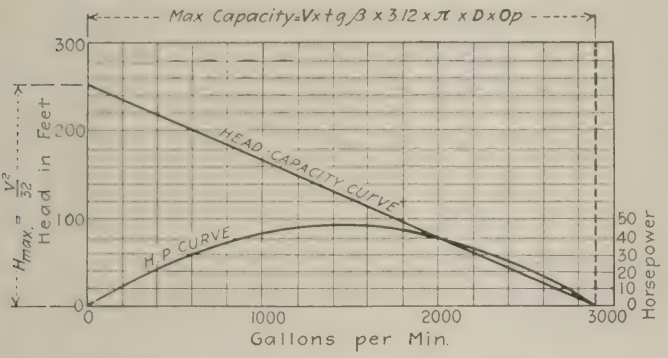


FIG. 5. THE HEAD-CAPACITY AND HORSEPOWER CURVES OF A PUMP

ity curve), the horsepower required to drive the pump at different deliveries (horsepower curve), and the efficiency developed by the pump at different deliveries (efficiency curve). They are obtained by testing the pump at constant speed on the factory test stand. The actual head-capacity curve differs considerably from the theoretical head-capacity line, but the inclination of the theoretical line influences the shape of the actual head-capacity curve and the horsepower curve to such an extent that theoretical head-capacity lines can be used for comparing the characteristics of various impellers.

Fig. 6 shows the diagram of a 6-in. pump impeller and Fig. 7 shows the theoretical head-capacity line, the actual head-capacity curve and the efficiency curve of this impeller. The best efficiency coincides with the "condition point," that is the conditions for which the pump was intended—namely, 1000 g.p.m. against a 100-ft. head. Although this is desirable, it will in practice not always be the case, especially with volute pumps.

Manufacturers sell a pump for any condition within certain economical limits, as shown in Fig. 7, in order to reduce the number of patterns for casings and impellers. It is the aim of the designer to produce a pump that gives good efficiency over a wide range—that is, large economical limits.

It will be seen from Fig. 7 that at the condition point the actual head obtained is only 60 per cent. of the theoretical head; or, in other words, the hydraulic efficiency is 60 per cent. The hydraulic efficiency varies with the delivery and usually reaches a maximum, a little ahead of the best efficiency point (in Fig. 7 at 900 g.p.m.). Shock losses and leakage within the pump determine the magnitude of the hydraulic efficiency, but the hydraulic efficiency of a centrifugal pump does not directly affect the mechanical efficiency. A centrifugal pump may have an hydraulic efficiency of 60 per cent. and yet have a mechanical efficiency of 70 per cent. or over. The hydraulic efficiency at the condition point varies between 55 and 75 per cent., depending on the size and type of the pump. At shut-off, the hydraulic efficiency varies between 45 and 55 per cent., depending on the impeller dimensions. It is usually around 50 per cent.

Effect of Vane Angle on Head-Capacity and Horsepower Curves

The blade angle of the impeller, whose velocity diagram is shown in Fig. 6, was 18 deg. If this angle is changed to 35 deg., X increases to 75.7 (see Fig. 8). Assuming an hydraulic efficiency of 60 per cent. as before, the actual head produced by this impeller would be $0.6 \times \frac{75.7 \times 90}{32} = 127.5$ ft. In order to produce only 100 ft. head with this 35-deg. impeller, the peripheral velocity must be reduced to 80.5 ft. In Fig. 9 are shown the theoretical head-capacity lines with their corresponding horsepower curves and the actual head-capacity curves of the two impellers.

It will be noted that: (1) A steep angle gives a low shut-off pressure, one that may be considerably below the condition point. This may make it impossible to start a pump when the column pipe is filled, as the shut-off pressure is not sufficient to open the check valve in the column pipe. In order to start such a pump a certain amount of water must first be bypassed, so that the pressure can build up. (2) A flat angle produces a steep head-capacity curve. If the pump draws water from a sump whose level changes (as is usually the case), the suction lift gradually increases. Assuming that the level changes 10 ft., this would increase the total head against which the pump has to work to 100 ft. The capacity of the 18-deg. impeller

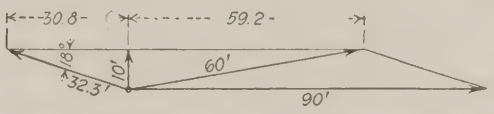


FIG. 6. DIAGRAM OF A 6-IN. IMPELLER

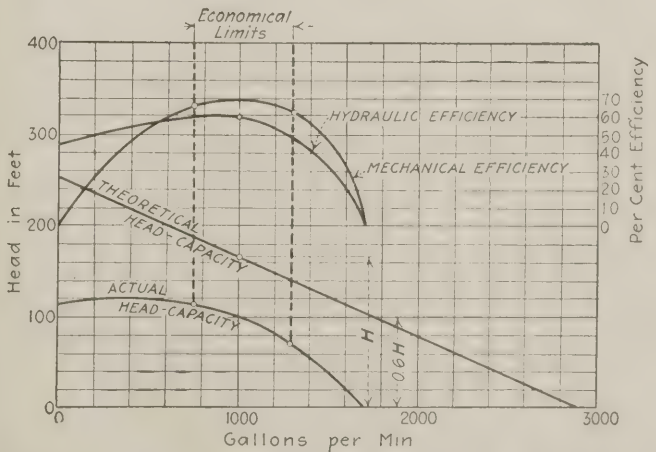


FIG. 7. CHARACTERISTIC CURVES OF 6-IN. IMPELLER

would be reduced to 800 g.p.m., whereas the 35-deg. impeller would cease to deliver water, as the maximum head which this impeller produces is 106 feet. (3) The horsepower curve, produced by the 18-deg. impeller, is flat and reaches a maximum near the condition point; whereas the corresponding curve, of the 35-deg. impeller, continues to climb after the condition point is passed. Should the head on the pump be diminished as through a break in the pipe line or when starting the pump with

the column pipe empty, the 18-deg. impeller would only slightly overload the motor, whereas the 35-deg. impeller would seriously overload it. Preference should therefore be given to impellers with small angles—that is, with strongly backward curved vanes.

Referring to Fig. 1, A represents the velocity and direction of the water as it leaves the impeller. This must be reduced and converted into pressure. Taking as an example the velocity diagram of the 6-in. pump shown in Fig. 6, the absolute velocity A is 60 ft. per sec. This velocity must be reduced to that in the 6-in. discharge pipe—that is, to 11.5 ft. per sec.—and this must be done gradually and with the least possible shock,

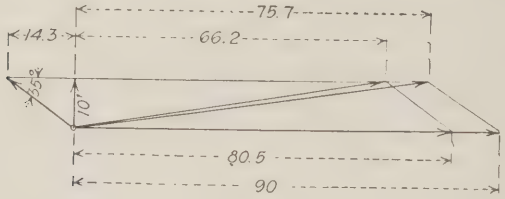


FIG. 8. EFFECT OF CHANGING IMPELLER ANGLE

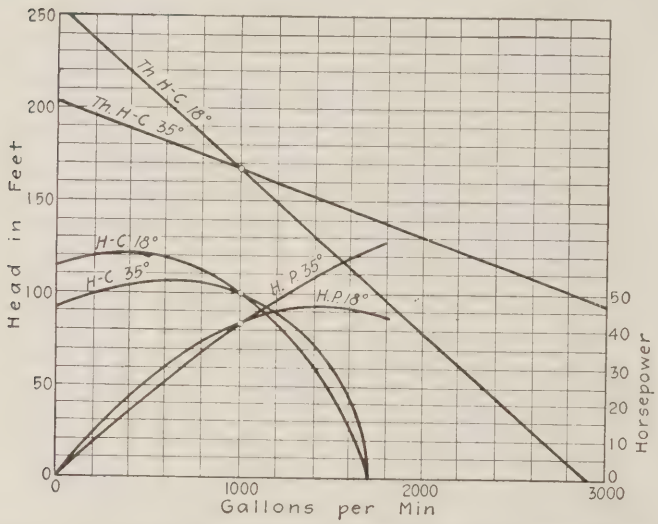


FIG. 9. CHARACTERISTIC CURVES OF TWO IMPELLERS

in order to avoid shock losses. There are two ways in which this can efficiently be accomplished:

1. By means of a volute casing, as in Fig. 1. The velocity of the water moving in the casing toward the discharge is lower than the absolute velocity A, and usually higher than the velocity in the discharge pipe. The shock and friction losses become a minimum for a certain ratio between the absolute velocity A and the velocity of the water in the casing. At this ratio the pump works most efficiently. The efficiency decreases if an impeller is installed that would produce a different ratio. Referring to Fig. 7, the best efficiency occurred at a delivery of 1000 g.p.m. against a 100-ft. head. If it was desired to use this machine to pump only 500 g.p.m. against a 100-ft. head, the efficiency would decrease considerably even if a special impeller was designed and installed. The efficiency would remain constant, however, if V and A were changed in the same proportion as was the capacity—that is, in our case reduced by one-half. This would give the same ratio between the absolute velocity and the velocity in the casing. The head would decrease as the square of the speed—that is as $\left(\frac{45}{90}\right)^2 = (\frac{1}{2})^2 = \frac{1}{4}$, or to $\frac{100}{4} = 25$ ft. *Capacity head and efficiency of a volute pump are therefore fixed and depend on the area of the casing.* It will therefore in practice be quite often the case that the condition point does not coincide with the best efficiency point, as manufacturers limit the number of casing patterns to one or two for each size. To state, for instance, that a 6-in. volute pump has an economical capacity of 900 to 1200 g.p.m. for heads varying from 10 to 100 ft., is misleading. If the economical range at 100-ft. head lies between 900 and 1200 g.p.m., then it will fall at 10-ft. head to between 320 and 380 g.p.m.

2. The absolute velocity A is reduced and transformed into pressure by means of a diffusion ring, consisting of a number of diffusers, placed around the impeller (see Fig. 10). The diffusers are so designed that at the condition point the water discharged from the impeller at the velocity A enters them with the least possible shock. While passing through the diffusers, the velocity is gradually reduced to about the velocity in the discharge pipe. The area of the casing has not much influence on the efficiency as long as the passages do not obstruct the flow of the water. If therefore, as in the case cited above, the capacity of a 1000 g.p.m. pump is to be changed to 500 g.p.m., it is only necessary to design a new impeller and diffusion ring without changing the casing; and the same or approximately the same efficiency is obtained. The diffusion ring pump is therefore more flexible than the volute pump, but the latter is simpler, has fewer wearing parts and requires less expensive repairs. Diffusion rings do not improve the efficiency of low head pumps. Also, so-called "filling rings" for volute

TABLE I. DOUBLE-SUCTION VOLUTE PUMPS

Size, In.	Head in Ft.	50 Ft.	60 Ft.	70 Ft.	80 Ft.	90 Ft.	100 Ft.	Efficiency, Per Cent.
4	G. P. M.	350–500	380–550	420–600	450–630	475–660	500–700	55 to 65
	R.P.M. 60 cycle	1,800–1,200	1,800–1,200	1,800–1,200	1,800–1,200	1,800	1,800	
	R.P.M. 25 cycle	1,500	1,500	1,500	1,500	1,500	1,500	
5	G.P.M.	500–650	550–700	600–750	630–800	660–850	700–900	58 to 68
	R.P.M. 60 cycle	1,200–900	1,200	1,200	1,200	1,200	1,200	
	R.P.M. 25 cycle	1,500	1,500	1,500	1,500	1,500	1,500	
6	G.P.M.	650–900	700–1,000	750–1,050	800–1,150	850–1,200	900–1,250	60 to 70
	R.P.M. 60 cycle	1,200–900	1,200–900	1,200	1,200	1,200	1,200	
	R.P.M. 25 cycle	1,500	1,500	1,500	1,500	1,500	1,500	
8	G.P.M.	900–1,700	1,000–1,850	1,050–2,000	1,150–2,150	1,200–2,300	1,250–2,400	62 to 72
	R.P.M. 60 cycle	1,200–900	1,200–900	1,200	1,200	1,200	1,200	
	R.P.M. 25 cycle	1,500–750	1,500–750	1,500*	1,500*	1,500*	1,500*	
10	G.P.M.	1,700–2,400	1,850–2,700	2,000–2,900	2,150–3,100	2,300–3,250	2,400–3,500	64 to 73
	R.P.M. 60 cycle	1,200–900	1,200–900	1,200	1,200	1,200	1,200	
	R.P.M. 25 cycle	750	750	1,500*	.....	.....	.....	
12	G.P.M.	2,400–3,500	2,700–3,800	2,900–4,200	3,100–4,500	3,250–4,750	3,500–5,000	65 to 74
	R.P.M. 60 cycle	900	900	900	1,200*	1,200*	1,200*	
	R.P.M. 25 cycle	750	750	.....	.....	.....	.....	

* These speeds are too high for bad water. Two-stage pumps will give better service.

TABLE II. HIGH-SUCTION MULTI-STAGE PUMPS

Size, In.	Head in Ft.	50 Ft.	60 Ft.	70 Ft.	80 Ft.	90 Ft.	100 Ft.	Efficiency, Per Cent.
4	G.P.M.	350–500	380–550	420–600	450–630	475–660	500–700	55 to 65
	R.P.M. 60 cycle	1,800–1,200	1,800–1,200	1,800–1,200	1,800–1,200	1,800	1,800	
	R.P.M. 25 cycle	1,500	1,500	1,500	1,500	1,500	1,500	
5	G.P.M.	500–650	550–700	600–750	630–800	660–850	700–900	58 to 68
	R.P.M. 60 cycle	1,200–900	1,200	1,200	1,200	1,200	1,200	
	R.P.M. 25 cycle	1,500	1,500	1,500	1,500	1,500	1,500	
6	G.P.M.	650–900	700–1,000	750–1,050	800–1,150	850–1,200	900–1,250	60 to 70
	R.P.M. 60 cycle	1,200–900	1,200–900	1,200	1,200	1,200	1,200	
	R.P.M. 25 cycle	1,500	1,500	1,500*	1,500*	1,500*	1,500*	
8	G.P.M.	900–1,700	1,000–1,850	1,050–2,000	1,150–2,150	1,200–2,300	1,250–2,400	62 to 72
	R.P.M. 60 cycle	1,200–900	1,200–900	1,200–900	1,200–900	1,200–900	1,200–900	
	R.P.M. 25 cycle	750	750	750	750	.....	.....	
10	G.P.M.	1,700–2,400	1,850–2,700	2,000–2,900	2,150–3,100	2,300–3,250	2,400–3,500	64 to 73
	R.P.M. 60 cycle	900	900	900	900	900	900	
	R.P.M. 25 cycle	750	750	750	750			
12	G.P.M.	2,400–3,500	2,700–3,800	2,900–4,200	3,100–4,500	3,250–4,750	3,500–5,000	65 to 74
	R.P.M. 60 cycle	900–720	900–720	900–720	900–720	900–720	900–720	
	R.P.M. 25 cycle	750	750	750	750	750	750	

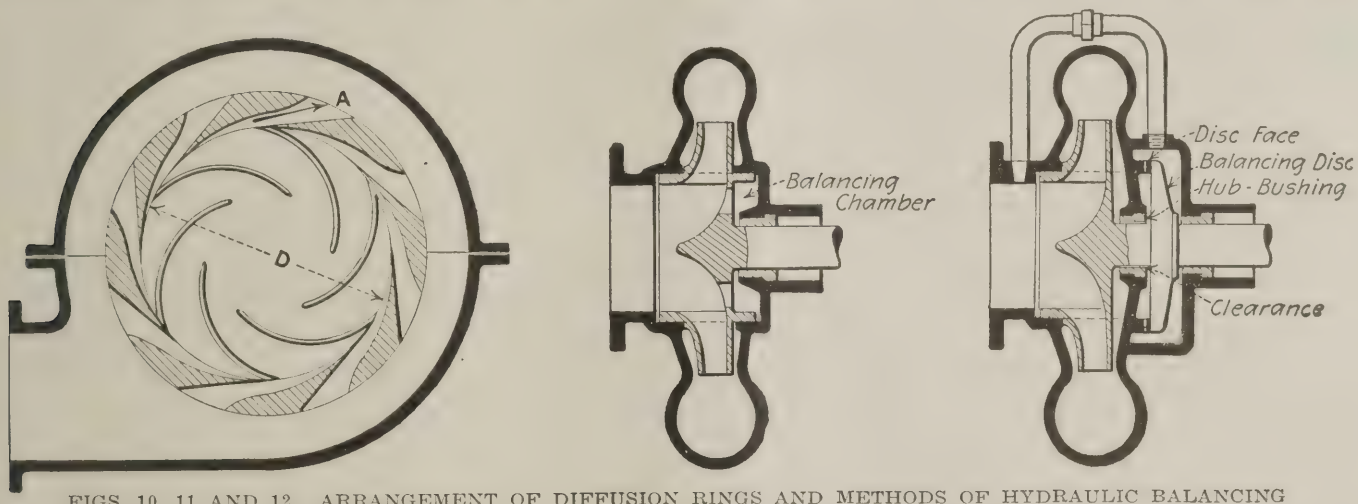
* These speeds are too high for bad water.

pumps fitted into the casing and surrounding the impeller, intended to minimize shock losses, should not be used in pumps handling acidulous water. They only add to the number of wearing parts and introduce troublesome joints in the casing.

A pump of the construction shown in Fig. 1 produces an axial thrust toward the suction inlet because the impeller areas exposed to the pressure within the pump casing are unequal, the area of the front being smaller than the area of the back of the impeller. The unbalanced area in Fig. 1 is $\frac{\pi}{4}(7\frac{1}{4}^2 - 2^2) = 38$ sq.in. Assuming the pump to be working against a 100-ft. head, which is equal to $\frac{100}{2.31} = 43.3$ lb. per sq.in., and assuming no pressure or vacuum on the suction, the axial thrust is $38 \times 43.3 = 1650$ lb. If, as in a four-stage pump four impellers are mounted on a shaft in series, the combined thrust is $4 \times 1650 = 6600$ lb. A heavy thrust bearing would be required to carry such a load and other means are usually employed to overcome it.

The elimination of the axial thrust "on paper" can be accomplished in several ways, but none gives absolute satisfaction in mine service. Excessive suction lift, particles of coal blocking the impeller passages, excessive wear of the internal parts, etc., may throw a pump out of balance and smash a number of the internal parts. Such accidents are costly and must be avoided. It is best to design a pump so that it is theoretically balanced and then add a good heavy marine-type thrust bearing for emergency.

A single-suction impeller, as shown in Fig. 1, can be hydraulically balanced by providing a balancing chamber at the back of the impeller (see Fig. 11). Holes drilled through the back of the impeller connect this chamber with the suction inlet of the pump and the unbalanced area is thus eliminated. Single-suction volute pumps and multi-stage diffusion-ring pumps are mostly balanced in this manner. Volute pumps handling water against heads exceeding 50 ft. are usually built with double-suction impellers. The water enters the impeller from both sides and no axial thrust is produced. The double inlet reduces the inlet area to one-half of the inlet area of a single-suction impeller. The wearing rings are therefore smaller in diameter and the leakage in a double-suction pump is consequently less and the efficiency higher.



FIGS. 10, 11 AND 12. ARRANGEMENT OF DIFFUSION RINGS AND METHODS OF HYDRAULIC BALANCING

Double-suction multi-stage pumps are not ordinarily used for mine service, as the casing becomes too large and expensive. A single-suction impeller can also be balanced by means of a balancing disk, fastened on the pump shaft and rotating in a chamber placed behind the impeller, as shown in Fig. 12. The disk divides this chamber into two compartments; one is supplied with water at the discharge pressure, the other is connected by means of a pipe to the suction inlet of the pump. The full discharge pressure acts therefore on one side of the disk, and the suction pressure on the other side, causing a thrust opposed to that set up by the impeller. If the diameter of the disk is made equal to the diameter of the impeller ring, the opposing forces are equal and balanced.

This device operates satisfactorily only if a constant

stream of water flows past the disk hub into the pressure compartment and past the disk faces back into the suction, preventing the disk from rubbing on the faceplate. The higher the pressure the higher will be the velocity of the escaping water; and it is obvious that acidulous water will soon destroy the disk hub and the disk faces.

The best and simplest arrangement to balance multi-stage pumps is to place the impellers in pairs "back-to-back" on the shaft, as shown in Fig. 13. The thrust set up by one impeller is thus opposite that set up by the other impeller, and the pump is therefore balanced.

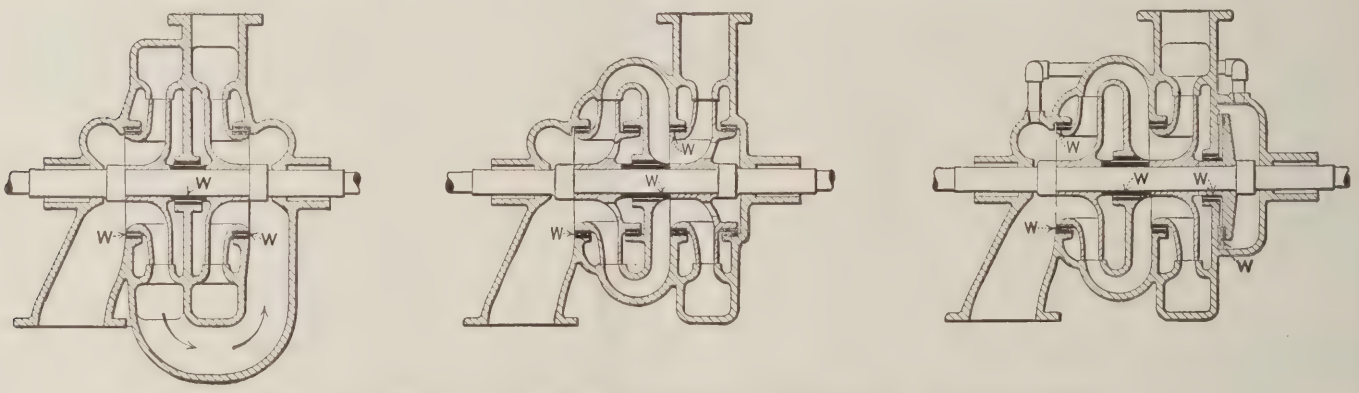
The interior parts of a centrifugal pump that are most subject to wear are the impeller and casing wearing rings, the distance sleeves and bushings, the balancing disk (if one is used) and the shaft bushings. If the peripheral speed is kept below 90 ft. per sec., the wear of the impeller is small and a properly built diffusion ring outlasts two impellers.

Internal leakage takes place at the impeller rings, the distance sleeves and the balancing disk. The more these parts wear, the greater will be the leakage. This may become so large that the pump will not force the water up to the surface. The efficiency decreases, of course, with increased leakage. As it is impossible to prevent wear of the internal parts, the number of these parts must be reduced to a minimum. Pumps that are not equipped with casing wearing rings should not be used in the mines as the casing would have to be rebored in a short time.

The designs shown in Figs. 11 and 12 are also used in multi-stage pumps. Figs. 14 and 15 show the arrangement of two-stage pumps, and in Fig. 13 is shown a two-stage pump of the "back-to-back" impeller type. The wearing parts are marked *W*, and the table below shows the number of these parts for each design:

	Number of Wearing Parts		
	Two-Stage Pump	Four-Stage Pump	Six-Stage Pump
Fig. 13	6	14	22
Fig. 14	10	22	34
Fig. 15	10	18	26

The back-to-back impeller type shows up most advantageously and is best suited for mine service.



FIGS. 13, 14 AND 15. INTERNAL WEARING SURFACES OF VARIOUS PUMPS

Capacity and Speeds for Mine Pumps

It is customary to limit the head per stage for mine pumps to 100 ft. If, for instance, the total head is 350 ft., a four-stage pump should be used. The speed of the pump should be kept as low as possible, but not so low that the impeller diameter becomes excessive. Large impellers produce much skin friction and low efficiency, and the casings become large and expensive. Bronze casings should be used for pumping acidulous water. Cast-iron casings can be used for water containing no acid or only a trace of acid, but the interior parts of the pump should always be made of bronze. Silt frequently causes more wear than the acid in the water. If the water contains a great amount of silt, it is best to use a wood-lined plunger pump. Tables I and II give speeds, efficiencies and capacities of double-suction volute and single-suction multi-stage pumps. The speeds listed are for direct-connected, motor-driven machines for 60-cycle and 25-cycle current. Capacities and efficiencies are average values and will vary somewhat with different makes.

The efficiency of a centrifugal pump installation depends to a great extent on the layout of the pipe line. A poorly designed suction pipe may cause a considerable decrease in pump efficiency. The suction pipe should be as short as possible and absolutely tight; the lift, including friction, should for normal conditions not exceed 15 ft. A short elbow should never be attached directly to the suction inlet of the pump as the disturbances in the flow of the water produced by such an elbow may prevent a proper flow into the impeller and cause a considerable decrease in capacity and efficiency, as well as noisy operation. A foot valve should, if possible, be omitted and the pump should be primed by means of an ejector or air pump.

Short elbows should also never be installed in the discharge pipe; and it should be remembered that for 100-ft. lift every foot of friction saved in the pipe line will mean an increase in efficiency of 1 per cent. When discharging 1000 g.p.m. through 100 ft. of straight 6-in. pipe the friction loss can be taken as 11.5 ft. against 2.8 ft. in an 8-in. pipe. Selecting an 8-in. pipe instead of a 6-in. pipe would save 8.7 ft. in friction head, equivalent to an efficiency increase of 8 per cent.

It seems that a long narrow combustion space is more efficient in burning the gases than a short wide one having the same cubical space. In the long narrow space the gases travel with a higher velocity, which promotes mixing and therefore quickens the combustion. In the short wide space the gases remain the same length of time, but travel slower. On account of this slower movement the gases are less agitated and tend to travel in stratified streams. Therefore there is less mixing and the combustion is slower.—*Bureau of Mines Bulletin No. 135.*

Cost of Reaching the Market

Many Factors Besides Mining Costs Enter Into the Cost to the Consumer, and These Must Be Considered in Reporting on the Feasibility of Opening a New Mine if Financial Pitfalls Are To Be Avoided

By J. F. K. BROWN
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An estimate of the cost of reaching the market in which a coal is to be sold is an important part of any coal-mining investigation. Reasonable accuracy in such calculations is essential, and this can only be secured as a result of knowledge and experience gained in actual operation under a variety of conditions. This subject is so broad, that it is quite impossible to treat it in detail, and so only the main features or governing factors in resultant costs have been considered in this article.

THE cost of reaching the market covers the following ground: (a) Mining costs; (b) transportation costs and (c) disposal costs. It is mere repetition to state that coal-mining costs will vary, these variations being caused by such factors as underground conditions, management, labor, supplies and finance. While all of these exert a more or less potent influence upon the cost of coal, and none may be forgotten in reporting on the possibilities of a coal property, they are all fairly well understood by mining engineers and will not be discussed in detail here.

It is easy to think about mining costs only in making a coal examination. These are so obvious and necessary that they can not well be overlooked, but the costs which stand out prominently are not always the figures which swing the total cost to the profit side of the balance sheet.

Transportation costs, except for those mines which are so fortunately situated that disposal of output takes place at the mine mouth, is a large item and one that demands a considerable amount of floating capital. It is self-evident that the extraction of coal is accomplished at a loss unless the item of reaching the point where sales can be consummated is taken into account at a figure which will permit of the disposal of the product at a profit.

Transportation Cost Quite an Item

Transportation costs can be of two classes—carriage by rail based either on the ton or ton-mile, and sea carriage, generally based on the ton loaded. In the latter case it is usual to include cost of loading and unloading. With rail carriage the mine costs cover coal loaded into cars at the mine mouth, while the cost of discharging is commonly borne by the purchaser, who buys his coal delivered in cars at destination.

In sea carriage, however, in addition to the cost f.o.b. cars, there is the further cost of loading and trimming the vessel except in those few cases where the mine is so located that it can deliver its product direct into the holds of vessels without the use of cars. The unloading of coal cargoes, and more especially where large cargoes are being handled, is often done at the cost of the shipper, who, if his shipments are regular, maintains appliances and equipment at the unloading port to carry on this work. There are conditions, however, under which coal cargoes are consigned to agents on an f.o.b. basis and the colliery company charged with the loading, but not with the unloading costs.

Rail costs are commonly reckoned at so much per ton-mile, and from such figures it is possible to outline the areas over which any fuel can be sold. Where Government ownership exists, and in a country where freight traffic is small and long hauls have to be undertaken through unproductive districts, freight rates can be reckoned as probably at a maximum. On the other hand, where railway lines are privately owned and there is considerable competition for the traffic in a dense industrial district, freights are at the lowest.

Question of Building Tracks

The cost of track or spur accommodation and the car question are important items when considering rail transportation. Regulations, custom and necessity differ in various countries. Some governments will only permit spurs to be built to established stations, while some railway companies will permit connection to any intermediate point. Many railway lines prefer to build the connecting tracks themselves and charge the mining company with the cost of construction, while others leave that work entirely to the coal company with the exception of the first rail length and the connecting points to the main line. They then content themselves with an inspection during and after completion of the work. This may be either rigid or perfunctory.

Whatever the regulations may be, they should be ascertained from the office of the railway company before construction is commenced. Unfortunately, many mines have been started and in the end been left stranded for rail connections, either because the coal company assumed that the railway would provide the needed spur and afterward found the opposite to be the case, or because the coal company assumed that it had only a short line to build and later discovered that it had a considerable distance to cover to reach the nearest station point where connection would be permitted. Both cases are examples of careless investigation on the part of the coal examiners.

The subject of cars to carry the fuel from the mines to the market is frequently a much disputed question. A coal company may own its own cars and have them run over the railway tracks, provided this rolling stock is equal to the requirements of the railway. In other

cases only the railway company's cars are permitted to run over their lines and private ownership of rolling stock is forbidden. Box-cars have to satisfy the aspirations of many coal producers, and the loading of these cars always implies at least a small additional expense.

Railway car supply is a complex subject, and one that is difficult to diagnose. It is easy to imagine that a railway company would be glad of all the carrying traffic that it could obtain, but a few experiences of having to send the whole mine force home for several days will nullify this agreeable impression. It is infinitely better to appreciate these factors before commencement than to learn them from experience at a later date. Car shortage is an item in cost just as serious as a miscalculation in the amount of coal available or the capital required for operation.

Sea transportation may include loading, carriage and unloading costs. Loading is made up of three items—hauling the cars to the loading piers, storage at the piers and actual loading and trimming.

Hauling cars to the piers is railway work and may be done with standard rolling stock or by means of mine cars either of standard or of some narrower gage. The use of an intermediate-sized car and rolling stock is to be deplored, since although it is a system popular in some districts, it usually involves several extra handlings and breakages, and implies that a complete range of supplies and means for repair of another track gage must be maintained.

Commonly the distances from mine to sea are short, more especially in those cases where the lines and stock are privately owned or the property of the mine. Where such a trade is being carried on, as that from the Virginian fields, necessitating hauls of over 150 miles, the conditions are those of ordinary rail shipment.

May Have to Store Coal at Mine

Storage at the piers may or may not be necessary. Where large tonnages are being mined and the vessels to be loaded are few in number, storage is often not required as the combined output of the mines more than meets the demands of the vessels. On the other hand, where the output is only moderate and a shipping trade has to be catered to, it is certain that storage either at the mine or at the piers will have to be undertaken. As vessels cannot afford to wait for cargo, and their arrival cannot always be predicted to the minute, practice has decreed that coal should be stored in pockets at the piers. This system makes vessel loading entirely independent of the mine.

Loading is influenced by the type of vessel, the hatch system and the method of discharging cars or loading from the coal pockets. Standard vessels being rare at present, there are in existence some strange but understandable anomalies in loading conditions. Coal handling and loading runs all the way in efficiency and all the way in method from a row of coolies with baskets, down to loading from a spout or a conveyor belt. Either of the latter systems are not as might perhaps be expected the most efficient at all times. There are cases where the cost of loading by the day wage, by hand and head and basket, is less than the interest which would have to be paid on the cost of a large and modern coaling plant.

Passenger vessels built for tropical voyages have often only small and awkwardly placed coaling hatches, designed for hand loading. The bunkering of one of these steamers becomes a long, slow, tedious operation at a modern coaling pier.

On the other hand, extremely rapid loading is possible where equipment has been standardized and a suitable class of vessel is employed. Hopper-bottom cars of large capacity delivering direct into bins or into chutes is naturally the most direct and quickest loading. With soft coal the breakage is excessive, and so various additional appliances are in use to overcome this defect. Questions of space and storage may, however, bring about the use of some of the other forms of loading appliances, but whatever be the method it should be as direct as possible and eliminate excessive handling of the coal from cars to hold, so that breakage can be avoided and speed attained.

Unnecessary Handling of Coal

Some systems and some concerns have so neglected these simple rules that the coal is sometimes handled no less than seven times before it reaches the boat. Conditions approximating these are more pronounced where coaling piers are not built separate from ordinary cargo docks, and where the coal is run onto the docks at water level.

Trimming is undertaken in order that the vessel may steam properly and be well stowed in cargo space. Trimming costs vary according to the wage scale paid, the labor available, the type of vessel and the tonnage of the boat to be loaded. Each port and each coaling company generally has its own scale of charges. In the case of publicly administered harbors this can be readily ascertained from the office of the harbor commissioners. Coal companies handling their own coal, or railway companies operating the coaling piers, also have a scale of charges for vessels requiring bunker, while they employ their own trimmers and pay them on contract or day wage, charging the shippers of the coal so much per ton or agreeing to handle the coal from the mine into the vessel's hold.

Sea transportation costs vary according to the tonnage carried, the length of the voyage and the time extension of the charter. Naturally, in freights as in everything else, it pays to move, within limits, large tonnages at one time; and when this is combined with a certain continuity of contract freight costs are at their minimum. It is also an axiom that it costs relatively more to move a cargo a short distance than it does to carry it a long distance. That is, one long voyage is preferable to several short ones. Since also a coal cargo can only be carried in the outward direction, it becomes a desideratum on the part of the boat owner to provide some form of return cargo or face a loss. The ease with which a return cargo can be arranged at certain ports is also a factor in reducing costs.

Coal-carrying companies who mine and ship their own coal and find their own vessels commonly do not trouble about return cargoes. To them the handling of the coal is a necessary part of the expenses, and as such has to be met and paid for irrespective of whether or not the boat is usefully employed both going and coming. This is a parallel on the sea to having to send coal cars back to the mine empty on land.

The time during which the charter or lease of the vessel runs has also an influence in the cost of carriage. Naturally the steamship owner, like the landlord, likes a steady tenant and is prepared to make some sacrifice on the chance of having his vessels usefully employed over long periods. The date at which these charters are drawn up, unless special provision is made therefor, is an important point in the ultimate economy. If consummated during a period of high freight rates and carried forward over a longer succeeding period of low rates such a charter may be a godsend to the owner of the vessel but a poor speculation on the part of the coal shipper. The reverse would be the case with a charter made in a period of low freight rates.

Coal unloading may include the handling of the coal from the vessel's hold to the dock and thereafter a screening operation to prepare it for sale. This latter handling might also be termed a disposal cost.

Unloading is carried out by means and systems ranging all the way from primitive to modern. Undoubtedly the quickest, and therefore the most economical under average conditions, is the grab-bucket system, which may be used where the vessel has been designed with large and unobstructed hatchways. The unloading of any vessel should not have to wait on the disposal of the coal, and therefore either a storage space should be provided on the dock or unloading done direct into railway cars. The processes generally are the reverse of the loading at the coaling piers.

Additional Items Entering Into Cost

In certain countries and in certain harbors, mainly those wherein the coal companies or the railway companies do not own or operate their own equipment, there are a number of smaller charge items which have to be paid before all the costs have been included. These are dock and harbor dues, towage, tug and wharfing charges. These may run as high as 20c. per ton and are payable mainly on the tonnage of the boat and on the services required. These items have to be reckoned with if an estimate is being made of the cost of handling the coal to an export market overseas.

Disposal costs are mainly office charges, but may in certain cases include a cartage and retail handling of the coal and maintenance of the necessary equipment. Mainly this work is carried out by retail firms who will contract with the importing company for so much tonnage per annum. Under these circumstances disposal charges are salaries to salesmen, the office staff employed and similar items. This work may even cover office and dock rent and provision and operation of a screening plant on the dock, necessitating the disposal of the small coal produced. In such cases the costs approximate and can be reckoned on the basis of similar charges at the mine itself, provided attention is paid to any differences in labor conditions and other factors which may govern the situation, where the screening or mining operations take place in one land and the unloading and screening in another.

To sum up then, the cost of reaching the market in most cases is by no means covered by the cost of mining. It may embrace many items of expense not ordinarily encountered, but none of which may be neglected in the engineer's report if the owners or lessees of the mine are to avoid financial errors.

Minecdotes

The Story of the Blind Miner

"I have never told this story yet," said the mine boss, "but what some doubting Thomas didn't say I ought to be elected a full-fledged member of the Ananias Union —or words to that effect. But I can vouch for it being the truth.

"When I took the job some years ago as assistant foreman at the ——— mine, they had a fellow working there as a miner who was completely blind. 'Old Johnny,' the men used to call him. He was a prime favorite with everybody, and in spite of his affliction was one of the best miners in the mine. He had been working there for years, and it was positively uncanny, at least to a newcomer, to see the way he could sense his way around.

"Now it happened that a short time after I arrived we ran into a gas pocket in one of the main headings, and to make a connection to air it was necessary to drive a crosscut 60 ft. to the airway. The place was making gas worse than anything I have ever seen before or since. It blew out of a fissure in the rib, under pressure, and you could hear it wheezing 200 ft. before you got to the face.

"We ran compressed air to the face as well as a brattice, but even at that it was impossible to raise a safety lamp over 2 ft. from the bottom without the gas snuffing it out. Naturally, nobody wanted to work in there, and to tell the truth I didn't blame any miner for steering clear of it. Just to hear the gas stewing out of the hole was enough to give anybody the creeps, let alone seeing a gas cap in your lamp as big as it would hold.

"Finally the superintendent offered double wages for any man who would work it, with no takers, until Old Johnny happened to hear of it. He grabbed it at once and went to work in there by himself. Now you can believe me or not, but in due time he made the connection with the airway so that it was possible to get good ventilation and continue the heading as before.

"It was easy meat for him, as the problem of a light didn't bother him any; and in that particular case the fact that he was blind enabled him to make a good piece of money for himself and at the same time enabled the company to get through the pocket of gas in perfect safety."

A rather heavy silence ensued after the mine boss concluded, which was finally broken by the master mechanic.

"If nobody offers any objection," he said, drily, "I would like to make it unanimous that the gentleman be made a *life member*."

[*Coal Age* will pay liberally for short, witty stories suitable for publication in this column, provided the tales are of the mine and have the proper coal-mining "flavor." If they point a moral, so much the better. Dig down into your experiences and share with the many readers of this journal the humorous incidents you have witnessed in your duties around the mine.]

Successful Burning of Anthracite Slush

SYNOPSIS — *Anthracite slush, or the fine material made in preparation that passes through a $\frac{3}{32}$-in. circular opening, has never been considered of commercial value except for the manufacture of briquets. However, this material is now being successfully burned by means of a chain-grate stoker and forced draft.*

PROBABLY every great industry has its waste-utilization of waste-disposal problem. Some, such as meat-packing as an illustration, have solved their difficulties in this direction, and little if any material is rejected or thrown away as entirely useless and unusable.

The coal industry, as well as the others, has had its waste problem. This has lain in the disposal of two products—the slate brought out of the mine with the coal and later separated from it in the process of preparation, and the fine coal produced, for which no commercial demand as yet exists.

Slate and bone are at present disposed of in various ways, one of the most effectual being the pulverization of this material and its flushing back into the old workings to insure surface support. For bituminous slack there exists at the present time a strong demand. In the past, however, considerable quantities of this material have been dumped on the ground and wasted at no small cost to the mine because there was no market for this fine material.

The sizes of anthracite that have been deemed usable have almost steadily grown smaller since the beginning of the industry. At present the only size of this material made which is not considered burnable in ordinary furnaces equipped for steam generation is what is variously known as culm, silt or slush. This is the size that passes through a $\frac{3}{32}$-in. circular opening, the actual size of the various particles ranging from minute dust to the full-sized opening referred to above.



FIG. 1. CAR OF SILT UNDER THE LOADING CHUTE. NOTE THE LARGE AMOUNT OF WATER

Because of the variation in size of the individual particles the interstitial openings are numerous but minute, and the passages through which air may travel in traversing a bed of any considerable thickness of this coal, as that upon a fire grate, are small and tortuous. The percentage of voids in a bed of this fuel is probably about the same as that in a mixture of fine gravel and sand.

The difficulty encountered in the burning of this fuel by ordinary hand-firing methods in boiler furnaces has been the deadening effect of a fresh charge of coal upon a going fire. This arises chiefly from the small air passages previously referred to. Ordinary natural draft, unless caused from a prohibitively high stack, is inadequate to force air through any considerable thickness of this fuel, and as a result where this material is to be burned commercially forced draft must be installed.

The coal department of the Delaware, Lackawanna & Western Railroad Co., at its Nanticoke power plant, is successfully burning this fuel under boilers, thus utilizing a product which has heretofore been considered useless except for the manufacture of anthracite briquets.

The fuel used in this particular power plant is made at the washery operated in connection with the Loomis breaker of the above-named company. The slush, or silt, which passes through the smallest opening of the shaker screens drops into a shallow hoppered tank under the shakers. While being treated on the shakers the coal is subjected to water sprays, and this water of course finds its way through the screen plates and enters the hopper-shaped tank referred to, along with the coal passing the small mesh.

At the bottom of the hopper-shaped concrete tank below the shaking screen the fine coal and a certain portion of the water is drawn off through an ordinary gate valve into a chute below. The greater portion of the water is, however, drawn from this tank at a point considerably above the apex of the hopper, so that little, if any, coal goes off with the bulk of the water. The chute into which the silt and water are discharged from the bottom of the tank leads to a storage bin exactly similar to the bins for storing the other grades of coal. At suitable intervals—that is, when a sufficient amount of this slush has accumulated in the storage bins—it is drawn off through regular chutes into a hopper-bottomed railroad car.

Of course, throughout this entire process, or until after the coal has been deposited in the railroad car, all of the voids between particles have been thoroughly filled, or a little more than filled, with water. This may be clearly seen in Fig. 1, which shows a car under the loading chute almost full of this fine coal. When a car of this material leaves the washery, while the coal is heaped up somewhat above the level of the top of the car, the water is overflowing the sides.

In passing the valve and traveling down the chute, and particularly in flowing from the bin to the car

through the loading chute, this mixture of fine coal and water behaves much like a thick or viscous liquid. At a short distance away the material in the car more resembles mud than it does coal.

So nearly liquid and so thoroughly flowable is this material when it enters the car, that it is necessary, before running the car under the loading chute from the slush or silt bin, to place in its bottom a few hundred pounds of coal of the next larger size in order to prevent the fine material from flowing out of the cracks around the hopper-bottom doors and thus being wasted.

In this condition it is run upon the coal tracks of the Nanticoke power plant. These tracks enter the boiler house at one end and extend throughout the length of the building immediately above the coal-storage bunkers. The coal is here discharged from the hopper-bottomed cars and passes down into the bunkers through a cast-iron grating containing openings about $2\frac{3}{4}$ x $3\frac{3}{4}$ in. From the bottom of the coal bunkers chutes lead to the feed hoppers of Coxe chain-grate stokers.

The fingers (or as they are familiarly known the "piano keys") of these stokers, which form the actual coal-supporting surface or grate, are of special design and contain openings about $\frac{1}{16}$ in. wide and $\frac{3}{32}$ in. in length. Approximately 6 per cent. of the grate surface is made up of these minute air spaces. On the grate of this stoker this fine material, which is carried to a depth of about 4 in., is burned by the aid of forced draft of an intensity of about 1½ to 2 in. of water. Considerable care and no small amount of skill must be exercised in handling this fire.

The fire carried in these stokers is by no means as flexible as it is possible to secure with some types of stokers and bituminous coal. The heat developed, however, is intense, as may be judged from Fig. 4. This is, by the way, a peculiar and in some respects a remarkable photograph. It was taken through the side door of the furnace and shows clearly not only the fire bed with the flame leaping up through it, the minute air holes blown in the fire at points above the tuyere openings



FIG. 2. THE SILT IN COMPARISON WITH A 6-IN. RULE

of the grate, but also the effect of the intense heat developed upon the side walls and setting of the boiler. This is evidenced by the slag formations on the side of the door opening, which somewhat resemble icicles in form and shape.

In this plant at the present time 10 Babcock & Wilcox boilers, each of 303 hp., are now in operation. These are set in batteries of two each. The actual effective grate surface under each boiler is 10 ft. wide and 11 ft. 8 in. long. Four more boilers, duplicates of the ones now in operation (except as to superheaters), are now being installed in the plant. Steam is carried at 155 lb. pressure and 150 deg. of superheat. From the boiler plant the steam is conveyed to the



FIG. 3. UPPER END OF BOILER PLANT SHOWING CARS ON FUEL TRACK ABOVE BOILER BUNKERS

engine room, which contains as main units two Allis-Chalmers steam turbines direct connected to Allis-Chalmers 4100-volt, 565-amp., three-phase, 60-cycle generators. These machines operate at 1800 r.p.m. Surface condensers are employed and a vacuum of about 28 in. is secured. Cooling water is drawn from the Susquehanna River and returns to the same source, the power plant being built upon the bank of this stream. The power generated is transmitted direct without transformation to eight different collieries of the Lackawanna company.



FIG. 4. INTERIOR OF THE BOILER FURNACE. THE CHAIN GRATE MOVES FROM RIGHT TO LEFT

At this and other Lackawanna plants, so far as is known, have been made the only successful attempts to burn an anthracite fuel as fine as that used. The size of the individual pieces of coal may be clearly judged from Fig. 2, which shows this fuel in comparison with a 6-in. ruler. As may be clearly perceived in this photograph, some pieces of the larger sized coal employed to keep the fine stuff from running out of the cracks around the door of the car have been included in the sample photographed. The balance of the sample shows clearly, however, the small size of even the largest particles and gives a clear idea to those familiar with combustion problems of the difficulties in any scheme for the utilization of this product.

This fine material contains from 85 to 90 per cent. as much heat per pound as does the larger grades. The question which has confronted would-be users of this fuel has always been how to get the heat out of this fine coal. It would appear that the chain-grate stoker and forced draft as employed in the Nanticoke power plant have proved a successful solution to this problem.



FIG. 5. VIEW DOWN THE FIRING ALLEY OF THE BOILER PLANT

Who's Who In Coal Mining

W. J. Heatherman

Character, integrity and ability are so plainly stamped on the countenance of W. J. Heatherman, who was recently appointed by Governor John J. Cornwell as chief of the West Virginia Department of Mines, that his face may be said to be one of his best assets. Mr. Heatherman, in reaching his present position, has had no easy road to travel. The standing he has achieved in the mining world is due to no accident, but to his own ambition and perseverance, coupled with a most delightful personality which at once attracts people to him and which undoubtedly had much to do with bringing to him the invitation to accept the post which he now holds.

W. J. Heatherman was born at Malden, W. Va., three days before Christmas, 1884. He is therefore not quite 34 years of age. What education the new mine chief has received has been gained at times which he could spare from work in the mines. The foundation for his technical education was laid in the public schools of West Virginia, supplemented by two years spent at Mount St. Josephs College, Baltimore, and a two years' course in mining engineering at the Ohio State University, where Mr. Heatherman was an instructor in surveying.

Most of his education, however, was gained after he had begun work in the mines. He started in as a trapper boy at the age of twelve, at Powhatan, working for the Powhatan Coal and Coke Co., operated then as now, by Col. L. E. Tierney. Having become interested in the technical phases of mining and desiring to learn all there was to know about the profession, young Heatherman accepted a position as chairman on the engineering corps of the Powhatan company. Observant of the ambitions of young Heatherman, Colonel Tierney presented him, as a Christmas present, with a correspondence course in mining engineering in the International Correspondence School. Equipped partially with an education as a mining engineer gained through a correspondence course, young Heatherman in 1900 became a mine boss for the United States Coal and Coke Co. at Gary, later being made a transitman for the same company.

After completing a two-year course at the Ohio State University, young Heatherman was made chief engineer with the Beury interests on New River. His ability was soon recognized, and in the course of a year or so he was made superintendent of the Stuart Mining Co. at Fayette. Attracted by his ability, the Clinchfield Coal Corporation tendered the young West Virginia mining engineer a position as superintendent of one of its mines in the Big Stone Gap section, Mr. Heatherman remaining with that concern for several years, acting as superintendent of several of its mines.

Another chapter in the career of W. J. Heatherman was written when he became general superintendent of the Main Island Creek Coal Co. in Logan County, continuing in that capacity until he branched out for himself during the last year, at the same time managing

the operations of the Maxine Coal Co., whose headquarters are at Huntington.

The new chief of the Department of Mines is an enthusiastic advocate of safety-first in all its phases. His slogan is not only "First Aid to the Injured," but "First Aid to the Uninjured"; and this forms the burden of his first communication addressed to the operators, mine officials and miners, made after he assumed charge of the West Virginia Department of Mines. One of the first things with which he was deeply impressed when he assumed the office of chief of the Department of Mines was the number of fatal accidents occurring in the mines in this state, a number which is greatly in excess of what he deems it should be.

He has publicly stated that he desires and solicits the coöperation of the operators, mine officials and miners in everything that will assist in placing the mines of the state on a higher standard of safety and efficiency.

Two teams of miners drilled by Mr. Heatherman during his connection with the Clinchfield Coal Corporation won the trophies awarded the best first-aid teams during the Virginia State Meet at Big Stone Gap in the years 1915 and 1916.



W. J. HEATHERMAN
Chief of the West Virginia Department of Mines

The new mine chief's favorite recreation is baseball, and not only baseball as seen from the bleachers or grand stand, but as seen from the diamond. He has played baseball since he was a youngster, and played so well that he could have secured a berth in the Three-I League and leagues of similar classification had he so desired, excelling as a first baseman.

When J. H. Murray and others of Huntington contemplated the expansion of operations of the Maxine Coal Co., they felt no hesitancy in investing additional capital to be expended in improvements so long as they knew W. J. Heatherman was to be in charge of such improvements and subsequent operations, even though he was then engaged in the coal-mining business as an independent operator; and therefore it was with much reluctance that those with whom he was associated consented to release him in order that the state might have the benefit of his services.

Mr. Heatherman and Miss Alice Smith, of Chillicothe, Ohio, were united in marriage in 1908, and have two splendid boys aged nine and seven respectively.

From remarks made by members of the staff of district inspectors of the Mine Department following the first conference held by the new chief, it is believed that he will not only command their confidence, but that of all others with whom he comes in contact.

Open Air Accidents with Explosives

Three accidents within a week, due to explosives, recently occurred in eastern Pennsylvania. All took place out of doors.

In the first accident a large number of drill holes were being charged with 20,000 lb. of dynamite. The work was being done by an expert blaster sent out by the company furnishing the explosive. In some unaccountable manner the blaster detonated the charge in one of the holes and was instantly killed. Although the exact cause of this accident will never be known, it is believed that a portion of the charge became wedged in the hole and, in attempting to dislodge it, the blaster set off this sensitive explosive with his tamping stick.

In anthracite stripping it is the practice to keep the holes a short distance ahead of the shovel and never to charge a hole with black powder while the shovel is digging. As a further precaution, when black powder loading is going on with a shovel in the proximity of the hole, even though the shovel is at rest the smokestack is hooded to prevent the emission of sparks.

In the second accident a series of holes had been drilled, and the foreman gave the blaster instructions to wait until after quitting time before starting to charge them. The foreman then left to attend to other duties, whereupon the blaster and his two assistants began to load the holes.

While the blaster was pouring black powder from a keg into one of the holes, a spark from a shovel that was digging nearby ignited the explosive. Every bit of clothing was burned off the man, and only a small portion of his body escaped serious burns. It is thought that he may survive, but this is considered doubtful. His two helpers received serious burns about the hands and face.

Heavy rains have prevailed during the past month, and after one of these several holes were loaded directly in front of a shovel. The dynamite used was of about 60 per cent. strength. After the holes had been fired, the shovel was moved up and work commenced. Only a few dipperfuls had been taken, however, when the engineer collapsed.

Upon examination it was found that this man had been "knocked out" by the dynamite fumes, the effects of which are well known. The morning was a "heavy" one, and the gases seemed to drift to a point directly under the shovel cab. Thus, while this man was practically working in the open air, he evidently received the full effects of the dynamite fumes.

Tenth Annual Convention of the International Railway Fuel Association

TO STIMULATE greater effort on the part of all concerned in the production and use of coal, the International Railway Fuel Association, composed of the officials of American and Canadian railway fuel departments, in conjunction with coal operators, recently tendered its services to the Government. The offer was accepted by the Fuel Administration and the Railroad Administration, and these two Government departments, in coöperation with the officers of the Fuel Association, arranged for the convention held on May 23 and 24 in Chicago. The speakers who addressed this meeting are all men of national prominence, whose previous experience or present contact with the fuel situation enabled them to speak with authority to mine operators, mine workers, railway officials and railway employees. Special emphasis was placed by most of the speakers on the value of individual effort in connection with coal conservation, as will be evident from a reading of the several inspiring and excellent papers abstracted on the following pages.

Fuel Problem As It Relates to War Activities

By P. B. Noyes

Director, Conservation Division, United States Fuel Administration

FOR nearly nine months the Fuel Administration has been rounding up, as it were, the factors of a problem absolutely new in the industrial life of America. The picture is now complete. The governing factors are before us. Their relations and inter-relations have been clearly determined. The solution, however, of the war fuel problem is a task quite beyond the power of any administration or administrator. It lies in the hands of a thousand agencies and millions of men.

The coal supply is short. Last winter it was short, and the immense new requirements for war purposes threaten to make it shorter still the coming winter. The mines, which must get out the coal, and the railroads, which must carry it, were pressed nearly to their limit before the war. They cannot take on 200,000,000 tons of additional production. Add to this the tremendous burden of war supplies, troop transportation, material for shipbuilding, and food for our Allies, and then picture to yourself what it means to the railways, with facilities little if any greater than three years ago, to provide transportation for 200,000,000 additional tons of coal.

Conceive of this increase as 16 solid trains of gondola cars filling 16 tracks from New York to San Francisco—a veritable freight yard filled with coal cars extending the breadth of this continent. And this represents only the increase of coal transportation demanded of the railroads. All of those four million cars must be switched in and out and carried hundreds of miles by our already burdened transportation system if war demands are to be met and the usual industrial life of the country be at all preserved.

The coal business is in physical proportions so far beyond any other business in the country that emergency remedies which can be successfully applied to any of the others will hardly make a dent in the coal shortage.

And yet, the success of the war is likely to depend just on this supply of coal. Coal to manufacture supplies and ammunition on a greater scale than Germany, and coal to transport these supplies and transport millions of men both in this country and across to Europe, is the first essential of our success. Behind this we have the necessity for coal to maintain life at home, to preserve our economic system and keep our ordinary industries running and keep labor employed.

There has been much talk of shutting down "nonessential" industries, but a little investigation shows that only a short distance down this road lies financial ruin and unemployment of labor on a scale which would bring disaster at home and failure in war.

We are apt to forget that what are now called the nonessential industries are the absolutely essential industries of peace times. They are more than that—they are, even in war times, the essential means for life and happiness to a very large portion of our population. At least 20 billion dollars of capital is invested in legitimate manufacturing enterprises producing goods not strictly needed for the war. Ten million men support their families from the work they do in these factories.

Whenever war industries are threatened with a coal shortage, unthinking people light-heartedly suggest the cutting off of nonessential industries. Last fall lists were repeatedly suggested by responsible people for the cutting off of certain industries as nonessential. It only required a cursory examination of this list of industries to find that they involved the happiness of a tremendous proportion of our working population; that cutting off their fuel supply meant bankruptcy on a scale which would precipitate the greatest panic ever seen in the United States, and the sudden and forcible unemployment of at least five million men. It was thought by some a sufficient answer to suggest the need of men for war work. But the shifting of workmen from one business to another is a difficult and slow process. We know that a majority of the workmen thrown out by such a sudden shutdown of industry would not get employment. Such readjustment of employment would affect only a small faction of the workers. A large proportion of the employees in every factory are not migratory. They own homes. They have lived in the same place all their lives. They starve there rather than move. They do not know where to go for work even if they are willing, and no power on earth could arrange new places for five million men in time to prevent not only hardship and misery but possibly riots and bloodshed.

All responsible agents of the Government now realize that keeping labor reasonably employed and only taking it away from nonwar work as fast as it can be employed on war work, is nearly as important for success in this war as the manufacture of munitions and ships. Granted that we must have 100 per cent. fuel for munitions and ships. We shall fail as a nation if we do not provide this without a complete breakdown of our industrial system.

Fuel is a small part of the raw material of most manufacturing institutions. The fuel expense in most highly organized industries is little over 1 per cent. of the total cost of the goods. On the other hand, this 1 per cent. is absolutely vital. Without it the factory closes. The other 99 per cent. are useless. We are called upon to view a ton of coal as equal to 500 or 600 lb. of ship plates or shells, but every ton of coal saved for our factories means the employment or nonemployment of a hundred men.

Over and beyond the desperate need of coal for war purposes lies an equally desperate need of coal to preserve the lives and happiness of the population. The threatened shortage of coal can easily mean unemployment and financial ruin.

Every extra ton of coal taken out of the mines is likely to keep a hundred extra workmen from idleness. Railway locomotives burn more than a quarter of all the coal mined in the country, and it lies in the power of the railway fireman and the organization with which he works to save enough coal to turn threatened national disaster into national prosperity.

Fuel economy on a scale which will really save the country from industrial disaster demands first, a study of methods and, second, a willingness to take pains. It has rightly been said that if every man who burns coal will do the very best he knows how without a word of new information, the saving effected will result in plenty of coal for every purpose. Under the present stimulus, I credit every one with giving more attention to economy than ever before, but this matter of doing one's best is relative. It is proportioned to the background of necessity which lies in our minds.

Few men ever reach 100 per cent. of their possible efficiency. Most of us never reach 50 per cent. Any man who through enthusiasm or other stimulus gets up to 75 per cent. of his possible efficiency is a brilliant success in his field of endeavor. The only man I can think of who is up to 100 per cent. of his possible efficiency is the drowning man. His "background" is sufficient to bring out all there is in him.

The background of this terrible war is raising the efficiency of every man and woman in the United States. It is raising it in proportion to the desperate character of that background. Those to whom war has not yet appealed as vitally affecting their lives, have little increased efficiency. The more the meaning of the war has come home to us, the more we have approached our possible efficiency. This is a real force and should be applied directly to fuel economy. Only in that direction lies success in winning the war.

What the Coal Operator Can Do To Help Win the War

By Harry N. Taylor

Vice President, Central Coal and Coke Co., Kansas City, Mo.

THREE great factors make up the fuel problem, any one of which can render helpless the other two. These are the producer, the transporter and the consumer. The producer may be ready to ship the coal and the consumer be ready to take it; but if the transportation is lacking, the other two are helpless. The railroads act in a dual capacity in relation to the fuel situation—they are both transporters and consumers. But viewing them from their primary standpoint—transporters—I believe no body of men is more alive to the importance of the great work before it, or will more patriotically perform its duties than the great industrial army of railroad men.

The coal operator is passing through the most extraordinary period in the history of his industry. He is confronted with the task of supplying an ever-increasing demand, while the means at his command are being constantly curtailed and production threatened. His men are being enlisted or drafted into the army, his machinery is wearing out, and to secure new machinery is next to impossible.

His allies—the railroads—are also being called upon to move an extraordinary tonnage created by war demand. This taxes them beyond their power of performance. This necessarily hampers the coal operator, through lack of motive power and shortage of car supply. We are all confronted by a great task, calling for determination and courage if it is to be successfully overcome. Every one of us must first think, then plan, then do, and the do must be spelled with a capital "D."

I have been connected with the coal industry for more than 30 years, and past experience teaches me that the coal man is at his best in times of stress. Trouble does not discourage, but spurs him on to greater effort. In the many lean years of the past, most coal men have had so little profit in their business that they have been forced to meet many emergencies, and they have become adept at turning corners when harassed by adverse conditions. Thus for years we have been meeting difficulties which would have tried the courage of any man; but this very condition of the industry has fitted the coal operator for the great task that now confronts him.

The railroads have had in the past five or six years a situation very similar to that of the coal operator. With constantly increasing costs of labor, material and supplies, with no means at their command to increase revenue to meet the demands made upon them, they have fought manfully against these adverse conditions and have done wonders with the resources at their disposal. Now that the extraordinary demands of the war are forced upon them, they are compelled to face difficulties seemingly insurmountable.

Roads Forced Into Bankruptcy

In the past few years many roads have been forced into actual bankruptcy, while others made heavy drafts on surplus earned to provide motive power and cars to meet emergencies. For years the big shippers of coal have done all they could to aid the railroads, in securing permission to increase rates, and thus to provide means for adequate motive power and cars to properly conduct their business. This was done, not because the coal men are philanthropists, but because they realized that unless an increase was secured they would pay far more dearly for enforced idle time at their mines arising from lack of adequate car supply than the amount they would pay through a reasonable advance in rates.

The demands of the public for coal supply now requires steady and full running time at all mines, six days per week, every week in the year.

As yet only a comparatively few people have realized the great responsibility resting on the vast consuming public, if the threatened shortage in coal supply is to be overcome.

Although the figures available at Washington show that 550,000,000 tons of bituminous coal was produced in the year 1917, still the country faced an actual coal famine. Every railroad, manufacturing interest and individual consumer was brought face to face with a shortage of supply. In ordinary times an increase of almost 50,000,000 tons would have found the coal industry demoralized by overproduction while the actual conditions in 1917 found us destitute of fuel in many localities, found our war preparations hampered, found our railroads and manufacturing plants crippled, and threatened the successful outcome of the war for liberty and democracy of the world.

We produced a surplus of coal, but found coal bins empty. Coal was the mainspring of industry in peace times, but is the very heart and sinews of the country's welfare in times of war.

We have had the experience of 1917 to guide us as to our duties and necessities for 1918. We know we must produce 50 million additional tons of bituminous coal in 1918 over and above the production of 1917, if we are to meet the demands and necessities of the war.

There are two ways by which the threatened shortage in coal supply can be overcome; First, by increased production; second, by conservation. Every effort is being put forth by the coal operators and miners' organization, the individual miners and the railroads to produce the maximum tonnage.

The records of production as reported from Washington from week to week since January first are not entirely satisfactory. One week we show a little gain and another week we show a dropping back. This record, so far this year, compared with the previous year, on the whole shows a slight gain, but not enough to spell security.

We can make a splendid inroad into the shortage ahead of us if we will pay special attention to the conservation of coal, and conservation must be practiced to a greater degree this year than ever before if we are to meet war necessities. If the coal operator will see to it that the miner gives him clean coal, and if the miner will follow out his patriotic duty and clean the coal, as he should, at the face, we will relieve the railroads of the necessity of hauling the impurities, we will add greater

efficiency to the performance of locomotive power and aid in the movement of trains. Clean coal will add to the efficiency of every manufacturing plant and every warship and transport, giving more speed to industry, and will go a long way toward helping win the war by adding efficiency as well as supply. By eternally trying to produce, and infernally trying to conserve, with every effort we have within us bent toward the end of our patriotic duty, with the great consuming public alive to the real situation, with every citizen a helper, not a knocker, we can and will meet this great necessity of coal supply in a manner that will leave enough coal over and above our own requirements to kindle the fire to finish the job when our boys and the Allies send Kaiser Bill where he belongs!

Individual Effort Toward Fuel Saving

By Eugene McAuliffe

Manager, Fuel Conservation Section, Division of Transportation, United States Railroad Administration

THE subject assigned to me, "Individual Effort Toward Fuel Saving," is sufficiently broad to embrace every feature of fuel production, preparation, transportation and consumption. Obvious limitations, however, will restrict me to what would seem, after all, to be the most important angle to which consideration should be given—that of individual effort, greater effort, a more unified effort than we have in the past attempted.

Statesmen and orators have told us we are a great nation. We have come to believe this oft-repeated assertion. It flatters us and it pleases us to be told these things. I confess that I have had in the past three years some fear that as a people we were not measuring up with the illimitable resources and magnitude of our great country, a country of great agricultural wealth, populous cities, great railway systems, all in turn drawing from Mother Earth, from her mines and wells, not only metallic wealth, but the coal and oil on which we depend for heat, light and power, on which our whole industrial and transportation system rests.

No country, no people, can be truly great as the result of individual achievement. We must keep step with and attune our ears to the music of the march of the human race, for while monarchies and republics have risen and fallen the human race has pressed on to better things. The struggle upward has been at times a difficult one; human suffering, blood, misery and brutality have marked the way.

At the Threshold of Greatness

This war will fix our place unalterably; not as one of the nations, but the greatest of all nations in the world, provided each of us does his part. We are at the very threshold of greatness, the door is wide open, and we are about to step inside. When we enter we will be a fully integrated people, with no doubt or question of allegiance; there will be no hyphenated Americans, no Northerners, no Southerners, no Easterners, no Westerners. Despite all our misgivings we will arrive on time; we are now entering the terminal; the signs are too patent to admit of doubt; the way the country has swung in a few months from a nation committed to peace and proportionately defenseless, into one with a great compelling purpose, a great duty, a great army and navy, has been marvelous.

No one with power of perception can look into the clean-cut faces and at the upstanding bodies of the thousands of young men wearing the blue and brown, who crowd the trains, "going down to the sea in ships," and fail to see in them the crystallization of two years of patience under insult and provocation; aye, challenge. Who of us now fails to recognize the German submarine that called at one of our eastern ports one Sunday morning two years ago, destroying five unarmed ships a few hours afterward, or the flamboyant "Deutschland," as less than a taunt and a challenge?

We are making tremendous strides toward greater individual effort. We have passed the first milepost; but what we who remain at home, we, the real reserve force of the American army must do, is to complete the work of reconstruction of our daily lives so as to make ourselves a living, breathing, fighting part of the country's military force, standing unalterably behind the men at the front, who—our sons and brothers—are the real "shock troops," the first line, depending on you and me to support, whether the fortune of battle sees their line move forward or, with military elasticity, settle back.

Some time ago a friend said to a young soldier who was leaving for France, "It is a great thing to be able to go abroad to fight for your country." "Yes," replied the soldier, "it is also a great thing for you who must stay at home to make and keep it a country worth fighting for."

We must work and we must save. The purchase of a few Thrift Stamps and the denial to ourselves of white bread is not enough. We must look on the winning of this war as a sacrament that it is our great privilege to partake of, and the acceptance of that sacrament means the consecration of all the mentality we can command; all the labor of our hands that we can muster; and most of all, the one compelling idea that all we do, all we can do, is not after all a duty, but instead, an inestimable privilege.

When I speak of working and saving, I wish to speak to you as Americans all. I do not mean that one class shall work and another class save, but that in this struggle each man and woman should practice more self-denial and perform more service. We must increase the output of the shop, the mill, the mine and the railroad. We must work more hours, show a more intensive application, restrict the number of holidays, and most of all, find our place and stay there until war expediency or necessity calls for a transfer. The tremendous expansion that the war has brought about has made us feverish. The job offered just beyond appeals to us, and we move; we move again and again, only, as is frequently the case, to come back at last to our original position. The loss of effort that distinctly belongs to our country is most serious, with nothing of gain to show in its place.

War a Contest of Skill

War is a contest, not alone of fighting skill, but of mining skill in tons of output; of railroad skill as measured by raw and finished materials moved, of passengers, including soldiers and sailors, moved. We are, as I said before, soldiers all, perhaps ununiformed, but standing behind our boys who are the first line troops, standing behind that first line in solid formation with every faculty alert and active, every muscle strained, ready and anxious to give support when the assault comes, and not a shifting, careless, carefree, dollar-seeking crowd, careless of the measure of duty we perform, indifferent to the quality of the material we produce, indifferent as to whether it arrives on time or otherwise.

There can be no middle course; we must take on more responsibility, more work. One-third of the man-power of the country, or more than ten million men, are now directly, or indirectly, engaged in the war; and the end is yet far off. The casualty list, as yet a tiny, trickling stream, will soon grow into a brook; it will pause as it runs past the door of many, many an American home—at the home of the worker in the mine, the factory and the ship yard; the home of the conductor and the brakeman; the engineer and the fireman; the dispatcher, the roundhouse man and the superintendent; at the home of the farmer and the plainsman; at the doctor's door; the lawyer's door; the capitalist's door; wherever the blue star of service hangs in the window. And they are becoming numerous now, the million mark has been passed already—that stream will leave a stain of blood, of tears, of sorrow.

If we are to prevent this brook from growing into a river, a river of American and Allied blood—the best and most chivalrous blood the world ever saw, blood which courses through arteries and veins under the inspiration of ideals such as the world never before advanced, ideals that carry no taint of

lust for land or wealth—we must as miners and railroad men mine coal, mine clean coal, move coal and save coal; we must crush our individual prejudices, our likes and dislikes; we must "carry on"!

A few days ago I reread the story of the "Oregon," and that memorable journey of 20 years ago from San Francisco to Santiago, Cuba. There was not a single American, man or woman, then living, who did not follow Captain Clark and his magnificent crew of men through every one of the 16,000 miles that the "Oregon" drove on her way to join the South Atlantic fleet for the defense of our country in the war then impending. I want to retell in a few words the story of the "Oregon." To my mind that story is our American Odyssey. Her story will appeal to motive-power men, to machinists, to engineers and firemen, and I think to miners.

"Oregon" Built on Honor

The "Oregon" was a creation of the West. She was built in San Francisco by the Union Iron Works, and Captain Clark said, "She was built on honor." When her builders, after installing first-class tubes in her condensers, found a superior metal, they took out the first set of tubes and replaced them with the better article at their own expense. Her builders started right. Is it any wonder that she was built and manned right?

On Mar. 19, 1898, the "Oregon" steamed out of the Golden Gate, down the west coast, from temperate California to the scorching equator. You can imagine the heat and discomfort of a ship's stokehold in the torrid zone, fresh water and ice alone making living possible. At this juncture the chief engineer reported that the use of salt water in the boilers meant scale; scale meant coal; and most of all it meant loss of speed, loss of ability to maneuver quickly when the supreme test came. The crew as one man told the officers to reduce the supply of fresh water issued to them, and the use of ice was entirely restricted to the firemen and coal passers.

On swept the "Oregon," her engines throbbing, her furnaces glowing down through the tropics, into the icy, storm-swept Straits of Magellan, where runs, it is said, the swiftest and most treacherous currents in the world. Captain Clark admits bad moments as he approached the "end of the world." But the "Oregon" steamed on, her boilers were kept clean and tight by the sacrifice of her crew, the steam pressure never failed. The condensers built on honor maintained the required vacuum, her heavy bearings ran cool.

The Straits were passed, and the run up the east coast toward the tropics was well on. Then the officers, concluding that the Cardiff coal taken on at 'Frisco should be conserved for the coming hour of battle—for the news that war had been declared reached the ship at Rio—sailors and coal passers began the exhausting work of rehandling the cleaner, higher grade coal, placing it in bunkers where it would be ready for the supreme hour.

This, to my mind, is the true definition of quality. Johnson's, Worcester's, Webster's, all the world's dictionaries in fact, never defined the word quality as did the crew of the "Oregon." They knew coal, clean coal, coal of quality; and they knew that without clean coal the "Oregon's" guns would not save her from defeat.

Can we not visualize the value of clean coal, mined and loaded on honor? Its value to the men who stoke and sail our transports, laden with the living, breathing embodiment of the million blue stars that show in our windows at home, stars whose azure blue will soon, alas too often, turn the color of hammered, fire-purified gold? Its value to the men who man and fight our battleships and our destroyers, who convoy the star-laden transports? Its value to the young men just enlisting in the great transportation army, the locomotive firemen, young men fresh from schools, farms and shops, to whom the work is now strange and arduous? What does not clean coal mean to all of these? When we pause to reflect how far-reaching is our thoughtlessness we often shrink from the study.

Cruise at an End

Sixty-five days after leaving 'Frisco, on May 24, 1898, Jupiter Light on the Florida coast streamed out on the "Oregon," and the memorable journey, which crystallized in the birth of two new republics and the rending in twain of the western continent, the dream for centuries of kings, statesmen and engineers, was at an end.

There Captain Clark received a terse short order from the Navy Department, the substance of which read, "If in need of repairs go to Hampton Roads; if not, go to Key West, coal and join the Atlantic Fleet." The "Oregon," built by Americans, of American-made steel, whose sheets, seams, tubes and stays were driven together by Americans, whose shafts and bearings were forged, wrought and scraped to a fit by American mechanics, whose bunkers contained a remnant of clean Cardiff coal reinforced by clean, mined-on-honor coal, from American mines, answered, "Ready," and turned her prow toward the shores of struggling, monarchical-cursed Cuba, where that festering old-world product, Weyler, then reigned supreme. She took on board, on May 27, sixty men from the Chicago Naval Reserve, young men whose whole training was received within sight of the City of Chicago. On Sunday morning, July 3, the Spanish fleet came out of Santiago Harbor in battle formation, while the "Oregon," stripped of every superfluous impediment, deckboats, ropes, stanchions, every possible obstruction out of the way, her decks sanded, the gun crews standing by the guns, naked to the waist line, sprang, under the impulse of her engines to the head of the line. And, at 9:27 a.m., her guns fired the first shot in an action that quickly ended a drama which closed with the furling of the Spanish flag and the end of old-world domination in the western hemisphere.

Can we not as miners and railroad men strip ourselves of all passion for profit, all controversy and prejudice, all obstruction, of whatever character, and go out with the determination to forget self, with the firm determination to follow our ideals, the successful conclusion of which will offer wordly opportunity without end?

Perhaps in passing I might well speak of what, to me, seems a great and already flowering field of opportunity, one that reaches out to the miner working in the bowels of the earth, out to the railroad man in the cab and the caboose.

Twelve hundred years before the coming of Christ, Tyre, on the Syrian coast of the Mediterranean Sea, was the greatest seaport of the world. Her merchants were known as "men of Tyre," her vessels were known as "ships of Tyre." Her commerce made and unmade men, cities and principalities. With prosperity came love of luxury, selfishness and other evils, and the command of the seas passed to others.

Seven times since then the over-seas commerce of the world has changed hands; early in the nineteenth century Yankee shipbuilders constructed clipper ships, with keel, ribs and sheathing cut from Maine forests, and with masts that were so tall as to seem at night to carry their tops through the stars, claiming the commerce of the world.

Then came Sir Henry Bessemer, and cheap steel—and Great Britain won back her place as mistress of the seas. And the sun set on the clipper-rigged ship of 50 tons burden, manned by men who were hardy and courageous enough to drive their ships through a gale, every inch of canvas set, at 18 knots an hour. Perhaps we yielded to staid Britain more easily than we would have done if the West—California, Oregon, Washington, the work of spanning the continent with iron rails, the eternal lure of the West—had not beckoned. That work is now done. There is now no frontier, and we are turning back to the sea for new adventure.

Shipyards Busily at Work

In one shipyard alone men are working on 50 keels at one time. From British Columbia, down the west coast to the end, and from Texas to Maine the shipbuilder is carving out the greatest merchant marine the world has ever seen—single ships into whose holds will be poured the contents of hundreds of freight cars for transport to the ends of the seven seas. Our army officers are building the greatest port facilities, warehouses and terminals ever conceived. All of which makes a new era.

What a vision of opportunity this offers to all Americans; not alone to the men of New England, but to the men of Kansas, Nebraska and the other inland states; to even the men of sun-baked Arizona. This means transportation to the men of the rails; coal to the men of the mine; glory and greatness for us, Americans all!

Individual Effort and the War

By E. N. Pratt
President International Railway Fuel Association

THIS war is indeed a serious matter, the winning of it a stern and determined necessity to us all. As individuals we take a back seat for no one when it comes to patriotism, but it has been my experience and observation we know not always wherein our individual duty lies nor do we sense its importance in the big game. We are wont to say: "What's the use of the extra exertion to save a shovelful of coal when another can save a ton?" "What's the use of unloading a car of coal a day earlier when we see trains of coal remaining unmoved daily?" "What's the use of firing a locomotive with care when the train dispatcher holds us an hour on a siding?" "Why repair a car today by extra effort when there will be 'just as many' tomorrow?"

It reverts to the old Bible story where the master called his servants together and gave talents or responsibilities to each according to his ability. "And to one he gave five talents, to another two, and to another one."

Some of us can do more than others; such have the responsibility equal to five talents. Others are in a position to do less, but all of us have it in our power to a greater or less degree to help win the war by doing our best. There is an old Scotch saying that "many a mickle makes a muckle." It is not expected that the miner can do as much as the operator, but both can do wonders in the improvement of the quality of fuel coal if their heart be in their work. The stationary fireman can do less toward fuel economy than the manager of the plant, who can provide efficient devices. Neither can the locomotive fireman save as much coal on his one engine as the train dispatcher with dozens of trains on a single track road, but each can and must do his part.

There are three items in this tremendous fuel problem—production, transportation and consumption—and the railroads are largely responsible for all three; for production in so far as concerns the delivery of machinery and supplies to the mines and a car supply for the coal produced. But the miners and operators both can do much in this particular.

How often have the mines dropped empty cars by the shaft for some trivial reason? This might be refuse in the cars, a hole in the floor or sides, a brake chain broken. How little effort on their part would avoid this loss of use of one or more cars for a whole day? I venture to say that this trivial item amounts to several thousands of coal cars each day.

The next item is transportation, largely by rail, some by water. Railroad men are a hardy and earnest lot and not easily discouraged, working every day in the year including Sundays and holidays that their task may be accomplished with credit to themselves, their employers and to their country. But when, last winter, after weeks of continued and unprecedented snow and cold their locomotives were compelled to operate with added disadvantages of poor and dirty coal, it was perhaps the greatest obstacle of all and many a locomotive died and its train was abandoned for this reason.

I have yet to see a miner or operator who would defer to the railroad man in the matter of patriotism or loyalty to country, and I believe if the proposition is put squarely up to the heart of the man that there will be no Sundays or holidays in either the mine, or the railroad, or in the coal yard, any more than there is Sunday or holiday in the trenches with the Hun facing our boys and the Kaiser menacing our free institutions.

Notwithstanding the fact that the railroads are great users of coal, the public should bear in mind that others are also responsible for waste. Therefore, when we seek the greatest economy in the use of fuel there is a tremendous need of an educational campaign at the kitchen stove, the house heating furnace, the power plant, the coke oven and the kilns that bake clay.

Yet this 27 per cent. of the coal which is used by the railroads is so large that we hope by care and close attention to details, not only as to firing, but better repair of locomotives, more care in dispatching and moving trains and better operation on the part of the engineer, to save millions of tons of coal and millions of gallons of fuel oil. The War Department's arrangements for deferred classification for skilled railroad men, places them under a peculiar obligation for extra effort in their work.

Superheating has been proved practicable and each locomotive so equipped saves hundreds of tons of fuel per year besides rendering faster and better service; hence the present practice of placing superheaters upon the larger locomotives passing through the shop should be continued as far as possible, considering the scarcity of materials and skilled labor to apply them. The locomotive feed-water heater also offers an attractive field for economy and efficiency and well warrants careful and continued experimentation.

It has been said, "Ships will win the war," "Food will win the war," "Coal will win the war"; but I tell you it is individual effort that will solve the fuel problem and thus render its great share in winning this war for democracy.

The leading feature of the morning session on May 24 was the thunderous applause which greeted the announcement of John P. White, former president of the United Mine Workers of America, and now labor advisor for the United States Fuel Administration, that peace in the American coal fields was assured for the duration of the war. The 1200 railroad men and coal operators who packed the hall gave White an ovation when he declared the 700,000 American coal miners are eager to work every day, Sundays and holidays, getting out the extra 200,000,000 tons of coal that will be needed this year if we are to keep business going in such a way as to win the war. He said the 87,000 miners of Illinois alone, who worked only 160 days and mined 60,000,000 tons, could get out 150,000,000 tons this year if enabled to work full time.

"Let the railroads quit haggling over the price and start buying their coal," said Mr. White. "Everybody else will follow suit, production will rise, and we won't have any coal famine next winter. The one mistake that has been made," he added, "was in talking price instead of production."

Claxton E. Allen, deputy fuel administrator for Illinois, said records of all coal dealers are being kept, so that if necessary the administrator can take coal from those who have a surplus and allot it to others who have none, if that measure prove necessary to prevent suffering next winter.

"Fuel Oil and the War" was discussed in a paper sent by M. L. Requa, director of the oil division of the Fuel Administration. The diversion of oil tankers from coast lines to transatlantic army supply service make it necessary for the railways to haul an extra 100,000 barrels of oil daily from Southwestern fields to the North Atlantic war-industry centers. Pipe-line deliveries are to be increased by 20,000 barrels daily. Fuel-oil users were urged to increase their storage capacity.

H. A. Garfield, the United States Fuel Administrator, sent a telegraphic greeting to the convention, emphasizing the national need for all fuel users to avoid waste.

National Coal Association Meets

National Coal Association began its first annual meeting in Philadelphia on May 28. The chief address of the day was made by J. D. A. Morrow, Director General of Distribution for the United States Fuel Administration. An abstract of his address is given below.

EVERY country that has gone into this war has promptly found itself faced with a difficult coal problem. In Great Britain, within six months after war had been declared, 250,000 coal miners had enlisted, and the production in Great Britain fell off 25 million tons. The railways were congested with traffic, and the country faced an industrial crisis.

England met that problem by taking over her coal industry absolutely, by fixing prices, by zoning the movement of coal on her railway lines, by putting into effect regulations concerning distribution and supply of coal more rigid than anything we have had in this country. In Germany, the production of coal fell off 35 million tons in the last six months of 1914, which was a reduction of nearly 20 per cent. In the next year, the production declined another 12 million tons.

We have no authoritative figures of the German industry since the year 1915, but we do know that they have been so short of coal in Germany that the suffering there among the ordinary people during the winter was more severe than anything we had in this country, and strict and rigid measures have necessarily been imposed by the German Government, in order to support the war machine.

The important French coal fields were overrun by the enemy at the outset of the war, and production was cut squarely in two. The supply there has been cruelly short, and every pound has been distributed by the Government. That has been the case also in Italy.

Coal Crisis Nothing Unusual

Thus it is nothing unusual for us to have a coal crisis in this country. You are all familiar with the insatiable demand for coal that coincided with congested traffic on our lines, and within six months after the declaration of war the United States had set up a Federal Fuel Administration, the industry was under Governmental control, and we had followed to that extent at least in the footsteps of other important belligerents.

So it is that this industry now faces a set of conditions it never faced before at the beginning of a coal year, and I think it is entirely true when I say that upon the wisdom of the manner in which the coal people of the United States meet these new conditions and upon the energy of their efforts will depend largely the success of the Allies in this war; because you all must know that a great deal of the industrial activity that is to support the armies of Great Britain, France, the United States and Italy will rest upon the manufacturing industries of the United States, and this goes back squarely to the coal mines.

Now, when I took up the work of directing the distribution of coal, it appeared to me that one of the first things we needed to know was what the requirements for coal would be. Nobody knew how great the real need for coal was. We want to know where we stood with reference to the coal demand for the coming year. To get that information we obtained reports from more than 100,000 industrial concerns, stating the exact quantity they consumed yearly. We obtained reports from 40,000 retail dealers covering their annual deliveries. We obtained reports from the Shipping Board, the War and Navy Departments, and from other Government sources, regarding the building of new factories and extensions to old ones, and the increase of activity in other plants. That information was checked up by the fuel administrators in the more important states. We also called upon private sources of information. When we had those figures together, we found that to run the United States on a war basis this year we need 735,000,000 net tons of coal.

Anthracite Production Will Be Short

It seems likely that the production of anthracite cannot exceed the output of the past year, namely 89,000,000 gross tons. The difference must be made up out of the bituminous mines. The bituminous mines of the United States this year are called on to produce 85,000,000 more tons than they produced last year, which was a record year.

To give you some measure of the responsibility that rests today on the coal producers of the United States let me say that they are called upon to produce more coal this year than all the mines of all the rest of the world combined.

As an example of needs, one single war plant today is calling on us for 5000 tons per day. On the first of July that tonnage will jump to 7000 tons a day, and that means 2,500,000 tons of coal a year.

Another plant equally important on Aug. 1 will double that demand exactly. Another group of war plants will ask us before the year is over for 1,500,000 tons of coal per month. Four new Government war plants this year will consume more coal than all the manufacturing plants, ships, power plants, gas works and street railways consumed last year of bituminous coal in the entire state of New Jersey. The demands for bunker coal for ships in the North Atlantic this year will be materially increased over last.

These are some of the factors that go to make up this demand for coal that enter into the total of 735,000,000 tons. When we face the question of whether that coal can be produced the question is immediately asked, Can the railroads furnish transportation enough to haul it? That is a question that the Railroad Administration will have to answer. The Fuel Administration and the Railroad Administration are working together in the closest harmony.

Mr. McAdoo and Mr. Gray are fully alive to the supreme importance of furnishing transportation enough to give this matter of coal its proper attention, and you may rest assured that they will bend every effort to accomplish that result.

We are now getting distinctly increased efficiency in the transportation of coal because we are working hand

in hand with the Railroad Administration. When I say that I doubt if the railroads can haul that tonnage of coal, whether they can transport it properly with respect to the Eastern part of the country, it does not imply any criticism of the Railroad Administration; it is simply a recognition of the fact that the roads are overburdened with war traffic and that if they furnish the transportation to turn out this tonnage they would do so at the expense of steel, iron ore, cotton and wool and food supplies, and other equally vital commodities, and we would gain nothing. So there has to be a consonance of action in the administration of transportation; and the portion of coal that can be moved and will be moved must be carefully worked out with respect to what necessarily must be furnished other lines of goods.

Domestic Consumer Must Be Cared For

Under these circumstances, then, we clearly and definitely face the prospect of a slight shortage of coal this year. Under these conditions we are trying to see that the domestic consumer is taken care of; that the supreme important users of coal get their supplies, and that if any is left that can go to the less important consumers there is where it will go. This is precisely the plan on which we are now running. This involves a decision as to who are the supremely important users of coal. That is a question that now is definitely settled by the decisions of the War Industries Board. That board is authorized by the President to decide on preferences and priorities in the deliveries of raw material; in other words, to decide who is entitled to supplies of such raw materials.

Bernard M. Baruch is chairman of that committee, and he has full authority of the board to see that the railroads and the ships and the food plants and other important war industries receive their supplies. Plants will be asked to state from day to day the amount of their consumption and the tonnage that is on the way to them, and then they will be granted such amounts of coal as the judgment of the board dictates.

In order to make sure that an equitable distribution is had between these important branches we have to get some very definite information about where the coal is going. We are now in the process of simplifying and reducing all kinds of information and getting it down to the lowest possible terms.

We intend to require every industrial consumer of coal in the United States to register and to report weekly his exact amount on hand, his consumption, his receipts and the amount that is moving to him. If we have all this information it will enable us to act intelligently; for we will know, at any time, how any given plant or industry or section of the country stands with respect to its coal supply, and it will then be possible to prevent trouble before it occurs in many instances, rather than to try to cure it afterward.

The Fuel Administration also thinks it is necessary to get consumers of coal to cut out a part of the waste in the use of coal. As coal is now burned, not merely by domestic consumers, but in many steam plants, there is an important element of waste. The Fuel Administration is organizing a conservation division which is to inspect the plants and teach the users of coal better methods of burning it in order that tonnage may be saved. It is estimated that if this can be done on a large scale this year it will be possible to save perhaps 20,000,000 tons of coal. Unless this is done many plants necessarily will be without coal and to some extent will have to curtail operations.

I want to make it clear that the Distribution Division of the Fuel Administration intends to be sufficiently in control of the situation to make sure that the domestic consumer gets his supply, that the railroads have theirs, and that the important war plants are all running, and that our ships get back and forth across the Atlantic. If we do that, if we take care of the domestic consumer and keep these plants running, it will be possible for us to avoid the suffering that occurred last winter and the working machinery of the United States will not lose one single stroke for lack of coal.

Since we are called on this year to produce and distribute more bituminous coal than all the other bituminous producers in the world combined, it goes without saying that we need a man with outstanding capabilities to handle that feature. We found that man in A. W. Calloway, president of the Davis Coal and Coke Co.; and since the day he came to the Fuel Administration there has been great advancement made in the development of means of coal distribution.

Some of the other men that we have in the Division of Distribution are Assistant Director S. L. Yerkes, of Birmingham, who is one of the most capable men in handling details I have ever met. The management of the distribution of coal in the Northwest and for Canada is in the hands of C. P. White. He has spent years in the Northwest. The distribution of railroad fuel will be in the hands of Walter A. Marsh. The tidewater distribution is in the hands of Mr. Cochran, formerly coal traffic manager of the Baltimore & Ohio, who is assisted by two other gentlemen.

Where the Consumer Comes In

It may be asked, Where does the consumer come in? He comes in in two ways: In the first place these coal men have nothing at all to do with the price of coal. We want nothing to do with it. If we get coal to the places where it ought to go, we will have all we can say grace over. The consumer is also represented in the Distribution Division through the state fuel administrators and their county chairmen, who are intimately in touch with the respective localities. The War Industries Board has asked that in the application of its rulings the state and county chairmen shall decide, in their localities, what consumers and plants come within the designated classes. These men are on the ground and they can find out the facts more quickly than there is any possibility of our finding them out in Washington.

The work of the state fuel administrators and county chairmen heads up in Washington in the Director of State Distribution, A. M. Ogle, who has just been appointed. This means that there will be someone at Washington whose business it will be to see definitely that the work of the state fuel administrators is properly meshed with the other work; in other words, that, to use an expression in Washington, we make sure we

all coördinate. This official will also see that general plans for the distribution of coal are carried out uniformly in the different states by the various state fuel administrators.

What I consider the important part of the Distribution Division in the Fuel Administration is made up of the coal operators and coal salesmen of the United States. It is our theory that those men comprise a highly efficient body of coal distributors, each one of whom knows intimately the business needs of his own customers and his own sections of the country. Those men will largely effect a fine distribution of coal. What we need to do is to organize and unify their efforts and direct them along lines that may be necessary, in order to get the supply of coal where it is needed at the time it is needed; in other words, to make sure that the preference consumer is really preferred. We expect a large part of the output of coal to move along the lines it would ordinarily move, through accustomed relationships and channels of business. It is only necessary to interfere with that movement in order to make sure that some important war plant is not only getting its current supply of coal, but building up a stock for next winter, and to make sure that the retail dealers are getting their coal in plenty of time; to make sure, in short, that coal is not diverted into unimportant and wasteful channels. To the extent that that may be necessary we may have to interfere with business, to take care of some particular consumer or plant, but I think that that interference will be reduced to a minimum. This is one of the misfortunes of war. It is not a desire on the part of the Fuel Administration; it is a thing we view with regret, but with a feeling that it is necessary.

Zoning Plan Benefits Railroads

The zone system of distribution was put into effect before we started, and we have simply gone ahead and carried out the plans submitted to Mr. Garfield. It has proved beneficial to the railroads. The vice president of the Norfolk & Western R.R. gives some idea of how it is helping that road. He says: "A comparison of the movement of loaded coal cars in our coal districts during the seven-day period May 4 to 10, 1918, to determine the advantages derived from the zone regulations, indicates that there was a saving in loaded car mileage in coal fields of 15.2 per cent. or 6982 loaded car-miles in seven days. This is simply the saving of car miles in the coal regions on our lines and does not take into account the saving that has been effected between the origin zones and the points of destination by the elimination of cross hauls."

This is indicative of the important saving in transportation that was effected by the zoning of coal. That zoning no doubt interfered with customary trade relations, it interfered with the customer in getting his supplies. We have this evidence of the fact that the sacrifices made have greatly helped our transportation problem at a time like this, when that is all-important.

To date we have been most admirably supported by the coal men themselves. There have been times when we have made mistakes, made lots of them; we will probably make a good many more. Nobody knows everything about the coal business nor even a small part about all of it, but we are trying to get together in Washington a personnel of leaders in this business in positions of responsibility, men that the coal industry can follow with confidence and respect.

When we do make mistakes I hope that the coal men will do what they thus far have done. They have come and said, "If this is what you want to do, you are making a mistake in the way you are going about it; we feel that you can accomplish better results by doing it in such and such a manner." And in every instance when coal men have come to us in that manner whoever it may be that is particularly affected and concerned with the problem has sat down with those men and said, "Well, let us get together and fix this up right." They have met us halfway, and so far as we are concerned we hope that will continue to be the practice in working out the most effective distribution of coal this year.

We now understand that for modern war to be anywhere near successful the armies in the field must be supported by equally effective and magnificent war machines built up in the industrial life of the country behind the armies. Germany had exactly that kind of an industrial machine completed before ever this war began. The entire electrical and chemical industries were centered in four groups of producers. The blast furnaces and iron men of Germany were organized in the Rhine basin into one single centralized concern that controlled 97 per cent. of the output of pig iron, gray iron, spiegel and other products of that character, and it was intimately related with the single central agency, the Stahlwerks Verband, which controlled absolutely the production and sale of steel in Germany.

The important part of the coal industry in Germany was in the Rhine Valley. That was the part that supported the steel plants and the great industrial activity of the German Empire. And the coal industry in that section was organized into one single, central concern, which had in its hands the control of the entire distribution of coal throughout Germany. That organization was matched in the Silesian coal fields by a similar organization, not nearly so important or large, because the production was not so large. That organization in the Rhine Valley was intimately related with and connected with the combination of iron and steel producers, and then in turn with the important electrical and chemical concerns. Thus when Germany undertook to swing her industrial machine into line behind her armies she needed only to get in touch with the fuel leaders who were responsible for the action of the other industries. When Germany set up what would correspond to our Fuel Administration, the major part of the work was already done.

It is equally necessary for us to build up here an industrial war machine that will support our military war machine just as effectively as does Germany's. Just as the soldier has to subordinate his wishes to the general plan, so the coal man will find it necessary in many respects to lay aside personal desires and privileges and submit his wishes to the general plan for the industry as a whole in support of the war program.

For the coal man to take that action, to play that part in the prosecution of this war, there will be no sleeves with chevrons, no shoulder straps with stars, no military medals or anything of that kind, but he will have the consciousness that he is definitely doing his part to make the world safe for democracy.

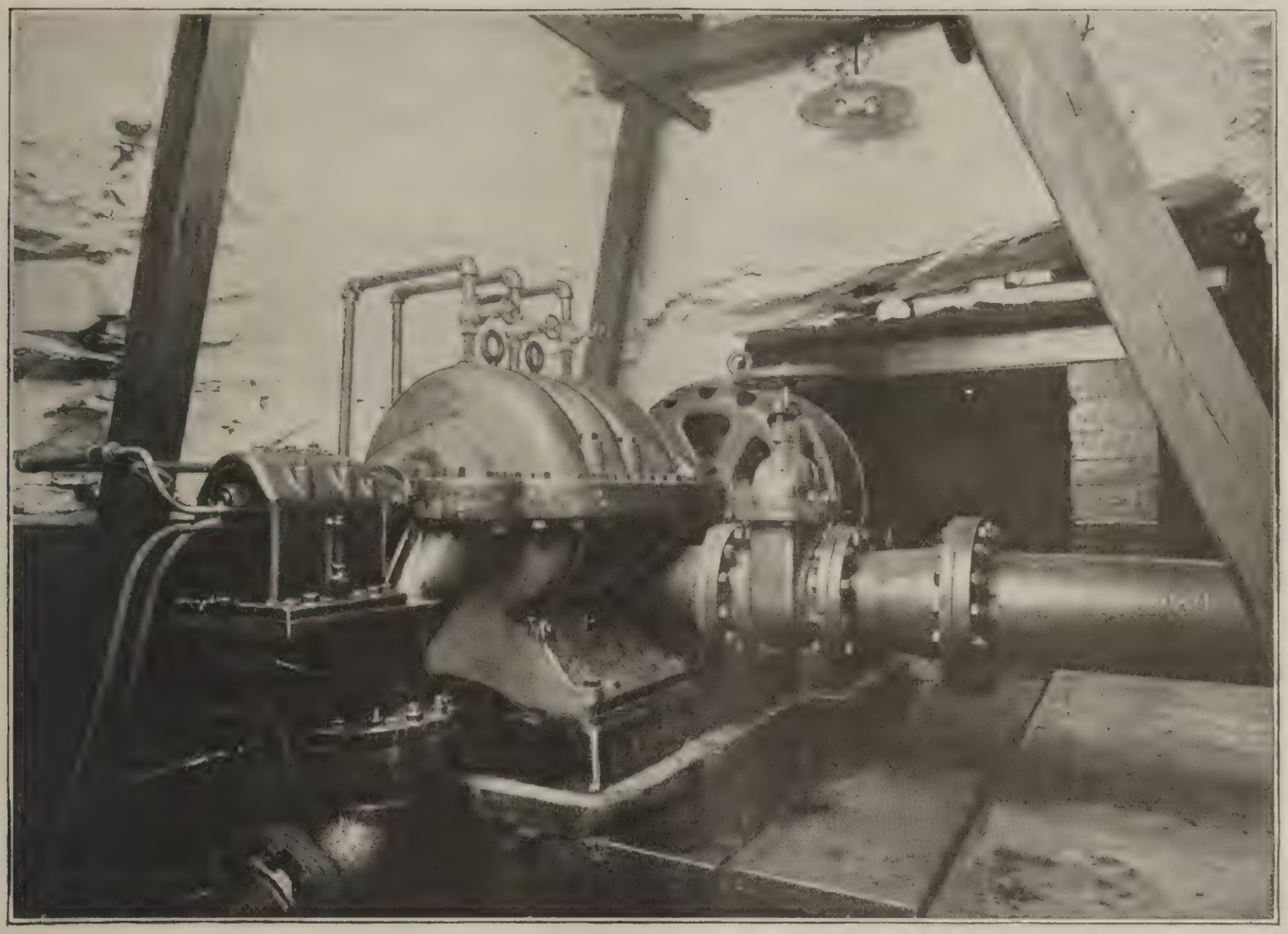
SNAPSHOTS IN COAL MINING





OLD AND THE NEW IN UNDERGROUND MULE BARNS

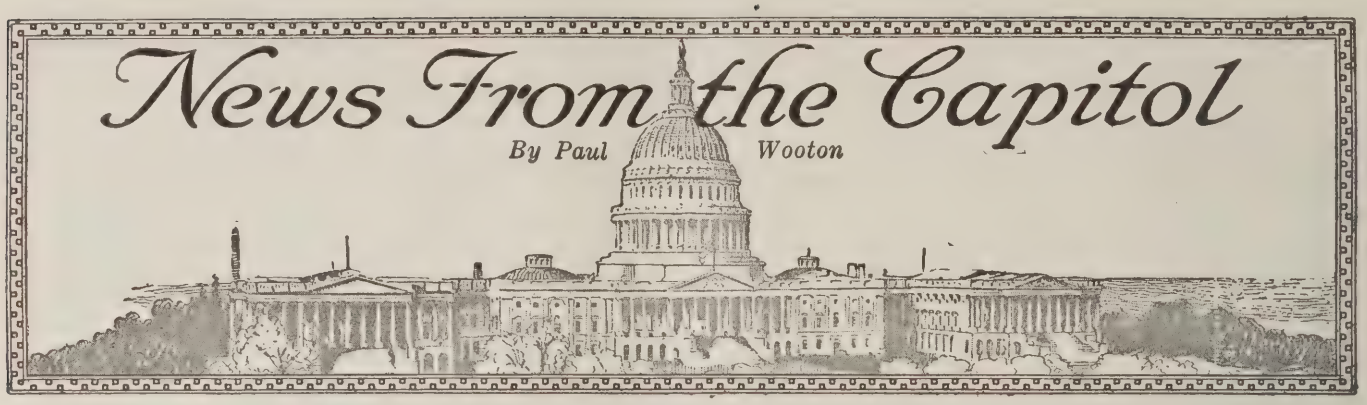
The top view shows the old mule barn at the Diamond mine of the Delaware, Lackawanna & Western R.R., Coal Department. The bottom view shows the modern concrete and steel barn at the Truesdale mine of the same company



THREE-STAGE CENTRIFUGAL PUMP INSTALLED BY THE CONSOLIDATION COAL CO. IN ONE OF ITS WEST VIRGINIA MINES



CONCRETE ARCHES IN THE WOODWARD MINE OF THE DELAWARE, LACKAWANNA & WESTERN R. R., COAL DEPARTMENT



Railroad Fuel Controversy Settled

Settlement of the railroad fuel controversy is regarded here as an unqualified victory for the coal operators, championed as they were by Dr. Harry A. Garfield and his organization. The fact that 10c. a ton was stricken from the price has brought in some protests from operators but, as a whole, operators appear to be more than satisfied by the establishment of the principle that railroads are not entitled to cheaper coal than are other consumers. It is regarded as a victory for the consumer as well, who probably never again will be forced to pay the only profit which was earned by the producer of coal.

The reduction of 10c. in the official price was made with the thought that the elimination of assigned cars would result in a saving in operating costs. Issue is taken with this conclusion, however, from the fact that average costs are bound to remain the same. The reduction, however, will not be noticed at mines where the car shortage is not unreasonable. The National Coal Association had expressed the opinion to Dr. Garfield, prior to the agreement, that a reduction of 5c. in the price would be warranted.

The reduction in price will fall heaviest in Alabama, in all states west of the Mississippi, in southwestern Virginia and in certain other restricted fields where production costs already were close to the maximum price allowed. The new price took effect at 7 a.m. May 25. The official order reads as follows:

The United States Fuel Administrator, acting under authority of an executive order of the President dated Aug. 23, 1917, appointing said administrator and of subsequent executive orders and in furtherance of said orders and of the Act of Congress therein referred to and approved Aug. 10, 1917—Hereby orders and directs that all prices for bituminous coal f.o.b. mines in the coal-producing districts throughout the United States fixed by the said executive order of the President, dated Aug. 21, 1917, and subsequent orders of the United States Fuel Administrator and in effect at 7 a. m. on the 25th day of May, 1918, shall be and the same hereby are reduced as to all shipments made after 7 a. m. on the 25th day of May, 1918, by the sum of 10c. for each net ton of 2000 pounds.

This order shall in no way affect the increase contained in the executive order of the President, dated Oct. 27, 1917, adding the sum of 45c. to the prices fixed for bituminous coal under the terms and provisions set forth in said last-mentioned order.

The order was accompanied by the following official statement:

The reduction will mean an annual saving to consumers of a sum estimated by the Fuel Administration at $60,000,000. The President has directed that the railroads pay the Government price for coal. The increased cost of railroad fuel thereby occasioned is also estimated at $60,000,000 per annum. The reduction of 10c. per ton on all coal will, however, reduce the net increased cost to the railroads from $60,000,000 per annum to $45,000,000 per annum. Under the President's plan, the railroads will furnish cars to all coal mines alike, without discrimination except as dictated by the prior requirements of the railroads for operating purposes and the needs of domestic consumers and of the war.

Under the present war demands, the maximum output of every mine working at full time would still be insufficient to meet the country's coal needs. The principle of equal car supply has accordingly been adopted so as to make for as steady an operation as possible of all properties, and for continuous employment of men, thus making for maximum output.

The introduction of the principle of even car supply will reduce the general average overhead of mine operation, and thereby justifies the Administration in putting out a price reduction order. It is understood that the mine prices thus fixed will remain undisturbed until the United States Fuel Administrator has before him the cost returns for the twelve months ending Aug. 31, 1918. The returns thus far in are being carefully studied by Fuel Administration accountants and engineers with a view to making the utmost saving to the public that is consistent with a maximum production of coal.

The order issued will have no effect on the price of anthracite coal, which forms the bulk of the domestic consumption fuel in the eastern part of the country.

Consumers of bituminous coal who have already entered their orders for the year's coal supply, but whose coal has not yet been delivered, will, of course, receive their supplies at the reduced price effective tomorrow. This price applies to all coal which leaves the mines after 7 a. m., May 25, no matter how long the order for the delivery of the coal has been standing.

Coal delivered after 7 a. m., May 25, under contracts which have been entered into since Dec. 29, 1917, will be billed at the new price. Under the regulation of the Fuel Administration all such contracts call for the delivery of coal at the Government price effective at the time of delivery.

Increased Freight Rates on Coal and Coke

The full text of section No. 2 of General Order No. 28 of the United States Railroad Administration, which provides for the increase in freight rates having to do with coal, coke and ores, is as follows:

SECTION 2—COMMODITY RATES, DOMESTIC

A. Interstate commodity rates on the following articles in carloads shall be increased by the amounts set opposite each.

Commodities—Coal: Where rate is nothing to 49c. per ton, 15c. per net ton of 2000 lb.; where rate is 50 to 99c.

per ton, 20c. per net ton of 2000 lb.; where rate is $1 to $1.99 per ton, 30c. per net ton of 2000 lb.; where rate is $2 to $2.99 per ton, 40c. per net ton of 2000 lb.; where rate is $3 or higher per ton, 50c. per net ton of 2000 pounds.

Where rates have not been increased since June 1, 1917, the increase to be made now shall be determined by first adding to the present rate fifteen (15) cents per ton, net or gross, as rated, or if an increase of less than fifteen (15) cents per ton, net or gross, as rated, has been made since that date, then by first adding to the present rates the difference between the amount of that increase and fifteen (15) cents per ton, net or gross, as rated, and to the amounts so constructed the above increases shall now be added.

These rates from producing points or to destinations have been based on fixed differentials in cents per ton, such differentials to be maintained, the increase to be figured on the highest rated point or group.

Coke: Where rate is nothing to 49c. per ton, 15c. per net ton of 2000 lb.; where rate is 50 to 99c. per ton, 25c. per net ton of 2000 lb.; where rate is $1 to $1.99 per ton, 40c. per net ton of 2000 lb.; where rate is $2 to $2.99 per ton, 60c. per net ton of 2000 lb.; where rate is $3 or higher per ton, 75c. per net ton of 2000 pounds.

Where rates have not been increased since June 1, 1917, the increase to be made now shall be determined by first adding to the present rate fifteen (15) cents per ton, net or gross as rated, or if an increase of less than fifteen (15) cents per ton, net or gross as rated, has been made since that date, then by first adding to the present rate the difference between the amount of that increase and fifteen (15) cents per ton, net or gross as rated, and to the rates so constructed the above increases shall now be added.

Where rates for producing points or to destinations have been based on fixed differentials in cents per ton, such differentials to be maintained, the increase to be figured on the highest rated point or group.

Ores, Iron: Thirty cents per net ton of 2000 lb., except that no increase shall be made in rates on ex Lake ore that has paid one increased rail rate before reaching lake vessel.

Restricts Opening of New Mines

No new coal mines are to be opened in the future until the proposition has received careful scrutiny on the part of the Fuel Administration. It is pointed out that coal is not produced commercially until it is loaded into railroad cars at the tipple. The Fuel Administration is unwilling to approve of the opening of new mines even when labor is abundant, if it appears to the Railroad Administration that it is impossible or inexpedient to furnish the necessary railroad facilities. The procedure in each case where it is desired to open a new mine is as follows:

1. All applications for the development of new mines shall be taken up in the first instance with the railroad upon which the connection is desired, full information in regard to the proposed operation accompanying the application. Four copies of applications and papers are to be filed.

2. Three copies of the application and accompanying papers will be forwarded to the Regional Director for his approval or disapproval.

3. The Regional Director will forward two copies of the application and papers with his approval or disapproval to the Director, Division of Transportation, United States Railroad Administration.

4. The Director, Division of Transportation, United States Railroad Administration, will submit one copy of the application and papers with the recommendation of the Regional Director to the United States Fuel Administrator.

5. Representatives of the United States Railroad Administration and of the United States Fuel Administration will, thereupon, agree upon the approval or disapproval, and a single notice of the disposal of the case indicating joint consideration and action, will be sent to the applicant through the office in which the application originated.

Weekly Production Statistics

Bituminous coal production during five days of the week ended May 18 exceeded the 12,000,000-ton rate. A heavy falling off in production on Saturday of that week, however, pulled the figure down to 11,732,000 tons, which was slightly below the performance of the week which preceded. Whether the cause for such a decided falling off on the final day of the week was brought about by lack of railroad cars or by the failure of labor to put in a full day Saturday has not been learned at this writing, but it is regarded as probable that these two factors were mainly responsible. The week which ended May 18 was the first in which there was no car shortage in the Pocahontas and Connellsville districts. Telegraphic advices concerning the week ended May 25 indicate that the performance will be slightly under that of the preceding week.

Anthracite forwardings for the week under review were 41,011 cars, the best showing that has been made in many weeks and an increase of 6 per cent. over forwardings of the week ended May 11.

Beehive-coke production for the week ended May 18 was 678,000 tons, a decided trend upward as compared with the week preceding. Byproduct coke production was 485,076 tons, which is practically the rate of production which has been maintained for several weeks. The industry is being operated at 90 per cent. of full-time capacity. This compares with 69.2 per cent. for beehive operations in the Connellsville and adjacent regions.

The estimates referred to above are those of C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

To Stimulate Use of Lignites in Northwest

The oil land leasing bill, which includes in its provisions coal, phosphate and sodium-bearing lands, passed the House of Representatives last week without the necessity of a roll call. The friends of the bill believe that it will stimulate the development of coal and lignite on public lands. During the course of the consideration of the bill Representative Norton, of North Dakota, stated that he had been given reasonable assurance that an experiment station of the Bureau of Mines is to be established in the Northwest which will be devoted exclusively to the consideration of problems looking to a more extended utilization of lignites.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The labor conditions were never better than they are today, for the railroads are giving improved service. There is no crop now to move, there are no winter obstacles and no trouble with floods; consequently the railroads are enabled to give a maximum car supply. In the week ending May 4, the railroads in the bituminous region had a car shortage of only 13.1 per cent. and on the week ending May 11, a shortage of only 11.2 per cent. In both periods the mines worked over three-quarters full time.

Unfortunately labor shortage and strikes caused a loss in operation of 5.4 per cent. In some sections the men will not work steadily, largely because they are not sufficiently and satisfactorily appealed to. Public meetings and posters are needed in every place to encourage the workman to do his utmost every day. It may almost be justifiably asserted that we have no posters urging steady work, day by day, and such few as are available are not posted. As the railroads do their duty more thoroughly the opportunity of the operators to urge steady work will be greatly extended and even now a campaign is badly needed in some sections.

ALABAMA MINERS CANNOT BLAME RAILROADS

Notably among these sections is the state of Alabama with a car shortage of only 0.5 and 0.3 per cent. in the two weeks under consideration. The labor shortage was far more important than the car shortage, namely, 8.3 and 8.8 per cent., respectively, and the strikes added 0.4 and 0.3 per cent. This is a bad showing for the mine forces. The miners owe it to the nation to work so steadily that they will never fail to fill the cars afforded them.

At this time of year the car supply is at its best, but the labor supply is normally at its worst. All the farmer miners are leaving the pick for the plowshare. The mines begin to fill up again in the winter, just at the time when the railroads are least able to haul freight and when transportation is cluttered by the product farmed by the miners and others, especially the others, during the summer. The farmer has some idle days in the warm weather but he does not feel as keen about his mining work so long as there is any need during any given week to work on the farm.

The situation in the Broad Top region is unchanged except that the decrease in the price of coal only makes the operators of that region less ready to make wage concessions. Unsupported by public opinion, the Fuel Administration and the union, the mine workers along the Huntingdon and Broad Top R.R. do not seem to have any great chance of winning their strike.

COMPARED WITH SOLDIER'S, MINER'S BIT IS SMALL

Philip Murray, the president of the Pittsburgh district (No. 5), at a meeting held at Bentleyville, Penn., denounced the miners who are unwilling to work because they can make a good living when working short time. Murray said "If the soldiers can shed their blood on the battlefields of Europe the miners can work. When the Government and the coal operators agreed to give the miners the greatest increase of wages ever known to organized labor the union leaders gave their solemn promise that the miners would work and insure the Government 100 per cent. production during the war. I beg, I plead with you to get to work and make good your promises to your employers."

United States Circuit Court Judge Joseph Buffington also addressed the meeting, scoring those who would not work eight hours six days a week. He said, "Any man who is able to work and won't work in these times is putting in that much time for the Kaiser and the Potsdam gang. There is no room in America for idlers or boozers."

In a well-reasoned editorial, the *American Coal Miner* explains why it is necessary that adequate prices be paid to the operator if peace in the labor field is to be attained. It shows admirably the reason for President Farrington's statement, reprinted in last week's *Coal Age*, page 978, that the union would feel unfriendly toward cut-price operators. However, it was not the purpose of the editorialist to discuss Farrington's letter, but to explain why the railroads should not be granted a drastic price reduction. The editorial says:

"Those conversant with mining know well that when operators are operating on scant margins cases of dispute about the payment for yardage, deadwork, setting props, laying rails, etc., multiply, because the mine foreman and superintendents are urged to work for the lowest possible production costs. When payment is demanded for these extras for mine labor by miners, the bosses, realizing the small margin under which they are operating, hold back and endeavor to drive bargains.

"Settlements that could be easily made between mine committees and mine bosses under a fair margin are delayed, carried up to joint boards, arbitrators and commissions, all of which causes unrest, reduces the efficiency of the men directly involved and promotes a general bitterness among the working force."

HOPKINS' MINERS GIVE RED CROSS A DAY'S WORK

The mine workers and coal companies of Hopkins County in western Kentucky contributed their entire output to the American Red Cross on Monday, May 27. The St. Bernard Coal Mining Co., with offices at Earlington, Ky., which was one of the companies in this generous dedication, operates 10 mines and employs about 3000 mine workers. There are four mines at Madisonville, Ky., that employ more than 1000 men.

In British Columbia, Canada, the Crow's Nest Pass Coal Co., Ltd., and other operating concerns in the Crowsnest region have granted a further increase of 20c. per day to their men. This increase will add to the payroll of the larger company mentioned $10,000 a month.

Not Patriotism but Trade Restriction

According to Attorney General Brundage of Illinois, the high wages paid in the mines were the indirect cause of the lynching of Robert P. Prager by a mob at Collinsville, Ill. He says that the state will demand the death penalty for the lynchers at their forthcoming trial.

"The entire trouble," says the attorney general, "grew out of Prager's desire to become a miner in Illinois. He had been working in St. Louis but figured that he could make more money in the mines. Consequently he moved to Illinois and applied for a certificate as a first-class miner. His application for this kind of a certificate was questioned by the officials of the miners' local on the ground that he had not worked four years at the business. Prager had the papers to bear out his statement and brought them forth when the officials called for them. Several days later he was paraded through the streets with a flag wrapped about him, probably because he had made the statement that he had worked four years in the mines in Germany. The parade, however, was in the nature of a joke and everyone was good natured about it. Later it took a more serious turn and ended with the hanging. Absolutely nothing was developed by the investigation to show that Prager was in any way unpatriotic."

The job of juryman in the Prager case is not popular. It was necessary to send deputy sheriffs throughout the county to secure suitable talesmen. The card system of drawing veniremen was discarded. On May 14 68 veniremen had been examined and not one had received the approval of both prosecution and defense, though three men had been tentatively accepted by the state. The accused appeared at court patriotically and conspicuously decked with the national colors.

The tedious process of getting a jury to try the men was little accelerated during the week following. Only eight men were finally accepted.

The greater part of the week was spent in an effort to get the other four. Court adjourned to last Monday, however, without the jury having been completed. Almost 650 talesmen had been examined. In adjourning court Friday, May 24, Judge Bernreuter congratulated the eight men and said he was proud there were eight men in the community who were willing to uphold the honor of the United States. He scored others who, he said, had read about the case after being called, for the purpose of arriving at an opinion and disqualifying themselves for service.

The general disposition has been to excuse farmers from the jury because of the paramount needs of the farm, and miners are probably not acceptable to the state's attorneys because they are apt to be friendly to those who are accused of Prager's lynching. It is hard to find a jury in a farming and mining community when there are reasons for not accepting both farmers and miners. However, on May 27 a jury was finally secured, and the trial commenced.

Superstition Closes Illinois Mine

One night last week, Charles Sartorius, the watchman at the Peabody mine near Kincaid, Ill., dreamed that someone was stealing the mine's supply of powder. When he awoke he investigated and sure enough there was no powder where he thought there should be some. Furthermore, he discovered at the pit mouth a skull and crossbones crudely drawn on a sheet of paper.

The story got around, and the next day most of the 700 miners stayed at home. They reasoned that the dream, the stolen powder and the skull and crossbones pointed to a plot to blow up the mine. An investigation showed that no powder had been stolen and that the skull and crossbones had been drawn by school boys. Slowly the miners recovered from their alarm and returned to work.

Should "Targets" Be Hired?

Perhaps it is better to define a "target" before going further, for the reader may not have heard the expression used regarding an employee. A "target" is a man who is, or appears likely to be, a bad risk because he is subnormal, mentally or physically or both, and therefore does not exercise due care at his work. He is likely to be repeatedly injured or, as Kipling would put it, "frequent deceased."

The Kansas City local of the National Safety Council discussed the question at its meeting on May 7 under the head, "How can the increasing turnover be checked, without keeping, in hazardous jobs, men or women habitually careless?" The question is not an easy one to answer in view of the shortage of labor.

One of the largest plant managers in Kansas City stated that he felt under obligation to accept for employment men whom under ordinary circumstances he would summarily reject. He said that it was not only a necessity to get someone to do the work, if only in a fashion, but it was also an obligation to provide everyone with work in view of the need of the war that our whole man-power be utilized. Many of the manufacturers present at the meeting discussed earnestly the ethics of refusing to employ a subnormal workman who needed the work, but could not be expected to fill the place with due efficiency and perhaps not with safety.

United States As an Employer

Uncle Sam in his capacity as the world's greatest employer is discovering that his workers will not "live by bread alone" and that high wages are not of themselves a sufficient inducement to hold men to their work. He is discovering that men are social beings and that employees must have certain social and community facilities if the daily job is to content them.

In a certain district two great munition projects are located. One of them, lacking almost everything in the way of recreational and welfare facilities, has had a labor turnover of many hundred per cent. The other with identically the same work and the same rates of pay has had no such turnover. The reason evidently is that the latter plant is located on the edge of a city whose social facilities while meager have yet been sufficient to bring into the lives of the men that social contact with one another for which we all instinctively crave.

At nearly all Government projects the wherewithal for recreation and social welfare is being put under way. Community huts are being erected where men may meet and play their games, where they may smoke and spin yarns and build that invisible, intangible something known as esprit-de-corps. Moving pictures are being provided and are attracting increasingly great audiences, and it is an interesting sidelight that the most popular pictures are of current events and not of the slapstick variety.

Reading rooms with books and magazines are being furnished for those studiously inclined. Baseball diamonds and tennis courts and up-to-date equipment are being built and baseball leagues organized. Lectures and concerts are to be provided from time to time and bands are being formed and equipped. Y. M. C. A. men are in charge in some of the large projects and ordnance welfare executives are being provided at others. Health conditions are being improved and at one project the U. S. Public Health Service is undertaking a clean-up resembling that so efficiently inaugurated at Panama.

In short, Uncle Sam is following the example of other great employers of labor and undertaking to keep his men sound in mind and body and watching with a jealous eye their comfort, convenience and happiness.

Another interesting phase of work which is being undertaken by the Ordnance Department through the Community Organization Branch of its Industrial Service Section is to work hand in hand with groups of citizens in those cities containing factories producing munitions, to eliminate those community conditions which may be adversely affecting the welfare of labor.

Many of these cities are so congested by war workers that they are unable to furnish community facilities for the newcomers. Part of the program to be worked out in such cities by the Community Organization Branch is as follows:

"Campaign of patriotic education to impress upon workers that they are the second line of defense and that their efforts are absolutely essential to the safety of the men in France and to the winning of the war. Formation of housing companies and of building-and-loan associations and the encouragement of home-building by individuals. Extension of trolley tracks to new districts and increased service. Extension of water, sewer, gas and electric service to the new housing districts. Ordinances to prevent the exploitation of the workers. Nearby farmers encouraged to grow produce, and public markets installed for producer and consumer. Provision of facilities for plowing and harrowing home gardens. Installation of branch libraries for convenient use of new workers and their families. Erection of community center "huts" with moving pictures, supervised dances, concerts, lectures, etc. Increased school facilities for children of new workers and night school during winter months for adults. Control of alcohol and social evils, and education of workers by medical specialists. Complete Americanization movement for naturalization of aliens, and instruction in history and citizenship. Education of workers, their families and especially the children to the need for thrift, and the complete utilization of the workers' time.

EDITORIALS

Canada's Difficult Coal Problem

CONDITIONS have been so vastly changed by the war that nations which formerly wished to exclude foreign products are now most anxious to receive them and are satisfied if they receive all that can well be spared. Canada, which regretted the fact that it had to buy coal from the United States, is now troubled because it seems probable that we will not have enough for ourselves to do our full part in supplying her.

Nations are dependent one on another. Whenever all tariffs are revoked they buy of one another just as if there were no lines of nationality. It is well for Canada to zone itself with the United States in peace and in war, contiguous areas in both dealing with one another to their mutual advantage without considerations of national lines. That section should perform the service that can do it with the least labor. If with the least labor the United States coal can reach Ontario, then Ontario is a market for United States coal. On the other hand if Boston can be better reached from Canada, then the Canadian coal has the better right to purchase.

Most nations today are worrying more that they won't be shipped enough than that they will get too much. In our great need we do not look over closely at the source. The "Made in America" cry has gone by the board with "Made in Canada" and "Made in Great Britain." What we want we must have, no matter whence it comes.

Could we believe in 1914 that the representative of the Canadian government would say in 1918 that "in the regulation of the supply of American coal to meet this year's requirements of both the United States and Canada the United States authorities had generously provided that there would be no discrimination against Canada, which in this respect would be treated as if it was part of the Union"? "This decision," says the Canadian Mining Institute Bulletin, "is further proof of the close and fraternal relationship that exists between the two countries; but if for no other reason than a desire to impose as little as possible on the goodwill of our neighbors, when such imposition may mean hardship to them or the impeding of their war efforts, our demands on them for coal should be limited strictly to imperative needs that cannot otherwise be satisfied."

This statement does not accord with the belief that every nation is ringed about with economic enemies. When will we learn that we can only receive satisfactory service by accepting it from those who are qualified by nature and propinquity to render such service? May the sentiments fostered by the war in our neighbor and ourselves last long after the war, and let the man who in the United States burns Canadian coal be as well satisfied as he would be if he knew the fuel came from a neighboring state.

No nation can become wealthy by buying material made under disadvantages or produced in a remote location, even though produced on the national terrain and hauled on the nation's railroads. It must buy where production is easy and the haulage cost is light. The world needs zoning, but in the planning of such zones the national lines will be of continually decreasing importance. The buyer and the seller are both benefited by trade, as we soon learn to realize when the seller refuses to sell. It is a relic of an old world this idea that the seller should carry his hat in his hand. He needs the buyer, it is true, but at times not nearly so much as the buyer needs him.

Coal, Like War, Waits on Transportation

FOR a long time the main problem of the war has been to determine how the Allies in Europe were to be fed and our armies sustained at the front with our ocean transportation threatened with a complete breakdown by the continued and powerful assaults of the German submarines. The problem is by no means solved even to-day, and the scare we have had has left us with little of the former complacency.

The coal situation is much the same. We have the men, at least to a large extent, and we certainly have the producing facilities for the largest possible demand for coal. We could supply ourselves with all the coal we need and at the same time provide our allies with all the fuel needed to supply their deficiency. With our capacity we might even supply Great Britain with as much coal as it is now producing—if we could only haul it on the railroads and find place for it in the holds of our vessels.

The public has been much comforted by the fact that nearly a billion dollars is to be expended by the Railroad Administration on new equipment and betterment. A billion dollars seems a smaller sum of money than it did a few years ago. But even in days when few used to think in billions we used to spend that billion without really knowing it. A great, big overgrown nation, we did not reckon just what our total expenditures were. We bought in small units. There were many corporations, and most corporations distributed their purchases through the year. Thus a large aggregate tonnage was purchased without it being considered large.

But now the public has its enumerating done for it. The Government is doing its own buying. It does it all at one time in the year, at least, it estimates in that manner, and it does it for all the railroads at once. The public is interested and sympathetic, as it always is in the work of the Government, and it is therefore quite ready to declare that the expenditure planned is stupendous and to anticipate that it is adequate to all the Government needs. It is needful, therefore, that we view the proposed expenditures critically.

The first important need to be met is locomotives. The new order will only add 1½ per cent. to their number, for there are 65,000 locomotives now in use. The new locomotives, however, will be larger in size and greater in power than the average locomotive now in service. They will probably do twice as much work, and for this reason the addition to the tractive ability of the railroads will be approximately 3 per cent. With this "stupendous" program the locomotive equipment would be changed every 33 years. Thus, under such a plan, locomotives of 1885 would just be ready for retirement; and if this percentage of new construction had been followed steadily since 1885, our transportation facilities would either be on the low basis of that year or we would still be using locomotives used during the Civil War.

The car program is more generous. The number ordered is 100,000, representing an increment of 4 per cent. to the 2,500,000 cars now in use. As the cars will be larger than the average now in service, we may say that the increase in capacity will be roughly 5 per cent. With this program we shall prevent a positive reduction in our freight-carrying equipment only by making it last a full 20 years. There will be no increased capacity unless we make the equipment last longer. Advance in the design of railroad equipment will never be rapid with such niggardliness in renewals. Even in the worst years of the railroads the car purchases have been larger. For years, when traffic even seemed to show signs of temporary decline, the railroads purchased more than the 5 per cent. of car equipment that is now quite generally extolled as amazing.

The *Railway Review* says that "for more than six years they [the railroads] have averaged car orders 50 per cent. greater than the 'control' has now put out"; and again its says, "As a mere matter of fact the Government is ordering two-thirds as much equipment as the railroads did in the year of their greatest distress under oppression, and less than half as much as they have averaged through the years of feast and famine."

As another authority points out, the whole billion dollars, or rather the $937,961,318, for that is the real sum, is only 6 per cent. of the existing capital investment in stations, terminals, roadway and equipment. Furthermore, the Associated Press dispatches lead us to doubt whether this 6 per cent. will be spent in adding to railroad facilities. "The figures," says the report of that agency of the press, "disclose Director General McAdoo's determination to let the railroads make many improvements which they had neglected during the last three years, through permitting tracks to run down and postponing all possible projects requiring big expenditures of capital." Evidently, if they disclose this purpose they do not offer hope that much of the necessary new work will be done.

In 1907 J. J. Hill advocated that at least $1,100,000,000 be spent annually for new construction and improvements, in order that the transportation interests might be kept abreast with industrial progress. Today $2,000,000,000 would scarcely do what $1,100,000,000 would have done in 1907.

Of course, Mr. Hill had in view construction such as could not patriotically be advocated during the war. This is conceded. Another concession may profitably be made, which is that Director General McAdoo probably believes that any program larger than he has written could not well be enacted in the twelve months of a single year with the world at war. He may well be justified in his decisions. Nevertheless, it is needful that the public generally, and especially the suffering coal industry, realize the narrowness of the program the Railroad Administration has, rightly or wrongly, decided to adopt.

Give the Hat-Boy His Tip

THE recent lowering of bituminous coal prices one dime per ton will be viewed quite variously; but, however viewed, the coal companies will loyally accept it. Some will feel it is hard to have to give a dime to the railroads and the public in order to secure that justice which is everybody's natural right. The dime will look like the *douceur* that we give to the hat-check boy. It will be said that the coal industry will be compelled to pay about $60,000,000 a year to get justice from the railroads. They cannot give adequate service, of course, but the service they give from now on will be evenly distributed. Pay your tip or the service rendered the coal industry will, in the future, be uncertain and irregular.

On the other hand, it must be admitted that the United States Fuel Administration in fixing coal prices may have visualized the possibility that the railroads, even though federalized would, as in the past, have "ways that are dark and tricks that are vain" and may have sought therefore to protect the coal companies by a degree of liberality in the fixing of prices. Or to put it more exactly, the figures of operating cost furnished to the United States Fuel Administration were based on actual and not on ideal working conditions, and the Fuel Administration has felt itself justified in believing that a little steadier work as an outcome of greater equity and more efficiency in railroad operation would result in reducing those costs.

The quarrel is at an end. The Railroad Administration promises to be good. If it starts buying coal as fast as coal may be obtained and tries no more shenanigans we can forget its past delinquencies, for the coal trade also has some things it would like to have forgotten. There is that little matter of dirty coal, for instance.

White Goes on Labor Policy Board

THE United States Fuel Administrator announced, May 28, that John P. White, the labor advisor to the Administration, was appointed representative of the Administration on the Labor Policy Board of which Felix Frankfurter is chairman. We wonder what the attitude of the industry would have been to such an appointment before the war and before it had its recent opportunity to know and appreciate Mr. White. It would certainly have said that at least a man like Rembrandt Peale should be added to provide a balance.

But since the war commenced Mr. White has shown clear evidence of his saneness of outlook and uprightness of purpose. Despite the fact that it cannot be denied that he represents only labor, he is sure to be regarded not unfavorably by capital. The policies he will advocate will doubtless be those he has elaborated with Rembrandt Peale and the Fuel Administration.

DISCUSSION BY READERS

Success in Mine Management

Letter No. 2—Reading the excellent article of W. W. Beddow, *Coal Age*, Apr. 27, p. 778, again calls up the question of what constitutes a successful manager of mines. Attention was first drawn to this matter by R. W. Lightburn in his letter, Apr. 13, p. 707.

As someone has already pointed out, the mine official who succeeds in holding his job and is successful in producing results is a man who is bigger than his job. While there are many thoroughly capable mine officials, there are many others who fail in a very vital point.

Success in management always involves the providing of suitable equipment that will enable the men to work efficiently and which will insure the production of the required output at a minimum cost. The failure to do this is common not only to the higher officials, but to those whose duties bring them into intimate contact with the daily operation of the mine. The principles that concern success apply equally to the higher officials and to their subordinates.

From Mine Foreman to Superintendent

One difference that is plainly noticeable to the close observer is the change that comes over the average mine official as he rises in the company and assumes a higher office. In his new position, a superintendent is not as anxious to secure improved equipment or undertake certain improvements in the mine that, as foreman, he was very anxious to secure.

Every foreman has an ambition to be progressive and is constantly recommending the most up-to-date equipment possible, because he realizes that the work of mining coal and hauling it to the shaft bottom can be greatly advanced by the employment of better methods and improved equipment.

As superintendent, however, the man's ideas seem to have undergone a change. He now views things from a different standpoint and is not so anxious to increase the cost-sheet by the purchase of new equipment or by undertaking the improvements recommended by his foreman. He appears to have forgotten his previous experiences in the mine, when, as foreman, he saw the need of these things, and falls automatically into the well-beaten path of his predecessor in office.

To the average mine foreman who is anxious for advancement, good equipment is a necessity; but with many superintendents, general superintendents and managers, any old equipment is good enough, provided the mine cars can be kept bumping over the rails, the locomotives continue to haul a fair tonnage, and the mine is not compelled to shut down too often for repairs. As long as the mine can be kept running fairly well, and their excuses for occasional failures are accepted, these higher officials are completely satisfied.

Many men fail to realize how much greater things they could accomplish by retaining the same progressive spirit that animated them when they occupied a lower position in the scale. I would not like to style this disposition of the higher official as a growing stinginess. I am inclined rather to explain it by saying that, in their higher position, the said officials are farther removed from observing daily the actual necessities of the work underground.

Managers are more concerned with the appearance of the cost-sheet and often forget that a low cost of operation can only be maintained by devoting a reasonable amount to improvements in methods and equipment. The foreman is, as we say, up against hard facts. He is pressed for a larger production at a reduced cost, while he is denied many things that are essential in order that he may make a good showing in the mine.

In reading the different articles in *Coal Age* that bear on this subject, I have been impressed with the fact that the majority of the men in charge of smaller operations do not have the *vision* that marks men for the highest attainments. This will even apply to many men in charge of larger operations.

In this connection, let me say that it would be a fine thing if some of the practical readers of *Coal Age*, who are in intimate touch with mining needs, would discuss the need of broader vision in securing a greater production of coal at a minimum cost of operation.

Let us see if we can ascertain why some men are more farsighted than others whom they have outdistanced in the race and have thus proved that their ideas are well worth while. Believing that these thoughts are of vital importance to successful mine management, I hope for a discussion that will broaden our vision and give us greater success in the management of mines.

———, Penn. OPTIMIST.

Loading and Shipping Clean Coal

Letter No. 7—Much has been written regarding the shipping of dirty coal and showing the large loss to the consumer, due to being compelled to burn coal containing a high percentage of refuse. This loss occurs not only from the low heat value of the mixed coal and refuse, but because of the additional expense of disposing of the large quantity of ash, to say nothing of the freight charges paid for such material.

A difference of opinion seems to exist, on the part of writers, in regard to who is responsible for the loading of this refuse with the coal. A few blame the mining companies for a laxity of discipline, while many believe that the miners are the parties most to blame. It is probable that both the operators and the miners contribute their share toward the difficulty.

We all know that the miner can increase his earning capacity by not taking the time necessary to remove the bony coal and slate. He not only gains in time and is able to load more cars, but increases his daily tonnage by the weight of refuse he loads with his coal.

Many of the coal companies allow this practice to proceed and offer little restraint, fearing the loss of good miners if they are too strict in their requirements in the mine. A few operators may even consider that the shipment of dirty coal will command the same price in the market, at the present time. They also realize that less experienced miners can be employed where the quality of the coal loaded is not a matter of so much importance.

There is an old saying that "Every cloud has a silver lining." The "silver lining," in this case, may prove to be the education of consumers, who learn how to burn lower grades of coal than that to which they have been accustomed. While this may require practice in firing and the installment, at times, of equipment better adapted to burn coal of an inferior quality, it will have the beneficial effect of conserving the better grades of coal and utilizing that of poorer quality.

Appearance No Indication of Quality

In the past, much prejudice has existed against coal that did not present a good appearance, though being of a fair quality. Some consumers would even refuse to give a rusty or muddy-appearing coal a trial, and looked askance at the bright colored peacock coal.

In Maryland, for many years, the only coal accepted by large plants was the best portion of the Pittsburgh or "Big Vein." But, as this seam approached exhaustion, these large consumers became less particular and soon discovered that all of the seam was of good quality. Later, they were glad to get both bottom coal and peacock coal, and, more recently, the same plants have been altered to burn outcrop coal, and many have been willing to take coal from other seams.

In the great demand for coal last winter, much of the extreme outcrop coal was stripped and loaded for market. Recently, strange as it may seem, the chemist of a large public-service corporation, in an eastern city, stated that the quality of this outcrop coal was remarkable. He said that, to see some of it on the railroad cars, one would think that it would be more likely to extinguish a fire than to maintain combustion.

In working the lower Kittanning seam, in West Virginia, several years ago, it became necessary to stop all places where the coal looked rusty or, as frequently happened, was partly coated with a thin fireclay mud. If but a small quantity of such coal reached the car, a complaint might follow or the shipment even be refused.

A recent analysis of this rusty and muddy coal, however, showed that the complaint was unnecessary, as the supposed low quality of the coal was imaginary and not real. Three types of this coal were analyzed; "A" is an average of fifteen analyses of glossy black coal, as usually shipped; "B" is an average of five analyses of muddy coal; and "C" an average of five analyses of rusty coal. They are as follows:

	A	B	C
Moisture	0.82	2.14	1.99
Vol. carbon	21.86	23.66	23.68
Fixed carbon	70.08	67.88	66.90
Ash	7.24	6.32	7.44
Sulphur	1.10	0.74	0.85

It will be observed that with the exception of a varying moisture content, the difference in quality of these coals would hardly be sufficient to justify a complaint being registered when a small quantity was found in a shipment.

In closing, permit me to suggest that, while the loading and shipping of impure coal is to be deplored, there will result eventually some compensation, should consumers learn to judge a coal by its actual quality, as determined by analysis, and not be prejudiced by the appearance.

J. A. Smith.

Albert, W. Va.

Letter No. 8—I am of the same opinion as W. H. Noone, who states in his letter, *Coal Age*, Apr. 20, p. 754, that "the shipping of slate and rock for coal is nothing more or less than an act of treason." Any operator found guilty of shipping an inferior quality of coal to the Government, for use on shipboard or in munitions factories, at this time, should be regarded as a traitor and his mine taken over by the Government.

I am inclined to have more sympathy with the miner when the conditions in his working place make it difficult for him to avoid loading more or less of bone and other impurities with his coal. Further, the miner is often obliged to speed up in loading his coal, so as to keep the drivers running, which gives the miner little time for a close inspection of what he loads. I have always claimed that the cleaning of the coal could be better done by daylight than in the mine where the miner is often deceived by the uncertain light of his lamp.

Coal Better Cleaned on the Surface

In order to clean the coal properly, at the surface, it would be necessary to install a suitable picking table, onto which the coal could be dumped as it comes from the mine. A sufficient number of boys must then be employed to pick out the bone and slate from the coal as it passes them on this table. At some mines, the miners have agreed to allow a deduction of 10 per cent., or 20 lb. to the ton of coal sent out of the mine, to pay for the employment of slate and rock pickers. They have also agreed to let the company dock them 100 lb. when the rock and slate in a single car exceeds 10 lb.

This method, however, has not proven generally satisfactory to the miners, because of the opportunity it offers for dishonesty on the part of the company, unless a checkweighman is employed. Where there is no checkweighman, the miners are apt to say "We are paying for the rock, so let her go."

In my opinion, it would be an advantage to appoint a coal inspector at each mine, whose duty it would be to visit every working place in the mine and instruct the men showing them the difference between the coal and bone and rock or slate. Let him secure some of the bone, slate and rock that have been picked from the coal sent out of the mine, and warn the miners by telling them what injury they are doing the mine when they load out such refuse. He should show them that they are running the risk of a shutdown of the mine by reason of the shipment of coal of an inferior quality.

When miners continue to load out rock and slate that should have been easily detected in the mine, it would be better to get rid of them without further delay. At

the same time, the men who load clean coal should be informed that their work is appreciated. Such a system has been followed at the mine where I am employed and I understand that the traveling coal inspector has stated that the coal coming from this mine is of better quality than for years before.

It is the patriotic duty of the miner who mines the coal, the operator who ships it to market, and the dealer who makes the final delivery to the consumer, to see that the coal is clean and of good quality. The consumer, on his part, must not be too severe when he finds a shipment to contain some impurities. He should notify the dealer or the company of that fact, making due allowance for the urgency of the present time. We must all make large sacrifices in the great cause for which we are striving; namely, that the earth shall be a better place in which to live.

Farr, Colo. ROBERT A. MARSHALL.

Gathering Motors

Letter No. 4—I have been an interested reader of the letter by "Motorman," who describes in some detail the different types of gathering motors that have been used in mines, *Coal Age*, Apr. 27, p. 800. Although the letter draws attention to several good points, I am compelled to differ with the writer in his view regarding the relative value of the combined trolley and storage-battery locomotive, which he seems to regard as a revolutionary step forward in gathering-motor practice.

There is hardly a question but that almost any form of storage-battery locomotive is an improvement over the old cable-and-reel motor. But, since the storage-battery locomotive has come to be an accomplished fact, by reason of its mechanical perfection and the durability of its batteries, let me ask, Why is it necessary to add the trolley attachment?

In the large number of mines that have installed storage-battery locomotives for gathering purposes, they have been found to perform every function of which the old cable-and-reel motor was capable. In all cases, the battery locomotive has given good satisfaction and performed the required work, except where the machine has been compelled to haul poorly built mine cars. From every standpoint, this type of gathering motor has proved efficient and economical.

The most successful installation of storage-battery locomotives that I call to mind at present is in a mine equipped with high-grade, roller-bearing mine cars. In an exhaustive test, it was demonstrated that the drawbar pull necessary to haul mine cars equipped with this type of bearing is reduced by 50 or 60 per cent.

No Need To Boost Batteries

We learn, also, that where storage-battery locomotives are used to haul roller-bearing mine cars, no time is necessary for the boosting of the batteries, as suggested by "Motorman" in the letter to which I have referred. When hauling these cars, the batteries have been found to perform their function with complete satisfaction throughout the entire shift, and the charging is done entirely at night.

It is true, as "Motorman" has stated, that when the charge of a storage-battery locomotive is about half exhausted, the drop is much more rapid in the latter half than the first half of the shift. However, no serious depletion of the charge of the batteries will occur if they are not subjected to the heavy drain caused by starting a trip of plain-bearing cars.

Cars equipped with roller bearings, it has been found, can be started with only 40 per cent. of the power required to start plain-bearing cars, and there is far less drain on the batteries from this cause. Stated in another way, the average plain-bearing car is two and a half times as difficult to start as the roller-bearing car of the same size and under the same conditions.

Track Resistance Greater Hauling Empties

While speaking of hauling trips of mine cars equipped with different types of bearings, kindly permit me to mention one fact that is not generally known; or, if known, is often overlooked when laying out the main haulage road in a mine. Engineers ordinarily give the main road a grade in favor of the loaded cars, but often fail to take into account the fact that if the cars are equipped with plain bearings the track resistance of the empty trip is increased by 40 per cent. over that of the loaded trip. It is interesting to know that if the cars are equipped with the best type of roller bearings, the track resistance for the empty trip is only 15 per cent. greater that that for the loaded trip.

These facts are of vital importance whenever a storage-battery locomotive is used on the main haulage road. As is well known, it frequently becomes necessary to start the empty trip on the upgrade where it has been halted by some obstruction on the track. These considerations should all be taken into account in estimating on mine haulage conditions.

As is generally believed, the success or failure of any gathering haul depends almost entirely on the condition of the track, the kind of mine cars and locomotives used, and the knowledge and skill of the motorman. In speaking with a prominent mining man, only a few days ago, he expressed the opinion that it will not be long before every mine manager, having an eye for the future, will insist on the installation of roller-bearing mine cars and storage-battery locomotives.

Pittsburgh, Penn. STORAGE BATTERY.

Observation of Sun for Latitude

Letter No. 2—Kindly permit me to draw attention to what seems to be the omission of a line, or a few words, from the last sentence of the letter of Prof. Howard Eckfeldt, *Coal Age*, May 11, p. 891. Speaking of "parallax," the statement reads, "Allowance must be made for the semi-diameter of the sun; but, as the resulting parallax amounts to but a few seconds of arc, it is usually ignored in this observation."

It is well known that the semi-diameter of the sun, as observed from the earth, covers an angle of about 16 min. Professor Eckfeldt has just stated that allowance must be made for this when observing the disk of the sun instead of its center. It is evident, therefore, that the allusion in what follows is the parallax resulting from taking the observation from the surface of the earth instead of its center.

This error of observation amounts to but a few seconds of arc, and, as stated, can usually be ignored.

Parallax, for the sun, never exceeds 8.8 sec. of arc, so that when using a transit whose vertical circle reads only to minutes, this correction is inappreciable. [Our thanks to Professor Callen.—Editor.]

While writing on this subject, permit me to refer to the suggestion made by H. M. K., in his inquiry, *Coal Age*, May 18, p. 943, in regard to constructing a chart that would read to a larger scale than the one designed by J. T. Beard, which appeared in the issue of April 20, p. 733. The suggestion made is that the chart should read to minutes of longitude and half hours of time, etc.

A moment's reflection will convince anyone that the actual longitude of the observer is not the important factor, unless the observer's watch is set on *sun time*. It is customary, however, to use *standard time* when taking an observation; and, this being the case, the change in declination of the sun from Greenwich noon, as tabulated in the Ephemeris, must be reckoned to the longitude's meridian for which the observer's watch is set.

For example, if the watch is set for Eastern time, the observer must reckon his longitude as 75 deg. W. from Greenwich. If his watch is set on Central time, he must estimate the difference of time to longitude 90 deg. W., remembering that the change in declination, from that given in the Ephemeris, depends only on the difference of time between the observer's watch and Greenwich noon.

A. C. CALLEN,
Prof., Mining Engineering,
Morgantown, W. V. West Virginia University.

Safety in Shotfiring in Mines

Letter No. 4—I am much in favor of the employment of shotfirers to charge and fire all shots in mines, instead of leaving this work to be performed by the miners. The shotfirers should be experienced men having the training that will enable them to determine correctly the amount of explosives that must be used to bring down the coal, in any case.

Where miners do this work themselves, the hole is often overcharged, or a frozen cartridge is inserted, which fails to explode and later finds its way into the car and possibly into the furnace. The work of blasting in mines is dangerous, unless it is properly performed by experienced men.

There is another feature to this question, however, that is likewise of importance. Attention has been drawn, in previous letters, to the danger of the presence of enemy-alien miners, employed in our mines, during the progress of the war. To my mind, their presence in the mines is a serious menace. Even though the enemy alien himself may intend no harm, he may have one or more men working near him who have taken a dislike to the man and are only too willing to seize upon the opportunity presented by the war to make trouble for him. They may even go so far as to place dynamite in his car, in order that it may be found and blamed to him as a disloyal act.

In time of peace, the finding of an occasional stick of dynamite in a car of coal would be regarded as an accident or due to carelessness on the part of the miner, who would be reprimanded and cautioned not to let it occur again. In time of war, however, such an occurrence is attributed at once to disloyal intent.

While I wish to be fair to all enemy aliens who are loyal to this country, I feel that there is much risk in letting this class of men work in our mines. It would be better, in my opinion, to employ them at other work that will afford them or others no opportunity of doing a harmful act.

C. MCMANIMAN.
Rawdon, Canada.

First Aid to the Uninjured

Letter No. 6—I have been much impressed in reading the letters that have appeared in *Coal Age* on this subject and cannot resist offering a few comments regarding our attitude toward all first-aid and safety-first work.

A short time ago I was looking over the anthracite mining laws of Pennsylvania and noted with interest the ample provision made for the care of the injured, in Art. 7, which gives in detail the kind of ambulance, stretchers, etc., that must be kept at the mine, in readiness for immediate use in case of accident.

The thought struck me, in this connection, that before the benefit of this wise provision can be fully assured, how important it is to give the necessary instruction to all classes of mine workers, in order to enable them not only to give the necessary first aid to an injured fellow worker; but, more important than all, to impress upon every man this idea of rendering *first aid to the uninjured*, and thus enable them to avoid these accidents.

In the giving of first aid to the injured, it must be remembered that, while the up-to-date motor ambulance is a great improvement over the old-time method of hustling an injured man over a rough road in an old black, springless, unventilated wagon half-filled with straw, and wrapping him for the time in old blankets that are scarcely fit to keep the mule warm that draws the wagon, these improvements will be of little aid unless the attendants understand how to treat the injured man successfully.

Unless a broken leg is first placed in a rigid position between splints, a well-appointed ambulance will not prevent what was originally a simple fracture from being aggravated in a manner that will necessitate the loss of the injured member. Likewise, improved appliances will not prevent a man bleeding to death if his fellow workers do not understand how to control the loss of blood from a severed artery.

OPERATORS AND MINE OFFICIALS, TAKE NOTICE

In the giving of first aid to the uninjured, I want to ask, Do our mine officials realize the importance of giving their men needed instruction in the treatment of possible injuries? Observation shows that, in many cases, because of the lack of foresight and the provision of this needed instruction, many lives have been lost, at our mines, that could have been saved had fellow workers known how to treat the injured ones.

A while ago, while walking one of the streets of Wilkes-Barre, my attention was attracted to a group of people standing about an old black ambulance wagon drawn by two mules that apparently could not proceed faster than a walk. Inquiry of the driver elicited the sad fact that a miner had bled to death.

In one of the Bethlehem steel mills, some years ago, there was started a first-aid and ambulance association.

The effort was attended with such success that the plan has now been extended to every mill and foundry of the company; and there is, today, not a department that cannot muster eight or ten men who are capable of attending an injured man properly.

Following an accident in one of the largest collieries in the anthracite field, I suggested to the foreman that a first-aid and ambulance association be organized for the purpose of instructing the men in giving necessary first aid in case of accident. I stated that men could be taught how to put a broken limb in an easy position, arrest bleeding from a severed artery, apply artificial respiration to those overcome by gas, or treat men rendered unconscious by electric shock.

Unwisdom of a Mine Foreman

Much to my surprise, however, the foreman argued that such a scheme, while a good one, would not be approved by the doctors and he refused to consider it further. Experience in later years has proved the fallacy of his contention; and doctors, today, take great interest in assisting to give the needed instructions in first-aid work to all mine workers. It must be remembered, of course, that the first thing to do, in case of a serious accident, is to send promptly for the doctor, while, at the same time, doing everything possible to prevent further injury and save life.

I recall an instance that occurred in the Wyoming Valley, some time ago, when 13 men were overcome by the afterdamp of an explosion, in a fruitless atempt to recover the bodies of two of their comrades who were killed by the force of the explosion. At such times many brave men are ready to risk their own lives in the hope of rescuing their less fortunate companions and restoring them to their families, who are on the brink of despair by reason of the accident. Here is where first aid to the uninjured would be valuable, in giving to these willing rescuers a knowledge of the danger incurred by going unprotected into places where an explosion has occurred.

Fred B. Hicks.

Kingston, Penn.

Favoritism in Mine Management

Letter No. 6—Speaking of the reasons that guide corporations in the choice of men to take charge of the several branches of their business, if every official who has the authority to choose his assistants was asked to give a reason for his choice, the replies received would be almost as varied as the men chosen.

One official will describe the man of his choice as "a young man who has the pep, push, vigor and vim to make things go." No doubt this is true as far as it goes. There are many men who can "make things go," but they do not always go right; and when things go wrong, someone will ask, "What are you going to do about it?" Let me say, the only thing to do, in that case, is to get a new man and try again.

A number of years ago I knew of a coal company who made it a rule to change their mine foremen at frequent intervals. The company operated a number of mines. At one mine, I remember that everything seemed to go wrong. The superintendent of the mine was a boy 20 years of age, who had been a timekeeper. The mine foreman was a young man of more than average attainments, but, like the superintendent, lacked the experience that one in his position should possess.

Both of these young men had plenty of push and go. Under their management, things moved, it is true, but the movement was not a steady march to success. Instead, things moved rapidly from bad to worse and, to save the situation that was fast becoming intolerable, the company decided on a change of mine foremen, which was then made nearly every month.

Inexperienced Management Bankrupts the Company

It is not strange to know that the result at this mine was a failure and the company went into bankruptcy. We are often led to ask why so many industrial concerns choose to employ young, untried and inexperienced men in an official capacity. Is it from a mistaken idea of economy? Can anyone think, for a moment, that the small amount saved in salary will compensate for the great loss that must result from the lack of experience on the part of the one given charge of the work? Efficiency and every vital consideration appear to be overshadowed by one idea, which the management are slow to realize is a false economy.

There are numerous instances about us where men are appointed to fill official positions more from the view point of *who* they are rather than *what* they are. A man may stand high in social and political influence and know little or nothing about coal mining; and yet, how frequently such a one is chosen for an important position by a large corporation, when the work he does most efficiently is to draw his salary. Like the wise old owl, they never talk because they could not instruct if they did. Someone must act for them at every turn.

Appointment of Favorites

In his letter, *Coal Age*, Apr. 6, p. 644, Richard Bowen says, "I do not think that any sane manager would place a man in a responsible position because he was a favorite in some respects." In this opinion, I cannot agree with Mr. Bowen. Whatever may appear as not reasonable, in this respect, the fact remains that such appointments are constantly being made by persons whose sanity has never been called in question.

Mr. Bowen, also, appears to have some curious ideas in respect to the practice in coal mines, in England. It seems strange to me where or from what source he could have obtained his information. In my opinion, he has been wofully deceived in respect to the conditions that he states exist in the mines of that country.

When we compare coal mining in this country with that in England, it would appear that we have done little more than to tag on behind. There is little that seems to me to be of original character in American mining, but we have thought out and accepted British ideas and made use of their experience in forming our mining laws, as well as in other matters relating to the operation of mines. In other words, we have been following in the footsteps of our English cousins. There is no doubt but that we have the men and the brains and should follow our own initiative.

Confluence, Penn. H. E. Gray.

INQUIRIES OF GENERAL INTEREST

Mine-Car Door

In the hope of obtaining some good suggestions from readers of *Coal Age*, allow me to present, for their consideration, a proposition that is causing us some study and thought. Our miners are loading only hand-picked lump coal, which is mined in large chunks and must be loaded into the mine cars where the seam is not more than 38 in. in height.

Up to the present time we have used cars without doors, but operating conditions make it necessary now to equip all cars with doors. The door must be such that it can be laid flat while the car is being loaded and quickly put in place by the miner before the car is finished. At the same time, the door must be adapted to the requirements of a self-dumping cage and must be in a position to clear when returning into the mine.

Russellville, Ark. V. C. ROBBINS.

We gladly submit this question to our readers and hope that they will be able to make some good suggestions.

Taking Anemometer Readings

When taking anemometer readings in an airway that is wider at the bottom than at the top, having the form of a trapezoid, how should the anemometer be held, in order to secure an average reading for the entire cross-section of the airway? I have in mind an airway that measures 8 ft. 4 in. on the bottom and 6 ft. 8 in. at the top, while the clear height of the passageway is 4 ft. 4 in. Will a reading taken in the center of this airway give the average velocity of the air passing?

——, W. Va. ASSISTANT FOREMAN.

The fact that this airway has the form of a trapezoid, and is wider at the bottom than at the top, does not materially affect the manner in which the anemometer readings should be taken, in order to secure an average reading for the airway. As has frequently been explained in *Coal Age*, the velocity of the air current is always greatest at or near the center of the airway, except where the conditons are such that the air has a tendency to hug one side of the airway, as in a sharp bend, or where certain conditions may cause the air to travel in larger quantity along the roof or the floor of the airway. These conditions have been fully explained in reply to the inquiry on "Measuring Air Velocity in Mines," May 4, p. 848.

In measuring the velocity of an air current in an airway having the shape of a trapezoid, we would suggest holding the anemometer an equal time, say a foot off the bottom and twice that distance below the roof, at points a foot or so to one side of the middle of the airway. Under ordinary conditions this may be expected to give a fair average reading in a 5- or 6-ft. airway.

As previously mentioned, however, it is of more importance that the same method be followed, each time, and that the readings be taken in the same place in the airway, in order to secure relative uniformity in the results. It must be remembered that velocity readings taken with the anemometer in an airway are only approximate, but the readings taken from time to time should be such as can be compared, for which purpose the method of taking the readings must be uniform.

Mixed Explosives in Blasting Coal

Kindly explain what is the danger in charging both powder and dynamite in the same hole when shooting slate roof in a mine. I have been doing this for several years with good succecss; but recently our mine foreman informed me that the district mine inspector gave orders that the practice must be stopped, as it was dangerous. PRACTICAL MINER.

Dubois, Penn.

The mine inspector is right. The habit of some miners of placing a small piece of dynamite in the foot of the hole, before inserting the powder cartridges is a dangerous practice. The purpose of the miner is to break the coal at the back of the shot, hoping thus to obtain a larger fall of coal than would be produced by a charge of powder alone. He claims that the quicker and stronger action of the dynamite, at the toe of the shot will serve to crack the coal at that point, and enable the charge of powder to break it down more readily and in larger quantity.

Attention has been drawn frequently, in *Coal Age*, to the fact that the explosion of the dynamite at the bottom of the hole is quite uncertain. It often happens that the explosion of the powder is not followed, as expected, by the explosion of the dynamite, which is found later in the coal thrown down by the shot. This is the chief source of the danger of using dynamite with a charge of powder. Dynamite should never be fired without a detonating cap.

It may chance that, owing to the quicker action of the dynamite charged with black powder, the explosion of the former may rupture the coal in such a manner as to cause a windy shot or "squealer." Or, the entire charge of black powder, or a large portion of it, may be thrown from the hole by the explosion of the dynamite and exploded in the air and cause disaster.

As stated in the inquiry, this practice of miners has been employed in numberless cases with good success; but it requires the best judgment on the part of the miner and, even then, there is no assurance that an accident will not happen. For this reason, the practice should be abandoned. The practice of mixing different grades of black powder in the same hole is also an exceedingly dangerous practice and should never be permitted.

EXAMINATION QUESTIONS

Illinois Mine Managers' Examination April 2, 1918

Ques.—When the air current in a mine contains marsh gas, which is the most dangerous, air saturated with water or unsaturated?

Ans.—When the air circulating in a mine generating gas is unsaturated it has a tendency to absorb the moisture from the roads and workings, which renders the mine dry and dusty and presents a more dangerous condition than would occur if the air current was maintained in a saturated condition.

Ques.—A seam of coal pitching at an angle of 16 deg. measures 6 ft., at right angles to the dip. What is the vertical thickness of the seam and the gross tons per acre, the specific gravity of the coal being 1.25? The cosine of 16 deg. equals 0.96126.

Ans.—The vertical thickness, in this case, is $6 \div 0.96126 = 6.24$ ft. The cubic contents of this seam, per acre, is then $43{,}560 \times 6.24 = 271{,}814+$ cu.ft. The specific gravity of the coal being 1.25, the weight of coal, in gross tons, underlying one acre is

$$\frac{271{,}814 \times 62.5 \times 1.25}{2240} = 9480 \text{ gross tons}$$

Ques.—When a person comes in contact with a bare electric wire carrying 275 volts, which do you consider the most dangerous, alternating or direct current? Give reasons why.

Ans.—The question does not state, what is of the most importance, the amperage of the current; and it is difficult to state which, if either, of these two kinds of electricity would prove the most dangerous, with only 275 volts. It should be remembered that, with this low voltage, it is amperage, or the volume of current flowing, that is the determining factor in respect to the effect produced on the human system.

An electric current may prove fatal to life in either one of two ways: (1) by shock to the nervous system; or (2) by the heating effect produced by the resistance of the body and which burns the flesh and dries out the blood. The first contact of the body with a live wire carrying *direct current* produces a shock in proportion to the voltage of the current. The shock is immediately followed by the heating effect, which depends on the quantity of electricity flowing through the body, or the amperage of the current. On the other hand, if the wire is carrying alternating current, there is a rapid repetition of the shock due to the voltage, and this rapid succession of shocks increases the danger and may prove fatal if continued, even though the amperage be small. Replying, then, to the question asked, bearing the foregoing facts in mind, it may be said that a direct current of considerable amperage, even with this low voltage, might be considered as more dangerous than an alternating current of the same strength and pressure, although many will agree that there is not much choice between them.

Ques.—If a collar or crossbar, 8 in. in diameter and 8 ft. between supports, bears a certain load what should be the diameter of a collar or crossbar, 12 ft. between supports, to bear the same load?

Ans.—In mining practice, it is the roof pressure or load per running foot of beam that determines the required strength or diameter of the beam; and the words "the same load" may be taken as referring to the same *unit load* resting on the collar. In that case, the cube of the diameter of the beam will vary as the square of its length or distance between supports. In other words, for the same unit load, the cube of the diameter ratio is equal to the square of the length ratio. Hence, calling the required diameter of the 12-ft. beam x, we have

$$\left(\frac{x}{8}\right)^3 = \left(\frac{12}{8}\right)^2 = 1.5^2 = 2.25$$

$$x = 8\sqrt[3]{2.25} = 10.48, \text{ say } 10\tfrac{1}{2} \text{ in.}$$

Ques.—State fully how powder and other explosives may be taken into a coal mine, and what precaution is necessary in handling powder and other explosives. State what is the maximum amount each miner is allowed, at any one time, and where same must be kept.

Ans.—The coal-mining laws of Illinois require that the powder must be taken in after the shotfirers have left the mine and before the entry of the dayshift for work. Explosives must not be carried in the same car with tools or other materials. The law provides that no workman shall have at any one time in the mine more than 35 lb. of black powder or more than 25 lb. of permissible explosives and not more than 3 lb. of other high explosives. All explosives must be kept in a wooden box, securely locked, which must be placed as far as practicable from the track and from other boxes in which powder is stored. Black powder and high explosives or caps must not be kept in the same box. Likewise, detonators must not be put in the same box with detonating explosives.

Ques.—In coal mines where heavy blasting is done, or in mines generating a large or small percentage of marsh gas and where fine dry coal dust has been allowed to accumulate on the roadways and timbers, sides or ribs, state fully what might take place if these conditions were allowed to exist. What mixture of marsh gas and coal dust will explode when ignited?

Ans.—Under the conditions named, a blownout shot caused by an overcharge of powder or a badly placed shot would be likely to cause a destructive mine explosion that would be propagated throughout the mine by the gas and dust accumulated on the roads and in the working places.

That coal dust lowers the explosive limit of firedamp is well known; but the percentage of gas and dust in the mixture cannot be stated, as this will vary with the inflammability of the coal, the amount and fineness of the dust and the character of the flame causing ignition.

COAL AND COKE NEWS

Harrisburg, Penn.

State Fuel Administrator William Potter has announced that he will turn over to the United States District Attorney evidence in the case against James Brothers, of Pottsville, Schuylkill County, accused of shipping to market four carloads of anthracite which contained from 14 to 47 per cent. slate. At a hearing held on May 22, Mr. Potter upheld an order of Baird Halberstadt, fuel administrator for Schuylkill County, who closed the company's colliery until June 1 and sent four cars of coal back to be unloaded and prepared for market.

The cars were en route to market and ordered back from St. Clair scales by Halberstadt. The state administration ruled that the cars should be hauled back to the colliery, unloaded, and before any coal can be loaded into the cars, the county administrator must certify that the cars were unloaded.

The state administrator also ruled that the Cambridge Colliery must be closed until June 1, and shall be allowed to operate after that date only provided changes have been made in the breaker and its machinery that will enable the operators to better prepare their coal. At resumption of operations, only coal that is freshly mined may be run through the breaker. Dumping of culm banks is prohibited. All shipments from the colliery will be inspected by representatives of the administration, and if found below standard, operations will again be suspended.

There was from 17 to 47 per cent. slate in the condemned cars. Some of the coal was consigned to the Home of Indigents. The gravity of this case has been aggravated by James Brothers, who on former occasions obtained permission to ship a car of condemned coal for use in a slate quarry owned by them. Instead of shipping the coal as they were given permission to, the operators sold the coal into the anthracite pool at Port Richmond, where it was mixed with high-quality anthracite.

Because of the repeated warnings given these operators, and the lack of defense on their part, it has been decided that the evidence in this case will be presented to the Federal District Attorney with recommendation for violation of the Lever act, and as a warning to other operators.

Charleston, W. Va.

The apportionment of cars to the several West Virginia coal fields, including the Kanawha & Michigan district, the Kanawha district and the New River district, appears to be most satisfactory. The car supply in the New River district, for instance, reached about 90 per cent. this week, and operators confidently look forward to a better supply next week because most of the shipments from here were for tidewater, so that there ought not to be any undue delay in the return of such cars.

The production during the week ending May 18 was 137,862 tons and the total of hours worked was 3344. Total hours lost because of car shortage was 639, and because of labor shortage 339. Just 24 hours were lost because of a strike, while on the score of mine disability (and in that is included power shortage) 277 hours were lost. All other causes were responsible for 104 hours of lost time. Between May 1 and May 23, a total of 27,322 loads were shipped out. In the same period the empties received amounted to 26,624.

In the New River district the situation, insofar as cars are concerned, is regarded as being much improved, although it is not so good this week as it was last week. While the problem which now confronts the operators is almost entirely a transportation problem, should there continue to be an improvement in the car supply so that mines would be able to produce to their capacity, the problem will be entirely a labor problem.

Coal operators believe that the amendment proposed by Provost Marshal General Crowder under which men in practically all occupations will have to work or fight is going to have a wholesome effect in the mining industry, where many miners are indifferent to whether they work full time or not. One suggestion which has been made is that concrete plans be adopted by all operators to check men in and out.

The car supply fell short of what it has been during the last month in the Fairmont district, the supply in the Fairmont field fluctuating between 700 and 900 cars.

Returning from the Villa mine of the Mill Creek Canal Coal Co., where 13 lives were lost as the result of an explosion of a gasoline engine which furnished power for a fan within the mine, W. J. Heatherman, Chief of the Department of Mines, after pointing out that the mine had not been inspected since April, 1917, issued a statement saying that he would close every mine in the state which did not remove any fans which were operated within the mine. In his statement the new mine chief said: "The records of this department show that this mine had not been examined since Apr. 25, 1917, and was classed in first-class condition, when the facts are that it was found to be in a deplorable condition. Not only the department of mines, but the owners and officials of the mine have shown the greatest disdain for human life and property, or they would not have allowed a gas-driven fan to remain over 400 ft. within the mine when it should have been installed on the outside. Since this occurrence this department has been advised that a great many mines throughout this district have fans inside the mines. This is to advise that any fan found within the mines in the future, whether gas-driven or otherwise, must be removed at once."

Birmingham, Ala.

In the Birmingham mining district conditions show little improvement. The local output is still under what many think it should be. Labor is being urged to greater activity and mine employees, both whites and negroes, at ore and coal mine, are being asked to give their best effort to steady production, as an increased output of ore and coal is needed to keep up the production in war industries and to meet the ordinary demands of the public.

The ore and coal miners are also being urged to give their work closer and better attention in an effort to produce the cleanest coal and ore possible, as carelessness in mining and dirty product has proved most costly to the Government thus far.

Coal production is scarcely above the steady demand, and while Federal fuel administrators are advising that some coal be stored for use in the fall and winter, so far little has been accomplished.

There is no complaint to be heard of the railroad car service in the mining district. The only dissatisfaction arising during the week has been because of unsteadiness and inefficiency of the labor.

Victoria, B. C.

The use of powdered coal to replace fuel oil is the subject of experiment in British Columbia. In Vancouver City the B. C. Sugar Refining Co., one of the largest of the Provincial industries, has installed a plant to provide for the change and, it is understood, is getting satisfactory results. The Canadian Collieries (Dunsmuir) Ltd., anticipating a demand for the new fuel, is making tests of waste from its washery which has been accumulating for years in the harbor at Ladysmith, B. C. If the results prove what is expected, the company will install special equipment for pulverizing and will proceed with the reclaiming of this coal refuse, of which there must be four or five million tons and some of which has been lying under water for 17 years. It is considered probable that, should the experiments now under way turn out right, and providing the United States withdraws the "tankers" at present in service between California and British Columbia, the Canadian Pacific Railway Co. will arrange for the use of coal dust in locomotives now burning oil.

An interesting sidelight on the increased value of coal in the Canadian Northwest is obtained from an experience of the Pacific Coast Coal Mines Co. In prewar days the company discharged its waste into a lagoon, across which a rough cofferdam had been constructed. George Wilkinson, then manager of the company's operations, and now Inspector of Mines for British Columbia, was responsible for this. His idea was that this coal, for which there then was no market, might prove useful in an emergency. Last year some 50,000 tons of it were recovered and sold at $3 a ton.

A new company, known as the Canadian Western Fuel Co., has been incorporated in British Columbia for the purpose of purchasing, taking over and operating all the assets in British Columbia of the old Western Fuel Co., of San Francisco, Cal. The incorporators of the new company are G. W. Bowen, J. B. Bowen and John Hunt, and the capital is $5,000,000. There will be no change in the management of the company as at present constituted, and its headquarters will be at Nanaimo, B. C. G. W. Bowen is the general manager and John Hunt remains the general superintendent. J. B. Bowen is the manager of the Western Mercantile Co., the trading establishment opened by the Western Fuel Co. when it was reorganized a year ago.

The Granby Consolidated Mining and Smelting Corporation, in the course of developing its newly acquired coal bearing areas near Nanaimo, B. C., has driven three slopes. On one, at a depth of 150 ft., a seam, 14 ft. at that point, has been opened up. The management express themselves as satisfied with the results up to date.

The purchase of the Vancouver Island properties of the Nanoose Collieries, Ltd., by the Nanoose Wellington Coal Co. has been announced. Lewis Williams, president of the purchasing company, has given a statement to the effect that it is the intention to push the development of the coal-bearing areas controlled by the new concern to the end that the present output may be trebled.

PENNSYLVANIA

Anthracite

Wilkes-Barre—Only $1 damages was awarded by a jury on May 25, in the suit of Mrs. Elizabeth Alexander against John Conlon, an independent operator of Plains township. Mrs. Alexander was unable to prove to the Court's satisfaction that damages to her property were caused by the Conlon operations.

Pottsville—The ruling of Provost General Crowder on the draft question may affect all strikes after July, declare labor leaders, who say that such a strike as is now being conducted at the Philadelphia & Reading Coal and Iron Co. shops may be banned by the order. These men, many of them of draft age, have been idle a week, demanding a 30 per cent. increase of wages.

Hazleton—Anthracite operators in the Lehigh field expect a record output for May. Thus far there has not been one day of idleness outside of Sunday, and the supply of cars has been better than at any time within the last two years. Despite the unfavorable attitude of workers, companies still hope the men will meet their request to continue at their places on Memorial Day.

The departure of 120 boys from here and 89 from Freeland, in the draft quota on May 27, has made such inroads on the operating forces of the coal companies that an appeal will be made to the district exemption board at Scranton at once to place all miners in deferred classification. It is contended that miners are as necessary at the collieries for the successful prosecution of the war as they may be at the front.

Bituminous

Stroudsburg—The Lackawanna R.R. is storing 2000 cars of bituminous coal at the Gravel Place, East Stroudsburg, for use in case of a coal shortage in the next year. The coal will be left there until needed by the company.

Uniontown—Coal land in Fayette County reached a record price recently, when the Jamison Coal and Coke Co. purchased 550 acres of coal land from the Alfred Fuller estate for $1,760,000, which is $3200 an

acre. The tract is the last of the large undeveloped coal tracts in the county and is situated near the holdings of the Washington Coal and Coke Co., extending to Perryopolis.

WEST VIRGINIA

Fairmont.—John Y. Hite, who has extensive operations in this section, has consummated negotiations for the purchase of 27 tracts of coal land in Harrison and Marion Counties from the Whyel Coal Co., of Uniontown, Penn., the consideration being $585,000.

Williamson—Coal is again being shipped from what is known as the old W. J. mine, near here, by Harry Randolph, who recently acquired the mine.

The tipple of the Bailey Coal Co. on Pond Creek, near here, destroyed in the February flood, just as it was being completed, has been rebuilt, and coal is again being shipped. The superintendent and general manager is Capt. E. L. Bailey.

New machinery is being installed and new houses being built by the Wilhelmina Mining Co., near here. The superintendent of the company is Jack Goodloe.

Junior—According to figures furnished by an officer of the Gage Coal and Coke Co., which operates near here, that company will expend $150,000 on improvements to be made to its plant. This company owns 640 acres of Kittaning coal and improvements will be begun immediately. It is proposed by the company to transport part of the output of the mines across the Tygarts Valley River to be converted into coke. The improvements to be made will consist largely of electrical equipment. The estimated capacity of new work in tons per year is 800, and the estimated capacity of plant when completed in tons per year is from 150,000 to 175,000.

Welch—The Standard Pocahontas Collieries Co., at Caples, McDowell County, has appropriated $20,000 for improvement in its mining facilities.

In round numbers $100,000 is being spent for improvements at the Ocean mine of the Marine Pocahontas Collieries Co., near Roderfield, the company only recently having completed a track to the mine.

A new bucket and cable system has supplanted the bridge formerly used by the New Pocahontas Colliery Co., at Hemphill, the bridge having been destroyed several months ago in a flood. A new stone storeroom and office is being built by the same company at its Deegan plant.

Jessop—Fire of unknown origin completely destroyed the power house of the Saxon Coal Co. last Saturday. Many tools belonging to employees were destroyed.

Roderfield—A modern plant is being constructed by the Hampton Roads Mining Co. at this place. The Hampton company is a subsidiary of the Pocahontas Collieries Co.

Charleston—Additional equipment is being installed by the Valco Coal Co., at Greenview, W. Va.

Preparations are being made by the Davis Creek Coal and Land Co. to sink a slope to the Coalburg seam. R. N. Snyder is general manager, with headquarters at Charleston.

Morgantown—The Monongahela R. R. has applied to the Government for permission to expend $225,000 in the construction of a railroad along Scott's Run, paralleling the Morgantown and Wheeling R. R., the company setting forth that the purpose in desiring to build up Scott's Run is to accommodate the Osage Coal Co. and the Cleveland and Morgantown Co. The Morgantown and Wheeling Railroad Co. has entered a protest against permission being granted for the Monongahela extension.

Bluefield—One of the largest deals that have been made in the transfer of coal properties in the Pocahontas field of south West Virginia was completed on May 15, when Frank S. Easley, of Bluefield, acting as trustee of parties of Bluefield, Lynchburg, Va., and Welch, W. Va., purchased through L. A. Osborn, mining and construction engineer of Welch, all the holdings of the Bradshaw Pocahontas Coal Co. Several tracts of land that the Bradshaw company was operating under lease were purchased in fee. The new company will have approximately 1500 acres of the Bradshaw Pocahontas seam of coal, which will average 60 in. clean coal. The present equipment will be immediately enlarged for a capacity of 1000 tons daily.

ALABAMA

Birmingham—The Woodward Iron Co. will begin at once the construction of a large Link-Belt concrete coal washery at its Woodward Furnace plant, which it is understood will cost in the neighborhood of $200,000. Construction work of every character in this district is being seriously retarded both by the shortage of skilled and unskilled labor and the inability to secure material and equipment without long delay.

It is announced that the Central Alabama Coal and Iron Co. will rehabilitate Jenifer furnace, located at Jenifer, in the western part of Jefferson County. Extensive improvements will be made in the machinery and equipment, including the installation of electrical power apparatus, the building of an ore washery and the addition of fifty coke ovens to the present battery of 100 ovens. Coal will be obtained from the company operation at Weller.

INDIANA

Petersburg—Every coal mine along the Evansville & Indianapolis R.R. has resumed operation after an idleness of eight weeks. The shutdown was caused by a dispute over freight rates which has been settled by the Federal Government. Reopening of the mines means an increase of about 25,000 tons of coal a week in Indiana. The various shafts employ about 1000 men. Cars are being supplied now by the railroad company in satisfactory allotment.

New mines are being opened by the Atlas Co., north of Petersburg. Seven machines will be used in taking out the coal and approximately 350 men will be employed in the work. The Petersburg Business Men's Association has been asked to build 50 houses to accommodate the increase in workmen. Hundreds of miners who left Petersburg and vicinity when the mines closed are returning.

Terre Haute—Vincenzio Boaso, president, and Lee Poll, secretary, of United Mine Workers Union of America, Local No. 6044, at Blanford, Ind., have reported that the union has adopted resolutions, in the form of a memorial, to be placed before the Indiana Supreme Court in the form of an appeal. The miners are requesting the right to be allowed to keep beer in their homes for family use, claiming that they do not care for saloons or whisky, but feel that they should be entitled to secure beer for home use and show that they are violently opposed to state-wide prohibition as now effective if it interferes with home consumption of beer.

OHIO

Oreton—Three thousand acres of coal, clay and oil land, located at Oreton, Vinton County, have been purchased by Chicago men. Two of the interested parties are L. D. Binyon and J. A. Hogan, well known in Columbus, and the present operators of the Union Furnace Brick Co., at Union Furnace, Ohio. Mr. Binyon and Mr. Hogan were in Columbus last week consummating the deal and arranging for the development of the property. Immediate steps will probably be taken to open coal mines, and later developments will undoubtedly include the production of firebrick, oil and gas.

San Toy—During the first half of May, Edward Blagg, at the No. 1 mine of the Buckeye Coal and Railway Co., loaded 258 tons of machine-mined entry coal in 12 working days. The entry is 15 ft. wide and the coal 3 ft. 8 in. high. On May 10 Blagg loaded 31 tons of coal in eight hours. His total credit for the two-weeks' pay was $188.57. The coal was cut by a Sullivan C. E. 7 shortwall machine and gathered by a Goodman, articulated-type storage-battery locomotive.

ILLINOIS

Nokomis—After a five days' fight with fire which broke out Saturday night, May 18, in the Peabody No. 2 North mine here, announcement was made by the mine officials on Thursday, May 23, that the flames were under control and that it would not be necessary as had been feared, to seal the mine. Damage estimated at $75,000 to $100,000 has been done, however, and it will be at least three months and probably six months before resumption at full capacity will be possible. Fire has been smoldering in the mine for seven years, behind concrete walls. Seepage is thought to have affected the sulphur deposits, causing the flames to burst through. The large machine shop and power plant below the surface were destroyed. More than a hundred men were employed at $1 an hour to fight the fire. On account of the gas and smoke they could only work 10 min. at a time, with rest intervals of 15 min. The method was to put streams of water into the mine with all the hose that could be obtained. The mine employes about 800 men. Its output is about 2000 tons a week.

KENTUCKY

Lexington—A big deal has been put over whereby the Elkhorn Coal Co. has increased its capital stock from $100,000 to $600,000, and absorbs the Detroit Elkhorn Coal Co., which has for some time owned and operated adjoining property. The stockholders of the two companies have taken up additional stock in the Elkhorn Coal Co., which in amending its charter broadened its scope considerably. The officers of the company are S. L. Bastin, of Lexington, president, and T. J. Cassidy, Lexington, secretary-treasurer. Most of the capital is held by Detroit and Lexington capitalists, several others being from the Hazard and Letcher County districts.

Providence—U. B. McGraw, a baker of Providence, finding that there was little money in the bakery business under strict Government regulation, is opening a coal mine in the White Oak district, on the Illinois Central R.R., about five miles from town. The coal is of the No. 9 variety.

Louisville—According to recent newspaper announcements from the Whitesburg, Ky., district, the Kentucky River Headquarters' Coal Co. is planning to develop several hundred acres of coal land along the headwaters of the Kentucky River in Letcher County. The property is alleged to have been purchased some time ago at a cost of about $100,000. Several Louisville people, including K. U. Meguire, are said to be interested in the development. Mr. Meguire is in North Carolina and the report could not be verified.

Paintsville—The business of the bankrupt Jennis Creek Coal Co. has been sold by Attorney H. S. Howard to a new organization composed of H. S. Howes, R. A. Patrick, James A. Williams and James W. Turner.

Foreign News

Sydney, N. S.—The construction of the 120 new Koppers byproduct coke ovens at the plant of the Dominion Iron and Steel Co., with complete apparatus to recover the gas, tar, ammonium sulphate and other byproducts, is nearing completion, and the early starting of the first 60 ovens is now hoped for. This installation represents the latest word in byproduct coke-oven design, and will produce more coke with a smaller labor supply.

Personals

J. W. Massing has been made superintendent of the Long Branch Coal Co., in operation at Long Branch, W. Va.

Ben English, who has been mine foreman for the Booth-Bowen Coal Co., Simmonds, W. Va., has resigned and will engage with the S. J. Patterson Pocahontas Co. in the same capacity.

J. H. Hillman, Jr., of Pittsburgh, Penn., president of the Hecla Coal and Coke Co., and a director of the United Coal Corporation, has been elected a director of the Peoples Saving Trust Co. of Pittsburgh.

John Crooks, of Hazleton, Penn., has been named manager of the Pardee Brothers coal-mining interests to succeed the late Calvin Pardee. Mr. Crooks had been employed as superintendent of the collieries.

Earl Henry, who was chief mine inspector for West Virginia for 16 years, has been appointed superintendent of the West Virginia Rail and River Coal Co., of Columbus, Ohio, with headquarters at Hallwood, W. Va. He succeeds **Joseph West**, who has taken a similar position with the Rive Mining Co., of Dayton.

E. W. Blower, of Columbus, Ohio, secretary of the Hisylvania Coal Co., the D. C. Thomas Coal Co., the Piney Fork Coal Co., and the Pan Handle Collieries Co., announces that he will join the colors within a short time. He will retain his title in the four companies. During his absence his work will be looked after by **John L. Jones**, who has been appointed auditor, and **Elmer E. Leared**, who has been named sales manager and purchasing agent.

Obituary

Col. W. H. Mabie, who founded the town of Mabie, about seven miles from Elkins, W. Va., about 20 years ago, and who has since that time been extensively engaged in the lumber and coal mining business, died recently while on a visit to his old home at Tideoute, Penn. He was 73 years old.

John Morgan Lewis, who for a number of years has been a resident of Jeanesville, Penn., died suddenly in that town on May 21, a victim of heart disease. The deceased was 65 years of age, and was a graduate of Lafayette college in 1875. Afterward he was employed as a mine foreman for the Pennsylvania Coal Co. at No. 10 colliery. Then he stood the examination for state mine inspector to fill a vacancy in the Hazleton district, holding the position for five years. Later he was mining engineer for Coxe Bros. & Co., and then was associated with a number of smaller mining operations as operator. He is survived by his widow and two children.

Recent Coal and Coke Patents

Boiler. P. Crosti, Milan, Italy, 1,250,979. Dec. 25, 1917. Filed Apr. 5, 1915. Serial No. 19,356.

Coal Drill. D. S. Bachelder, Tilden, Ill., 1,251,323. Dec. 25, 1917. Filed Apr. 19, 1916. Serial No. 92,191.

Dump Car. A. M. Gow, Duluth, Minn., 1,251,770. Jan. 1, 1918. Filed July 26, 1916. Serial No. 111,332.

Safety Crosshead for Mine Hoists. S. Jewell, Negaunee, Mich., 1,252,122. Jan. 1, 1918. Filed Jan. 25, 1915. Serial No. 4196.

Means for Promoting Combustion of Fuel. G. P. Ward, Chicago, Ill., 1,251,146. Dec. 25, 1917. Filed Oct. 16, 1916. Serial No. 125,782.

Gas Producer. E. A. W. Jefferies, assignor to Morgan Construction Co., Worcester, Mass., 1,251,038. Dec. 25, 1917. Filed Aug. 2, 1913. Serial No. 782,561.

Gas Producer. C. W. Lummis and G. H. Isley, assignors to Morgan Construction Co., Worcester, Mass., 1,251,064. Dec. 25, 1917. Filed May 21, 1914. Serial No. 840,110.

Apparatus for Handling Coal. R. M. Bickley, assignor to Heyl & Patterson, Inc., Pittsburgh, Penn., 1,251,626. Jan. 1, 1918. Filed Mar. 13, 1915. Serial No. 14,156.

Process for Producing Liquid or Soluble Organic Combinations from Hard Coal. F. Bergius and J. Billwiller, Hanover, Ger., 1,251,954. Jan. 1, 1918. Filed Aug. 3, 1914. Serial No. 854,825.

Industrial News

Molus, Ky.—The Harlan Block Coal Co. has filed notice of an increase in its capital from $35,000 to $50,000, to provide for expansion.

Hazard, Ky.—The Kentucky River Coal Mining Co. has filed notice of an increase in its capital from $100,000 to $150,000, to provide for expansion.

Artemus, Ky.—M. T. Lindsay, president of the W. L. Blue Gem Coal Co., following action of the Board of Directors on Apr. 29, has filed notice of dissolution of the corporation.

Birmingham, Ala.—The Alabama Fuel and Iron Co. has recently acquired about 1725 acres of coal lands in the Harlan district of Harlan County, Ky., and is planning for immediate development.

Pikeville, Ky.—The Kentucky Elkhorn Byproduct Coal Co. is a new company which is starting operations at Shelby. H. L. Cox, one of the most prominent business men in eastern Kentucky, is superintendent of the new company.

Harriman, Tenn.—The Big Bend Coal Co. is planning for the immediate installation of machinery for the development of 500 acres of coal lands, to have a daily capacity of about 150 tons. L. O. Scott is president; Arthur W. Evans is manager.

Dora, Ala.—The May & Phillips Coal Co., recently incorporated, has perfected organization, and is planning for the immediate development of about 40 acres of coal lands, to have a capacity of about one car daily. John D. Phillips is president.

Kingwood, W. Va.—The Hoffman Coal Mining Co., recently incorporated with a capital of $30,000, is planning for the immediate installation of the necessary machinery for the development of about 200 acres to have an output of 300 tons daily.

Louisville, Ky.—The Byrne & Speed Coal Co. and the Jellico Laurel Coal Agency have filed suit against the city of Louisville for approximately $2000, representing coal purchased in October and November last, and upon which payment has not been made.

Norton, Va.—The Mohawk Coal Mining Co., recently incorporated with a capital of $50,000, is planning for the immediate development of about 1000 acres of coal lands near Keokee, to have a capacity of about 150 tons daily. H. P. May, of Norton, is president.

Pikeville, Ky.—The Middle Ridge Coal Co. is a new corporation that is being organized with Millard Burke as president; A. J. Younce, vice president and G. H. Francisco, secretary-treasurer. The main office will be at Pikeville, with mines at Elkhorn City.

Jenifer, Ala.—The Central Alabama Coal and Iron Co. is planning for extensive additions and improvements at its plant, including the construction of 50 new coke ovens at its coal mine in addition to the present battery of 100, the erection of a new washer at the brown-ore mines, etc.

Scranton, Penn.—The Delaware, Lackawanna & Western Coal Co. has taken bids for the construction of a large new coal breaker, about 140 x 140 ft. steel and concrete, to be located in the Providence section of Scranton. The structure is estimated to cost in the neighborhood of $250,000.

Wilhurst, Ky.—The Wilhurst Coal Co., recently incorporated with a capital of $20,000, has perfected its organization plans, and will commence work at once on the development of about 217 acres of coal lands to have a capacity of about two cars per day. J. C. Hurst is president; Ray Williams is vice president.

Belleville, Ill.—E. A. Daley, secretary of the Belleville Fuel Administration, has announced that the price of coal here will be advanced July 1 from 14c. to 15c. a bushel. The announcement followed a conference with the team owners' organization in reference to a demand for an increase from 75c. to $1 in the hauling rate, which has been approved by State Fuel Administrator Williams, to go into effect at once. The team men were persuaded to wait until July 1.

Richlands, Va.—The Richlands Coal Corporation, which recently filed notice of an increase in its capital from $50,000 to $300,000 is planning for the immediate development of extensive coal tracts acquired in Tazewell County, on the Big Creek branch of the Norfolk & Western Ry. The company will commence work at once on the construction of a new railroad siding to the property, the coal to be loaded with a tipple from a tramway It is planned to have a capacity of about 600 tons daily.

Toledo, Ohio—Activity prevails in the lake trade at the port of Toledo. This is shown by the records of loadings at the docks of the railroads. During the week ending May 25 the Hocking Valley docks loaded 125,000 tons as compared with 117,000 tons the previous week. The total loaded since the opening of the season is 493,000 tons. During the same week the Toledo & Ohio Central docks loaded 68,000 tons as compared with 64,000 tons the previous week. The total handled since the opening of the season is 266,000 tons.

Topeka, Kan.—The Kansas Retail Coal Dealers' Association was organized at Topeka, May 15, when 145 retailers of the state attended the meeting called by the Topeka dealers' association. T. J. Monhan, of Topeka, was elected president; A. W. Rich, Emporia, secretary and treasurer. The executive committee, consisting of two coal dealers from each congressional district, will promulgate recommendations, including those to the Federal Fuel Administration. The zone system as it operates was criticized by many speakers at the convention.

Fairmont, W. Va.—The car supply was fair for the week ending May 25 and starts off fairly good this week. The regional car shortage was 7800 on May 14, but the fair supply last week has reduced that slightly. The railroads are in good shape locally, according to H. Wilson, superintendent Monongah division of the Baltimore & Ohio, who reports that all loads were cleaned up by the start of this week. The Shippensburg gateway is in fair shape. There is an insistent demand for coal from this district for the lakes, but the Fuel Administration is trying to send it east.

Columbus, Ohio—Columbus domestic consumers will require more than 600,000 tons of coal for the year ending Apr. 1, 1919, according to figures submitted to the State Fuel Administration by James G. Young, secretary of the Franklin County Fuel Committee. This requirement is in addition to deliveries already made. Following a survey of the entire county, Young figured that for the year beginning Apr. 1 the county will need for domestic consumption alone 757,500 tons of coal. Of that amount 695,000 tons were figured as the need of Columbus domestic consumers.

Amarillo, Tex.—The Retail Coal Dealers' Association of Texas met in annual convention here on May 21 and 22, with dealers from all parts of the state in attendance. Coöperation with the Federal Fuel Administration in its campaign to induce industries and individuals to lay in their winter supply of coal during the summer months, while business is slack and transportation facilities can be had, was discussed at length and hearty indorsement given to all efforts of the Government along this line. Reports of dealers indicated that in all parts of the state the individual coal users are laying in their winter supply, and that the situation in this regard is most encouraging.

Bluefield, W. Va.—With only two out of the total membership of the association absent, the Pocahontas Coal Operators Association held one of the most successful meetings in its history in this city last week. Numerous matters of importance to the association were discussed, but definite action on a number of questions was deferred until a later meeting. George Wolfe and others who have given some thought to the subject presented to the association their ideas as to how the miners might be induced to work during the full time available. Mr. Wolfe has evolved some theories which he has been testing with excellent results, it is said, at his Winding Gulf operations.

Columbus, Ohio—The completion of the double-tracking of the Hocking Valley Ry. from Columbus to Toledo will be pushed as rapidly as possible with the money supplied by Federal Director of Railroads McAdoo. This is the announcement of M. J. Caples, vice president of the Hocking Valley Ry., who returned from Washington last week. He said that of the $25,000,000 allotted the Chesapeake & Ohio system, the Hocking Valley will get $5,600,000, a large part of which will be used in the double-tracking project. The work has been going on for some time, but scarcity of labor and money have held it up. Speeding up will start at once. The Federal Government realizes the importance of the Hocking Valley Ry. in moving coal from Ohio, West Virginia and Kentucky to the lower lake ports for shipment to the Northwest.

St. Louis, Mo.—The hearing on the application of the St. Louis Chamber of Commerce to the Interstate Commerce Commission for the abolition of the bridge arbitrary of 20c. per ton on coal, is to be held Monday, June 3, at the Jefferson Hotel. Joseph W. Folk, General Counsel of the Chamber of Commerce, has resigned to enter the race for United States Senator, but will make the argument in the arbitrary case. City Counsellor Daues will file an intervening petition, to make the city a party to the petition. The East St. Louis Chamber of Commerce has adopted a resolution declaring its intention to ask for an increase of the arbitrary unless St. Louis abandons its effort to have it removed. East St. Louis at present enjoys an advantage of 20c. a ton in the coal freight rate, although it is a part of the St. Louis industrial district.

Charleston, W. Va.—What is regarded as one of the most successful meetings of the New River Coal Operators' Association was held here last week when about 30 members of the association were in attendance. The meeting was for the most part devoted to a review of conditions in the coal industry. No fixed policy was discussed or proposed by the various members. The association went on record as favoring the continuance of the West Virginia Association, but as believing and urging that the association ought to be conducted on a business basis and that it should devote its attention to only those things which affected the coal industry as an industry. All the officers of the association were present, C. C. Beury, president of the association, presiding. The other officers are S. A. Scott, vice president; Ernest Chilson, Thomas Nichol, H. M. Bertolet and G. H. Caperton, members of the executive committee.

New York, N. Y.—The Coal, Ice and Wood Division for the Borough of Manhattan of the American Red Cross Second War Fund received contributions of over $107,000 in the campaign just closed. Among the largest contributions were: Delaware, Lackawana & Western Coal Co., $35,000; Williams & Peters, $10,000; John Markle, $5000 in Liberty Bonds; Dickson & Eddy, $5000; Pennslyvania Coal Co., $7000; Peale, Peacock & Kerr, $2500; Pennsylvania Coal and Coke Co., $2000; Thorne, Neale & Co., $1500; Whitney & Kemmerer, $2000; Burns Bros. $2500. R. H. Williams, of Williams & Peters, was chairman of the committee, and M. F. Burns, chairman of the Coal Division. James A. Hill was chairman of the Wholesale Bituminous Committee; John A. Whitely, chairman of the Wholesale Anthracite Committee; George Eltz, chairman of the Retail Committee, and Thomas F. Farrell, treasurer.

MARKET DEPARTMENT

Weekly Review

Output Still Below Requirements—Distribution Plan for Anthracite and Bituminous—Mine Price Reduced—Freight Rates Increased—Coal Denied to Less Essential Industries

RODUCTION of bituminous coal during the first five days of the week ending May 18 exceeded the 12,000,000-ton rate. On Saturday, however, output fell considerably, bringing the total for the week down to 11,732,000 tons, which is slightly below what was produced during the preceding week. The estimated weekly production of bituminous coal needed to cover our 1918 requirements is 11,900,000 short tons. Basing calculations on this estimate, the total actual production of bituminous to May 18 is more than 25,000,000 short tons behind schedule. For the first time in many weeks no car shortage was reported from the Pocahontas and Connellsville districts. In other sections operators received cars to only 50 per cent. of capacity, while the Fairmont region reported 71 mines idle owing to lack of cars. Though the car situation evidences signs of improvement, it appears likely that the shortage of labor in the mining districts will tend to keep output below maximum. Anthracite shipments for the week ending May 18 totaled 40,011 cars, the best showing since Apr. 6 and an increase of 2244 cars over forwardings for the week ending May 11.

A distribution plan for the entire output of both anthracite and bituminous coal has been decided upon by the Fuel Administration. The entire available supply will be apportioned by geographical districts and states so that every section will receive the entire amount that can be devoted to its industries. The production of bituminous coal will likely fall considerably short of the necessary quantity, and no material increase in the output of anthracite can be expected during the present coal year. The distribution plan was pushed to completion in order that every section of the country might be informed as to its exact status in relation to the available supply of coal and attempt to adjust its needs accordingly.

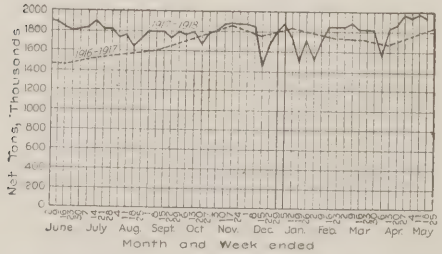
The reduction of 10c. per ton in the mine price of bituminous coal, and the order that all consumers are to pay the same price for their coal settled the long-standing controversy between the Fuel and Railroad Administrations. The net result will hardly show any effect in the gross tonnage; however, it will undoubtedly cause a more even output from individual mines. The increase in freight rates on both anthracite and bituminous coal will raise the cost to the ultimate consumer from 15 to 50c. a ton, but he will not grumble at that if he can only get all the coal he needs.

The Fuel Administration continues to deny soft coal to less essential industries which have not procured priority certificates. Preferred consignees, on the other hand, have learned that the filing of a statement of their last year's source of supply does not mean that the coal will immediately be shipped to them from the same mines. This is the case only when such requisitions do not conflict with special uses for certain grades. Byproduct industries, bunkering needs, plants where low sulphur coals are essential, and even domestic requirements, it is understood, will be given preferential consideration.

On the eve of "Coal Week" anthracite demand for all sizes continues to pour in. Dealers cannot fill orders of all customers even up to two-thirds of their requirements. Steam business is active, with buying for current needs and storage purposes going on actively. Railroads are now taking a large tonnage.

COAL PRODUCTION

The slump in loading on Saturday, after a good five-day performance, caused production during the week ended May 18 to decline slightly. The total production of soft coal (including lignite and coal made into coke) during the week of the 18th is estimated at 11,732,000 net tons, an average daily production of 1,955,000 net tons, compared with 1,971,000 net tons during the week of May 11. Beehive coke production



during the week ended May 18 is estimated at 678,000 net tons, an increase over the preceding week of 10,000 net tons or 1.5 per cent. The average production per working day amounted to 113,000 net tons, compared with 111,000 during the week of May 11.

Beehive Coke—Production of beehive coke in the Connellsville and adjacent regions declined slightly during the week ended May 18. The principal operators located in the Connellsville, Greensburg and Latrobe districts reported production of 318,605 net tons, or 69.2 per cent. of their maximum capacity, compared with 70.7 per cent. during the preceding week. The operators reporting had a hundred per cent. car supply during the past week and losses attributed to yard labor shortage declined from 19.4 per cent. during the week of May 11 to 14.4 per cent. Losses in potential capacity due to causes not reported, however, increased from 2.8 per cent. to 16.4 per cent. The same operators mined 129,950 net tons of coal.

Byproduct Coke—During the past ten weeks operating conditions in the byproduct industry have exhibited very little change. The ratio of production to maximum capacity rose from 87.5 per cent. in March to 89.6 per cent. on May 4, the maximum performance since the weekly statistics on byproduct coke were begun. Since that date the ratio declined to 89.2 per cent. the week ended May 11 and rose to 89.3 per cent. during the week of the 18th. Out of total losses of capacity of 10.7 per cent. during the week of May 18, 2.7 per cent. was due to lack of coal, 2.0 per cent. to labor trouble, 4.8 per cent. to repairs to plant, 0.3 per cent. to "no market" and 0.9 per cent. to all other causes. Material improvement, made possible by repaired plants, was reported by operators of New York State, the ratio of production to maximum capacity rising from 88.3 per cent. during the week ended May 11 to 93.7 per cent. Less favorable conditions, however, were reported by the operators of Alabama and West Virginia. In the former state the producing ratio declined from 91.1 per cent. to 88.3 per cent. and in latter state from 97 per cent. to 92.8 per cent., the decline in both states being due to repairs to plants. Minnesota alone continues to report loss of capacity due to "no market."

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended Apr. 27	May 4	May 11	May 18
Bituminous shipments, 123 roads.	204,527	202,558	207,145*	205,026†
Anthracite shipments, 9 roads...	39,522	40,570	38,767*	41,011†

* Revised from last report. †Subject to revision.

Anthracite shipments were reported as 41,011 cars during the week of the 18th, an increase of the week previous of 2244 cars, or 6 per cent.

BUSINESS OPINIONS

Dry Goods Economist—The restrictions in imports recently put into effect by the Federal Government have further increased the shortage of merchandise. This condition is accentuated by the continued demands on domestic output for Government and Red Cross purposes, as a result of the expansion of our forces and their necessary adjuncts. An important development of the week was the sale of 5391 bales of German-owned cotton by the Federal Alien Property Custodian. More than 100 agents for cotton mills attended the auction and prices averaged close to 28c. a pound, while about 300 bales sold for 29¼c. These prices, being considerably above the Exchange quotations, indicate that the cotton offered was above the Middling Uplands grade.

American Wool and Cotton Reporter—The uncertainties which have been noted in

the woolen goods market are still present, and while some believe that certain of the difficult problems will be settled in the comparatively near future, there are many who feel that they will not be settled at all, except over a period of time, and that no definite arrangement will be made for any of the unsatisfactory features now existing. It is becoming more apparent as each week passes that the amount of goods which will be available from any section of the producing industry will be relatively small for some time to come. Few feel that there will be any great shortage of raw material, but that the inability to operate all the machinery available, and other similar conditions, taken in combination with the large Government requirements, will practically eliminate the production of any large amount of civilian merchandise.

Bradstreet's—Tightening of conditions in nonessential lines, further speeding up of war work, excellent crop news, and reports that large distributors are selling all the goods they can get after Governmental requirements are satisfied, comprise the mainsprings of the week's events. Because of a paucity of supplies at a time when shelves are being cleaned out of medium-priced goods, as the result of heavy buying flowing from abnormally high wages, linked, too, with concern about the likelihood of being unable to cover future requirements, final purveyors are buying liberally and as often as opportunity offers.

Atlantic Seaboard

BOSTON

Tension relieved somewhat by settlement of railroad fuel question. Policy of district representatives becoming better understood. Car service varies in different regions. Central Pennsylvania output near maximum on present car and labor supply. Only "preferred requirements" got shipments the past week. Many dess essentials fail to grasp the situation. Hampton Roads dispatch excellent, but the great urgency is still for ships. Three large colliers now definitely assigned for railroad fuel. Coal for inland distribution not yet limited to preferred consumers. No "free" coal. Anthracite receipts improve on April figures, but still inadequate. Steam sizes in good request.

Bituminous—There has been so little favorable news of late that the President's action on the railroad fuel mix-up was received almost with acclaim, such hopes have been built upon an equitable distribution of cars. Undeniably the trade feels a slight easing up on the subject of contracts, particularly with operations in Pennsylvania, but it is hard to see how actual shipments can be materially increased in the aggregate. Whole groups of mines there are, especially where freight differentials have tended in normal times to discourage commercial buyers, that have had absolutely no cars for several weeks except for railroad fuel, and it is fair to suppose now that commercial business will now be undertaken, at least to a limited extent. A lot of such coal came forward a year ago on high prices and was readily absorbed by requirements that are now on the preferred list; but on the other hand the railroads will now be obliged to take fuel from operations that recently have furnished none. The net result will show hardly any effect on gross tonnage; it will probably mean only a more even output from individual mines.

The 10c. horizontal reduction causes no comment whatever, it being viewed as a solace to the railroads. Buyers here are not at all interested in price; they are ready to buy coal in any direction by rail or water. Operators can be thankful that their net margins are so little disturbed, for had the railroad interests prevailed there might well have been such a reduction on output as a whole as might seriously have diminished production.

The Fuel Administration continues ruthless in denying coal to "less essentials." Shipments by the train-load have been diverted from paper manufacturers, for instance, who are engaged exclusively on goods for the Government; but apparently there is no redress unless and until the consignees are definitely granted priority certificates. There begins to be an attitude of resignation toward these wholesale reconsignments, although now and then there is a cry, "How long?" So far there is no sign of any change in the instructions of May 15.

Taking last week as a whole, car-supply showed a slight improvement, but different districts showed such variation a general statement is apt to be misleading. The territory tributary to the Baltimore & Ohio and the Western Maryland continues to suffer most, in some sections the shortage being in excess of 50 per cent. Open-top equipment is now withheld from all-rail service to New England on account of congestion due to shortage of locomotives. Box-cars with coal are allowed to come through, but the tonnage is necessarily so light that large industries looking to these districts for supply are beginning to despair. Similarly, the gas companies who depend upon the Pittsburgh region are much alarmed over the outlook there. Large consumers are being told their shipments are likely to diminish rapidly, since traffic conditions are so favorable to movement west. In the Fairmont district 71 mines were recently idle for lack of cars. The effect upon labor is serious.

In central Pennsylvania car-supply is not so far in arrears, taking into account the shortage of labor. The best opinion is that with the number of mine workers available and at what is now their average working time the whole district would be put to it to load 200 or 300 cars more a week, if they could be furnished. The average weekly output is a round million tons.

The smokeless regions in West Virginia continue to show the effect of "zoning" and the volume to the piers is fairly heavy. For what ships report the dispatch is excellent, steamers seldom being detained beyond the time necessary. The joint pooling arrangement is of great assistance, but the need of ships to speed up deliveries to this territory is still most urgent. A few of the lake-built steamers have now discharged their cargoes of Cape Breton coal and are arriving at Norfolk to begin regular service. Now and then a new ship like the "Tuckahoe" makes its appearance, but the number of bottoms is entirely too small to make up the arrears that stare us in the face. From Hampton Roads New England shipments since April 1, up to and including May 26, were 1,451,920 tons. When it is figured that 1,500,000 tons per month were estimated as necessary from Hampton Roads from April to October to give New England any reserve for cold weather he who runs may read what is in store for us.

Three steam colliers, the "Hampden," the "Transportation" and the "Coastwise" are now definitely in the coastwise service to carry fuel for New England railroads. Under favorable conditions these ships would together bring 800,000 tons a year, practically all of it from Baltimore piers.

Thus far there has been no effort on the part of fuel authorities to restrict the distribution of water-borne coal to preferred consumers either inland or directly on tidewater. It seems only a matter of days, however, when distribution will again have to be rigidly supervised, now that large numbers of consumers are cut off from service all-rail.

Persistent inquiry from buyers still outside the breastworks fails to disclose any "free" coal. While existing "contracts" can hardly be considered binding, yet those factors who consider themselves morally committed and have regard for their reputation are increasingly shy of additional business. That will be their attitude at least until more transportation is in view. The tremendous demand for over-sea bottoms now that our troops are crossing in such numbers is an element in the situation that must be taken into account.

All-rail movement remains on about the same level that has prevailed since Apr. 1. The average for May up to and including the 24th was 479 cars of bituminous passing the five gateways. At this rate the 1917 figures will be materially cut. To maintain 10,000,000 tons per year the average would have to be 617 cars daily. It will be interesting to see the result in June in view of the decision on railroad fuel.

The railroads take different views with regard to paying purchasing agents commissions. There have been recent instances both ways, the desire to keep a safe margin, however, being a consideration in some cases where the commission was paid. One of the larger roads is making frequent drafts upon commercial coal arriving for distribution and another is picking up from limited storage, the usual practice being to take current supply directly from cars. Stocks therefore are materially less than a fortnight ago.

It has lately been announced that questions of railroad fuel will not be handled by state administrators, but should be taken up direct with Washington where a new office has been established for the purpose. New England engine supply is so mercurial it will be interesting to see how this plan works. It probably means more "emergencies," and therefore greater interference with well considered plans of distribution by representatives of the fuel administration on the ground.

Anthracite—At a recent conference in Philadelphia between fuel administrators of the New England states and members of the Anthracite Committee it was "agreed" that 1,250,000 net tons per month domestic sizes would be furnished this territory. During April the receipts are computed to have been 950,000 net tons and while May is going to show an increase the total will be nine hundred thousand tons below the mark set. Rail movement shows a falling off recently, but water shipments are holding up fairly well. The companies are adhering closely to the 1916 distribution thus far, although the program is sure to work hardship to a number of communities where through war industries the population has increased by leaps and bounds.

NEW YORK

Anthracite receipts far below requirements, with dumpings reduced. Coal men watch efforts made to stock New England. Buckwheat coals in good demand with supply quickly absorbed. The bituminous situation active because of price reduction, settlement of railroad controversy and advance in freight rates. Dumpings for week show decrease.

Anthracite—Receipts continue to be far below requirements, as is evidenced by the reports of the number of cars dumped at the various local piers during the week ended May 27. These were 6205 cars as compared with 6346 cars in the previous week. Reports for the week ended May 18 show that 41,011 cars were shipped to market as compared with 38,767 cars the week ended May 11, an increase of 2244 cars, or 6 per cent.

Conditions are not favorable, and many complaints are heard of slow shipments. Few dealers can boast of much tonnage in their yards, while most of them lay claim to having at least enough orders on their books to keep their help busy for the next six months.

The order of the Anthracite Committee of the Fuel Administration of May 24 following a conference with the New England Fuel Administration that for the month of June a domestic tonnage amounting to one-twelfth of the shipments into New England during the coal year beginning Apr. 1, 1916, plus 50 per cent., shall be sent forward, caused some uneasiness here, the fear being expressed in some circles that this market is being slighted. It also resulted in new efforts being made to urge the appointment of a successor to Albert H. Wiggin, who resigned as State Fuel Administrator, several weeks ago.

Cyrus C. Miller, administrator of Bronx County, has notified Dr. Garfield that 1,451,250 tons of coal will be needed in that county during the coal year beginning Apr. 1, 1918.

The order of the Railroad Administration ordering increases in freight rates results in an advance of 30c. per net ton ton of 2000 lb. on coal; brought to this market. The trade was surprised at the largeness of the advance granted in view of the recent increase of 15c per ton. The advance does not become effective until June 25.

The local situation is far from satisfactory. Consumers are anxious about their winter fuel and the dealers are powerless to help them. The larger sizes, egg, stove and chestnut, are in good demand, with pea a trifle easier.

The buckwheat sizes are in good demand. The larger of these coals is moving freely, buyers being numerous and anxious to pick up free tonnages. The better grades of rice and barley are hard to find, while most consumers are just as anxious to pick up the cheaper grades.

Bids opened last week by the Department of Docks and Ferries for 71,100 gross tons, two-thirds buckwheat No. 2 and one-third semi-bituminous, resulted in prices of $7.39 and $7.59 per ton, the latter price being made where it was provided there should be a reserve stock of several thousand tons on hand at all times.

Another city department had the following prices submitted in a bid: 6000 tons buckwheat No. 1, $7.66 per ton; 12,000 tons buckwheat No. 2, $7.10; 500 tons pea coal, $8.06; 500 tons egg coal, $9.44; 1500 tons broken, $9.60; 4000 tons semi-bituminous, $7.80; 250 tons nut, $9.44, and 250 tons of stove, $9.44.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.55	$7.30
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	3.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	

The Labor League of New York City, at a meeting held in the City Hall on May 24, adopted resolutions "that we emphatically insist upon the coal dealers of this city being compelled to secure and store coal to meet the requirements of the people of this city next winter."

The resolution stated that the local dealers are apparently not doing everything necessary that could be done to prevent a recurrence of the conditions existing in this city last winter, and that "it is practicable and possible for the mines to be operated and arrangements made with the Government to transport coal during the summer months."

The resolutions also recommend that the dealers ascertain the actual amount of coal needed to fill the requirements of all the people of the city "in a long and cold winter similar to the extraordinary conditions which prevailed last year and in previous years," that the Mayor's Committee should then ascertain if the coal dealers have sufficient storage facilities for keeping the coal on hand, and if the dealers are willing and ready to secure the coal now and have it ready for delivery to their customers during the winter months. The resolutions also provide that after storage places are secured the matter of securing the coal be immediately taken up with the Federal authorities, so that the mines will be furnished with a sufficient number of cars for the carrying of coal to this city, and that "in the event that the mine owners are not willing to mine the coal and the coal dealers are not willing to store it, we demand that the city through the Mayor's Committee, purchase the coal and have it on hand for every emergency."

Bituminous—There was considerable activity in the situation last week although receipts were far below requirements. The reduction of 10c. per ton from the mine price, and the order by which all consumers shall pay the same for their coal, settled the long standing controversy between the Fuel and Railroad Administrations and eases the minds of many operators who have been waiting for some such ruling for many weeks. While the order results in a lower price for the producer, he is apparently satisfied because there is going to be an equitable distribution of cars which means steadier work and a larger output. On the other hand, some operators say that with labor short they will have difficulty in loading many more cars than formerly.

The increase in freight rates to become effective June 25 means an advance of 40c. per ton on New York tidewater shipments. Consumers are expected to take kindly to the new price they will have to pay for fuel.

Dumpings at the local docks for the week ended May 27 were 6295 cars as compared with 6625 cars the previous week, a decrease of 330 cars, while the shipments for the week ended May 18 were reported as 205,026 tons compared with 207,145 tons during the previous week, a decrease of 2119 tons.

The Tidewater Coal Exchange has eliminated five pools at this port, assigning Pool No. 15 to Pool No. 14; No. 22 to No. 9; No. 23 to No. 11; No. 24 to No. 18 and No. 47 to No. 18.

Stocks are low and free coals continue scarce. Bunker coals are in good demand.

PHILADELPHIA

Anthracite deliveries unimproved. Shippers can give no promises. New England being favored. Estimated needs far in excess of production. Non-dealer shipments increase. "Coal Week" idea ridiculed by dealers. City bureaus urged to buy at once. Buckwheat exemption order being obeyed now. Bituminous situation displays slight improvement. Car supply better. Some concerns stocking fair tonnage. Price reduction will not surprise. Some contracting, with new forms in use.

Anthracite—Shipments into this territory are not increasing, and as the season advances the dealers and their trade are becoming more anxious. The bulk of the coal that is being received is consigned to the regular buyers, who have always depended on the larger shippers for their supplies. During the season of 1916-17, which is now being used as a basis for all shipments, there were thousands of tons shipped to other than the old line of buyers. Each dealer who had a car shipped during that period seems to be able to trace it to its source and is claiming at least the same tonnage now, but those who bought spasmodically or in small lots have thus far received scant attention. Some shippers claim that it is this class that is becoming most insistent for coal. It is not that any shipper declines to fill such orders, but they take the stand that they do not have the coal now and will endeavor to cover this tonnage later in the season.

Much disappointment has been expressed by the local dealers, who had expected an excess of tonnage for May over their alloted proportion. They had laid great hopes on this eventuality, owing to the fact that several of the larger companies had shipped them quite liberally in April. During the last week of the month just past any number of local retailers failed to receive a shipment from the big companies. They were candidly advised that they had received their proportion for May and were not at all likely to receive any more coal during the month. As a consequence many of them had their equipment idle.

Recently retail shippers have been inclined to criticize the rapidly growing practice of fuel committees in outlying sections in granting permission to various individuals to receive carload shipments. It will be remembered that the national administration had decreed the elimination of this practice except with the approval of local authorities in each instance. Recently the committees have taken the stand that such shipments are permissible where the buyers had made similar purchases in 1916, but are compelling the shipments to be made in care of retail dealers, who thereby get the hauling. However, the claim has been made recently that even this restriction has not been deemed necessary, and that persons with some influence have been able to obtain shipments without the necessity of having the coal sent in care of a dealer.

The wisdom of designating the week of June 3 as "Coal Week," when the public is expected to file orders for the coming fall and winter, is being severely criticized or referred to as a joke by the retailers here. Certainly this part of the trade needs no artificial stimulation. There are many who have far oversold their quota, and certainly none who with slight effort could not do so.

This week the state and local fuel administrators urged the city officials to endeavor to purchase early a large proportion of the coal needed by the municipal institutions for next winter. Messrs. Potter and Lewis, chairmen of their respective committees, have asked the city's director of supplies to lessen the red tape surrounding contracts let by the city, in order to expedite deliveries of coal. At the same time the city authorities were urged to make payment for fuel promptly, as often payments are considerably in arrears. While in usual times shippers were inclined to overlook this condition, yet at this time there is a decided disinclination to ship to any one where payment is not forthcoming within a reasonable period.

As to the relative sizes among the dealers there still continues to be no favored size. The situation is simply one of eagerness to get coal of any size, and no yard in the city has a stock of any kind of coal on hand. The consuming public undoubtedly has a preference as to size, but there is no difficulty whatever in having the customer change the size on request from the dealer to conform to such shipments as he may have at the moment.

The latest evelopment in the steam trade is the fact that the larger companies are now asking their customers using buckwheat coal to secure exemptions from Washington in accordance with the instructions issued by the anthracite distribution committee almost a month since.

The prices per gross ton f. o. b., cars for line shipments and f. o. b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5.70	Rice	2.65	3.65
Stove	4.75	6.05	Boiler	2.45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—It continues to look as if there is a continued improvement in the car supply, with a consequent increase of tonnage shipped to the city recently. Aside from the utility plants we are now able to notice other industrial enterprises which are beginning to accumulate some stocks of fuel in excess of current consumption. This is far from a general condition, but the signs are at least encouraging. Operators state that the labor supply is far from satisfactory, and signs of unrest among the men cause many anxious moments to the shippers.

Recently some shippers have closed contract business with big consumers, especially with trade they have not heretofore served very heavily, but who are among the most necessary and vital consumers. The idea appears to be that this business must be taken care of in any event. Most shippers have now received the approval of the new contract forms, the principal change being an insertion of the Garfield order of Dec. 24, 1917, bearing on the contract business.

BALTIMORE

Diversions of coal continue to make the bituminous situation here fairly easy, except on Pennsylvania line points. Hard coal men see big shortage ahead, and consumers are getting uneasy.

Bituminous—Through diversions of coal at junction points to the west of here, fuel for the most part originally destined for the Storrow account in New England, this section continues to receive a fair supply of bituminous coal. As the coal arriving here on direct consignment is confined practically to the preferential delivery list and for Government account, such as shipping, a serious state of affairs would exist for the less essential industries were it not for the diversions named. The various Government committees at Cumberland and nearby points are working hard to prevent any freight jams at the junctions, and whenever there is any evidence of congestion blocking progress on the northern connections the coal is at once rerouted through to this section and to the Washington district before it reaches the Cumberland scales. This method has kept the Baltimore & Ohio and Western Maryland lines pretty well open on direct shipment, and meanwhile the shipments have benefited consumers here. There is still complaint, however, from those consumers on the Pennsylvania who were cut off under the zone plan and who for the most part have found it impossible to make any new supply connections on the Baltimore & Ohio and Western Maryland lines. The Fuel Administrator and his committee here have been called upon repeatedly and have managed to keep these concerns going for the most part, although there was one shutdown reported the past week.

Anthracite—The more the hard coal men here delve into the prospects for the coming fall and winter the more convinced they are that a big shortage will be faced here. The trade is now engaged in compiling figures to show the amount of tonnage distributed so far, the amount of coal in yards, the immense increase in ordered tonnage, etc. These are to be carried to Washington by the local fuel administrator to prove that unless there is a decided increase in deliveries here the trade will not only fail to deliver the two-thirds on orders before fall, but the winter will be faced by many without sufficient supplies to carry through. The trade here has joined in with the general request of coal men that the administration in Washington stop urging people to insist on immediate deliveries of coal that is not here to distribute. The trade does not object to placing orders on the books, but the consumers are not satisfied, in the face of Government urging, to await deliveries, and many warm arguments are taking place. The National Fuel Administration urging has undoubtedly placed the retail hard coal trade in an unfortunate position.

Lake Markets

PITTSBURGH

Operators not enthusiastic about 10c. reduction. Car supplies better. A fair amount of stocking by consumers.

Pittsburgh coal operators have not enthusiastically approved the reduction of 10c. a ton in bituminous coal prices which went into effect at the beginning of this week, not only as to new sales but also as to deliveries, no matter when the contract was made. A few operators assert that they have been making practically no money. At the same time it is generally recognized that the 10c. reduction represents a compromise, the Fuel Administration having proposed a 20c. reduction to equalize with the fact that the railroads are to pay the full set prices instead of the much lower prices proposed by the Railroad Administration.

The wording of the official statement, that there will be no further changes in coal prices until costs for the 12 months ending Aug. 31 have been studied, suggests that the Fuel Administration has no thought of making any advances in future but has hopes of finding a basis for reducing prices further. All the operators, of course, are making much better cost showings than in the winter.

Car supplies in the Pittsburgh district have undergone some further improvement and are now fairly satisfactory. There is some shortage of labor, this being more noticeable than when operations were so much curtailed by car shortage, and fears are entertained that men will not be so eager to work now that there is less idleness enforced by lack of cars. Operators feel

that the men should work longer hours per week than those prescribed in the scale as minimum.

More coal is being stocked by the large consumers than formerly, and all show a willingness to stock to the limit of their ability, a willingness that will now be enhanced by the 10c. reduction in price. The majority of observers, however, believe that the rate of stocking thus far has not become high enough to insure that consumers will be carried through next winter without difficulty.

A moderate amount of coal is being sold in the open market, and the proportion that passes through brokers, with an extra brokerage charge to consumers, is somewhat reduced. Many brokers, however, are having a fair turnover from week to week. With the 10c. reduction, effective at the beginning of this week, the set prices are as follows: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, subject to 15c. brokerage in addition in the case of sales made by brokers.

TORONTO

Supplies of anthracite coming forward freely. Dealers filling winter orders. Bituminous scarce. Fuel Administrator advises dealers to order all they can. Wood as substitute fuel.

Supplies of anthracite are coming forward freely and the dealers are now filling winter orders, but owing to consumers having placed these earlier in the season than usual, there are large arrears to be overtaken. Shipments by water have so far been considerably smaller than during previous seasons. There is a marked shortage in the supply of bituminous, which is much in requisition. R. C. Harris, Fuel Administrator for Ontario, is advising dealers to place orders for all the coal they can, and expresses the opinion that owing to war conditions the supply will fall far short of meeting the requirements of consumers. He urges the municipalities to arrange for wood supplies in sufficient quantity to make good any deficiency.

Quotations for best grades per short ton are as follows: Retail anthracite egg, stove, nut and grate, $10; pea, $9; bituminous steam, $8.50; slack, $7.50; domestic lump, $10; cannel $13. Wholesale f. o. b. cars at destination, three-quarter lump, unprepared, $6.11; prepared, $6.31; slack, $5.18.

BUFFALO

Would be plenty of coal but for car shortage. Jobbers find it hard to keep going. Anthracite moving steadily by Lake. Local supply light.

Bituminous—The change in the situation is mostly due to lack of cars. Nobody seems to have a supply, and some of the mines get none at all some days. An increased amount of bituminous is moved in box-cars and yet the shortage grows. If the scarcity gets much worse it will be impossible to meet the most ordinary demands. At the same time the anthracite movement is at least normal, but that trade is allowed to use box-cars freely. Some of the lake shipping docks here now have box-car unloaders, so that they can move coal as well that way as by dumping.

The new order reducing the prices of bituminous 10c. a ton is not well understood here yet. It will reduce the following quotations by that much, if regularly effective: Allegheny Valley thin-vein, $4.45; Pittsburgh lump, $4.25; Pittsburgh mine-run, $4; Pittsburgh slack, $3.75, all per net ton, f. o. b., Buffalo.

Anthracite—The movement is fairly large. An average amount by lake is now going out and it does not appear to affect the local supply seriously, which means that the leading companies have diverted the usual amount from the eastern trade and that the upper lakes will get their regular supply. The city consumers are not making such feverish demands for coal as they were before the early warm weather set in, and it may be that they will soon find that they are getting enough to warrant the expectation of a full supply in good time.

Canada does not appear likely to slacken her demand for coal. In spite of the big supply of bituminous there and the advice to lay in some of that for emergencies, the retailers and consumers still beset the shipping offices here about as they did during winter.

Shipments of anthracite by lake for the week were 104,300 tons, of which 41,300 tons cleared for Chicago, 34,400 tons for Duluth and Superior, 10,800 tons for Sheboygan, 7500 tons for Green Bay, 4500 tons for Milwaukee, 3300 tons for Marquette and 2500 tons for Hubbell. Freight rates are 60 and 65c. to Chicago, 50c. to Sheboygan and Green Bay, 48c. to Duluth and Marquette, 55c. to Milwaukee and 45c. to Hubbell.

DETROIT

Diminishing receipts of bituminous and anthracite cause anxiety. Margin to retailers yet unchanged. Lake shipments not heavy.

Bituminous—Jobbers find that while there is a comparatively free movement of bituminous coal into Detroit, the shipments are largely of mine-run, and that other sizes are coming in in small amount. Users of steam coal with plants adapted to consumption of mine-run are having little difficulty in providing for their requirements. Those who are accustomed to use slack, nut or pea sizes find it less easy to obtain the coal they desire. The demand from consumers of steam coal continues steady and is well maintained.

There is a noticeable deficiency, jobbers say, in the supply of domestic sizes of bituminous. Household consumers are not yet buying heavily, however, while the controversy between Detroit dealers and W. K. Prudden, Michigan fuel administrator, in reference to what constitutes a just margin of profit on domestic coal delivered during the summer, is apparently reflected in a curtailment of deliveries by the dealers. The state fuel commissioner has not yet made known his decision as to a recommendation submitted by the Detroit Board of Commerce asking that a margin of $3 a ton be allowed on bituminous and $2.50 a ton on anthracite. Meanwhile the margin of $2.50 a ton, previously fixed by Mr. Prudden as applying to all domestic coal, remains in effect. Retailers insist their costs range from $2.14 to $2.45 a ton in handling domestic coal, and some of them assert they will go out of business if the margin of $2.50 is maintained.

Anthracite—Incoming shipments of anthracite are not increasing. Records of the secretary of the Detroit and Toledo railroad committee show that the daily average receipts of anthracite since May 1 have been 36 cars, a large drop from the daily average of 56 cars in April. Points in Michigan outside Detroit also show a reduction in supply, the daily average for the state, outside Detroit, amounting to 51 cars this month against 58 during April. Many household consumers who have been endeavoring to provide their winter supply find dealers unable to deliver the coal and declining to book orders for future delivery.

Lake Trade—Shipments of coal by the lakes have considerably diminished since the opening of navigation. The supply arriving at loading docks is not sufficient even for loading ships under carrying contract. Many are going up without cargo.

COLUMBUS

Continued good demand for steam and domestic grades is the chief feature of the Ohio trade. Lake trade is progressing satisfactorily.

Under the influence of a better car supply, excepting on some eastern Ohio railroads, production in Ohio fields has been increased during the past week. In eastern Ohio there is still a shortage in cars and the output is consequently restricted. Demand is good for both domestic and steam grades and little is on the open market. On the whole the tone of the trade is good and prospects are for a continuation of the active conditions.

The lake trade is one of the most active departments of the industry. Every lake shipper is hurrying a large tonnage to the lower lake ports for shipment to the Northwest. The vessel movement is good and as a result there is also a good ore movement. Ice is now all out of the straits and upper passages and there is no interference of that nature. Lake prices are firm at former figures, and the recent reduction of 10c. on the ton will not affect lake coal as practically all has been contracted for at original quotations. Some delay in getting permits from the Ore and Coal Exchange has caused a slow movement in certain thin-vein regions. The lake pool officials are insisting that both thick and thin vein prices be the same.

Domestic trade is active and dealers are busy making deliveries. Retail stocks are not large and every effort is being made to increase them. Householders are buying liberally, even if they cannot get the customary grades. There is little Pocahontas coming into the Columbus market. Considerable West Virginia splint is arriving, however, to make up the deficiency of Pocahontas. The greatest part of the tonnage sold in the domestic trade comes from Hocking Valley and Pomeroy Bend mines. Retail prices so far have not been affected, but a general reduction of 10c. to correspond with the change in mine price is expected.

The steam business is active to the extreme. Buying both for current needs and for storage purposes is going on actively. The larger users have some surplus stocks and are buying rather liberally. Smaller users are increasing their surplus where they have available storage space. Railroads are taking a large tonnage, especially from eastern Ohio mines.

Production is active in most districts as the car supply has been good. This is especially true of the Hocking Valley where the output is estimated at 90 per cent. of normal. In the Pomeroy field the percentage is about the same. In Cambridge and Crooksville production is estimated at 80 to 90 per cent. of normal. Eastern Ohio is still hampered with a shortage of cars and the output is about 65 per cent. of normal.

CINCINNATI

Maximum activity continues in distribution of coal, and dealers' stocks are therefore not rising. Larger receipts would be welcome, but car supply limits shipments.

Deliveries of coal against orders by consumers for storage are continuing at an unprecedented rate, and are limited only by the delivery facilities of dealers on the one hand and the amount of coal available on the other. Receipts are not all that could be desired, especially in view of the increasing volume of shipments to the Northwest, and indications are that unless the car supply increases so as to permit larger production and shipments, not much improvement in the local situation can be expected. However, the trade feels that much has been accomplished in securing orders for so large a proportion of next winter's local requirements, and that even if there should be a shortage next winter it will not in any case affect consumers as severely as they were affected last winter. The storage of coal by industrial consumers is as marked as that by domestic consumers, the accumulation of large quantities of fuel, which are piled in heaps outdoors, is going on at many manufacturing plants in and around Cincinnati. With the continuation of this movement during the entire summer, it is certain that consumers in all classes will start the fall and winter with more coal on hand than ever before.

LOUISVILLE

Second draft is further reducing labor supply, resulting in greater difficulty in operating mines to capacity. Car supply fairly good. Demand for domestic coal good. Steam coal still little draggy.

The greatest obstacle to satisfactory movement of coal during the past month has been the general shortage of labor, which has made it practically impossible for the large mines to operate at anything like capacity in spite of the fact that the demand is good and the car supply fair. Although coal prices have suffered some reductions since stocking up began, few complaints are being heard by the retailers concerning the fact that they paid more for next winter's coal than the present price.

The retail trade is receiving many inquiries for terms on coal stocked for next winter, buyers claiming that it is impossible for them to lay down the case or take care of the bill within 60 days. However, mines are paying off every two weeks, and expect prompt payment from the coal dealers, with the result that they are not in position to grant long terms on winter stocking.

In eastern Kentucky the labor situation is the worst factor, as a good supply of cars is being received. In western Kentucky the mines are operating nearer to capacity than for some time past, but are having more difficulty in obtaining cars than is the case in the eastern section of the state.

The numerous wagon mines which have been operating both in eastern and western Kentucky have been demoralizing labor to some extent. A great deal of good labor is working in these mines, where production cannot begin to compare to that of the large mines in comparison to the actual number of men employed. However, the high price of coal and the profits that are being derived from its sale has enabled hundreds of these little mines to operate, and take labor that would otherwise be producing much more coal in mechanically operated mines.

BIRMINGHAM

Demand strong and steady in the local market. Storing of domestic coal is keeping a satisfactory pace with receipts, which are still much restricted. Distribution of steam-coal supply causes distributing agencies much worry and work. Output shows little betterment.

Domestic consumers continue to evince much interest in acquiring their coal supply for another year, and the demand on dealers is unabated. Records of the Jefferson County Fuel Board show that 16,398

tons of coal passed into the bins of consumers during April, the first month of the coal year, which, in the face of the estimated local yearly requirements of 300,000 tons, might not be considered in an optimistic light but for the fact that in the past storing during the spring and summer months has been very light and the impetus given to the movement this year is gaining force and will likely only be impeded by two factors—financial inability on the part of the consumer and light receipts from the mines. Dealers have contracts and promises for approximately 100,000 net tons of the estimated requirements of 300,000 tons for year ending Mar. 31, 1919.

The distribution of steam coal, on account of the inadequate supply and priority regulations, is proving a vexatious problem, and many industries are unable to operate on a satisfactory basis due to lack of fuel, among which brickmakers are probably the most important. Contractors on the local Federal postoffice are understood to be facing a suspension of work because they cannot get the brick contracted for and which the manufacturers are unable to burn for lack of coal. The Southern Ry. priority order for the current week called for 51 per cent. of the output of operations on its lines in this district, being increased from 46 per cent. for the previous week.

Reports from producing districts are not optimistic as regards increased production. Mine workers continue to absent themselves from their work to an alarming extent, which is proving disastrous both to coal production and coke manufacture.

Coke

CONNELLSVILLE

Labor shortage more in evidence with car supply better. Blast furnaces almost completely supplied with coke.

The visible influence limiting coke production in the Connellsville region is shifting from car supply to labor supply. A number of operators report that on some days they have not sufficient labor to load all the cars furnished, but evidently this means that car supply has increased rather than that labor supply has decreased. Shipments on the whole are increasing slightly from week to week. There are no serious complaints by blast furnacemen of coke shortage, and nearly all the furnaces appear to be well supplied and to be getting out their maximum production of pig iron. There have been a few cases of furnaces asking operators to curtail shipments on contracts. There is a rather limited demand for coke in the open market and operators display some fear that free offerings in the open market would tend to depress prices below the set maximum. Doubtless such fears are well founded, for coke is a particularly difficult commodity to sell when there is not an active demand. While the Connellsville producers may be able to regulate the supply to requirements for the time being, there is a question what will occur when various byproduct plants are put in operation in the next few months. Including the Cleveland plant of the Steel Corporation, which began operations in part three weeks ago, the new byproduct capacity to come in by the end of September promises to represent about 100,000 tons of coke a week. While this will be chiefly by the Steel Corporation, which will merely curtail its production of beehive coke, it will represent the release of some men as well as of some railroad facilities.

The market remains quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1-in., $7.30, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 18 at 343,270 tons, an increase of 2160 tons.

Middle Western

GENERAL REVIEW

Labor situation serious; another coal famine predicted unless remedy is applied soon.

Mines in all sections of the country report a growing shortage of labor. In some localities where cars are to be had there are not men enough to load out the supply. Although cars continue to be short in various sections, nothing has so absorbed the attention of coal operators during the past week as has the labor problem. One of the principle causes for worry is the indifference of the miners and their desire to throw mines idle on the least provocation. For instance, in any locality where soldiers are leaving on certain days for cantonments the miners declare a holiday and do not report for work. This practice has been freely discussed for some time, but the miners refute all statements by saying there were plenty of men to load all the cars that were to be had and that the mines could not work full time because of the car shortage. Union officials are working hard to remedy the situation.

The car supply has shown some improvement during the past week on many of the large coal-carrying lines. However, some roads continue to be seriously handicapped on account of congestion at the terminals. The demand for domestic size coal continues to be active and householders express a willingness to put in all the coal the dealers will deliver.

CHICAGO

The demand far exceeds the supply; dealers unable to accumulate any stock.

The same condition that prevails throughout the country affects this market. While fine coal has been soft during the past week, there has not been anything like a sufficient supply of lump, egg and nut to take care of orders reaching the dealers. The fact that no coal is being stored confirms the statements that users are taking all the coal that reaches this market. In fact buyers are becoming restless because they cannot get coal as fast as they want it.

Quotations in the Chicago market are as follows, per net ton f. o. b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will
Steam lump	$2.65@2.80	$2.65@2.80	$3.05@3.20	$2.65@2.80	$2.65@2.80	$3.35@3.50
Domestic lump	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Egg or furnace	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Small egg or nut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Stove	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Chestnut	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	3.35@3.50
Pea	2.65@3.00	2.65@3.00	3.05@3.20	2.65@3.00	2.65@3.00	.....
Washed egg	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed stove	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Washed nut	2.85@3.00	.....	.....	.....	2.85@3.00	3.35@3.50
Mine-run	2.45@2.60	2.45@2.60	2.85@3.00	2.45@2.60	2.45@2.60	3.10@3.25
Screenings, over 1 in.	2.20@2.35	2.20@2.35	2.45@2.60	2.20@2.35	2.20@2.35	2.85@3.00
Washed slack	2.15@2.30	2.15@2.30	2.50@2.65	2.50@2.65	2.15@2.30	2.85@3.00

	Clinton and Sullivan	Knox and Greene	Eastern Kentucky
Domestic lump	$2.65@2.80	$2.65@2.80	3.10@3.25
Steam lump	2.65@2.80	2.65@2.80	3.10@3.25
Egg	2.65@2.80	2.65@2.80	3.10@3.25
Small egg or nut	2.65@3.80	2.65@2.80	3.10@3.25
Mine-run	2.40@2.55	2.40@2.55	2.85@3.00
Screenings	2.15@2.30	2.15@2.30	2.60@2.75

MILWAUKEE

Coal business slow and unsatisfactory. Small dealers have no coal to deliver and consumers are awaiting the summer price schedule. Cargo receipts not up to last year's volume.

The coal situation at Milwaukee is unsatisfactory at the present time, and there is little likelihood that it will be any better until the summer price schedule is announced and dealers are in position to make deliveries. Consumers are slow in booking orders for hard coal, as they know there is not much on hand and they feel that it may be to their advantage to wait. Most of the coal dealers in Milwaukee carry no stocks, but rely upon the dock companies to furnish them with supplies as needed. Thus far the leading dock company, which serves fully 90 per cent. of the small dealers, has received only one cargo of hard coal, and that a very small one; hence all these dealers are practically out of business for the time being.

Cargo receipts up to and including May 25 aggregated 386,835 tons, of which 65,148 tons were hard coal. That slow rail service from the mines is hampering shipments is evidenced by the fact that a 10,000-ton steamer arrived this week with only 4500 tons, preferring to come up with that amount rather than wait for more cars. In May last year Milwaukee received 436,016 tons, of which 63,553 tons were hard coal.

ST. LOUIS

Too much demand for high grade and not enough demand for low grade coal. Railroads still holding off and steam users not storing. Car situation improved on only one road. Domestic consumers continue to hold out for the best, which they cannot get, in preference to the second best, which they could get.

With the railroads buying only what they were compelled to have, and steam users refusing to store, and domestic consumers ordering high grade which they cannot get, at least for some time, and refusing the low grade, of which there is an over-supply, and the mines capable of supplying more even under conditions of car and labor shortage, the demand for Carterville is sustained and the prices unchanged and that for Standard is weaker, with none of the sizes except 6-in. lump bringing the Government prices.

The shortage of cars in the Carterville and Duquoin districts continues, and the scant supplies of coal from those fields received here are used in filling orders that were filed weeks ago. New orders for high grade coal are being received and filed faster than old ones can be filled. Some domestic consumers when told how long they will have to wait for the filling of their orders agree to delivery of low grade, but to most of them winter seems a long way off and they say they will wait. Pressure is being brought to bear by publicity and otherwise to induce them to accept the coal that they can get.

Conditions are approximately normal in the Mount Olive field. In the Standard field there is no improvement in the car supply except that the Louisville & Nashville is in somewhat better shape.

Steam users are doing little storing. They make the excuse that low grade coal deteriorates in storage. In fact the deterioration in six months is slight, but even if it were considerable, the loss it is suggested, would not be as great as if, next winter, a shutdown were necessitated by fuel famine.

The announcement of a reduction of 10c. a ton in the mine price caused an immediate decline in the demand, in the expectation that other reductions might follow.

The circular here is, per net ton f. o. b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.65@3.00	$2.65@2.80	$2.30@2.40
3x6-in. egg	2.65@3.00	2.65@2.80	2.30@2.40
2x3-in. nut	2.65@3.00	2.65@2.80	2.30@2.40
No. 2 nut	2.65@3.00	2.65@2.80	2.30@2.40
No. 3 nut	2.65@3.00	2.65@2.80	2.30@2.40
No. 4 nut	2.65@3.00	2.65@2.80	2.30@2.40
No. 5 nut	2.15@2.40	2.15@2.35	1.50@1.65
2-in. scrgs	2.15@2.40	2.15@2.35	1.50@1.65
2-in. lump	.....	.....	2.30@2.40
3-in. lump	.....	2.50@2.65	.....
Steam egg	.....	2.35@2.50	2.30@2.40
Mine run	2.45@2.60	2.45@2.60	2.00@2.15
Washed:			
No. 1	2.65@3.00	2.65@3.00	2.65@3.00
No. 2	2.65@3.00	2.65@3.00	2.65@3.00
No. 3	2.65@3.00	2.65@3.00	2.65@3.00
No. 4	2.65@3.00	2.65@3.00	2.65@3.00
No. 5	2.15@2.30	2.15@2.30	2.15@2.30

Williamson & Franklin Co. rate is 87½c.; other fields, 72½c.

General Statistics

NORFOLK & WESTERN

The following tabulation shows the coal tonnage from mines on the Norfolk & Western Ry. and from other railroads, for the month of April, 1918:

From	Net Tons
Pocahontas field	1,361,085
Tug River field	287,235
Thacker field	252,921
Kenova field	92,260
Clinch Valley field	122,335
Other Norfolk & Western fields	9,586
Total Norfolk & Western fields	2,125,422
Williamson & Pond Creek R.R.	168,145
Tug River & Kentucky R.R.	51,480
All other railroads	112,475
Grand Total	2,457,522

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

STEEL SHEET PILING—The following price is base per 100 lb. f.o.b. Pittsburgh, with a comparison of a month and a year ago:

Current	One Month Ago	One Year Ago
4–5	$3.10	$3.60

PIG IRON—Below are the present quotations, with a comparison of a month and a year ago:

	Current	One Month Ago	One Year Ago
CINCINNATI			
No. 2 Southern foundry	$35.90	$35.90	$42.90
No. 2 Northern foundry	33.26	33.26	43.00
NEW YORK †			
No. 2 X Northern foundry	34.25	34.25	45.75
No. 2 plain Northern foundry	33.75	33.75	45.25
No. 2 Southern foundry	39.00	39.00	44.25
BIRMINGHAM			
No. 2 Southern foundry	33.00	33.00	39.00
CHICAGO			
No. 2 Northern foundry	33.00	33.00	46.00
No. 2 Southern foundry	37.00	37.00	.....
PITTSBURGH			
Bessemer iron *	36.15	36.15	45.95
Basic iron *	32.00	32.00	42.00

* These prices include the freight charge from the valley to the Pittsburgh district. † Delivered Tidewater, New York.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill, Pittsburgh	New York—Current	New York—1 Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$3.00	$4.195	$5.00	$4.27	$4.20
Channels, 3 to 15 in.	3.00	4.195	5.00	4.27	4.20
Angles, 3 to 6 in., ¼ in. thick	3.00	4.195	5.00	4.27	4.20
Tees, 3 in. and larger	3.05	4.245	5.05	4.27	4.25
Plates	3.225	4.45	7.00	4.52	4.45

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	St. Louis	Denver	Birmingham
3.50	4.17	4.05	4.38

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3.50	$4.30	$4.85	$4.25	$4.25	$4.80	$4.75
Cut	3.75	5.30	.....	4.40	....	6.40	.....

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh—Current	Cincinnati	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes 5/16-in. and larger	$3.90	$6.00	$4.50	$6.25	$6.25	$5.30	$5.00
Track bolts	4.90	8.90	5.50	6.40	7.45	8.00	6.00
Standard section angle bars	3.25	....	4.45	....	4.90	....	4.30

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List	+10%	+10%	+35%	+30%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.25	$6.50	$6.50	$6.25	$7.50	$7.00
Assorted	5.40	6.50	6.50–7.00	6.40	7.75	7.25

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York—Current	New York—1-Month Ago	New York—One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$58.35	$58.35	$58.00	$57.55	$57.00	$65.00	$61.00
6 in. and over	55.35	55.35	55.50	54.55	54.00	62.00	58.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh—Current	Pittsburgh—One Year Ago	Chicago—Current	Chicago—One Year Ago
Standard Bessemer rails	$63.00	$38.00	$63.00	$38.00
Standard openhearth rails	65.00	40.00	65.00	40.00
Light rails, 8 to 10 lb.	*3.135 (100 lb.)	58.00	*3.135 (100 lb.)	53.00
Light rails, 12 to 14 lb.	*3.09 (100 lb.)	57.00	*3.09 (100 lb.)	54.00
Light rails, 25 to 45 lb.	*3.00 (100 lb.)	53.00	*3.00 (100 lb.)	52.00

* Government price per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$31.50	$29.75	$28.50
Stove plate	22.50	23.00	20.00
No. 1 machinery cast	34.00	26.50	21.50
Machine shop turnings	16.00	15.50	15.50
Cast borings	16.00	15.75	15.00
Railroad malleable cast	31.00	29.50	26.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.18	$0.17

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid		15c.	15c.
Hollow		25c.	....

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Nov. 6, 1917, for steel pipe and for iron pipe:

BUTT WELD

Steel Inches	Black	Galvanized	Iron Inches	Black	Galvanized
⅛, ¼ and ⅜	44%	17%	¼ to 1¼	33%	17%
½	48%	33⅓%			
¾ to 3	51%	37½%			

LAP WELD

2	44%	31½%	2	26%	12%
2½ to 6	47%	34½%	2½ to 4	28%	15%
			4½ to 6	28%	15%

BUTT WELD. EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	40%	22½%	¼ to 1¼	33%	18%
½	45%	36½%			
¾ to 1¼	49%	36½%			

LAP WELD. EXTRA STRONG PLAIN ENDS

2	42%	30½%	2	27%	14%
2½ to 4	45%	33½%	2½ to 4	29%	17%
4½ to 6	44%	32½%	4½ to 6	28%	16%

From warehouses at the places named the following discounts hold for steel pipe:

	Black—New York	Black—Chicago	Black—St. Louis
⅜ to 3 in. butt welded	38%	42.8%	40.1%
3½ to 6 in. lap welded	18%	38.8%	36.1%

	Galvanized—New York	Galvanized—Chicago	Galvanized—St. Louis
⅜ to 3 in. butt welded	22%	27.8%	25.1%
3½ to 6 in. butt welded	List	24.8%	22.1%

Malleable fittings. Class B and C, from New York stock sell at list price. Cast iron, standard sizes, 15 and 5%.

SHOP SUPPLIES

NUTS—From, warehouse at the places named, on fair sized orders, the following amount is deducted from list:

	New York—Current	New York—One Year Ago	Cleveland—Current	Cleveland—One Year Ago	Chicago—Current	Chicago—One Year Ago
Hot pressed square	$1.05	$0.50	$1.40	$1.65	$1.05	$3.00
Hot pressed hexagon	.85	.50	1.20	1.50	.85	3.00
Cold punched square	1.00	.50	.75	2.00	1.00	2.50
Cold punched hexagon	1.00	.50	.75	2.75	1.00	3.00

Semifinished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	40%	50%
Chicago	50%	50%
Cleveland	60%	45%

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago
¾ by 4 in. and smaller	30—5%	40—10%	40—10%
Larger and longer up to 1 in. by 30 in.	30%	30—5%	35—5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:

New York $3.00 Cleveland $3.00 Chicago $3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York $3.50 Cleveland $3.50 Chicago $3.50

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel 7/16 and smaller	30%	40%	40%*
Tinned	30%	40%	40%*

* For less than keg lots the discount is 35%.

Button heads, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:

New York $6.09½ Cleveland $5.35 Chicago $5.50 Pittsburgh $4.65

Coneheads, same sizes:

New York $6.19½ Cleveland $5.45 Chicago $5.60 Pittsburgh $4.75

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	Chicago	St. Louis	Birmingham	Denver	Pittsburgh
Cup	7	5¼	6.9	7½	10½	7½
Fiber or sponge	8	6	7.4	7½	15	7½
Transmission	7	6	7.4	7½	13	7½
Axle	4½	4	3.6	3	5	4
Gear	4½	4½	7.0	7½	6	4
Car journal	22 (gal.)	3½	4.5	3	6	4

BABBITT METAL—Warehouse prices in cents per pound:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Best grade	90.00	65.00	100.00	65.75	100.00	60.00
Commercial	50.00	35.00	22.00	20.75	22.00	25.00

HOSE—Following are prices of various classes of hose:

Fire

	50-Ft. Lengths
Underwriters' 2½-in	75c. per ft.
Common, 2½-in	40%

Air

	First Grade	Second Grade	Third Grade
¾-in. per ft	$0.55	$0.30	$0.25

Steam—Discounts from list

First grade 30% Second grade 30–5% Third grade 40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	40+5%	35%
Denver	35%	30%
Birmingham	35%	40%
Chicago	30—10%	40—5%
Cincinnati	40—10%	40%

RAWHIDE LACING—40% off list.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.65
Duck and rubber for piston packing	1.00
Flax, regular	.90
Flax, waterproofed	1.10
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.90
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.25
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.10
Asbestos wick, ½- and 1-lb. balls	.65 to .70

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+20%
Galvanized cast steel rigging	List
Bright plain rigging	30%
Bright cast steel	17½%
Bright iron and iron tiller	5%

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ⅝-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1⅛-in., 2 ft. 10 in.; 1¼-in., 2 ft. 4 in. Following is price per pound for ⅝-in. and larger, in 1200-ft. coils:

Boston	$0.34½	Atlanta	$0.36
New York	.33½	Denver	.35½
Cincinnati	.33¼	Kansas City	.34
Chicago	.32½	New Orleans	.33
St. Paul	.34	Seattle	.33½
San Francisco	.31	St. Louis	.33
Pittsburgh	.36	Los Angeles	.32
Birmingham	.37		

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING

Pipe Size	Standard List Per Lin. Ft.
1-in.	$0.27
2-in.	.36
6-in.	.80
4-in.	.60
3-in.	.45
8-in.	1.10
10-in.	1.30

BLOCKS AND SHEETS

Thickness	Price per Sq.Ft.
½-in.	$0.27
1 -in.	.30
1½-in.	.45
2 -in.	.60
2½-in.	.75
3 -in.	.90
3½-in.	1.05

85% magnesia high pressure 15% off

For low-pressure heating and return lines { 4-ply 58% off; 3-ply 60% off; 2-ply 62% off

LINSEED OIL—These prices are per gallon:

	New York		Cleveland		Chicago	
	Current	One Year Ago	Current	One Year Ago	Current	One Year Ago
Raw per barrel	$1.55*	$1.31	$1.65	$1.32	$1.65	$1.28
5-gal. cans	1.65*	1.41	1.80	1.42	1.75	1.33

* Nominal.

WHITE AND RED LEAD in 500-lb. lots sell as follows in cents per pound:

	Red				White			
	Current		1 Year Ago		Current		1 Year Ago	
	Dry	In Oil	Dry	In Oil	Dry and In Oil		Dry and In Oil	
25 and 50-lb. kegs	11.25	11.41	11.75	11.50	11.25		11.50	
12½-lb. keg	11.47½	11.62	11.12	11.75	11.47½		11.75	
100-lb. keg	11.02½	11.19	12.25	12.00	11.02½		12.00	
5-lb. cans	11.82½	15.25	13.75	13.50	11.82½		13.50	
1-lb. cans	13.72½	14.62½	.....	13.50	13.72½		.....	

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Cincinnati	$12–15.50	Birmingham	$13.25–15.00
St. Louis	14.00	Denver	8.50

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½ lb. rolls	35c. per lb.
Rubber tape, ½-lb. rolls	45c. per lb.
Wire solder, 50-lb. pools	45c. per lb.
Soldering paste, 1-lb. cans	50c. per lb.

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply		2-Ply		3-Ply	
	C.I.	L.C.I.	C.I.	L.C.I.	C.I.	L.C.I.
No. 1 grade	$1.30	$1.55	$1.60	$1.75	$1.90	$2.05
No. 2 grade	1.15	1.30	1.45	1.60	1.75	1.90

Asbestos asphalt saturated felt (14 lb. per square) costs $5.35 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $1.95 per roll in carload lots and $2.20 for smaller quantities.

Shingles, red and green slate finish cost $5.25 per square in carloads, $5.50 in smaller quantities, in Philadelphia.

ROOFING MATERIALS—Prices per ton f.o.b. New York or Chicago:

	Carload Lots	Less than Carload Lots
Tarfelt (14 lb. per square of 100 sq. ft.)	64	65
Tar pitch (in 400-lb. bbl.)	20	21
Asphalt pitch (in barrels)	35	40
Asphalt felt	72.50	77.50

HOLLOW TILE—The price per 1000 in carload lots f.o.b. mine is as follows:

	4 x 12 x 12	8 x 12 x 12
St. Louis	$80.00	$137.00
Chicago	79.00	137.00
Denver, per ton	11.00	200.00
Kansas City	75.00	140.00
St. Paul	56.00	110.00
Boston	80.00	150.00
Birmingham	65.20	122.25
Cincinnati	68.00	129.00
Pittsburgh	86.50	147.10

LUMBER—Price of yellow pine per M in carload lots:

	1-in. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$40.00	$31.00	$38.00
Birmingham	28.00	30.00	28.00
Pittsburgh	48.50	48–50	50–55
Denver	40.00	42.00	42.50
Cincinnati	45.00	44.00	39.00

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill, in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
*No. 28 black	5.00	6.445	6.445	9.25	6.385	8.25	6.45	7.50
*No. 26 black	4.90	6.345	6.345	9.15	6.285	8.15	6.35	7.40
*Nos. 22 and 24 black	4.85	6.295	6.295	9.10	6.235	8.10	6.30	7.35
Nos. 18 and 20 black	4.80	6.245	6.245	9.05	6.185	8.05	6.25	7.30
No. 16 blue annealed	4.45	5.645	5.645	8.70	5.585	7.95	5.65	7.70
No. 14 blue annealed	4.35	5.545	5.545	8.60	5.485	7.85	5.55	7.60
No. 10 blue annealed	4.25	5.445	5.445	8.50	5.385	7.75	5.45	7.50
*No. 28 galvanized	6.25	7.695	7.695	11.00	7.635	10.00	7.70	9.50
*No. 26 galvanized	5.95	7.395	7.395	10.70	7.335	9.70	7.40	9.20
No. 24 galvanized	5.80	7.245	7.245	10.55	7.185	9.55	7.40	9.05

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 5c., all gages.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver			St. Louis			Birmingham		
No.	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex	Single Braid	Double Braid	Duplex
14	$13.00	$15.00	$31.09	$11.00	$20.00	$31.50	$12.00	$17.40	$36.30
10	22.15	25.25	50.05	25.40	29.00	59.00	30.30	34.30	48.80
8	31.40	24.25	69.50	35.45	35.00	72.50	42.35	46.85	67.60
6	49.40	53.30	.....	.....	61.00	120.00	64.60	74.10	.....
4	71.30	76.15	.....	.....	86.00	.....	101.75	106.55	.....
2	108.00	113.65	.....	.....	130.00	.....	151.50	163.00	.....
1	140.40	147.85	.....	.....	176.00	.....	201.00	209.50	.....
0	176.85	176.85	.....	.....	222.00	.....	276.00	285.00	.....
00	.....	239.45	.....	.....	270.00	.....	317.00	330.00	67.60
000	.....	298.15	.....	.....	330.00	.....	417.00	428.00	.....
0000	.....	357.00	.....	.....	400.00	.....	508.00	516.00	.....

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb keg for black powder:

	Low Freezing	Gelatin			Black Powder
	20%	40%	60%	80%	
New York	.....	$0.27½	$0.34½	.....	$2.40
Boston	$0.24¼*	.27½	.34½	$0.41¼*	.....
Kansas City	.20	.26½	.33½	.43½	.....
Seattle	.17¾	.24½	.31¼	.41¾	.....
Chicago	.18¾	.22½	.33	.43	.....
St. Paul	.20	.23	.28	.....	2.45
St. Louis	.20	.24	.29	.43½	2.45
Denver	.18	.25½	.32½	.42½	.....
Dallas	.23	.29½	.37	.47	.....
Los Angeles	.22	.28	.36	.....	.....
San Francisco	.17½†	.23½†	.30½†	.40½†	.....
Cincinnati	....	....	....	....	1.95

† In carload lots. * 25% and 75% respectively.

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc., the following freight rates are effective in cents per 100 lb.:

Boston	21.5	Minneapolis	35.5
Buffalo	11.6	New Orleans	30.7
Chicago	21.5	New York	19.5
Cincinnati	18.5	Philadelphia	18.5
Cleveland	13.5	St. Louis	27.0
Denver	79.0	St. Paul	40.0
Kansas City	47.0	Pacific Coast (all rail)	100.0

COAL AGE

Volume 13 NEW YORK, JUNE 8, 1918 Number 23

Organizing the Coal Industry

By Floyd W. Parsons

MANY people have believed that the production and national distribution of coal could not be systematized. There was good reason for entertaining this idea, because no commodity enjoys wider use or comes more generally into daily life than does the fuel production of our 8000 mines.

The Fuel Administration in Washington, however, some months ago determined to know just where all the coal goes, and this ambitious plan is on the way to a happy and useful realization. Very soon all consignees who receive as much as one car of coal per month, or approximately 500 tons per year, will be required to report regularly all receipts, disbursements and consumption of fuel.

At the commencement, the Fuel Administration will receive about 100,000 reports weekly. This will cover approximately 90 per cent. of our production. The remaining 10 per cent. will be cataloged a few weeks later.

Before snow flies again, Dr. Garfield and his associates will have definite figures showing the production and consumption of coal in every zone, and these data will enable them to shift coal promptly from one region where there is an abundance to other districts where a shortage exists.

With an equitable car supply, and such complete data covering fuel requirements, it is now a certainty that we will have far greater efficiency in coal distribution than ever before. It is not so likely that one region will have a feast and another a famine.

The Government will have absolute control of the Nation's industries through its power to dispense fuel. Less essential industries will not get coal that war plants need. It is because of this fact that hundreds of businesses must either seriously curtail output or substitute war work for peace work.

Every 3-in. shell that we fire on the battle front in France means a consumption of 80 lb. of coal. When artillery bombardments are intense, it is not unusual to fire enough shells at a single point to consume 7000 tons of coal per hour. One recent battle lasting several months consumed more coal than we will produce in all of the mines of Tennessee this year. To build one 8000-ton cargo ship requires 16,000 tons of coal. We plan to build hundreds of these ships this year, so it is evident that this work will demand a large quantity of fuel.

War is a new business with us, but it is already our chief business. We must adapt our lives to a new order of things, and to this end let us supply the Nation with sufficient coal to avoid any lack in the necessary sinews of war. This is no ordinary occasion, and we can only win by putting forth the last ounce of energy that is in us.

IDEAS AND SUGGESTIONS

Combination Signal System

BY ELECTRICAL ENGINEER
Lafayette, Colo.

The use of primary batteries for operating signal bells is common practice; alternating current at 110 volts is not considered successful unless the bells are specially wound; the use of direct current at various

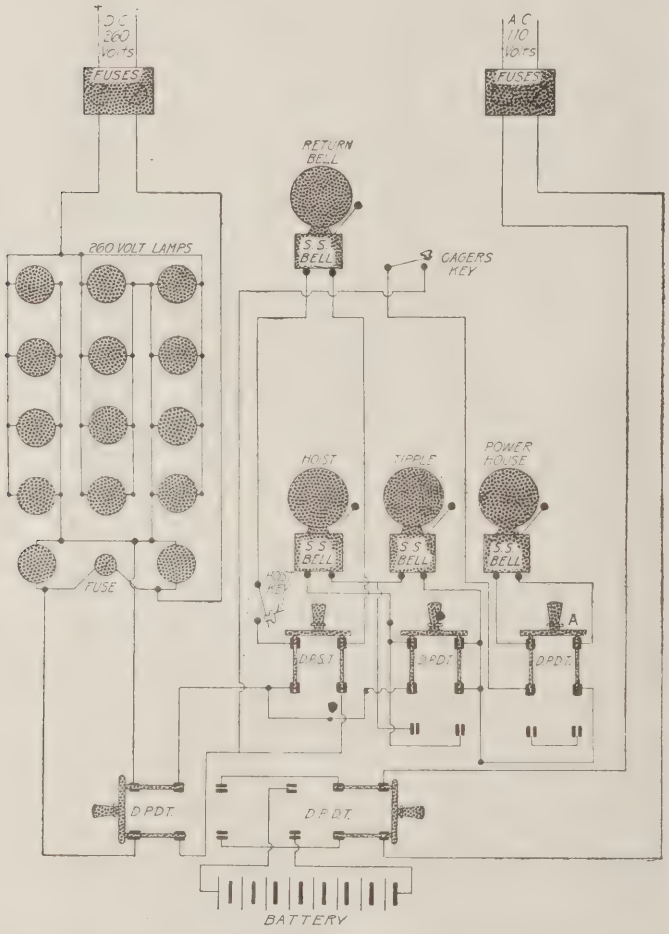


FIG. 1. SIGNAL-BELL SYSTEM THAT OPERATES ON ONE OF THREE SOURCES OF SUPPLY

voltages through a set of lamps is in use to some extent. A signal-bell system that is arranged to work on any one of these three sources of supply by simply changing certain switches is especially interesting. Such an arrangement and one that is working successfully, is shown in Fig. 1.

This system has been in successful operation for years at one of the large coal mines in Colorado. The mine in question is a shaft, and the signal board is located in the hoistroom. The bell and the ringing key are also located in the hoistroom. Another bell is located at the top of the tipple where the cage and cars of coal land. One bell and a strap key for signaling is located at the bottom of the shaft for the use of the cager. Another bell is placed in the power house. This is generally cut out of circuit by the switch *A* and is only used when the engineer who attends to the power house as well as the running of the hoist is attending to that part of his duties. This bell will then warn him when he is wanted at the hoist.

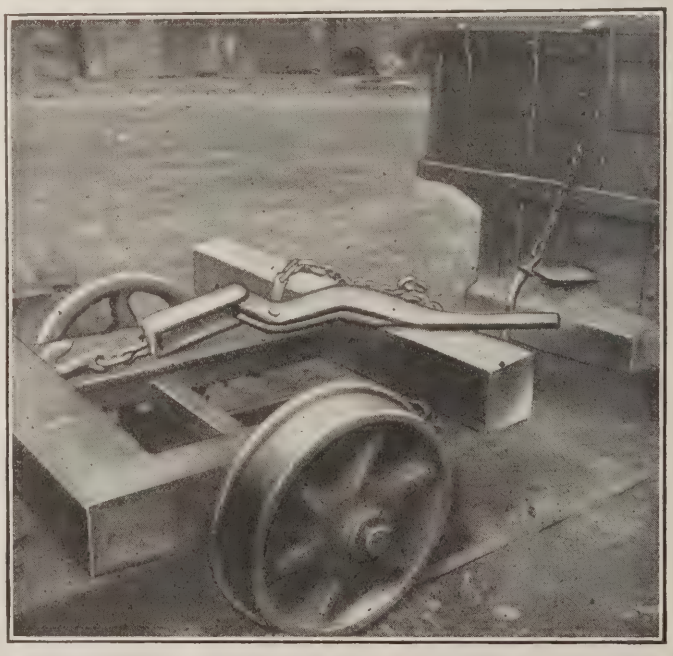
The bells used are all single stroke and are fitted with 8 and 10-in. gongs. The electro-magnets are wound with No. 18 double cotton-covered magnet wire. The results obtained are a quick, clear ring with each pressure on the keys. The system generally in use is shown in Fig. 1. The system is here shown operating on direct current.

Self-Locking Pipe and Timber Binder for Slope Car

BY R. W. MAYER
Connellsville, Penn.

The American Zinc and Chemical Co., at Burgettstown, Penn., handles rails and pipes in its mine on a special car which was built for that purpose. This car has no box, only a framed platform on the axles of the car. A special binder is provided, to hold the load of pipes or rails in place on the car, the load being bound at the front and rear of the car.

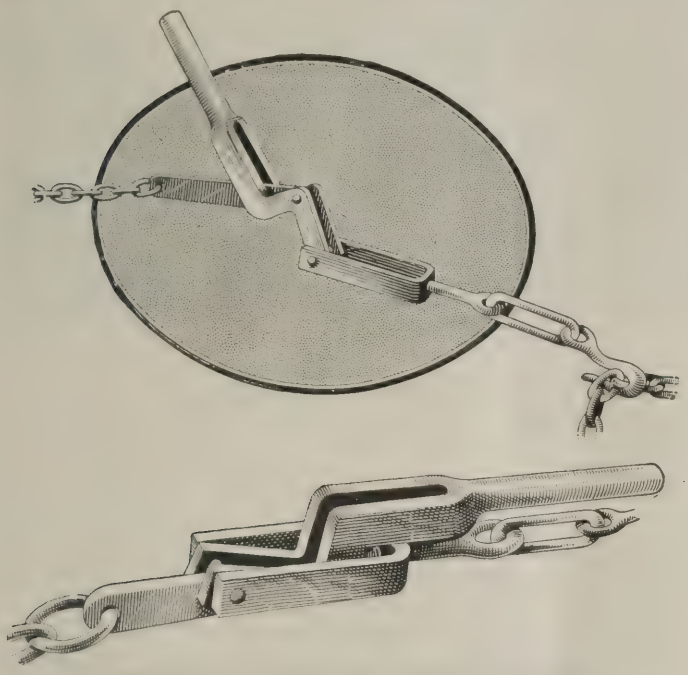
The binder proper consists of a self-locking lever carrying a grab hook. This grab hook is attached to the lower end of a clevis by means of a link and swivel; a slotted and properly bent hand lever is attached to the open end of this clevis by means of bolts or rivets; at the first bend of the lever a strap link connects the



BINDER HOLDS LOAD OF PIPES AND RAILS IN PLACE ON A SPECIALLY BUILT CAR

lever to the chain attached to one corner of the truck; the lever terminates in a suitable hand hold. The link last mentioned is long enough to reach from its point of attachment to beyond the end of the lever and is free to move between the two lever prongs. The clevis also is sufficiently long and wide to permit the lever at the bent portion to swing between its sides.

In operation, after the load of pipe, rails, pit lumber, or other material has been placed upon the truck, the



DETAILS OF PIPE AND TIMBER BINDER

chain from one corner of the car is brought up and over the load. The chain from the opposite side, as has been stated, carries at its extremity the binder terminating in the grab hook. This hook is attached to any convenient link of the opposite chain and the hand lever then moved downward toward the clevis. This, of course, shortens the loop of chain encircling the load, and when the bent portion of the lever passes the center line of the clevis the device becomes self-locked. The load is thus securely bound to the truck. When it is desired to remove the load a pull upward on the lever unlocks the binding so that the grab hook may be unfastened.

Bell-Ringing Transformers to Serve Signaling Devices

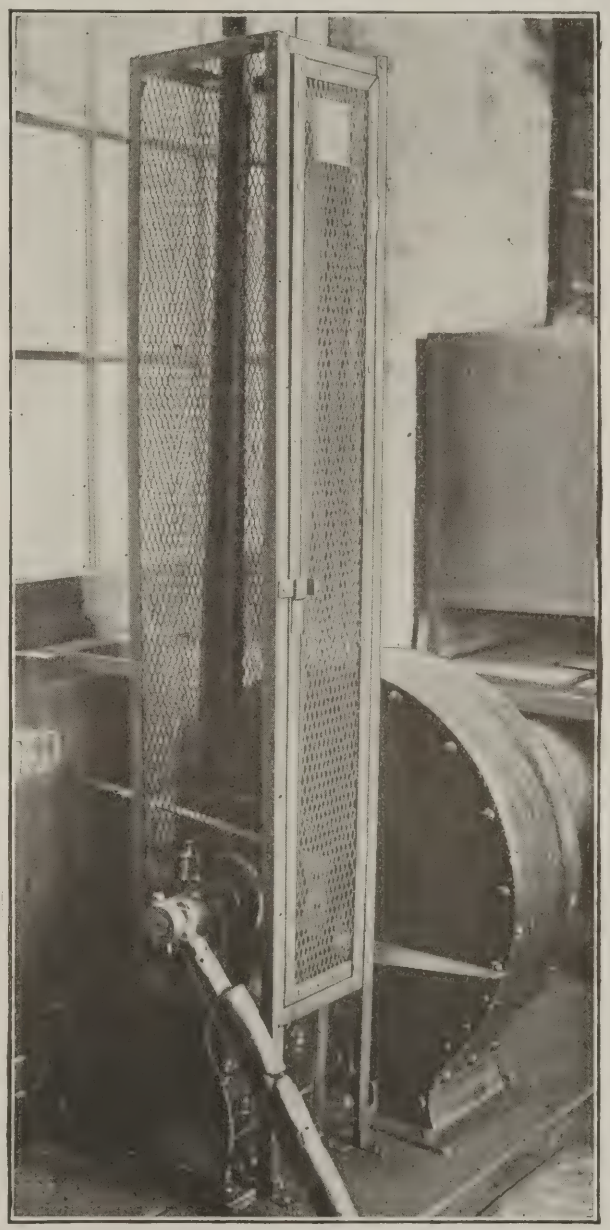
By H. O. Gra ·am

Any reasonable number of electric signaling bells or annunciators may be served from one bell-ringing transformer, provided the circuits are so arranged that not many of the signaling devices will be taking energy through the transformer at the same instant. For example, the ordinary small bell-ringing transformers that are used in the average house-wiring installation will usually satisfactorily serve simultaneously two or three electric bells, or devices requiring an approximately equivalent amount of energy. Larger bell-ringing transformers can be purchased that will serve simultaneously six, seven, or even possibly a dozen ordinary signaling devices.

Convenient Machine Guards

The guarding of belts, flywheels and other moving machine parts has received considerable attention at coal mines and various industrial plants during the past few years. The materials from which guards have been constructed have ranged from pine boards to steel or iron castings. The ideal guard, however, is one that is light, strong, easily removable either in whole or in part, and does not shut off or seriously obstruct the view of the moving parts shielded.

The accompanying illustration shows one of the most efficient types of guards yet devised. It consists of an angle-iron frame over which expanded metal is stretched



EFFICIENT TYPE OF MACHINE GUARD

and fastened securely. It will be noticed that one side of the guard here shown is a hinged door that may be opened easily, thus affording ready access to the belt that is inclosed. The journal oil cups are outside of the guard. The machine may thus be oiled and inspected without disturbing the belt guard. The guard may be entirely removed at any time should occasion require that this be done.



Coal Tipple for Small Operations

By H. B. MOSLEY
Philadelphia, Penn.

SYNOPSIS — *An extremely simple and inexpensive tipple for run-of-mine coal is here described. This consists essentially of a dump at ground or drift level and a scraper conveyor elevating and conveying the coal across a trolley track and highway and discharging it into railroad cars. A few slight changes would enable this tipple to make two or more sizes.*

BECAUSE of the increased demand for coal, the general shortage of labor and the Government-fixed price, it has become essential for the small operators to work on the most efficient basis possible and with the smallest amount of help.

The purpose of this article is to describe to some extent, at least, means by which the small operator (who cannot afford or who is not warranted in the expenditure of a large sum of money for a modern coal tipple) can handle his coal with the minimum amount of labor and at the least cost.

At the Paul & Dailey Coal Co., Western Port, Md., where coal is found outcropping in various beds up the hillside, a system for the mechanical handling of coal from mine cars to railroad cars has recently been installed and found quite satisfactory, not only in operation and maintenance, but in the man power saved.

At this mine mules are used to pull cars of coal to the mouth of the drift. This is driven in the lower coal bed, known as the "split six," being 6 ft. of fine grade bituminous coal split in the middle by a rock binder 1 ft. thick. From the mouth of the mine the cars are taken over a scale and weighed. First, however, the mules are unhitched and taken back into the mine.

After the cars are weighed they are sent down a slight incline and discharged by means of an automatic dump into a receiving hopper. The empty cars are switched to another track and sent down grade to the entrance of the mine again. It was the original intention to have the scale housed in the same building with the receiving hopper and automatic dump, but this meant that both loaded and empty cars would have to pass over the scale, so the other method was adopted.

The receiving hopper is 10 x 12 ft. in plan and built of $\frac{1}{4}$-in. steel plate, securely stiffened with angles. This hopper is attached to the sides of a concrete pit by bolts set in the concrete. The housing over the hopper and the automatic dumper is of light steel, "angle-iron" construction, sheathed with No. 22 gage galvanized corrugated iron.

From the receiving hopper the coal is fed into a flight conveyor by a reciprocating feeder. This feeder consists of $\frac{3}{16}$-in. side plates 18 in. high, attached to the outlet of the hopper, and has a $\frac{1}{4}$-in. plate bottom to which is attached shafts and rollers on which it reciprocates. These rollers travel on angle-iron tracks which are hung from the feeder sides by cast-iron brackets. The feeder plate is driven by means of a wristplate and pin and eccentric rods which are actuated by a substantial chain drive from the tail end of the conveyor.

The conveyor is built of two strands of 9-in. pitch steel roller chain having $\frac{3}{8}$ x $2\frac{1}{4}$-in. side bars, $\frac{7}{8}$-in. pins and 3-in. hard cast-iron rollers at each joint, between which are attached at 18-in. intervals $\frac{3}{16}$-in. steel plate flights, 10 in. high by 20 in. wide. This chain has an ultimate strength of 50,000 lb., but is rated at 2300 lb. working strength by the builders. The flights are built of a single piece of plate flanged back on both sides and securely attached to the chain. This makes a rigid and serviceable flight.

The carrying run of the conveyor operates in a steel trough having 9 in. x $13\frac{1}{4}$-in. channel sides and $\frac{3}{16}$-in. plate steel bottom. The bottom plates are bolted in place and in case of appreciable wear new ones can readily be substituted. Angles 4 x 3 x $\frac{5}{16}$ in. are

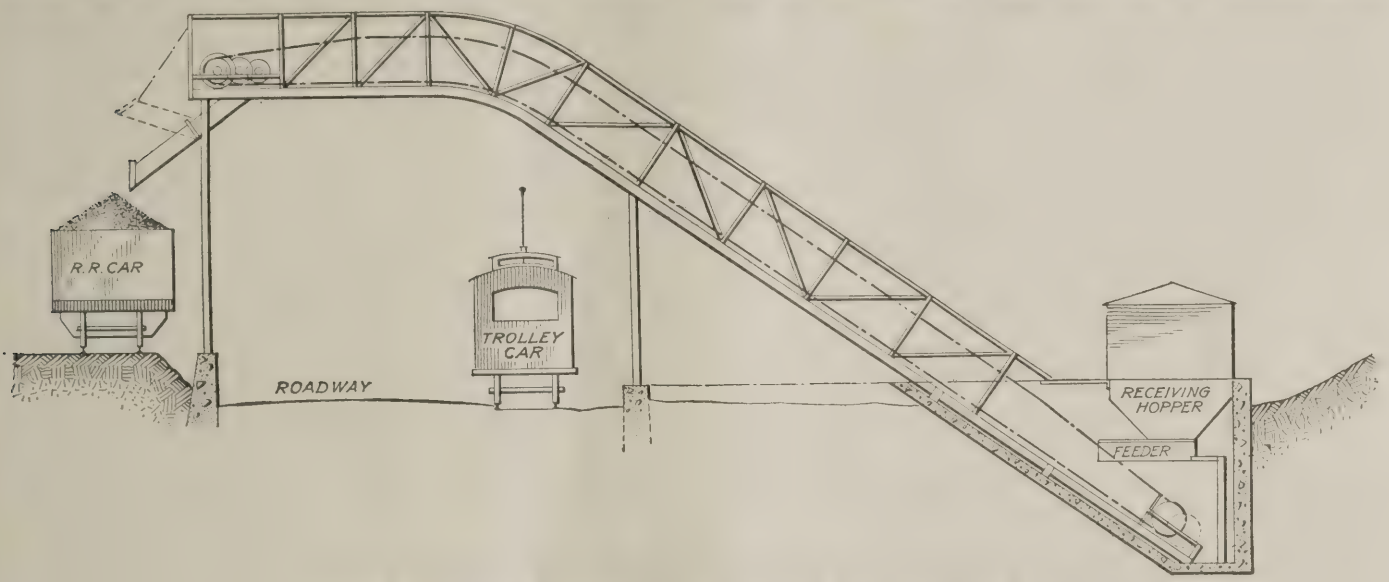
countersunk and riveted to the upper flanges of the trough channels for the chains to roll upon, also to form part of the bridge which spans the roadway. The return run of the conveyor also travels on 4 x 3 x $\frac{5}{16}$-in. angles, which serve as the upper chord of the conveyor bridge. All shafts of the conveyor were designed for both torsion and bending, allowing a combined unit stress of not over 11,000 lb. Bearings are of the rigid babbitted type, fitted with compression grease cups.

A 10-hp., 1100-r.p.m., Westinghouse, constant-speed, continuous service, open-type motor is connected to the conveyor countershaft by means of a cast-iron cut spur gear and brass-bound rawhide motor pinion. A light steel-plate motor box was used to cover the motor and automatic starter, while gear guards of the same material surround all gearing to protect the attendant.

Push-button stations for controlling the conveyor are located at the conveyor receiving hopper, at the discharge chute and at the mouth of the mine. The conveyor carries the coal up an incline of 30 deg. and horizontally over a highway at a clearance height of 21 ft. from the crown of the road and discharges it into a chute which deposits the coal in railroad cars at the rate of 70 tons per hour. This fills the average size of car in about 45 minutes.

The discharge chute is 18 in. square, built of $\frac{1}{4}$-in. steel plate, and is hinged to fold up in order to give necessary railroad clearance. An ample counterweight is provided so as to make the raising and lowering of the chute simple and easy.

From the ground a footwalk 24 in. wide, built of 2-in. plank, is provided extending up the incline and along the horizontal portion of the conveyor on one side. Wood cleats are furnished on the inclined portion to assist the attendant in walking up. A platform is provided around the driving machinery to give easy access to the lubricating grease cups. A double run handrail 42 in. high, built of 1$\frac{1}{4}$-in. black pipe, incloses the footwalk and



CROSS-SECTION OF THE RECEIVING HOPPER AND CONVEYOR LINE



SIDE VIEW OF TIPPLE, SHOWING ITS GREAT SIMPLICITY

platform on the outer side. This layout shows what can be done for the small operator who is at all times hard pressed for labor to transfer coal from mine cars to railroad cars. The equipment would be even less expensive if there were no highway to carry the material across, and it was only necessary to elevate the coal to railroad cars. Again, if the cars are far away, it is an easy matter to lengthen the conveyor and supporting bridge.

If it is desired to screen the coal before loading it for shipment, the trough bottom plate may be perforated to the desired size and all material passing through the screen plate would enter a screenings hopper from which it would be drawn by a gate at the bottom. A screen of this type can also be arranged in the chute to the railroad cars, this being a favorite method of finally screening all breeze from coke before it goes to the ultimate consumer.

Many modifications of a plant of this type can be worked out and all be thoroughly practical. It is therefore believed that the small operator will soon appreciate the opportunity for mechanical handling equipment for coal after it has reached the mouth of the mine. This will relieve a large number of men for work in the mines themselves, or at some other place where they are more urgently needed.

The complete equipment described was furnished by the R. H. Beaumont Co., of Philadelphia, Penn., which specializes in coal, coke, and ash handling equipment.

Educating the Small Mine Owner to the Value of Engineering

By O. H. Hampsch
Washington, D. C.

The matter of engineering in small mines is often a neglected factor. I say small mines, for most of the larger companies have one or more engineers whose work it is to look after and solve the engineering problems that arise. But by many of the smaller companies it is deemed an unnecessary luxury to hire an engineer.

It is quite true that many small companies may not be justified in keeping an engineer when development is slow and a small tonnage is produced, but often such companies may jointly keep a man, allotting so much of his time to each mine (this amount depending upon the speed of development) or using his services at regular intervals.

The value of keeping entries and rooms on sights needs no argument, for I think anyone will agree that it is worth the time and money spent. Such a procedure results not only in maximum recovery, smaller air resistance and compactness of mine workings, but regular and even pillar supports tend to lessen squeezes and loss of territory and increase the value of a mine. One's opinion of crooked entries and diverging rooms in a mine is the same as his opinion of a town or city with crooked and winding streets and lots to correspond. Many operators consider the state survey that is required by law annually or semi-annually a sufficient amount of engineering, and many would not do even this if it was not compulsory. This reminds one of surveying a railroad after it is built.

In most cases the majority of these problems are taken care of partly by foremen in charge with the aid of a Brunton pocket compass. This is wholly inadequate for accurate work because of rails, pipes, cars, etc., which in every case will cause an erroneous reading or bearing and render it impossible to run straight entries or compute with accuracy the distance to a boundary line. Accurate transit or vernier surveys of a coal field, and tied to a complete underground survey, is the only kind that should hold in a dispute or lawsuit over boundary lines of relative location of underground workings. Many a mine owner has been agreeably or disagreeably surprised to find just where he actually is, often having mined for several years as a mole burrows through the earth, taking the line of least resistance. The cost of an encroached property or a lawsuit springing therefrom, not considering the ill feeling between land owner and operator, would often pay for the services of an engineer for a year or more.

On main entries and other passages where haulage is continuous or heavy, profiles should be run and plotted. From these the exact locations of hills or sags in the road bed and necessary cuts or fills for an ideal grade can be determined. This is quite a factor in haulage and amounts to much, whether the haulage be by mule or motor power. The user of profiles where entries are wet or water flows is of considerable value for ditching or determining the location of pumps and sumps. Often by careful grading a gravity flow can be obtained.

Entries driven off main entries or at a point where two entries diverge should be started on a curve ranging from 50 to 150 ft. in radius, depending upon the speed and kind of haulage. This eliminates considerable friction, makes an easier pull for haulage power and decreases the danger of loaded cars leaving the tracks. Care should be taken as the underground workings progress to watch the location of wells, springs, creeks, etc., especially when there is but little cover overhead, in order that these do not affect the mine through leakage; also the location of important or heavy buildings, railroad tracks and the like, leaving, if necessary, a reserve block of coal to support them.

I believe that as mineral rights become more valuable and efforts are made to improve the methods of mining, the value of starting and developing a mine on well planned, sound engineering principles will be more and more realized; and the day will come when an engineer will be as necessary to a mine as to a railroad or city.

Antiseptic Value of Peat

Peat produced by the decomposition of sphagnum moss is so antiseptic and absorbent that it is used as a dressing for wounds and is an excellent substitute for medicated cotton. This fact was recognized many years ago in Europe, where sphagnum peat is now extensively used in preparing surgical dressings. According to Professor Soper, who has made a detailed study of the peat deposits in northern United States, there are many square miles of sphagnum bog in the northern counties of Minnesota, Wisconsin and Michigan that would supply material suitable for antiseptic applications. It will not be necessary to incur the expense of deep excavation, for immense quantities of sphagnum can be taken from the upper parts of the deposits. Sphagnum peat is also abundant in Maine, and some is found in New York and Pennsylvania.

Exhaust-Steam Turbine Installations at Coal Mines—I

By E. I. ROBERTS
Cardiff, Alberta

SYNOPSIS—*An opportunity for making a considerable saving in fuel consumption exists at many coal-mining plants in the shape of a low-pressure turbine drawing its steam supply from other units. Such a machine of course necessitates the installation of considerable auxiliary apparatus, but the economies possible sometimes amount to as much as 100 per cent.; that is, the power reclaimed from exhaust steam sometimes equals the power generated by the live steam.*

THROUGH the conditions brought on by the war, and a closer adherence to efficiency methods, the attitude of coal companies with reference to the coal burned at their own plants is changing. In the past the majority of the operators considered that mine-run, nut or even egg coal cost them nothing and, in consequence, any of these sizes were used at the plant. The boilers were usually hand-fired, and often this was done by men who were good coal shovelers but poor firemen.

The coal was moved by hand into the boiler house and there unloaded, again by manual labor. All of the ashes were loaded and taken from the boiler house and dumped by man-power. Still the operator considered that the coal cost him nothing. Today we see a change. The tendency is to use the smallest sizes, to burn this with stokers, to handle the coal to the boiler plant with conveyors, and to distribute the ashes with the same appliances. Some coal companies go still farther. They install water-tube boilers, water-softening plants, superheaters and turbines, so that their mines may be electrified as far as possible. These latter features have been, and are still, considered in some fields as unnecessary refinements at any place except a large power plant. There is one method, however, which would at once make a decided gain on the profit side of the balance sheet of any average mine power plant. This is the installation of an exhaust-steam turbine unit. It is with this latter piece of apparatus that this article deals.

Considering the charts, Fig. 1, which show the heat used from the coal in plants employing ordinary engines alone, and again, using exhaust-steam turbines in addition, it will be seen that for the same fuel value the power produced is increased 70 per cent. Considering also that the total quantity of heat available from coal is around 9 to 10 per cent. at the average coal plant, the extra saving is an appreciable factor to any coal company.

In the first case let us assume that steam is to be drawn from high-speed reciprocating units, using steam at the rate of 27 lb. per i.hp.-hr., while the rating of the exhaust steam turbine is 30 lb. per i.hp.-hr. Further we will assume that the high-speed units consume 15,000 lb. of steam per hour. This gives $\frac{15,000}{27} = 555$ hp. Of this 15,000 lb. of steam used we allow 20 per cent. lost in condensation, and elsewhere, thus giving us 12,000 lb. available for the turbine. This gives $\frac{12,000}{30} =$ 400 hp. From this we subtract 7 per cent. for the driving of auxiliaries, for forming the vacuum for the turbine. This amounts to 28 hp., which leaves 372 hp. net from the turbine, or an increase of 67 per cent. in power derived from the same quantity of steam generated by the boilers.

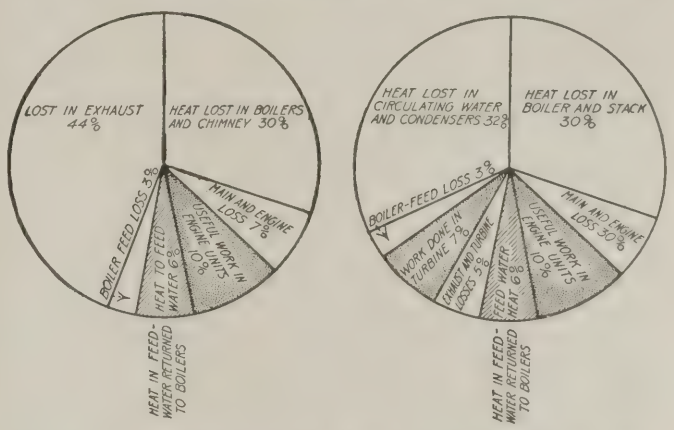


FIG. 1. UTILIZATION OF HEAT IN POWER PLANTS

If the hoist, steam pumps and general steam-consuming units around the mine are of the simple noncondensing engine type and less economical in steam consumption than has been assumed above, a still further saving can usually be made by the installation of a unit using the exhaust steam. This additional saving may at times amount to as much as 100 per cent.

In the second case let us assume a plant uses saturated steam at the rate of 40 lb. per i.hp.-hr., and the turbine at the rate of 30 lb. per i.hp.-hr., and that 20,000 lb. per hour is the quantity used in the simple noncondensing units. Then allowing 20 per cent. for condensation and loss in cylinders, piping, etc., 16,000 lb. will be available for the turbine. The power developed by the simple noncondensing units is $\frac{20,000}{40} = 500$ hp., and that developed by the turbine $\frac{16,000}{30} = 533$ hp., subtracting from this 533 hp., 7 per cent. for the driving of auxiliaries, or 37.3 hp. for rough figuring, say 37 hp., leaves 496 hp. from the unit using the exhaust steam. The total increase over and above the live-steam units is then 99.3 per cent., or roughly 100 per cent. increase in power for the same quantity of steam generated by the boilers.

It is in existing plants that the exhaust-steam unit will give the most advantage. New plants are being

designed and equipped with modern appliances to consume steam economically. Furthermore, during the early development of the mine insufficient exhaust steam is supplied by the live-steam units to operate a turbine; unless it is of the mixed pressure type, wherein live steam may be used during the periods when there is no exhaust steam.

The operation of a unit of this type, together with the condensers and auxiliary equipment, if properly installed is as simple as that of any reciprocating engine. It occupies less space, and if so installed that water cannot enter with the steam and dust is excluded from the bearings, is much cheaper in maintenance. There are other advantages to this type of unit. Thus, when a surface condenser is used with the turbine the condensed water may be returned to the boilers. This in itself is an item which covers a large ground at a mine plant. The cleaning of boilers, the bagging of sheets and the purchase of compound for the boilers in which mine water is used is an ever-present source of trouble while foaming and priming are constant dangers; also the corroding and pitting of feed-water pipes and boiler fixtures are a continuous source of expense. The returning of the condensate to the boilers practically eliminates these difficulties.

Even at plants employing condensing units there is a field for the exhaust-steam turbine. The exhaust unit being placed between the high-pressure machine and the condenser will enable at least 2 in. more of vacuum to be carried at the condenser, and this means about 10 per cent. more power from the steam. It is impossible to increase the vacuum to this extent with the known reciprocating engines, as air leakage prevents a vacuum higher than about 26 in. referred to a 30-in. barometer.

Passing from the preliminary considerations to the design and erection of such a unit at a coal-mining plant, we will consider in succession the steam available, the turbine specifications and the auxiliaries that are necessary for a 500-kw. mixed-pressure turbine driving a direct-current generator of this size.

We will first detail the equipment, from which data were taken for the actual driving of a unit of this size. This is shown in the following table:

Unit	Size	Cutoff	Speed	Hp.	Time Operating at	Per Cent. Load	Quantity Steam, Lb.
Hoist (twin)....	24x36	5/8	90	510	3/10 (see other details)	100	12,240
Shaker engine...	14x18	1/2	80	71.5	Full time	66	1,920
Roller screen engine.....	10x20	1/2	75	38	75 per cent.	75	860
Fan engine.....	14x20	1/2	70	62.5	100 per cent.	87	2,200
Shop engine.....	5x10	3/8	175	10	100 per cent.	75	300
Pump No. 1....	14x18	1/1	250 per	gal. min.	250-ft. head	100	1,000
Pump No. 2....	12x 7	1/1	200 per	gal. min.	40 ft. head	100	120
Holmes car lift..	14x18	1/1	3 trips per min., 40 hp.			.....	1,600
Total steam at 40 lb. per hp. equals.....							20,240

The gage pressure at the boilers is 110 lb. normal, with a 10 per cent. variation up or down. The proper way to ascertain the steam consumption of the various units is by means of an indicator. Lacking this, however, the quantity used by any of the units may be calculated as follows: Roller Screen Engine—The boiler pressure as 120 lb., a line drop of 10 lb. gives us 110 lb. gage at the engine. With ½ cutoff the mean effective pressure will be approximately 80 lb. This is calculated from the following formula: $0.9\ [k(p + 14.7) - 17]$ equals the mean effective pressure where k is 0.847 for ½ cutoff and p is the gage pressure at the engine. Then the horsepower equals

$$\frac{80 \times 1.66 \times 78.54 \times 75 \times 2 \times 0.8}{33{,}000} = 38\ hp.$$

This engine works at three-quarters of its load, giving 28.5 hp., and during three-quarters of its time. This gives 28.5 × 40, which equals 1140 lb. of steam per hour at full operating time and 855 lb. for three-quarters operating time. In the foregoing table this is considered as 860 lb. of steam per hour, which closely approximates the calculations.

While in the preceding calculations the steam consumption has been figured at 40 lb. per hp.-hr., it must be remembered that the steam consumption is often as high as 60 lb. per hp.-hr. The water rate for an exhaust-steam unit varies from 36 to 46 lb. per kw.-hr. Assuming then an average of 40 lb. of steam per kw.-hr., the total quantity of steam as shown, and not allowing for condensation losses, would give enough steam to generate 500 kw. It was found ultmately at this particular plant, that, owing to a steam consumption greater than 40 lb. per hp.-hr. of some of the units, the exhaust line and cylinder condensations were easily covered in the calculations.

In Fig. 2 will be seen the electrical load that was carried by the turbine-driven generator, with admission of live steam above the full load line. The hoist and the Holmes car lift give a fluctuating exhaust, that is, steam is admitted to the hoist for 6 sec. per trip and no steam for 14 sec. This will be taken care of by a regenerator, which carries the steam over the idle period, giving it out as required by the turbine.

Having decided that the steam available is sufficient to warrant the installation of a 500 kw. unit, we will next consider the type to employ. There are two types of

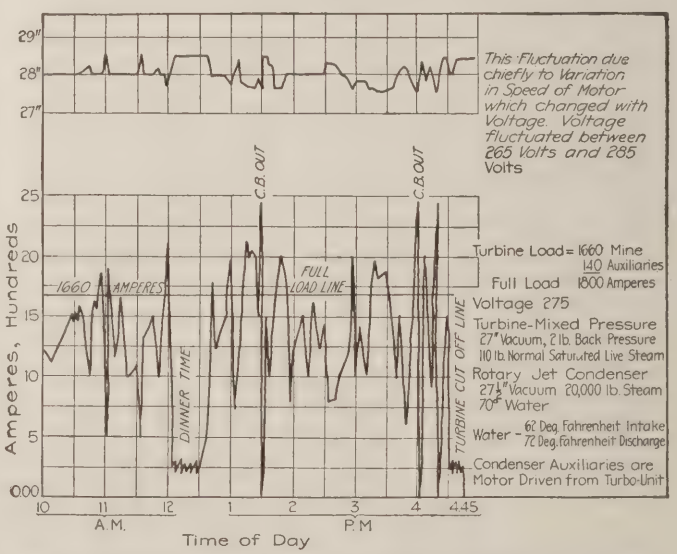


FIG. 2. ELECTRICAL LOAD ON THE PLANT AND THE VACUUM

turbines adaptable to this class of service. These are the low-pressure and the mixed-pressure machines. The first type, as the name implies, is operated entirely on low-pressure steam, and if an insufficient supply is available for operating this class of unit, under all conditions, a reducing valve has to be installed so that the live steam may be reduced from the boiler pressure to the 2 or 3 lb. pressure required by the turbine. This, of course, is

not efficient, but satisfactorily enables a low-pressure unit to be employed.

The mixed-pressure unit is equipped with two kinds of blades, one for the live steam and the other for the low-pressure steam. In some cases the blades are such that both the live- and low-pressure steam can be used on the same blading. The admission of the live steam is automatically governed, so that at a certain reduction in speed the governor opens the live-steam valve. The speed can thus be maintained with live steam when the low-pressure steam supply is insufficient to carry the load. When the load drops off, or the exhaust steam increases, the live steam is shut off automatically and the turbine operates entirely on the low-pressure steam until such time as the load exceeds that which can be carried by this supply. This is the class of turbine that is usually most suitable for mine purposes, since with the exhaust steam alone the turbine manufacturers will not guarantee the overload capacity from the turbine that the generator will carry momentarily. They will, however, do so with a mixed-pressure unit. This question, of course, is governed by local conditions.

The generator may be alternating or direct current, as required by the company's conditions, and may be connected either directly or through reduction gears. The transmission of power through modern high-speed reduction gears is quite efficient, so that this means of connection is no longer considered uneconomical. It is necessary, however, that the life of such gearing be specified and considered in the proposal from the manufacturers.

An outline of the specifications for an exhaust-steam unit suitable for coal mines, is as follows:

1. The turbine shall run smoothly and furnish the required power for full load of generator, at the rated speed, under any of the following conditions: Exhaust steam pressure, 2 to 4 lb. per square inch; vacuum, 27 to 29 in. of mercury referred to a 30-in. barometer. Overloads may be carried by live steam, automatically, at 110-lb. pressure per square inch, with a 10 per cent. variation below and above this pressure.

2. The unit shall run without undue noise, excessive wear or heating, and must be capable of running for long periods at full load.

3. The turbine to be of sufficient power when running at rated speed, to develop 1¼ times the rated full load of generator.

4. The valve gear shall work, automatically, over the total range of conditions, that is, operation from zero to 1¼ times rated load of generator, when operating under normal live-steam conditions of 110-lb. gage pressure per square inch, 3-lb. gage pressure exhaust steam, and 28-in. vacuum referred to a 30-in. barometer.

5. The turbine shall bear without injury the sudden throwing on or off of 1¼ times the rated load of generator, which may be brought about by the throwing out of the circuit breaker or other cause.

6. The speed variation shall not exceed 2½ per cent. when the load is varied between full load to 20 per cent. of full load, gradually or in one drop, the turbine operating under running conditions.

7. The speed variation shall not be more than 3½ per cent. when the load is thrown suddenly on or off under normal conditions.

8. A common sub-base shall be furnished for the proper mounting of the turbine, reduction gears (if any) and the generator, and planed projections shall be provided for leveling same.

9. The sub-base to be provided with bolt holes for foundation bolts, which bolts will be supplied by the coal company.

10. All external nuts, liable to frequent use, shall be case-hardened, and where they are liable to work loose shall be furnished with lock nuts. The seats for the bolt heads and nuts shall be faced.

11. The adjoining portions of the machine are to be given plain corresponding marks, for convenience in reassembling.

12. All necessary wrenches, lifting eyes, jacking bolts for removal of wheels, special tools, feelers, etc., are to be furnished by the turbine manufacturer.

13. Sufficient tests are to be made by the turbine manufacturer, at his own expense, to insure the proper conforming to these specifications. Two tests shall be made by the coal company at the plant after erection. Any repairs and defects developing at the first test at the plant shall be remedied before the second test and before final acceptance.

14. The live-steam inlet shall be equipped with an automatic emergency throttle valve, in such a way that it will automatically close with a 10 per cent. increase of speed above normal.

15. All flange drillings shall be standard, except the flange drilling for the live-steam connection, which shall be extra heavy drilling. Companion flanges shall be furnished where this is not done, and flanges shall be threaded for the size pipe that is called for on plans.

16. Forced lubrication is to be used on all bearings on which shaft pressure exceeds 20 lb. per square inch of projected bearing surface. In case of forced lubrication the oil is to be cooled by water in contact with coils through which oil flows. The coils and water-circulating system to have the connections outside of pedestal.

17. The upper and lower halves of main bearings shall be removable, without removal or displacement of the shaft.

18. Ball thrust bearings shall be used where necessary.

19. Provision shall be made in the construction of the complete machine so that the armature can be removed without excessive dismantling.

20. A pop safety valve exhausting to the atmosphere of a size sufficient to prevent an injurious back pressure arising in the turbine casing, due to a leaky throttle valve, shall be provided.

21. The assembled turbine is to withstand a hydrostatic test of 50 lb. per square inch, without showing undue stress or leaks.

22. Provision shall be made on all oil discharge from all bearings to observe the flow of oil from each bearing; and if bearings are also water-cooled, a similar provision for observation of cooling water flow shall be made.

23. An adjustable relief valve shall be furnished to protect the oil pump.

24. The oil tank is to be supplied with a sight gage and a ¾-in. bib-cock at lowest point to permit the withdrawal of the oil, and a cock shall also be supplied to permit the withdrawal of the cooling water.

25. Mandrels, with collars, complete, shall be furnished for renewing babbitt metal of all babbitted bearings.

26. The following gages shall be furnished: One 6-in. combination gage showing 30-in. vacuum and 30-lb. pressure; one 4-in. oil-pressure gage at oil pump; one tachometer for registering turbine speed.

27. An automatic device shall be furnished to break the vacuum in the turbine exhaust end when overspeed exceeds 10 per cent. above the normal operating speed, which device shall also control the live-steam throttle.

28. All workmanship on turbine shall be first-class, and appearance of the machine shall be as neat and as efficient looking as possible.

An outline of the specifications for the generator is given in the following:

1. Provision shall be made for vertical adjustment of magnet frame with bedplate.

2. Brush holders are to be staggered, so that wear over commutator surface may be even.

3. The shaft is to be provided with suitable means to prevent the oil from the bearings from working along the shaft to the commutator or armature.

4. Provision shall be made for the mounting of a commutator turning tool.

5. The field rheostat is to have a range of adjustment from 10 per cent. above to 20 per cent. below normal voltage.

6. The jump in voltage shall not exceed 15 per cent. when full load is suddenly thrown on or off.

7. The normal voltage to be ——— volts, compounding up from this, at rated speed, to ——— volts at full load.

8. The generator is to be able to carry a normal overload of 25 per cent. for two hours, with a temperature rise not exceeding 55 deg. C. on commutator and 50 deg C. in the windings and armature, at a room temperature of 70 deg. Fahrenheit.

9. The generator is to carry the rated full load of ——— amp., continuously, with a temperature rise not exceeding 45 deg. C. on commutator and 35 deg. C. in windings and armature, in a room temperature of 70 deg. Fahrenheit.

10. The efficiency of the generator is not to be less than as follows: ½ load, 88 per cent.; ¾ load, 90 per cent.; full load, 91 per cent. 1¼ load, 91 per cent.

11. An insulation test of 1500 volts alternating current shall be applied to all windings, and the windings shall not be punctured or broken down at this test.

12. The generator is to be compound-wound, and is to be provided with all necessary terminals for cables from switchboard.

13. Equalizer terminals shall be provided, and this generator is to parallel a generator having the following characteristics: Size, ———; voltage, ———; compounding characteristics, ———; driven by ———, etc.

(To be continued)

Increased Cost of Railroad Coal

The following table, prepared by Director General of Railroads McAdoo, strikingly illustrates the steady increase in the cost of railroad coal since 1915:

Year	Tons	Price Per Ton	Total Cost
1915	122,000,000	$1.13	$137,860,000
1916	136,000,000	1.32	179,520,000
1917	154,000,000	2.12	329,000,000
1918	166,000,000	2.95	489,700,000

Gulf States Steel Co. Byproduct Plant

In April, 1917, the Gulf States Steel Co. started to operate its byproduct plant of 37 Koppers coke ovens at Gadsden, Ala., shown in the accompanying illustration. This company owns or controls coal, iron ore and limestone properties in the vicinity of its steel mills, blast furnaces and byproduct plant. Thus ideal conditions exist for the production of low cost iron. Labor conditions also have been good, up to the time of general disturbance—a further contribution to the successful operation of the Gulf States steel plants.

The byproduct plant of the Gulf States Steel Co., shown in the illustration, is reported to have been particularly successful in operation. The most prominent features of the plant as shown are the coal handling and storage buildings. Coal is unloaded from railroad cars into a hopper from which it is conveyed to the top of the building shown at the left of the illustration. In this building the coal is crushed and pulverized, then moved by another inclined conveyor to the coal bin shown in the center of the illustration. The 37 byproduct coke ovens are directly to the right of the coal bin. The steel stack at the right of the bin furnishes draft to the coke ovens, to keep up a circulation of burning gases in the oven heating flues and hot products of combustion through the regenerators.

The byproduct plant is equipped with complete apparatus for producing ammonium sulphate, tar, benzol, etc., in addition to coke. The surplus gas from the coke ovens is used for reheating steel at the wire mills of the company. The plants for treating the byproducts —ammonia, tar, etc.—are shown in the background.



BYPRODUCT PLANT OF GULF STATES STEEL CO., GADSDEN, ALABAMA

Coal Mine Photography—I

By H. A. WILLIAMSON
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SYNOPSIS—*The camera can often be used to supplement or expedite the work of the drafting room. It may also be employed to illustrate complaints or establish the reasonableness of claims. For photographing plans special plates and developers are advantageous, while for certain kinds of reproductions suitable color screens may well be employed.*

IT IS doubtful whether more than a very few mining companies make use of the photographer in connection with their work, and yet the possibilities of economies in time, material and convenience to officials and employees of all classes are large.

Probably the greatest economy and also the greatest convenience lies in the use of photographic reproductions of maps of mine workings. All agree that maps of workings on a scale of 100 or 200 ft. to the inch are large and inconvenient to handle, yet if the original tracings are made on a smaller scale the drafting-room work becomes laborious and slow and requires draftsmen of high skill in order to make the work intelligible; furthermore, the skilled draftsman commands a high salary and is hard to get at any price.

By producing the original maps on a standard scale of 100 ft. to the inch and then photographing this map down to 500 ft. to the inch a map is obtained which is entirely legible and convenient to carry in the pocket and to use in cramped quarters such as are often found in mines. They are also convenient to attach to correspondence and entail less expense in mailing. Quite crude lettering on the original map, if only it is sufficiently large to reduce, becomes reasonably good looking on reduction five times.

Camera Valuable in Drafting Room

In an office where a large amount of drafting is done (especially if parts of it be the building up of new maps from parts of others, frequently on various scales) there is no question of a camera being an economy. By reductions and enlargements parts of maps or other data can be brought to a standard scale with a rapidity and accuracy not to be obtained by even the most expensive pantograph or other mechanical method.

If an original map happens to be in various colors and the information conveyed by one or two colors only is wanted, screens can be used intensifying those tints desired and eliminating the undesirable. Old maps of great value can be photographed and from the plate enlargements or reductions can be made in any quantity, the valuable original being filed away as a matter of record.

Data from technical journals or other matter can be copied in convenient form and distributed to employees. One organization has obtained from a large public library various technical books containing information of value and copied with the camera such pages as are desired. These people have in this manner secured a library of essential information in compact form and of great value. Had it been necessary for them to purchase the books complete it would have been expensive and cumbersome, as in many cases there were large volumes of several thousand pages where they only desired possibly five or six pages of technical tables or similar data.

An item which has been of great value to one mining company has been the use of photographic enlargements of parts of the topographic sheets issued by the United States Geological Survey. These sheets contain information in regard to streams, roads, contours and other features. In establishing locations for new operations it was found that by photographing that part of the topographic sheet covering the specific area, and making an enlargement from the resulting negative, it was possible to bring the scale up to as much as 300 ft. to the inch (the original being one mile to the inch). This brought the contours to such size that it was possible to do a large part of the preliminary estimating before it became necessary to run accurate levels on the ground. As this allowed a large amount of office work to proceed ahead of the data brought in by the field parties a considerable period of time was saved.

Photographs Helped Settle a Claim

Some time ago a railroad company furnished to a certain mining company quite a number of badly damaged cars and also a number of cars containing large quantities of refuse material. The company receiving these empties complained on various occasions but could get no satisfaction; in fact were rather abruptly treated. This organization called in a photographer who made pictures of some 15 or 20 damaged and refuse-filled cars. These pictures were forwarded to the railroad company with a brief letter calling their attention to this evidence, which did not admit of refutation. The result was prompt and satisfactory, and this particular company has had no similar trouble since.

It is not to be supposed, however, that it is essential to have a photographic department in order to do this work. While this is desirable it is not absolutely necessary. The local photographer with a little coaching can do this work and usually welcomes it as an addition to his income.

As in everything, if success is to be obtained there are certain features which should be observed. While it is entirely practical to photograph almost anything, naturally better results are obtained if the possibility of photographing the final work is kept in mind at the time of producing a map.

To make a map excellent for photographing does not require any special effort, nor does it spoil the map for any other purpose. If one will bear in mind that a sharp clean line photographs better than a fuzzy one, the line need not be broad. It should, however, be dense; that is, a black line, good for photographing,

when held up against the light is sharply black and not gray in places where the ink has not been laid on from a well-filled pen.

As to lettering, it has been found after several years' trial that on a map to be reduced five times no letters on the original should be less than $\frac{1}{10}$ in. high, and they should be sharp and clean-cut. They do not have to be particularly well done, although, of course, the better the work the better the final map will look. A letter even as much as $\frac{1}{2}$-in. high poorly done does not look so bad when it is reduced five times or more. To repeat, with two simple rules: Make your line black, not gray. A $\frac{1}{10}$-in. letter will stand a five times reduction.

There is no reason why any ordinary draftsman, together with an intelligent photographer, cannot turn out a good photographic map.

For copying maps, either on tracing cloth, paper or mounted map paper, if no ink except black is used (or in some cases black, red and orange), the photographer should use a sensitive plate commonly termed a "commercial" or "contrast" plate; and in developing he should use a "contrast" developer, the object being to get a sharply black and transparent negative. It is of course necessary either to carry a stock of these "contrast" plates or to order them for each job. As they are cheaper than the usual portrait plates and also keep much better in storage than other grades, it is not much expense to carry a few of them in stock. (If kept dry and away from extreme heat these plates may be stored for 12 to 18 months without deterioration, and in some cases have been used with success after 24 months' storage.)

A Good Development Formula

A good developer for this work is made up as follows: Water, 15 oz.; sodium carbonate, $\frac{1}{2}$ oz.;[1] sodium sulphite, 1 oz.; potassium bromide, 15 gr. Of this take sufficient to cover the plate well and add three grains of dry pyrogallic acid for each ounce. (Pyrogallic acid should be added just when you are ready to use the solution.) The temperature should be 70 deg. F. Density comes slowly—the plate should be fully developed in three to five minutes. When developed immerse the plate in 16 oz. of water and 30 gr. of citric acid. After this fix thoroughly in an acid fixing bath.

If the map to be reproduced is in colors, a color sensitive, or as they are commercially known a "panchromatic" or "trichromatic" plate should be used with the developer recommended by the manufacturer of the plate. If the map is badly soiled or yellowed with age a screen of light yellow may be used to increase the contrast and cut out the dirt.

In field work (such as the railroad complaints mentioned above) pictures for advertising showing various grades of screened coal, character of equipment, working places or machinery within the mines, there is a wide range for the photographer. To do such work properly requires some simple equipment, which almost every photographer has, and quite a good deal of ingenuity. Topographic and triangulation work can be largely supplemented and aided by camera work. This, however, requires greater skill and special equipment, and would mean the employment of a photographer specially fitted to do the work; such expense would hardly be justified except in the case of large and important areas where a great deal of detail information was essential to carry out some special plan.

There is also the wide field of the motion picture camera, particularly valuable in advertising, and in safety and welfare work. This, however, is an industry within itself and should be dealt with apart from other camera work. The initial expense is high, as is also the operation, and such work is not ordinarily justified by the results except in special cases.

Naturally photographic work along the lines indicated can be abused and made expensive, but this is hardly likely to occur as such features are easily recognized and corrected. As a whole there is almost no limit to the work that can be carried on with the camera. There are economies that can be accomplished in no other manner, and as a convenience, once thoroughly tried out, it is seldom if ever abandoned.

(To be continued)

[1]Note: If desiccated sulphite and carbonate are used, use 100 grains carbonate instead of $\frac{1}{2}$ oz. and 220 grains sulphite instead of 1 oz. All the foregoing figures are based on 437½ grains to the ounce.

Briquets from Anthracite Slush

Anthracite producers are now giving earnest attention to the matter of increasing the fuel supply through salvage of coal fragments which have been slushed away from the breakers and lost. It has been found possible to utilize such waste anthracite by manufacturing it into briquets which make perfectly good and effective fuel. On a small scale this has been done with success and to the satisfaction of those who have used briquets.

Now the thought is to develop the briquet as a by-product of the anthracite industry. In 1917 the Lehigh Coal and Navigation Co. produced 30,001 tons of briquets. These consisted of coal fragments the size of pin heads and less, bound together with tar and compressed into solid lumps by high pressure. Briquets burn to excellent advantage in furnaces, ranges and open grate fires. As made they average about the size of nut coal.

Much of the anthracite refuse which is now swept down the streams and rivers of Pennsylvania is carbon, but until recently there was no way to conserve such lost coal to economic advantage. In the development of the anthracite industry and the progress made in all directions it has been found possible to salvage more and more coal which formerly was wasted.

Improved mining appliances and methods enable proportionally more of the anthracite in the ground to be taken out than in the old days. This is a gain in conservation of a valuable natural resource.

Under the old methods and before the breakers were highly perfected as they now are, a great deal of anthracite was, of necessity, discarded. Hence the huge culm banks of the past, which are now being washed over through washeries, yielding a large amount of coal in every way as good as fresh mined anthracite.

Salvage of the coal now lost in the slush washed away from the breakers will be, as it were, the last word in getting and making of commercial use all that is taken from the anthracite mines that will burn.

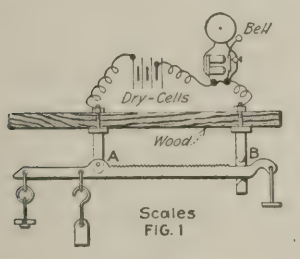
Electric Signals on a Modern Tipple

By FRANK HUSKINSON
Lafayette, Colo.

SYNOPSIS—*A system of signals is here described that enables intercommunication between various localities on the tipple. The scale signal is semi-automatic in that when a car has received a certain loading a warning bell is sounded.*

ON A tipple that has two dumps and where coal comes from several mines, a reliable system of signals that can be heard above the noise is necessary to enable the dumpers to know when to start or stop the dumping of coal. Nowadays, when the railroads require that all cars must be loaded to within a very small per cent. either under or over their rated capacity, it is necessary where there are several scales that these be arranged in such a manner as to give a warning signal when the car is about loaded. It is also necesary that the weighmaster be enabled, by a system of signals, to let the dumpers on top of the tipple know when to stop and when to start to dump coal, while he furthermore must be able to signal to the box-car loader operator and the car droppers, and they to him.

The tipple at the mines at Delagua, Colo., have two dumps, each one independent of the other. The average amount of coal handled over this tipple exceeds 2200 tons per day. There is a weigh-house for each dump on each side of the tipple to weigh the coal as it comes out of the mines. Most of the coal is loaded into box-cars. There are four railroad tracks underneath the tipple, each with its separate scale. The slack is



Scales
FIG. 1

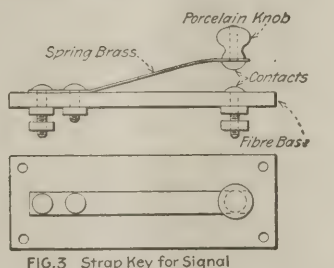
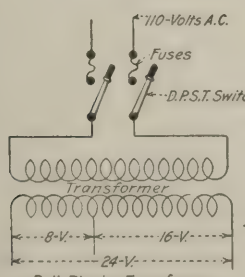
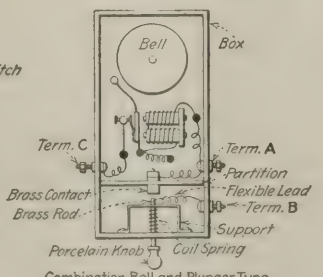


FIG.3 Strap Key for Signal



Bell-Ringing Transformer
FIG.5



Combination Bell and Plunger Type of Push Button
FIG.4

FIGS. 1, 3, 4 AND 5. SHOWING VARIOUS DETAILS OF SIGNAL SYSTEM

screened out and the balance of the coal is loaded into coal cars or box-cars.

The scales for weighing the railroad cars are located together in a room halfway from the bottom of the tipple to the top. One man attends to all of the weighing and billing out of all the railroad cars, and it is seldom that a car is overloaded or underloaded, due mainly to the system of electric signals.

In the weighmaster's room each scale is arranged with a signal system, as shown in Fig. 1. The scale beam is pivoted at *A*, and connection is also made here. The stop at *B* is normally open on the upper side until

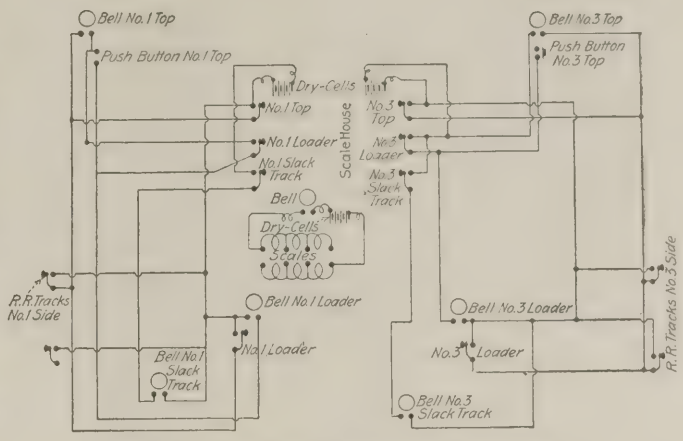


FIG. 2. COMPLETE WIRING DIAGRAM

the scale beam balances. The bottom stop on *B* is insulated from the beam by a piece of fiber. When the scale beam balances it makes contact with *B*, to which another connection has been made, This closes the circuit, causing the electric bell to ring as long as the scale beam is touching *B*. It thereby attracts the weighmaster's attention to the scale. As soon as a car is run onto the scales the weighmaster weighs it and sets the scale so that it will balance at a few hundred pounds less than the capacity of the car. He pays further attention to the scale only when the bell rings.

In order to let the box-car loader operators know when to start or when to stop loading there is a strap key at each scale that rings a bell at the box-car loader. A strap key is also installed at each scale so that the weighmaster can ring the bell at the top of the tipple to let the dumpers know when to stop or when to start dumping coal. Furthermore, the bell box at the top of the tipple is fitted with a special push button, so as to ring the bell at the box-car loader, and the box-car loader is provided with a strap key for ringing the bell on top of the tipple. Two strap keys are located at each railroad track. These keys are placed so that a man can signal with one of them from the ground or from the top of a box-car or coal car, to start or stop the dumping.

In Fig. 2 is shown the complete wiring diagram for the entire system of bells and strap keys. In Fig. 3 is shown the construction of one of the strap keys. These are easily and cheaply made and are reliable and durable, with nothing to get out of order. In Fig. 4 is shown the construction of a combination bell box and special plunger type of switch, all completely inclosed in a weatherproof box, so that the weather as well as those persons that are always experimenting and putting such things out of order can not get to it. This

switch is reliable and durable, and will not get out of order.

I made up and installed the complete system as shown in the diagrams, over a year ago, and it has not given any trouble other than the dry cells having to be replaced periodically. At the present time I am figuring on taking out the dry cells and putting in a good bell-ringing transformer. A diagram of the transformer is shown in Fig. 5. This can be used instead of the dry cells. The change will mean that the bells, if made for direct current, will have to be readjusted and will require more voltage from the bell-ringing transformer than they do on the dry cells. As shown in Fig. 2 the scheme of wiring is interesting since it is designed to give the most satisfactory service with a minimum amount of wire.

Coal Washery Collapses

By Correspondent

The photograph shown below is of the wrecked washery at the Parrish colliery of the Lehigh & Wilkes-Barre Coal Co., Plymouth, Penn. The washery was working as usual during the morning, but as the afternoon operations were resumed it was noticed that the wooden foundations were cracking and, therefore, the employees were ordered out. The building fell to the ground at 1 o'clock, Apr. 29, 1918.

The washery at this operation was built in 1910 and enlarged in 1912. The trouble began in the center of the building, directly under the pockets, which rested on upright pieces 12 x 12 in. in size. As soon as the supports under the pockets gave way the building collapsed toward the center from the four sides.

The building site is located on low ground, and the occasional floods and the wash water resulting from the operations rotted the foundations, thus weakening the supporting timbers, the decay of which was of course accelerated by the alternating wet and dry condition. Owing to the warning, no one was hurt.

Some Observations on Ice, Water and Steam

By W. D. Owens
West Pittston, Penn.

Ice is found to be much lighter than water. In other words, it requires 109 cu.ft. of ice at a temperature of 32 deg. F. to produce 100 cu.ft. of water at the same temperature. This is the reason why ice floats, having about one-eleventh of its bulk exposed above the level of the water. Ice, also, to a certain extent, at a temperature of 32 deg. F., has the power of absorbing heat without any apparent rise in its temperature even though a change of state takes place. Thus, if you take a pound of ice at 32 deg. F., and another pound of water at a temperature of 174 deg. F., and insert the ice into the water at the above temperature, the heat of the water will convert the ice into liquid. There will then be 2 lb. of water, but its temperature will be only 32 deg. F. Thus, 142 units of heat were absorbed by the 1 lb. of ice, the only effect being to convert it into water. Hence 142 B.t.u. is called the latent heat of ice.

In converting the pound of ice into water it contracted in bulk about 9 per cent.; but if heat is applied further to the 2 lb. of water at 32 deg. F., the volume will still continue to contract or diminish in bulk until the temperature reaches 39.2 deg. F. At this point water weighs more per cubic foot than at any other temperature. In other words, if water is made either higher or lower in temperature than 39.2 deg. it will expand.

Water when heated under atmospheric pressure from 39.2 to 212 deg. gradually but continuously expands. At the latter temperature, however, it ceases to increase in volume; but upon continued absorption of heat is converted into steam. It also ceases to become warmer, or higher, in temperature as long as the pressure of the atmosphere is constant.

The amount of expansion between 39.2 and 212 deg. is but 4.3 per cent., and its specific gravity undergoes a corresponding change. Pure rain water weighs 62.424 lb. per cubic foot at 39.2 deg. F., and its specific gravity



WRECKED WASHERY AT THE PARRISH COLLIERY OF THE LEHIGH & WILKES-BARRE COAL CO.



WATER-PURIFYING PLANT AT COAL MINE IN CLEARFIELD COUNTY, PENNSYLVANIA

at this temperature is taken as a standard, being here unity or one. All comparisons between the weight of air and water should be taken at a temperature of 39.2 deg. F. or 4 deg. C. The weights of the two fluids at this temperature are in the ratio of 1 to 786, or, in other words, water is 786 times denser than air at this temperature. If air and water are heated above this temperature the expansions are not proportional. Water expands on an average between 39.2 and 212 deg. F., about 1 in 4000, but the expansion of air is constant—1 in 460. If, however, the temperature of both air and water be reduced below 39.2 deg. the air will contract 1 in 460 and becomes heavier per unit volume, while water expands and becomes lighter.

If 1 cu.ft. of water is raised in temperature to 212 deg. F., or boiling point in the atmosphere, and kept boiling continuously, it will in a certain period be all converted into steam the volume of which will be equal to 1696 cu.ft. This steam will however retain a temperature of 212 deg. F. or 100 deg. C.

Again, if this body of steam, 1696 cu. ft., is now allowed to enter a volume of water at 32 deg. F. and weighing 5.36 times as much as the steam, the steam will all condense into water; but the temperature of the whole body will be found to be 212 deg. F. In other words, 1 lb. of steam at 212 deg. F. will raise 5.36 lb. of water from 32 deg. F. to a temperature of 212 deg. F., when the whole resulting 6.36 lb. will show this same temperature. Therefore $(212 - 32) \times 5.36 = 966$ B.t.u., which is called the latent heat of steam. This is equivalent to 536 units of the centigrade thermometer.

The molecular weight of water vapor is 8.96 when hydrogen is taken as 1; oxygen, 15.96; common air, 14.45, and nitrogen 14.1; hence if a cubic foot of air at 39.2 deg. F. weighs 0.0794 lb., a cubic foot of water vapor at the same temperature and pressure will weigh only 0.0493 lb.; and, according to the rules of expansion, will weigh at a temperature of 212 deg. as follows: $\frac{460 + 39.2}{460 + 212} \times 0.0493 = 0.0366$ lb. Or dividing 62.424 (the weight of 1 cu.ft. of water at 39.2 deg.) by 1696 (its total expansion into steam), will give practically the same result; thus, $\frac{62.424}{1696} = 0.0368$ lb.

Mine Water-Purifying System

The illustration above is of a water-purifying plant at one of the large mines in Clearfield County, Pennsylvania. At some periods of the year this colliery can procure clean water from the Buffalo, Rochester & Pittsburgh R.R. for use in its boilers, but for the most part it is forced to use mine water. This water is full of impurities, and to prevent it from ruining the boilers it is treated with soda and lime, the quantity used depending on the analysis of the water.

The water tanks, of which there are three, are 15 ft. in diameter and 15 ft. deep and contain 19,880 gal. of water each. Twelve tankfuls of water are used by the boiler plant in 24 hours. After the lime and soda have settled, the water is drained off from the bottom of each tank and filtered through charcoal and sand to the supply tank. This equipment was furnished by Scaife & Son.

Referring to the illustration, the house farthest up the hill is the supply house. The one just below it is the mixing house. Immediately to the rear are the three treatment tanks. The tank shown on the extreme right is one of the two supply tanks, the water from which is fed direct to the boilers.

The ratio of the volatile carbon to available hydrogen is only one of probably several factors which may indicate the burning qualities of volatile combustible. Among the other factors the oxygen content in "moisture and ash free" coal suggests itself as the most important one.—*Bureau of Mines Bulletin No. 135.*

War as a Supreme Test of Efficiency*

By EDWARD N. HURLEY
Chairman, United States Shipping Board

IN PAST wars victory was thought largely a matter of purely military strategy. Under our highly organized system of today, the whole weight of the nation must back up with its full resources military and naval action. Otherwise there can be no effective action. This means that everything of basic importance needed to carry on the war must be operated as a unit. Coal is a fundamental. Transportation for the carrying of coal and all other commodities is another fundamental. Our Government is fast going ahead with its process of coördinating railroad systems and inland waterways, lake, coastwise and ocean transportation. Railway equipment is being provided. Fleets of ships and vessels have already been speeded from our shipyards, and many more will follow.

Whatever the length of the war, we are preparing in good measure for present and future. We are doing it in a large way worthy of our great country. Not only for the war, but for the times after the war, when we shall be called upon to do the immense work of rehabilitating devastated Europe. Other countries needed our coal before the war—nearly 21,000,000 tons of it annually. They have needed more of it since the war began. They will need it after the war. And we will not only have the vessels and other vehicles to carry on our inland and coast waters and on our railroads the millions of tons of coal used yearly in this country, but we shall have a great merchant marine of our own to carry coal and all other American products to other countries.

Up to Operators to Produce Coal

The distribution of coal is only one part of the problem. The coal requirements for the United States for the coming year are nearly three quarters of a billion tons, and if this nation is to run on a war basis during the next twelve months, the coal mines must produce at least seven hundred million tons of coal. That is an enormous tonnage that the nation calls on you to furnish. We understand that in the past your production has been limited by insufficient transportation. The fact is now well understood, but the railroads of the United States have been brought under the direct control of the Government. We are told that one billion dollars will be expended this year in improving and expanding our railroad transportation facilities. With new locomotives and cars and with new tracks, bigger yards and better terminals and with centralized control, sooner or later the mines will be furnished all the transportation needed to haul their output to the points of consumption. It will then be squarely up to you to produce the coal. In the meantime you will have suffered a progressive loss in the numbers of your employees and unless you have made preparation to get the utmost efficiency out of your mines and your organizations, we will fall far below the coal production that we will need.

It seems to me that one of the most important things your association can do is to begin active preparations now to increase your efficiency so as to maintain the production of coal at the highest possible level. You have taken the first step in this direction by working out a uniform system of cost accounting and by organizing a cost accounting department to assist mine operators to put their business on a sound basis. In every trade association the strong must help the weak and in most cases the weak are those who know the least about their own business. Accordingly, the first move to strengthen your industry is to teach those weak producers the facts about their own conditions. Coal should be mined at a profit, but no man can know whether he is really making a profit or not unless he knows his costs.

Thoroughgoing Cost Accounting Means Efficiency

Profits are not all, however. No man can know whether his organization is really efficient or not unless he knows his costs and unless he has some standard of costs, either the average for his field or the figures of the lowest producer which he can use to compare with his own. It is vital to us all to develop the highest industrial efficiency of which we are capable today. In one sense, this whole war is a test of industrial efficiency. Thoroughgoing cost accounting is the very basis of efficiency in your business, as in every other business. Accordingly, it is especially gratifying for me to know that you have already begun this first great educational work which you must carry on among the coal producers of the United States in order to increase your efficiency.

In the next place, you should examine critically your own management. In my judgment, 50 per cent. of the inefficiencies of coal production today are due to poor management. At this meeting your association should recommend that in each district a committee on efficiency be appointed and that they put forth every effort to improve the management of the mines in that district. Many of your properties are well equipped and well managed and might serve as models for all the world. They set a splendid standard for the efficiency committee to measure up to, yet you know that there are hundreds of mines that are not well equipped; that are indifferently operated; that are loading poor coal; in short, that are poorly managed. They constitute a fertile field for your efficiency committee to cultivate. This is one way for you to show the Government and the people that your association is really worth while. As long as you have inefficient management in any considerable part of the coal-mining industry, this organization is necessary for the success of the coal-mining business.

I have always thought that the mining of coal could be improved by the use of more supervision. The general manager of a certain property once told me that in his mine he had a foreman to approximately every 200 men. The president of his company, after looking into the matter, asked him to increase the

*Abstract of speech delivered before the National Coal Association at the Bellevue Stratford Hotel, Philadelphia, May 28, 1918.

number of foremen and assistant foremen to one to every 40 or 50 men. This was done, and he found that the greater attention to detail, the better care of the property, the decrease in accidents and the general improvement of his organization, resulted in a very definite increase in the production. We found the same fault in many of our shipyards when we had their management looked into. We found many yards had no competent foremen, no layout men, no supervision at all that modern industrial practice demands. We put a sufficient number of good superintendents and foremen into those yards and obtained surprising increases in the efficiency of production. Isn't it worth your while to make this kind of study of your own organizations? When we found that we did not have sufficient foremen or layout men and that many of the men did not know the best methods of work, we established schools to teach the fundamentals of shipbuilding to the men and the superintendents.

When Mr. Schwab made his first trip to Hog Island he wanted to get in contact with the workmen, the foremen, and the superintendents, instead of the president and vice presidents, and he said: "Hurley, if we are going to build these ships, I must meet the workmen, foremen and the superintendents; they are the men that are going to finish this job for us." Your superintendents and foremen are running your mines while you are here in Philadelphia. You know that the superintendent out at the mine is on the job today and that everything will go all right as long as he is there. In addition to paying good wages to your workmen, pay your foremen and superintendents good salaries and encourage them with a bonus on your increased output.

If each industry in this country would have its superintendents and foremen get together, either through some auxiliary to their trade associations or through some school, to discuss ways and means to improve their methods of production and management, they would materially benefit their industry.

Labor Playing a Great Part

Labor is playing a greater part in this war than in any other conflict which the world has known, and let me say here that in the United States labor as a whole is measuring up to its responsibility splendidly. The leaders of organized labor in Washington are men of the highest character, patriotism and honesty. All of us who are acquainted with Mr. Gompers' work know that he has endeared himself to the people of America and all of the allied nations by the position which he has taken in this war. He has about him other able men who are equally loyal and patriotic.

On the whole, however, labor as well as capital is not producing that degree of efficiency that it should produce in these trying times. If faulty management is responsible for 50 per cent. of the inefficiencies in the production of coal today, inefficiency on the part of labor is responsible for the other 50 per cent.

The reports to the Government show that from 10 to 20 per cent. of the men in the mines are not working as they should. In mines that are given sufficient car supply there are some employees who are not working as steadily as they should. Some of these men fail to work their full eight hours when they do enter the mines. Others work only three or four days a week when they might work six. Under these conditions, it is not a question at present of increasing the number of hours the mine operates per day, but it is a question of the men working fuller time each day and working more days in the week.

Men Were Willing to Work Overtime

You may say that this is primarily a matter for labor itself to deal with. In part that is true, but have you yourselves done all you can to remedy this condition? The president of one big western Pennsylvania coal-mining company recently found that with a full run of cars, a certain number of the cars were standing over at his mines every night and were not being loaded. He took the matter up with his men in a meeting and explained to them something of the necessity to the nation at present of having increased coal production to carry on the war, and brought home to them as best he could their responsibility to mine the coal. After the meeting was over, some of the English-speaking miners came to him and said that if the country needed the coal they were willing to stay overtime and get other men to help load the cars that were left over each evening. That incident serves as an illustration of the spirit that can be roused in your men if they are properly approached. They are just as patriotic as you or I. Their sons and brothers are going into the trenches.

They will do their part as earnestly as any of us if they understand clearly what their duty is, but it is first up to you, the presidents and owners of coal properties, to do your part by going to the mines personally, obtain first-hand information and explain to your men the great need for increased production.

With full running time, the mine wage scales are remunerative and the men can make good earnings. Wages are based on the effort of the individual miner. Practically all of the coal in the United States is paid for on the piece-work basis at some rate per ton. Under these conditions, if the miner wishes to increase his earnings, he can do so by working more energetically and nearer full time. In getting increased efficiency from labor, therefore, there is no question of a fair day's pay for a fair day's work. The man can get his fair day's pay if he is willing to work.

I wish to express my admiration for the United Mine Workers of America as a great labor organization that recognizes the piece-work basis.

The United States Shipping Board Emergency Fleet Corporation has established a rule that any piece-work rate set by any shipbuilder must stay in force during the period of the war. The controversies between employers and employees over the question of piecework has been most serious, and the employers in many cases have been chiefly to blame. Any manufacturer, whether he be a producer of coal or any other commodity, who sets a piece-work rate, finds he has made a mistake, and then reduces that rate, is doing a great injustice to the workman. A piece-work rate set by a manager, superintendent or foreman is a contract that should be kept in force for at least one year. Furthermore, if this piece-work rate is on a particular machine, and

the man or the operator should leave or be dismissed, the man who succeeds him should receive the same rate. A law passed by the Government making it compulsory for a piece-work rate to remain in force for a given time from the date it is put into effect would be helpful to labor and industry.

It cannot be doubted that in many industries there will be a decided shortage of labor after the war, not only in this country, but in most of the countries of the world. That country will best succeed which protects its workmen by improving their living conditions, by providing for insurance against accidents and protection for their families, and guaranteeing a fair return from their labor—all under conditions that will be helpful to make the worker a better citizen. The country taking those measures will be the country that will develop and produce the products most economically, and will be performing a world service by producing goods at a price that will be fair to other nations. Unless we have efficient management and efficient employees, our country will be at a great disadvantage compared to countries which establish these improved conditions.

It is true that labor itself must do its full share in obtaining increased efficiency from mine labor, and if the operators have committees in each district to increase the efficiency of mine operation the United Mine Workers should appoint committees to take up this matter of fuller working time and better effort on the part of mine labor. In some effective manner mine operators and mine workmen should coöperate in democratic fashion in the common cause of winning this supreme struggle for democracy by obtaining increased production of coal.

Shipbuilding Industry Solved Its Problems

Some of the problems that you are meeting in this industry we have had to meet in the building of ships, and a brief outline of our efforts to overcome them may afford you some suggestions that will be of value in solving your own problems.

In the sphere of shipbuilding we built 91 new wood and steel yards since last July. Most of the organizations that built these yards and many of those working on our great new merchant marine are men who had never before built ships. A vast force of men were put to work on yards and ships of all kinds. New foremen and new superintendents were engaged. Many obstacles, such as develop in a new industry, turned up, but we constantly tried to improve our knowledge about the building of ships. One particularly serious problem faced us. We found we did not have sufficient foremen or layout men. We started a number of schools to educate the men and teach the fundamentals of shipbuilding. Less than a year ago there were not 45,000 men employed in American shipyards—today we have 300,000 skilled mechanics and laborers in our shipyards, and 250,000 additional men are employed in making boilers, engines, winches, etc.

We have a Department of Education and Training, whose task it is to train workmen, foremen and superintendents. The training of the various kinds of shipbuilders in the yards is accomplished by putting the men to work on production jobs, under the supervision of a yard instructor. This yard instructor has full charge of gangs while they are learning. The jobs they do are selected for their educational sequence, but are all of them production jobs. The efficiency of a green gang under training will average about 80 per cent. that of a finished workman. Yard instructors are skilled mechanics to whom has been given a knowledge of teaching method. This knowledge is gained in a training center, which is designed to teach the skilled mechanics how to instruct. The mechanic is given an idea of instructional management, and how to get the instructions across effectively. The difference between a yard instructor so trained and a production foreman is that the former knows how to go about the job of teaching, whereas the latter does not.

The first training center was established at Newport News. To it were sent skilled mechanics, selected from the yards. They were given a six weeks' course of training, eight hours a day. During the last part of this course they were obliged to spend 40 hours in the actual handling of gangs of green men. Yard instructors are drawn from a variety of trades, such as riveters, ship fitters, ship carpenters, caulkers, etc. While each one teaches a different line, the instructor training which they get is essentially the same. Twenty-two plants have sent men for training as yard instructors. Of these 216 have completed their training and 74 are now in training.

Could Make Improvement in Other Industries

In addition to the training of green men, there exists the problem of taking men who are already skilled in allied trades, but have never worked in shipyards, and making them into shipbuilders. This is called a trade conversion course and consists essentially of determining what supplementary work a skilled mechanic from the allied trades must have in order to give him the necessary knowledge to do shipbuilding work. Careful studies of this conversion process and the instruction necessary have been made and special trade conversion instructors are employed in a number of plants to meet this situation.

If we could do this in the shipbuilding industry, if we could develop in a year the building of wooden ships which has been a long-lost art, if our workmen in many yards have increased in efficiency more than 25 per cent. through this method in the past few months, it can be done in other industries. We did it by improving the management. Where we have efficient management we have efficient workers. You can't expect to have efficient workmen in an inefficiently managed shipyard nor can you expect good results.

It we have thus been able to start anew the building of ships and in a year's time have organized a great new industry employing almost as many men as yours, if we are throwing away the old standards and setting up new ones, if we are breaking records every day, if we are devising new methods to improve our management and increase the effectiveness in the shipyards, I trust that you men will rouse yourselves to new efforts, will take a fresh view of your industry, and will obtain a sufficient production of coal, in spite of all the difficulties that may beset you, and will give the Government your thoroughgoing support in carrying on the war. These are the results that the nation will inevitably expect from you and I am sure you will not disappoint the American people.

We are building ships not alone for the war, but for the future of world trade. Remember that once their part in the winning of the war is ended, a large number of them will be engaged in bringing back to home and industry the victorious soldiers, and in transporting to Europe the materials necessary for reconstruction of normal life freed from the menace of avaricious autocracy. These vessels will serve the commerce of other nations equally with our own.

The building of ships, the mining and distribution of coal, the production and conservation of food products and other important war necessities are all vital to the nation's needs during these trying times. No great task can be undertaken, if quick action is to be obtained, without the making of some mistakes. We may make mistakes, but we are moving forward and getting results. We cannot go far wrong with the American people united and working for victory. If each of you will do your part, putting your country above everything else, we will win.

Anthracite Distribution Program for Current Coal Year

The Anthracite Committee of the United States Fuel Administration—composed of Joseph B. Dickson, S. D. Warriner and W. J. Richards—has gone over the whole problem of fuel supply and distribution in conference with Dr. Garfield. Those in charge of the bituminous distribution, who have an equally difficult problem, have also been consulted. Both must be worked out together to best uphold the public interest. To meet the war needs compels use of considerable anthracite in place of bituminous. This has been arranged through undertakings to substitute bituminous wherever it can be used.

Upon such basis of coöperation, which entails not only readjustments in the country's fuel supply as between sections and uses, but a new balance as between anthracite and bituminous, domestic sizes of anthracite will be distributed during the coal year, which runs until Apr. 1 next. This distribution and arrangement has the approval of Dr. Garfield, United States Fuel Administrator. The following allotments will be made under it:

1. It is closely figured that a total of 54,345,783 tons of anthracite of domestic sizes will be available for distribution to consumers during the period. Such amount will be an increase of 2,668,323 tons, or more than 5 per cent., over the actual distribution for the coal year 1916-1917.

2. Distribution to New England and Atlantic states will be materially increased to meet the greater requirements of their expanded population. It is to be noted that the greater needs in these states for domestic fuel are not in full proportion to the larger population, for the reason that the average number of people per house, particularly among industrial workers, has increased so that the additional houses to be warmed are not as many as might be expected.

3. Government requisitions for anthracite to be supplied the army and navy, and to war industries and utilities which require it, will be fully met.

4. To make possible such necessary increased distribution upon Government orders and through those sections of the country where the people are dependent upon anthracite for heating and cooking, there is no alternative but to curtail shipments to other states and to bar anthracite entirely from many more where it has been used but in which bituminous and other fuels can be procured and substituted.

Comparing with the coal year 1916-17 the foregoing work out as follows:

	Tons
Increased production	2,668,323
Curtailment in distribution	2,202,288
Gain from barred sections	765,931
Total gained	5,636,542
Less army and navy	600,000
New balance available	5,036,542

Such available freed balance is allotted to increase the distribution of domestic anthracite among the New England and Atlantic states. It enables an increase of 1,497,621 tons, or 17 per cent., in the total amount to go to New England, and of 3,538,921 tons, or 13 per cent., in the amount for the Atlantic states.

Fuel Administrators of the six New England states figured the probable demand of 10,699,400 tons for domestic requirements. The allotment made by the Anthracite Committee is 10,331,000 tons of domestic sizes for all purposes.

Fuel Administrators of the Atlantic states—New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and the District of Columbia—asked for a total of 33,413,621 tons for domestic requirements. To the Atlantic states the allotments by the Committee total 31,417,154 tons of domestic sizes for all purposes, an increase of 12.69 per cent. over last year.

Increased Allotment for New England

Increased allotments to New England and the Atlantic states are made with regard to their necessities—the larger population which the war has concentrated in such sections, their essential dependence upon anthracite, and the virtual impossibility of getting bituminous for their needs. Shipments to the full amounts of the allotments are dependent upon the expected output of domestic sizes being reached.

It must be understood that these allotments to New England and the Atlantic states represent absolutely the maximum amounts which can be given without grave injustice to people elsewhere in the United States and Canada who require anthracite in substantial amounts.

The Anthracite Committee states further that should it be possible to gain any anthracite out of the nearly 2,500,000 tons used by the railroads for fuel, or to expand the total production above the 54,345,783 tons of domestic coal estimated as the output for the year, such gained coal will be distributed to increase the allotments as now fixed for the central and northwest states, which, as it stands, are called upon to make large sacrifice from their accustomed prewar supply of anthracite.

Compared with the actual distribution for the coal year 1916-17, both by state and groups of states, the allotment of domestic anthracite for all purposes for the current coal year as made and now publicly announced by the Anthracite Committee is as follows:

ALLOTMENT OF DOMESTIC ANTHRACITE FOR ALL PURPOSES FOR THE CURRENT COAL YEAR COMPARED WITH COAL YEAR 1916–1917

	1916–1917 Distribution	Allotment, 1918–1919	Increase, Per Cent.	Decrease, Per Cent.
New England:				
Maine	556,683	660,000	18.56	.....
New Hampshire	314,945	375,000	19.07	.....
Vermont	316,850	330,000	4.15	.....
Massachusetts	5,027,993	5,689,000	13.15	.....
Rhode Island	664,008	800,300	20.53	.....
Connecticut	1,952,900	2,476,700	26.82	.....
Total New England	8,833,379	10,331,000	16.95	.....
Atlantic States:				
New York	14,169,809	15,855,300	11.89	.....
New Jersey	4,961,622	5,460,784	10.04	.....
Pennsylvania	6,815,650	8,059,700	18.25	.....
Delaware	223,503	245,853	10.00	.....
Maryland	933,889	1,027,317	10.00	.....
District of Columbia	517,760	665,800	28.59	.....
Virginia	256,000	102,400	.....	60.00
Total Atlantic States	27,878,233	31,417,154	12.69	.....
Central States:				
Ohio	585,626	246,250	.....	57.95
Indiana	710,274	284,110	.....	60.00
Illinois	2,215,122	1,750,585	.....	20.97
Michigan	1,589,002	1,201,000	.....	24.42
Total Central States	5,100,024	3,481,945	.....	31.73
Northwest:				
Minnesota	1,071,532	990,000	.....	7.61
Wisconsin	1,181,926	1,024,000	.....	13.36
North Dakota	249,314	200,000	.....	19.78
South Dakota	207,416	166,000	.....	19.97
Total Northwest	2,710,188	2,380,000	.....	12.18
Trans-Mississippi:				
Missouri	129,289	.....	.....	100.00
Kansas	15,907	.....	.....	100.00
Nebraska	130,273	.....	.....	100.00
Iowa	352,496	.....	.....	100.00
Total Trans-Mississippi	627,965	.....	.....	100.00
RECAPITULATION				
New England	9,833,379	10,331,000	16.95	.....
Atlantic States	27,878,233	31,417,154	12.69	.....
Central States	5,100,024	3,481,945	.....	31.73
Northwest	2,710,188	2,380,000	.....	12.18
Trans-Mississippi	627,965	.....	.....	100.00
Twenty-four states	137,966	.....	.....	100.00
Railroad supply	2,481,754	2,481,754	.....	.....
Canada	3,856,021	3,602,000	.....	6.59
Miscellaneous exports	51,930	51,930	.....	.....
Army and navy camps and cantonments	.....	600,000	.....	.....
	51,677,460	54,345,783	5.16	.....

When Mine Accidents Occur

Speaking before the American Institute of Mining Engineers at its recent meeting E. E. Bach, the sociological director of the Ellsworth Collieries Co., declared that at least 75 per cent. of all accidents can be prevented and that the Ellsworth concern reduced its accident list 40 per cent. in the past year.

It is in the months of July and August that the greatest number of accidents occur. October and February have the fewest of the unfortunate occurrences. The investigation of the Ellsworth Collieries Co. as to the relative hazards of the days of the week has covered a period of 7 years and shows that the greatest number of accidents occur on Tuesday and the second largest list occurs on Monday. Apparently these are the results of celebrations held on previous Saturday nights and Sundays. There are 52 distinct holidays scattered through the year, aside from the regulation American holidays, and they are followed by a lot of accidents.

The greatest number of accidents occur in the morning between 10 and 11 o'clock. In the afternoon they occur between 2 and 3 o'clock. T. T. Read, of the New Jersey Zinc Co., said that August was the unfortunate month for accidents at the zinc company's mines and that 10 o'clock in the morning and 2 in the afternoon, as Mr. Bach has found, had an unfortunate preëminence in accident rates.

Minecdotes

The Mine Foreman Solves a Hoisting Problem

An irascible mine foreman of Welsh descent, after completing his day's work, went to the foot of the hoisting shaft to be hoisted to the surface. When he arrived at the shaft foot ten men were on the cage and the bottom man was about to give the bell. "Hold on there," said the foreman, "I am going up along."

"There are already ten men on," responded the cager.

"Never mind," said the foreman, "don't you think I know what I am doing? The last man who got on that cage get off."

No one moved.

"I tell you, the last man get off."

Still no one made a move to get off.

"All right, then," he said. "I'll fix you. Come off of there, every man of you."

Of course, the men as ordered filed off the cage. The foreman, after getting on, said, "Now, then, nine of you get back on."

In Which the Paymaster Settles a Complaint

Jim was a hard-working miner and usually lifted a fat envelope on pay day. But Jim had a great fondness for the dollar, and it seemed as if he never got quite enough in his envelope to satisfy his craving. So he fell into the habit of complaining whenever he received his statement.

He would walk to the pay window, look at his statement, and then blurt out with an indignant snort, "Say, mister, I am short about five."

The paymaster would talk to him, explain every detail of his account, and when all else failed the mine boss and superintendent would be called in to help smooth matters. In the end Jim left the pay window breathing dire maledictions against corporations large and small and all paymasters in general.

The paymaster stood this for several months. Finally the thing got on his nerves, and he thought of a little scheme to put an end to it. His idea was to put five dollars more in Jim's envelope than was really due him, and await events.

Pay day arrived, so did Jim. He walked up to the pay window, went through the same maneuvers, finishing as usual with, "Say, mister, I'm short again."

The paymaster took the envelope back and carefully counted the money. Then, producing the accounts, he proved that the envelope contained five dollars too much and said, "I'm sorry, but I must take this five out of your envelope."

Jim looked quite crestfallen as he handed back the extra five; but the scheme worked like magic, for he never after complained of being short on pay day.

High temperatures such as exist in boiler furnaces and absence of oxygen promote the decomposition of all hydrocarbons, including methane, the lightest of the paraffin series, one of the products of decomposition being soot.—*Bureau of Mines Bulletin No. 135.*

Gravity Track Systems at Anthracite Coal Breakers*

By F. N. RUPPRECHT
Wilkes-Barre, Penn.

SYNOPSIS—*Five typical arrangements of tracks at coal breakers and washeries are here presented. Local conditions dictate what general plan of trackage must be adopted. Sometimes local topography dictates a design inconvenient from the operating standpoint.*

IT HAS been estimated that in the United States nearly half a million freight cars are continuously employed in hauling coal traffic. All railroads derive some revenue from this trade, but with certain roads it is the main source of income. Such roads as a rule originate the coal traffic and are vitally interested in methods that prove most economical in handling cars. This applies with particular emphasis to the loading of cars at the mines and their subsequent making up into trains. This article deals particularly with the conditions and methods employed in the anthracite region of northeastern Pennsylvania.

Coal mining and transportation have a mutual attraction for each other. Wherever convenient, collieries are located on the main line of some railroad; otherwise, a branch is built to the mine. The former practice is preferable, since in a thickly settled rolling country the construction of branch lines is difficult, and high real-estate values render it costly. Frequently the haulage problem can be most readily solved by means of narrow-gage tracks either on the surface or underground, over which the unprepared coal may be taken to a convenient breaker. Nevertheless, an extended network of railroads traverses this coal region, upon which traffic moves in all directions.

Maximum Production Not Maintained

The annual production of somewhat over 80 million tons of anthracite in Pennsylvania is divided among many collieries. The daily capacity of these plants ranges from 500 to 3000 tons and more, but the maximum capacity is not maintained throughout the entire year. With an eight-hour working day the annual production of an up-to-date colliery will not average much over 500,000 tons. At the rate of 3000 tons a day about 70 cars will be required to move the coal, and 45 tons per car may be taken as an average of capacity. It may readily be seen that the cost of switching such a number of cars day after day for the purpose of loading them would be extremely high.

Collieries are usually constructed with the idea of giving service for fifty years, or even more. Consequently, a careful study of the requirements of each individual plant with regard to track facilities is necessary. As a general rule a colliery has upon one side the track or system of tracks, for holding the empty cars. These are known as the "light tracks." On the other side of the breaker is another track or system of tracks, for holding loaded cars, known as "loaded tracks." Scales are placed upon either side of the breaker, between the building and these systems of tracks, for the purpose of weighing both the empty and loaded cars. These are known respectively as the "light" and "loaded" scales.

The track connections and grades are so arranged that a locomotive places empty cars only above the breaker and takes out the loaded cars below it. For the purpose of loading, the cars are run beside or underneath the breaker by gravity. The movement of cars from the light to the loaded tracks is of course not continuous. They are stopped at the light scales for weighing, spotted at the loading chute and stopped again for weighing on the loaded scale.

Grade of 1½ Per Cent. Most Desirable

The placing of empty cars and the removal of loaded ones do not interfere with the operation of loading or weighing in the least. The tracks running through the breaker and over the scales are not intended for locomotives so far as the curves and track materials are concerned. In a like manner the scales are constructed only to weigh cars and have no dead rail to permit a locomotive to cross over them.

Experience has shown that a grade of about 1½ per cent. is the most desirable for the operation of these gravity track systems. Under favorable conditions cars will run on a 1¼ per cent. grade, or even lower, but around sharp curves and over comparatively rough tracks, also for operation in winter, anything less than a 1½ per cent. grade proves insufficient. On the other hand, grades much in excess of 1½ per cent. will make it comparatively difficult to stop the cars upon the scales or under the breaker chutes.

The accompanying illustrations show typical track arrangements at coal breakers. They may be grouped into four distinct classes, the chief difference being in the method in which they are connected with the main track.

From an operating standpoint the most desirable method is to make connection with the main line for both light and loaded tracks, as shown in Fig. 1. In this arrangement, however, it is difficult as a rule to secure the necessary 1½ per cent. grade adjacent to the main line without resorting to a hump in the light track connection, a depression in the loaded track connection, or possibly both. Furthermore, if the main line has a low grade, the approach to the hump will be of considerable length and require a large amount of track. Finally, the distance between the light and loaded track connections on the main line will be increased. It will thus be only in rare instances, where the ground ad-

*Abstracted from "Engineering News-Record" of May 23, 1918.

jacent to the main line is favorable, and where the required right of way will be available for such a purpose, that an installation as shown in Fig. 1 can be made.

Track systems with connections at both ends are always expensive to install, and it is doubtful if the advantages from an operating standpoint are of much significance.

The method most frequently employed is to provide a direct connection from the main line to the loaded tracks, as shown in Fig. 2. A thoroughfare, or running track, is built alongside the loaded track to a point above the light scale where it connects with the light tracks. The only disadvantage of this construction is that it interferes with the continuous loading of cars when the locomotive places the empties on the light track. However, this operation takes only a comparatively short time, and if convenient can be carried out when the breaker is idle.

The advantages in the construction of this type of track system will readily be appreciated. This layout is quite flexible and can be fitted to local conditions in most cases. Since the grade of the track can be raised or lowered to fit the ground the grading is reduced to a minimum, while at the same time it is not necessary to have the breaker tracks parallel, or even approximately parallel with the main line. They may curve in any direction and be kept upon ground best suited for the purpose. The high ends of the light tracks are not connected with each other. It would be useless to make such a connection. Moreover, the stub ends save car capacity and reduce the length which would otherwise be required for the light tracks and the track system in general.

Fig. 3 shows a layout in which the light tracks are connected with the main line. This construction is not as desirable as the one just described, the main objection being that the locomotive does more or less switching when the loaded cars are removed. This switching necessarily interferes with the running of the loaded cars onto the loaded tracks immediately after they have been filled with coal. Whenever convenient the loaded cars should be taken away during the hours when the breaker is not in operation. Generally, however, there will be more interference in removing the loaded cars than in placing the empties on the light track. In this type also loaded cars have to be hauled up a steep grade when they are removed from the colliery.

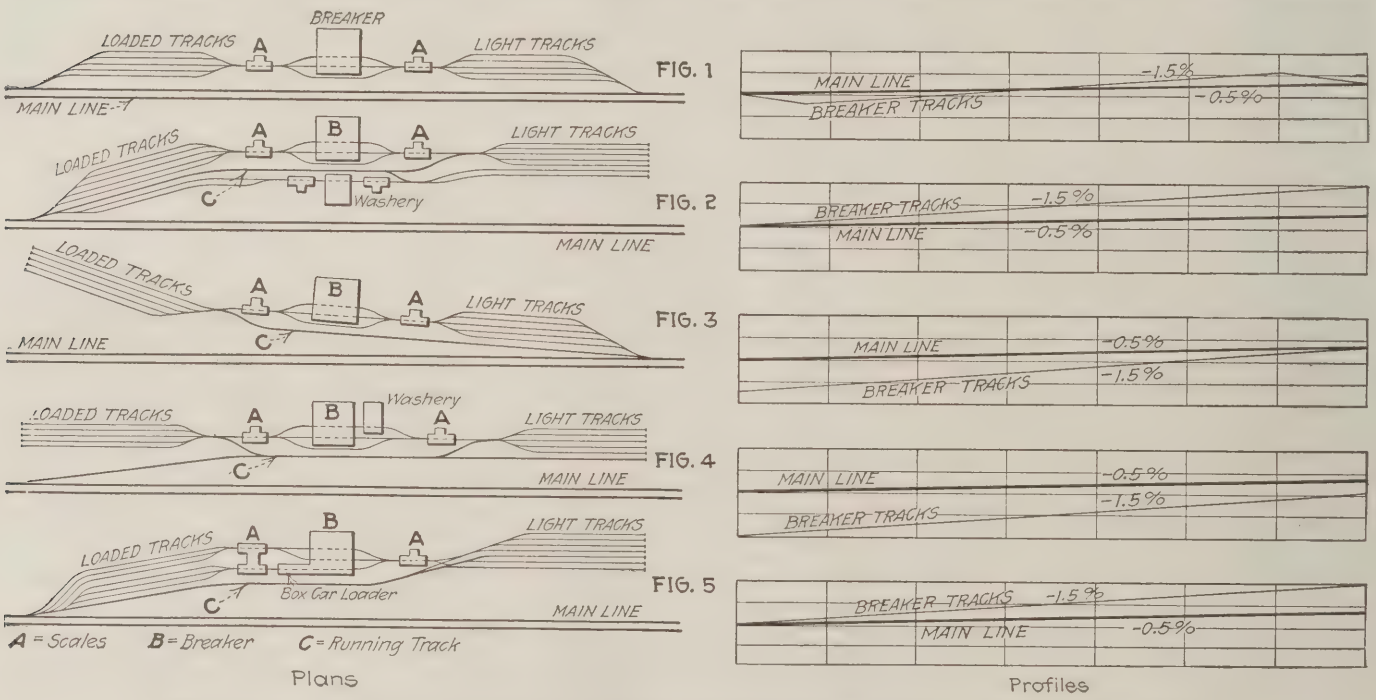
Such a track system as this is resorted to in places where the main line is on a high embankment, and where it is desired to construct the breaker on low ground beside it. In flexibility of construction there is no difference whether the light tracks or the loaded ones are connected with the main line; the difference lies in the operation alone, as has been shown.

A track system not frequently employed is shown in Fig. 4. Here the far ends of both the light and loaded tracks are disconnected, and both the operations of placing empties and removing loads will result in interference with the continuous loading of cars, because the only access to the track is over the connections alongside the breaker. Moreover, a reverse movement is necessary, either in placing empties or removing loads, depending on whether the loaded or light tracks form a continuation of the branch leading to the colliery.

From an operating standpoint, therefore, this track system is not desirable. Its advantage lies in the fact that for the same car capacity it will require less space than any other system, and that it can be readily adapted to the various conditions of insufficient right-of-way and unfavorable topography.

A construction of this type will usually be found some distance from the main line of a railroad, the difference in elevation between the main line and the colliery track determining to a considerable degree the location and grade of the branch line.

At the present time many washeries usually located adjacent to collieries are reclaiming coal from the old



FIGS. 1 TO 5. TYPICAL RAILWAY TRACK SYSTEMS AT ANTHRACITE-COAL BREAKERS

culm banks. A considerable number of these banks, however, are located at points where the collieries have been abandoned. In such cases the tracks serving the washery are extremely simple, as the capacity of such a preparation plant is only a few hundred tons a day.

Frequently a single track without scales is laid either through the washery, or beside it, the grade being made such that the cars may be moved by gravity after they have been placed by locomotive.

Where a washery is operated in conjunction with a breaker it is highly desirable to have this washery located beside the breaker, provided there is sufficient room. In such a case there will be no duplication of facilities, and the washery will be benefited by all the advantages secured from the breaker track system. It is not always possible, however, on account of lack of sufficient space to effect such a location, and frequently the washery is placed on the opposite side of the running track, as shown in Fig. 2.

Tracks serving a washery are constructed on the same principles as those serving a breaker, and parallel with them, although of course the capacity will be much less.

Sometimes existing collieries are overhauled, equipped with improved machinery and the capacity increased. In such a case it is necessary to provide additional tracks to take care of the increased output. The track system already existing and designed with the intention of occupying as little space as possible may present a difficult problem when extensions are required and expenses must be kept down.

If it is impossible to add length to existing tracks, which is not uncommon, the only alternative is to construct new tracks paralleling the existing ones, and make the best connections possible.

Fig. 5 shows a satisfactory method of adding to the capacity of a track system which could not be extended in length. Each group of light tracks has to be accessible to the running track (for the purpose of placing empties) as well as to the light scales. This results in a set of crossing frogs. The loaded track additions require the construction of a second loaded scale, so as to use all of the available space.

The total capacity for which the light and loaded tracks should be designed will depend not only on the capacity of the colliery, but also to a considerable extent upon operating conditions. After the daily capacity of the plant goes beyond a certain number of cars, which may be handled by one locomotive, the capacity of the tracks may have to be only slightly in excess of this, because the switching service can be so timed that empty cars will always be on hand. For instance, a train of empties may be placed early in the morning and another one early in the afternoon.

The rail employed in the construction of breaker tracks is usually "relayer," and in places where the track is not traversed by locomotive this may be as light as 62 lb. per yard. Turnouts through which locomotives run are usually No. 8's; but those which only take cars may be No. 6's or even No. 5's. In order to save as much room as possible turnouts are frequently designed on the style of the old three-throw stub switch, except that the two switches are about 25 ft. apart and the frog is not in the center of the main track.

Formerly scales 38 ft. long were ample, but at the present time the length of cars has been increased so that 42-ft. scales are too short, and 50-ft. scales are being installed.

To facilitate the filling of box-cars, which are quite common nowadays, to their full capacity, box-car loaders of various types are being employed. One type of this device consists of a vertical turntable on which the cars are placed and revolved through a vertical arc, first one end of the car being lowered and filled with coal and then the other.





FIGS 6 AND 7. LIGHT TRACKS SHOWN IN THE LEFT-HAND VIEW, LOADED TRACKS IN THE RIGHT

Modern collieries also have facilities for the economical handling of condemned coal. Cars condemned for having too much slate are taken by locomotive from the loaded track and replaced on the light track. From here they run by gravity over a hopper pit, just above the breaker, where they are emptied and again spotted for loading. The condemned coal is taken by a conveyor back into the breaker for retreatment.

One of the outside tracks of the breaker is frequently used for the unloading of supplies of various kinds, such as mine props. Sometimes, also, there is an extra track leading to the power house, where fuel may be unloaded. Provision for such track forms a variation in the layouts as shown in this article.

The temperature in a boiler furnace is about 1400 deg. C. At this temperature oxygen reacts with the combustible material to be burned very rapidly, but proper conditions for reaction must be provided.—*Bureau of Mines Bulletin No. 135.*

Some Reasons for Industrial Discontent*

By IRVING FISHER
Professor of Political Economy, Yale University

IN ORDER that labor shall be contented we must understand the psychology of the workingman. We must satisfy his great fundamental human instincts. I believe there is a field for what might be called industrial psychiatry. I have talked about this often in my classes but have been rather hesitant to say anything about it publicly; until recently I have discovered that a number of other people have been working along the same line and have reached substantially the same conclusions.

Among these is at least one practical employer of labor, Robert B. Wolf, who has shown, in the wood-pulp industry, that it is possible to make the work itself interesting to the laboring man. I believe that herein lies the hope of solving the great industrial problem of labor discontent more than in any other direction. I think that if employers would join Wolf and the few other employers who have gone into this line, studying the psychology as well as the physiology of labor, and try to adapt conditions of work to the needs and yearnings of labor, labor discontent will be diminished far more than by any other method I know of.

Must Satisfy Fundamental Human Instincts

As I see it, any human life in order to be a successful human life, must satisfy six or seven of the great fundamental human instincts. In my classes I have been enumerating them as follows: First, there is the instinct of self-preservation, about which little needs to be said, because we all recognize it. The trouble is, we harp too much on that one string. We think that is all the workman is interested in; that his interest is confined to his pay envelope. Undoubtedly that is the most fundamental thing. But there is also the instinct of self-expression, or the instinct of workmanship; there is the instinct of self-respect and respect for others; there is the instinct of self-sacrifice or heroism; the instinct of love, or the home-making instinct; the instinct of loyalty; and possibly, whether it is innate or not I do not know, the instinct of worship. If we examine the misfits of life, those who fill our insane asylums, our prisons, our hospitals, you will find that they are made up of people who have not been able to satisfy all, or possibly any, of these fundamental instincts.

In order that the laboring man may live his life, he must satisfy something more than the instinct of self-preservation. His life cannot amount to much if it merely consists in keeping body and soul together. And yet, with strange blindness, the employer assumes that the only thing his employee is, or can be, interested in is his wages. Hence these ingenious schemes, like the Taylor system, for trying to get more work out of labor consist entirely of thrumming on this one string—trying to hold out a bale of hay for the donkey, and as he approaches it, making him walk the faster to reach it. I believed thoroughly in these systems, and in piece work, until I began to understand what at first had appeared to me strange, the objections on the part of the laboring men, though they did not and do not themselves understand the nature of their objections. Their souls are hungry and thirsty to satisfy these great instincts, but they do not know it.

Now, what Robert B. Wolf did was to restore, in the first place, the instinct of workmanship, which has been subtly abstracted from industrial life through specialization of work and division of labor. Originally a man was interested in his product, just as an artist is interested in his picture. But today, with the minute division of labor, a laboring man sees his work sweep by him, a peg in a shoe, a bolt in an automobile, and since he is not able to visualize his part in the product his work ceases to be interesting and becomes drudgery.

He wants to shorten his hours; and the employer, whose work is interesting, whose work is his life, cannot understand why the employee is always trying to shirk, whereas he himself is willing to work twelve or sixteen hours a day. The reason is that in one case the instinct of workmanship is satisfied and in the other case it is not. I have sometimes thought how much wages I would have to be paid to give up my job to put pegs into shoes or to take up other monotonous work.

If you paid me $1,000,000 a minute, I would not give up my work and go into an automobile factory or a shoe factory. I might for a few minutes! But if it meant sacrificing my life work, I would prefer suicide, after having had a taste of the satisfaction that comes from doing work which I love.

Each Man Shown His Particular Work

What Wolf did was to show each of these men, or some of them, what their own particular work was. At first he tried to introduce the Taylor system, but those associated with him practically forbade it. So he put into operation a system of charts whereby men could record by a series of curves just what was happening at each stage of the process. They watched their records, and did more work than could have been gotten out of them by the Taylor system.

The men in this wood-pulp factory have to raise gradually the temperature of the cookers into which the chips go, keep the temperature there for a certain number of minutes, then raise it again, and so on through a certain cycle in order to get the results. Eight years ago when Wolf went into this plant they were making, if I remember correctly, with a certain equipment 100 tons of the worst wood pulp in the country.

Today, with the same equipment, they are making 200 tons of the best, and the transformation has been due to giving these men a record of their work and getting them interested in bettering this record. Meanwhile, wages have arisen 40 per cent.; there have been no strikes; the men are loyal to the organization; and the industrial problem has been largely solved.

All day these men trace with a lead pencil their work. Their own part in making that wood pulp is that little

*Closing remarks in the presidential address of the American Association for Labor Legislation delivered at its eleventh annual meeting held in Philadelphia, Penn., Dec. 27, 1917. The title of the address is "Health and War." Copies of the unabridged address are being distributed by the author.

picture or graph. And they are just as much interested in making that picture every day as an artist is in painting a new picture. It is theirs. They get credit for it from their fellows and in the eyes of their boss.

There is more in the system, because Wolf has tried to satisfy also the other great natural instincts, the instinct of self-respect and respect for others, the instinct of loyalty; making them feel as though they were human beings—his brothers, instead of a lower order of human beings interested only in their pay envelopes.

Would you try to limit the instinct of a soldier merely to his pay envelope? Would you try to make a soldier go over the top by bribing him? Suppose President Wilson had said to General Pershing: "Now, Pershing, I want to be sure you are always on the job, and not skimping it. I have developed a Taylor system by which your wages will go up or down according to your victories."

What do you suppose Pershing would have said? He would have said: "Mr. President, what do you take me for? Of course I must live. But I am not primarily interested, or only interested, in my pay envelope. The motives which are sending me to France are loyalty to my country, heroism, the desire to sacrifice myself, to satisfy my instinct of self-respect and the respect of others, and may be to win some glory. Idealistic motives spur me and keep me at work."

And now we are taking men out of the factory and sending them into the trenches, when the only stimulus we have played upon in the factory has been the pay envelope; and yet these same dormant higher motives are there and will operate to make good soldiers. They could be enlisted to make good workmen. I hope that this may be one of the lessons of the war.

After this war we must apply science to industry, in a way to make industry more wholesome and healthy; which means not only better sanitation and ventilation, not only how to make the workman keep his bodily functions going properly, but how he may obtain mental health so that he may live, as Professor Alfred Marshall says, a complete all-around life. And if we are to say that the world owes every man a living we should mean not only that it owes him wages but also that it owes him the full expression of the fundamental instincts of a human being.

Storage of Bituminous Coal

The more general storage of coal during the spring and summer months is coming to be recognized as the only practical means of avoiding a coal shortage during the winter. Many corporations and individuals will this year undertake, for the first time, to store large quantities of coal.

The storage of bituminous coal presents certain difficulties because of its tendency toward spontaneous combustion with its attendant dangers and losses. The methods to be employed in avoiding spontaneous combustion have not generally been well understood and those which have seemed successful in some cases have failed in others.

The Engineering Experiment Station of the University of Illinois has just completed a study of the problems involved in coal storage and has published the results in a 200-page illustrated book designated as Circular No. 6, "Storage and Bituminous Coal." The study was made under the direction of H. H. Stoek, Professor of Mining Engineering. The reasons and advantages of storing coal are given, the kinds and sizes of coal which may be safely stored are described, and the many factors entering into successful storage are discussed.

Copies of Circular No. 6 may be had by addressing the Engineering Experiment Station, Urbana, Illinois. The price is 40c. a copy.

HELP YOURSELF

BY RUFUS T. STROHM

WE'RE apt to be filled with envy
At the mention of the chap
Whom circumstance, by a lucky chance,
Has tossed into Fortune's lap;
For the ordinary mortal
Is a poor and hapless elf,
And the best that he can expect to see
Is a way to help himself.

IT'S a comfort to the climber
Who would scale the mountain wall
To know a friend is at hand to lend
Swift help should he chance to fall;
But the man who scans most keenly
Each inch of the rocky shelf
Is the lonely wight on the dizzy height
Who is forced to help himself.

THE strides that the race is making
In its struggle toward the light
Have come by the throes and the sweat of those
Who have had to work and fight;
For earth doesn't owe its progress
To the Guildford or the Guelph,
But in shire and town to a Jones or Brown
Who has learned to help himself.

THE gawk who inherits millions
Has a cheap cause to be vain,
Since not one sou of the sum is due
To his use of brawn or brain;
But the engineer who labors
As he garners in the pelf
Has the cheering thought that his wealth is wrought
By the way he helps himself.

Reprinted from "Power."



To Enforce Loading of Clean Coal

The following new regulations, which are expected to insure the production of clean coal, became effective on June 1:

No bituminous coal will be permitted to be sold, shipped or distributed if it contains such quantity of rock, slate, bone, sulphur, fireclay, shale or other impurities that it would not have been considered merchantable prior to Jan. 1, 1916.

Shipments from bituminous coal mines in which the coal is naturally of such character as to be unfit for market may be prohibited by the Fuel Administration. Operators of bituminous mines whose products are capable of being made merchantable by complying with the requirements of the Fuel Administration in regard to the removal of impurities, and who fail to comply with those requirements, will be required either to unload and clean such coal, if it has been loaded into cars or bins, or to deduct 50c. per ton from the Government price. In the event of repeated violations on the part of such operators, such further action will be taken by the Fuel Administration as it may deem advisable.

The enforcement of these orders devolves, primarily, upon inspectors appointed by the district representatives. These inspectors are required to familiarize themselves with the conditions under which coal is produced and prepared for market in the particular territory to which they are assigned, and to advise mine operators and employees of such methods as the inspectors may deem necessary to bring coal up to the standard; to inspect coal-mining operations in their respective territories; and to make daily reports to their several district representatives.

Copies of these reports, with the recommendations of the district representatives thereon, will be forwarded to the Fuel Administration for final action.

The United States Fuel Administration also made public an order under which operators of bituminous coal mines may receive a special allowance for coal mechanically washed or extraordinarily cleaned or picked in such manner that the fuel value of the coal will be substantially increased by the removal of waste and impurities. No special allowance, however, will be made for the ordinary method of cleaning or picking coal

The amount of the allowance contemplated by this order will be determined by the Fuel Administration, and will be set forth in a permit to be applied for and obtained by such operator in conformity with the provisions of the order.

Coal-tar products, valued at nearly $200,000,000, were produced in the United States in 1917, it is announced by the United States Tariff Commission, which recently completed a census of the coal-tar industry.

New Coal Prices in North Dakota

New prices for coal produced in North Dakota have been fixed as follows: South of the 12th parallel, run-of-mine, $2.25; prepared sizes, $2.50; 6-in. steam lump, $2; slack or screenings, $1.25. North of the 12th parallel, run-of-mine, $2.70; prepared sizes, $3; 6-in. steam lump, $2.50; slack or screenings, $1. The wage allowance of 45c. may be added to the prices.

Delayed Coal Delivery Causes Discontent

Considerable discontent is evidenced by domestic consumers, judging from letters reaching the Fuel Administration, because deliveries of coal are not being made. The Fuel Administration is trying to call every one's attention to the fact that, while it is very necessary to place orders now, this does not carry with it assurance of immediate delivery. The booking of the orders is a necessary factor in the working of the Fuel Administration's plan, and every precaution is being taken to assure adequate supplies to all domestic consumers this winter. It would be unwise in many instances, of course, to interfere with essential transportation to deliver coal which will not be used for several months.

Weekly Production Statistics

Bituminous coal production reached a new high point during the week ended May 25, when it exceeded by 6000 tons the production of the week ended May 11. The total production for the week was 11,811,000 tons. Anthracite forwardings fell off slightly as compared with those during the week ended May 18. The total forwardings during the week ended May 25 were 40,752 cars.

Beehive coke production fell off 2 per cent. The output during the week ended May 25 was 664,000 tons. Byproduct coke production during the week under review was 484,333 tons, a slight decrease over production during the preceding week.

Telegraphic advices regarding production for the week ended June 1 indicate that there will be a sharp decline in production for that week. This is due largely to the observance of Decoration Day as a holiday. The foregoing estimates are those of C. E. Lesher, the geologist in charge of statistics for the United States Geological Survey.

Dr. Garfield Appoints General Solicitor

W. T. Alden, a Chicago attorney, has been appointed general solicitor for the Fuel Administration. Owing to the growth of the Fuel Administration and the development of its functions, the work of its legal section has assumed large proportions. It interprets and defines the jurisdiction and powers of the organization under the law and prepares all executive orders and regulations. This is in addition to widely extended activities through the various sections of the administration.

Lack of Orders in Western States

Mines in Iowa during the week of May 18 lost 13.5 per cent. of their production due to lack of orders, according to the Fuel Administration. Losses were shown in other Middle Western and Western states for the same reason. This condition could be avoided, Dr. Garfield states, if domestic consumers would place their orders at early dates. A large portion of the domestic orders in the bituminous consuming region have not been placed. Losses, attributable to that cause in other states, during the week of May 18 are as follows: Rocky Mountain states, 10.8 per cent.; Oklahoma and Arkansas, 4.3 per cent.; far western states, 2.8 per cent.; Kansas and Missouri, 2.6 per cent.; Indiana, 2 per cent.; Illinois, 1.4 per cent.

Allotment of Anthracite Now Fixed

Anthracite production during the coal year, which will end Apr. 1, 1919, will be 89,000,000 long tons, it is estimated by the Fuel Administration. Of this amount, 54,345,783 long tons, it is expected, will be available for domestic consumption. This is 5 per cent. more than was distributed for domestic purposes during the last coal year. The difference between the total production and that available for domestic consumption represents the amounts used at the mines, by industries and by the railroads.

New England is to receive 16.95 per cent. more anthracite for this year's consumption than was used in that section last year. The Atlantic states have been allotted 12.69 per cent. more than they had last year. Canada will receive 6.59 per cent. less anthracite than last year. Reductions also will be made in the supplies for the Middle West and the Northwest. None will be sent west of the Mississippi or south of the Potomac and Ohio Rivers.

Coal Distribution Plans Now Complete

The matter of fuel priorities is rapidly assuming its final form. Some of the brightest minds, both in and out of the Government service, have been working on this question. No attempt is being made to conceal the fact that many of the nonpreferred industries will be severe sufferers from lack of fuel this winter. There will not be enough coal to go around. Instead of the uncertainties of last winter, however, systematic distribution will be made. Domestic consumers and the preferred industries will have coal enough. Plans, which give this assurance, already are complete.

No Anthracite for Industrial Plants

Use of anthracite coal for steaming purposes was an important contributing cause to the shortage of domestic fuel in New England last year, the Fuel Administration believes. For this reason, an order has been issued forbidding any dealer to deliver anthracite to an industrial concern without a certificate of exemption from the Federal Fuel Administrator.

To Solve Car Distribution Problem

With the railroad fuel matter settled, officials of the Railroad Administration and the Fuel Administration are engaged in working out plans for the distribution of cars. While "a car is a car" under the present plan, which abolishes assigned cars, there nevertheless are numerous problems which must be solved. One of these is the treatment to be accorded privately owned coal cars. There is one company which owns $4,500,000 worth of cars. No solution in this matter has been reached, but it is probable that the company owning the cars will be given the privilege of using as many of them as can be handled without delay, but none of them will be allowed to stand idle.

Effort Made To Insure Clean Coal

While numerous cars are being found to contain dirty coal, it is pointed out at the Fuel Administration that the great majority of operators and workmen in the mines are being more than ordinarily careful to send out clean coal. The cases where this is not being done are regarded as exceptions and rapidly are being ferreted out. The penalties being imposed are having the effect of straightening the matter out where there have been delinquencies in this respect.

An increased force of inspectors is now in the field for the Fuel Administration. As it is inconceivable that any mine operator or mine workman should be unaware of the imperative need to conserve railroad transportation facilities, no leniency is to be shown in cases where an undue percentage of dirt has been loaded with the coal.

Brief Washington Notes

A fuel administrator for Alaska probably will be named in the near future. At present the Alaskan field comes under the jurisdiction of the state administrator for Washington.

Great difficulty is being experienced in meeting the rapidly increasing demand in the East for smokeless coal. That the Fuel Administration was justified in restricting the use of this class of coal and in cutting it off from Chicago and other cities is held to have been demonstrated.

F. J. Goodfellow, of Bradford, Penn., has been named a district representative of the Fuel Administration for the charcoal-producing region east of the Mississippi. A need for a more systematic allotment of charcoal became evident and Mr. Goodfellow was entrusted with its administration.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

In all parts of the Union labor is working steadily on all occasions when cars are provided. In some places, however, no great enthusiasm is being shown. Short hours and total absenteeism make it impossible to secure the maximum tonnage of which the mine-working force is capable. The men in some cases do not visualize the war, nor do they feel any incentive driving them onward to maximum production.

In a recent issue of the *United Mine Workers Journal* an account is given of the subscriptions of the mine workers in Washington to the Third Liberty Loan. In some towns where there are a number of people not engaged in mining the quota was largely over-subscribed. In Carbonado, for instance, the subscription was 733 per cent. above the quota. But quotas are quite deceptive bases for estimation, and the possibility of a number of nonmining contributors cannot be overlooked. Casting out these records, however, we find that 129 men at the little town of Tono, in Thurston County, just south of Seattle, purchased $23,000 of bonds—just $178.29 per man. But the little town of Fairfax, in Pierce County, did better. Fairfax's contributors only numbered 62 men, but they bought $17,000 of bonds, or $274.20 per man. Talk about "lengthening the worker's stride"—you couldn't lengthen that stride much. It is a long jump in itself—such as a Westerner might be expected to take. Three hundred men at New Castle did not do so well, but even they subscribed for $18,000 of bonds, or $60 apiece. Men who buy bonds like the men of Tono and Fairfax must be and will be workers. They live rigorously and work stupendously that our Nation may live and not die.

> **MY KNOWLEDGE of the miner leads me to believe that, given the proper opportunity, he is willing and anxious to enter into team work with his employer, the Government and all concerned. Only by this method can maximum results be obtained. The miner has always been a man who loved his independence, and approached in the proper spirit he can be relied upon to contribute his full effort. He will coöperate, but cannot be driven. In this spirit of coöperation the sucess of the mining industry, as well as of all other industries, lies. The coal operator who desires to obtain the best results from his men should approach them in this spirit, and the response will be wonderful.—John P. White at International Railway Fuel Association meeting.**

Sergeant H. Austen Beck, formerly of the 1st Battalion, Canadian Infantry, has for two months been aiding the United States Fuel Administration by making speeches in coal-mining villages. He is the son of N. D. Beck, Supreme Court Justice of Alberta, Canada. Invalided by reason of shell shock and gas, he has been able to tour West Virginia, Tennessee and Kentucky towns.

He says: "If there is any lack of patriotism in the United States it can be charged to ignorance of the true conditions in France. The miners and other workers in the little out-of-the-way places are hungry for news. The Fuel Administration sent us, four returned soldiers of the speaker's staff, at the invitation of a committee of workingmen to mining towns in West Virginia and Tennessee. In many of these places we were the first visitors who had actually been in the fighting. In Pruden, Tenn., the miners increased their output by 300 tons the day following our visit and planned to continue this good work. At Petros, where the Tennessee state mine is located, we read the President's "Buy another bond" slogan. As a result, the town's quota was oversubscribed thirteen times."

To this testimony nothing need be added. Where the truth is apprehended the response is unquestioned. The Evans Coal and Coke Co., of Connellsville, Penn., with about 250 men, announces that every man contributed to the second war fund of the American Red Cross. The contribution was $100 from the company and from the employees $524.25. The Illinois and Kentucky papers will please not copy this item. Our news notes of May 25 exhibit how much larger was the offering of Illinois, and the Labor Situation of the same date showed how much more generous was the outpouring from Kentucky. Yet the Evans men stand well above many of their fellows in Pennsylvania.

In the anthracite region the mine workers of the Hillside Coal and Iron Co. and the Pennsylvania Coal Co., Erie affiliations, gave the Red Cross $16,000, the Ewen mine leading with $2815. The larger contribution is somewhat over $1 per head. As the average for the whole country was $1.75 per capita and $4.25 per person employed in industry, the gift does not appear commensurate with that made by others.

The gross income of the American people is said to be $40,000,000,000 a year. The Red Cross apparently secured from out of this $175,000,000, or about $1 in every $229. Thus the average gift of the American people was one day's income in every 9 months of steady work. Judging by this the Illinois mine workers who promised a dollar a month and the Kentucky men who gave a full day's work sensed the nature of their obligations with fair accuracy.

A Red Cross four-minute man in New York City somewhat startled his audience the other day by appealing for their nickels and dimes. If it be true that 6,000,000 people in that city gave about $34,600,000 and that 40 per cent. of the people receive an income from services rendered, then the amount contributed was $5.75 per person and $14.40 per income-receiving unit. From this it will be seen that people are giving generously—not in dimes, but in days, some even in weeks, of income.

In reply to an inquiry Van Bittner, president of District No. 19, informs us that every member of the United Mine Workers of America in that district, which comprises southeastern Kentucky and Tennessee, gave to the American Red Cross the proceeds of the first day's work performed during the week of May 20, in accordance with instructions issued by the district officers of the United Mine Workers. Owing to this generous contribution the coal mining districts of southeastern Kentucky and Tennessee oversubscribed their Red Cross quota 500 per cent.

At the Dorrance colliery of the Lehigh Valley Coal Co., near Wilkes-Barre, Penn., the mine workers cornered Stanley Brucchi, a man about 45 years of age, and demanded that he withdraw his positive refusal to contribute to the Red Cross. When he repeated his declaration Brucchi was grabbed and hurled into the colliery reservoir. After a good soaking he consented to make a contribution to the Red Cross.

As stated May 25, the Maxwell No. 2 colliery of the Lehigh & Wilkes-Barre Coal Co., at Ashley, recently had a strike. A second suspension for substantially the same reasons laid the mine idle May 28. The strike lasted two days and caused a loss of tonnage of about 2500 tons. On

May 29 the men agreed to go back to work if certain demands were immediately met by the company. This second strike seems to have caused a severe split in the ranks of the men, the president of the local, Thomas Moran, resigning, and another man being elected in his place.

The officials in District No. 1, the northern district of the anthracite region, are determined to prevent locals from calling strikes that violate existing contracts between the union and operators. They have instituted proceedings against the officers of a local at Laflin, Luzerne County, charging a misuse of the funds of the local treasury in the conduct of an illegal strike. The union has given the officials an opportunity to return the misappropriated funds. Seven of the 16 officers of the Ridgewood colliery local were arraigned on May 29 before an alderman, the auditor of the United Mine Workers of America charging them with conspiracy and of receiving money under false pretenses. The men were held in $500 bail.

The illegal strike mentioned was against a certain foreman, to whom the men took exception, and it lasted from Jan. 17 till Feb. 18. During the course of the strike the local officers paid money to committeemen who were engaged in attempts to prevent other men from displacing the strikers. Eight of the officials thus offending have refunded the money, but there are still seven that the union deems should make a return of monies believed to be wrongfully expended. The United Mine Workers say they will take the case to the highest courts and make every effort to obtain a conviction.

Still the Hard-Coal Men Will Button Strike

The Honey Brook No. 5 colliery of the Lehigh & Wilkes-Barre Coal Co., at Audenried, is also tied up by a strike. This mine is in the Beaver Meadow district near Hazleton—a long way from Ashley, which is in the Wilkes-Barre field. The strike has been called by the local union because some of the members of an Italian local would not pay their dues. The men have been termed members of the Industrial Workers of the World, but that is not true. They are merely delinquents who will not pay dues either to the local union or to any other organization. By this strike about 500 men lose several days' pay and the country loses thousands of tons of coal, all to balance the books of a small local.

The Huntingdon and Broad Top Region has, at least temporarily, composed its troubles and none too soon, if it be true, as stated, that a riotous disposition developed among the miners which made the mine owners at Rockhill apply to the sheriff for a force of deputies to protect the works. The disaffected men, it is said, tried to induce the pumpers to leave their jobs and let the mines flood with water. The State Police assisted the sheriff's deputies in keeping order.

Broad Top Men Consent to Await Arbitration

However, after three weeks of idleness, the 2600 men decided that they would go back to work. Representatives of the mine workers on Friday, May 31, and on Saturday, June 1, held an extended conference in Washington with Fuel Administrator Garfield. The Fuel Administrator took the position that production must not be interrupted pending the adjustment of the controversy.

The officials of the union returned to the Broad Top Region with Rembrandt Peale, one of the representatives of the Fuel Administration. At a meeting of the representatives of the various locals June 4 the delegates unanimously voted to return to work pending arbitration of the matters in dispute.

The strike was called for the purpose of enforcing the continuance of an agreement to pay a bonus of 10c. a ton which was in effect last year and which the operators contracted with the men to pay till the first of April. When that date arrived the operators reduced the rate of pay and the men, for a while, continued at work but finally struck about May 9.

President W. M. Rodgers, of the Monongahela Valley Labor and Trades Council, of Fairmont, and president of the West Virginia Federation of Labor, stated recently that a conference was held a few days ago at which C. W. Watson, George T. Watson, J. O. Watson, Frank J. Hayes, president of the United Mine Workers; R. C. Valentine, of the Official Board; Frank Keeney and Fred. Mooney, president and secretary of District No. 17, respectively, were present. It was agreed that there should be no blocking of the organization in northern West Virginia. Six or seven organizers are hard at work in the Fairmont district and the organization seems securely planted at several mines; P. K. No. 25 being one of the first.

The hope that Madison County, Illinois, would renovate itself in the world's opinion by convicting the 11 men charged with the murder of Robert Paul Prager, a German enemy alien, in the name of loyalty, was not realized. Though one of the defendants had confessed that he was the leader of the mob and though strong evidence was presented against the others, the jury on Saturday afternoon, June 1, returned a verdict in the Edwardsville Circuit Court acquitting all the defendants and this after being out only 45 minutes.

While he denied that his clients killed Prager he contended that the man was killed by "good loyal citizens, men of middle age, who feared that their lives were in danger when working in the mines," yet 8 out of 11 defendants, including Joseph Riegel, the confessed mob leader, were coal miners.

Prior to the lynching, which took place at Collinsville Apr. 5, Prager had tried to get into the miners' union at Maryville and statements attributed to him had been interpreted as hostile to the country and a suspicion was abroad that he wanted to get into the mines to blow them up. No proof was offered at the trial or elsewhere, however, in support of these rumors.

An "Unwritten Law" of Enemy-Alien Murder

In the trial "loyalty," as a synonym with "lawlessness," was invoked in every possible way. A frank effort was made to obtain the acquittal of the defendants under the unwritten law. Although Judge Bernreuter ruled that disloyal utterances, even if proven, afforded no justification for mob murder and though he excluded testimony intended to set up that sort of justification, the defense contrived to inject the "loyalty" question in one form or another, and the arguments of the attorneys for the defense were confined largely to a justification, on "patriotic" grounds, of the acts of the mob.

Riegel, who had confessed to the coroner's jury and to a newspaper reporter that he was the leader of the mob, repudiated both confessions when placed on the stand. He and most of the others claimed that they were innocent bystanders. The remainder denied that they were present at the lynching. There was wild disorder in the courtroom when the verdict was announced. Friends of the defendants cheered and an impromptu parade was formed, with the acquitted men marching as heroes at the head of the column.

Judge Bernreuter instructed the jury plainly that the war had nothing to do with the matter. It was simply a case in which a helpless prisoner was taken from jail and murdered. He declared that it was as unlawful to murder an enemy alien as to murder any other man.

Michigan is still restless. It lies so far off the beaten track of the coal miner that we are apt to overlook its activities. The miners are seeking in the Saginaw district an increase of 10c. a ton. Fuel Administrator Prudden, temporarily at least, refuses to concede it. Mr. Prudden met the mine workers' representatives about May 28 and they returned home to report. The miners have been favorable to a strike which was to start June 1, but apparently, on due consideration of what it would involve, the delegation did not favor any such action.

In Alberta, Thomas Biggs, the president of District No. 18, of the United Mine Workers of America, has settled the case brought against him by William Williams, a coal miner, by a complete apology. Williams had brought suit against Biggs charging criminal libel. He had also been suspended from the union and he brought an action against the Wayne local demanding reinstatement. This was also granted

EDITORIALS

NO ONE can deny that there would be undoubted charms for all of us in a state of things where every act we performed would be for the common fund and not for personal advantage. Little as the hope is that such an idyllic condition can ever be attained, we must never forget that in taking stock of motives there are two imperatives which make it possible to dream socialism though not to encompass it. These two imperatives, which have a great power and value in our present and immediate social life, are altruism and industrialism. Irving Fisher, professor of political economy, Yale University, in an article we publish this week, has called the former the instinct of self-sacrifice, or heroism; the latter he terms the instinct of self-expression.

The war has laid bare the first of these—the instinct of altruism. It is by no means dead in any of us. If socialism ever becomes something more than an academic theory of things that might be, it will be largely because of the instinct for altruism that lies in most of us, the natural craving for service that is deep-seated in the hearts of us all. During the present war this spirit has shown itself, first of all, in voluntary enlistment, then in the readiness of civilians to accept and perform unpaid service, later in the willingness of the public to permit of the conscriptive army, navy and aviation services, and to propose and support measures of taxation and price regulation of the most drastic kind.

It has been shown also in all forms of self-abnegation, in the purchase of bonds by people who thought far more of the service than of the investment, and in the generous gifts to the many great funds by which the works of mercy of a great war are made possible. The spirit of altruism, of self-sacrifice, of heroism, or of service, whatever we may term it, is still in the world however much in peace it may be overlaid by prudence and covered by a load of baser motives.

* * *

AND the other motive, that of self-expression, workmanship or industrialism, is not a bit less lacking. They who are socialists in name only urge that men are wedded to their fetters. They are indeed wedded to their work, but that work is usually no fetter. It is rather a labor of love. In this connection we may profitably study on page 1066 Professor Fisher's most interesting remarks on our social instincts.

Fisher has well said that a man in his work seeks something larger than the means of livelihood. He frequently hangs to his job because he has put his personality into it, because he feels also that in it he has accomplished something for somebody. If socialism ever comes about in "the rolling of the spheres," it will rely most on those who least believe in it—on the altruist, with never a bad word for his fellow, and on the plodder enamored of his task.

WE SHALL find the managers, secretaries and foremen of our great industrial organizations the backbone of our new institutions, as they are the backbone of the present institutions, as they must be indeed the backbone of all institutions however planned and wherever set in operation, if those plans are to arrive at a happy fruition.

No man in whom the instinct of getting, the instinct of crowding others, is plainly manifest has a chance in the conduct of a modern business for a modern corporation. We have long realized that men with such a viewpoint do not make good executives. A man must have the ideals of service and the love of good workmanship, in and for themselves, if he would fit into places of such trust.

Such men would be the very life of a socialistic condition, and not those who urge socialism so blatantly. The soap-box orators have caught hold of a holy thing and desecrated it by their worship. To them socialism is to be sustained by the spirit of greed and the spirit of envy, the only spirits to which they are subservient and which they understand.

* * *

BUT to what end is all this talk about a condition that is hopelessly remote if it can ever be—if indeed it ever ought to be. Just this. The spirit of service and the spirit of workmanship are integral parts of the spirits of men. No man is happy who cannot serve them in a degree. Community service gives a chance for the development of the first; therefore, foster that spirit in every mining village. Let every man have an opportunity for some free service to the community that this good spirit may grow in him, satisfy him and make him noble and happy. The employer will undoubtedly gain by this development, not only financially but in other ways. The employer, like his employee, has those nobler instincts which are only satisfied and fed by service and the opportunity for it, and the good which comes to his mining village will rest as a benediction on his own heart.

As to the spirit of workmanship, let its existence never be forgotten. Give every man a pride in his work. Let him learn the joy of high accomplishment. Let training be given, not for the purpose of creating discontent with the common round, but with the idea of making the work the man has to do worth while.

* * *

NOT every rookie has "a marshal's baton in his knapsack," and yet we train the private soldier. We do not drill and coach him with the idea of making a sergeant, much less a general, of him, though we would not begrudge him the place if he could fill it. No, he is drilled and instructed to the end that he may be a good soldier in the squad, and so that he may have pride in a soldier-like performance of duties. So also

in the industrial army. Every man should exercise body, mind and spirit in his daily labor. It should obsess all his powers, at least in working hours. It should elevate and inspire him. Its skillful accomplishment should feed not only his body, but his mind and his heart.

Because some men will never reach the place of leadership and authority is no reason for depriving them of the sustaining pleasure that comes out of the skillful performance of labor. Something of "art for art's sake" should enter into all our employments and give to them dignity and to their artificers mental and moral stature. Not the boss only, but the worker also, should be a craftsman in the art of mining.

An Accident That Never Occurred

THERE has been a great deal of ingenuity used to anticipate the possibility of accidents from acetylene lamps. There are dangers connected with them, of course, but they are less frequent and harmful than the dangers to be found in the use of other open lights.

The most unsubstantial of all charges against the system of lighting is the possibility of the acetylene entering into chemical union with the copper of the lamp, forming thereby a compound of such unstable character as to make a disastrous explosion conceivable. Strange to say, this accident never happens. It remains one of the unexperienced possibilities. Time surely has removed it from among the probabilities.

The danger seems to have had equal consideration in Great Britain with that it has received here. Henry Louis introduced the question of the danger at a recent meeting of the Institution of Mining Engineers of Great Britain. He advocated that acetylene lamps be always made of steel, tin plate or some similar metal, and said that copper and brass should be avoided. He added that a man with a brass acetylene lamp was running a risk he had no right to run. And yet he "freely admitted that he had never heard of an accident that could be traced to that cause." With the many real causes of accident, it seems purely academic to refer to the possibility of an accident, the like of which has never yet occurred so far as can be ascertained and would not in all probability do any extensive damage if it did occur.

William Maurice added that hundreds of thousands of brass acetylene lamps were in use, yet practical experience proved that no risk of the kind suggested was involved thereby. He stated that "the use of copper and brass vessels for acetylene lamps had been officially investigated in England, France and other countries, and it had been definitely and authoritatively stated that there is not the slightest risk in using brass vessels."

By scratching the inside of the copper acetylene lamp with a nail flashes of light have been obtained, but no explosion. The fact that the outcome of these flashes was not an explosion would seem to substantiate the notion that an explosion is entirely improbable. The choice of metals, therefore, should be based wholly on commercial grounds. If an iron or tinned container will give satisfaction there is no reason why it should not be used. Acetylene lamps, while quite inexpensive, have only a limited life and anything that reduces their cost will add much to their value and popularity.

The Submarine Menace

THE pirate Hun in his sneaking U-boats has appeared off the coast of the United States and has started his work of destruction on American shipping. It is interesting to note that one of the vessels escaping from the raiders was a steamer bound for New England with a cargo of coal.

Temporarily demoralizing as may be the effect of a submarine campaign waged upon this side of the Atlantic, it is at least gratifying to know that thus far the Hun has chosen here to play more nearly the part of a man. So far as is known to the general public, at least, his raids upon our commerce have been "decent"; that is, they have been in accord with the principles of international law and bear little semblance to the "frightfulness" of some of the sinkings that have been perpetrated across the Atlantic.

The present depredations of the U-boats are particularly interesting in that they may exert a powerful bearing upon the normal movement of coal by water to New England. It has been the intention and desire of the Fuel Administration to greatly increase this movement. The presence of undersea raiders may, however, render it necessary to move a greater tonnage all-rail than has been intended. A slow-moving collier or a tow of coal barges would doubtless be an easy prey to the Hun pirates. On the other hand, such a cargo should be easy of convoy and might offer a tempting bait wherewith to lure the adventurous submarine to within striking distance of destroyer, patrol boat or hydroaeroplane, any one of which is "bad medicine" for U-boats.

If convoy has to be resorted to—as may quite possibly be the case—it may not seriously decrease the tonnage transported. Groups of vessels under the protection of war ships are notoriously slow, for the simple reason that the group can move no faster than its slowest member. It will probably be quite possible, however, to so organize the movement of coal that vessels of approximately the same speed may be grouped together. Thus all the vessels in one convoy would move with about their normal rapidity.

An old adage has it that "forewarned is forearmed." We have lost a few ships at our very doors, we will doubtless lose more. In the meantime, however, means of protecting our coastwise shipping may have to be employed. The Hun U-boat should be no more difficult to hunt in American waters than in the North Sea or the Mediterranean. On the other hand, the submarine enemy is much farther from his base of supplies on this side of the Atlantic than on the other.

While the submarines are sinking a few unarmed schooners, tankers and the like, American shipyards are turning out vessels—real cargo carriers and war ships—at a speed never before equaled in the history of the world. Simultaneously, while the Hun puts dents in the Allied line—dents as expensive in men as they are useless strategically—the war cloud of Germany's new enemy grows even more formidable and threatening. The lightning from that cloud—that our enemies not so very long ago were wont to consider negligible—has already struck—at Cantigny.

Yet a little longer, and in spite of U-boats, massed offensives, frightfulness, "efficiency" and "kultur," we shall see the beginning of the end.

Hungarian Miner Invests All His Savings in Liberty Bonds

THE STORY OF JOHN DZUBER OF BLACKWOOD VIRGINIA



WHO BOUGHT LIBERTY BONDS TO THE VALUE OF $1200

JOHN DZUBER is 27 years old and has been 8 years in this country. He came from Hungary, but I don't believe he should be called a Hungarian any more. He married here some years ago, when he was working in the anthracite region. His child was born here and all the possessions he has were obtained here.

He is not sufficiently Americanized as yet, but he is going to be. He is learning every day and will get there sometime. John saved his money and was wise enough to know that he should keep his money in the bank, but when war was declared against Germany he was afraid to trust the bank and took out his money and put it in his trouser pocket.

Then came the Liberty Loan Campaign. John talked the matter over with the other miners and attended meetings, and he soon saw it was his duty as a citizen to help the boys "over there" to win the war.

He talked things over with his wife and Mr. Creveling, general manager of the Blackwood Coal and Coke Co., and finally bought $1000 worth of bonds for himself and $200 for his wife.

John Dzuber is some American, and there are a number of Hungarians like him in America.

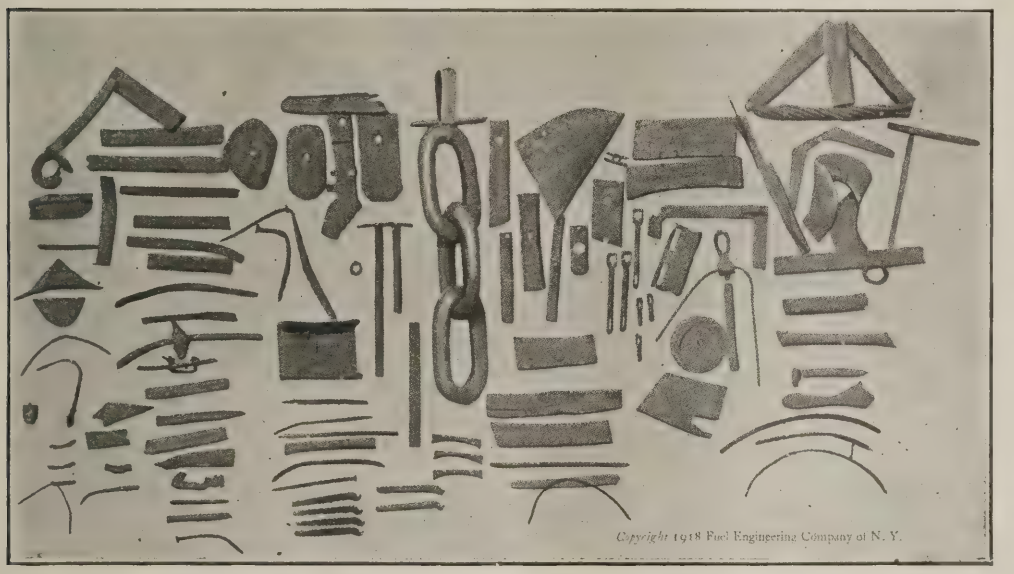
Contributed by Ernest L. Mandel, editor Magyar Munkaslap (Hungarian Workmen's Journal).

DISCUSSION BY READERS

Loading and Shipping Clean Coal

Letter No. 9—Speaking of the frequent recent shipments of impure coal, to which attention has been called by numerous letters appearing in Coal Age, I want to cite an extraordinary case that has just come to my notice in the reading of *Fecony*, an interesting monthly publication of the Fuel Engineering Co. of New York.

The accompanying figure is a reproduction of the supplement of the June issue of *Fecony*, which we are kindly permitted to make. It represents a lot of material that was found in one two-horse truck load of coal, recently delivered to the steam plant of the Society of Useful Manufactures, having a central power station at Paterson, N. J. The truck was loaded from a car of bituminous coal that was shipped from Meyersdale, Penn. The scale of the photo is about 1 in. per ft. The over-all length of the exhibit, as photographed, being 5 ft.



SCRAP FOUND IN A 2-HORSE TRUCK LOAD OF BITUMINOUS COAL

The remarkable feature of this incident is the fact that so much scrap, including both bits of iron, wood, wire rope and cable employed in the operation of a mine, could find its way, either by accident, carelessness, or actual intent, into a car of coal loaded for shipment.

Such a thing seems incredible and, but for the evidence in the photo produced and copyrighted by the Fuel Engineering Co. of New York, it would be unbelievable. Through the agency of its little publication, *Fecony*, and the numerous sources of information open to it through the avenues of its business, the Fuel Engineering Co. have done much toward exposing the dishonest practices and unwise and unjust proceedings that have developed in the coal industry since this country entered the war.

The coal mines of this country, by the fortunes of war, are made the world's storehouse from which must come the fuel needed in the production and transportation of all war munitions and supplies. The output of coal must be maintained at its maximum efficiency.

——, N. Y. A SUFFERER.

Transportation of Coal by Canal

Letter No. 2—My attention has been called to the letter of W. G. Wilkins, which appeared in *Coal Age*, May 18, p. 938, asking for further explanation of the figures presented in my article regarding the practicability of utilizing the canal system of New York State for the transportation of coal.

Mr. Wilkins suggests that in any computation as to the cost per ton-mile of canal transportation, the expenditures made for canal construction, maintenance and repair, the maintenance and operation of the locks and dams and the sinking fund and bond interest charges should be included, and inquires whether the two mills per ton-mile rate, mentioned in my article was based on all of these charges.

In discussing the ability of the improved canals to transport a considerable volume of the anthracite and bituminous coal consumed in the area traversed by the canal between the Buffalo and the Hudson River, I made no computation as to the exact cost of transportation per ton-mile. In fact, there is no accurate basis that could be employed in obtaining such cost. This is because no one has as yet had experience in navigating the new canal, nor has the transportation of commodities on a large scale been undertaken until this year. The actual cost may not be correctly ascertained until the transportation business has been developed.

It was generally understood, however, that the ton-mile cost on the old canal was about two mills. In 1899, the Canal Advisory Committee, of which General Francis V. Greene was chairman, estimated that the cost of transportation, at that date, was 1.75 mills, per ton-mile. The committee estimated also that the cost of transportation on the new canals would be decreased to 0.52 of a mill-ton-mile.

Taking the ton-mile cost on the old canal, as computed by the Greene Advisory Committee (1.75 mills) and considering that the old type canal boats, now being

used on the enlarged canal, may be loaded to a greater draft and carry larger cargoes than was possible when the estimate was made, and further considering that such boats may now move at a greater rate of speed in the larger waterways and make a greater number of trips each season, it would appear that my previous statement that "coal may be profitably transported in large volume via the canal, at a rate of two mills per ton-mile" is susceptible of proof. When, later in the season, business on the canal has developed considerably, figures showing the cost of operation will be compiled and the actual cost, per ton-mile, ascertained.

If the canal system was constructed, owned and operated by a private corporation, undoubtedly, in computing the ton-mile transportation cost, all of the elements mentioned by Mr. Wilkins would be included. In great public improvements undertaken by governments, however, such course has not been followed. Governments enter upon great undertakings for the benefit, direct or indirect, of their citizens, and actual financial returns coming directly to the government are not expected. This is in line with the theory that the general good to be obtained will compensate the nation or state for the actual money expended.

So far as the New York canals are concerned, the securing of a direct revenue by the state is forbidden by constitutional provision, tolls having been abolished about 1881. It is interesting to note, however, that up to the time the tolls were abolished, the state had received a revenue from its canals of approximately $40,000,000, over and above all sums expended up to that time, for construction, maintenance and operation. In addition to this great revenue, it was a fact worthy of note that the canal was the greatest single factor in the growth of the state in both population and commerce. It is fair to assume that, even with the collection of tolls forbidden, as provided by the constitution, the indirect return from the enlarged canal system will continue to be equally as great as was derived from the operation of the old canals.

Canal System of the State Compared with Other Public Utilities

The state maintains a splendid system of state highways, which enables the farmer to bring his products to market cheaply and conveniently. Commodities are transported speedily, from place to place, by trucks. This easy means of transportation has a considerable bearing upon the cost of such commodities to the consumer; and yet, in the computing of the cost to the consumer, it is not the practice to compute also the proportion of taxes paid for highway construction and maintenance to meet sinking-fund contributions and bond-interest charges.

Further, as I understand the policy adopted by the United States Post Office Department, in computing the cost of the postal service, the expenditures for plant, namely, the post-office buildings, are not included. Yet, it is evident that such cost must be met by the taxpayers. To apply the suggestion of Mr. Wilkins, further, in additon to the cost of the stamp required to carry a letter to its destination, we should add the writer's proportion of taxes.

However, as to the canals, their mere existence tends to hold in check and maintain a uniformity of rail rates in the territory between Chicago and New York City. The potential canal competition on the rail-rate structure has an effect that it is impossible to measure in dollars and cents, and every student of transportation knows that, but for the existence of the canals, the rail rates betwen Chicago and New York and the rates made with relation to the Chicago-New York route would be materially higher. In fact, every rate in New York State is affected; and, for every day the improved canal is in operation, the citizens of this state are saving, either directly or indirectly, a large sum in transportation costs. This applies equally also to the merchant, the manufacturer and to the farmer, in the state.

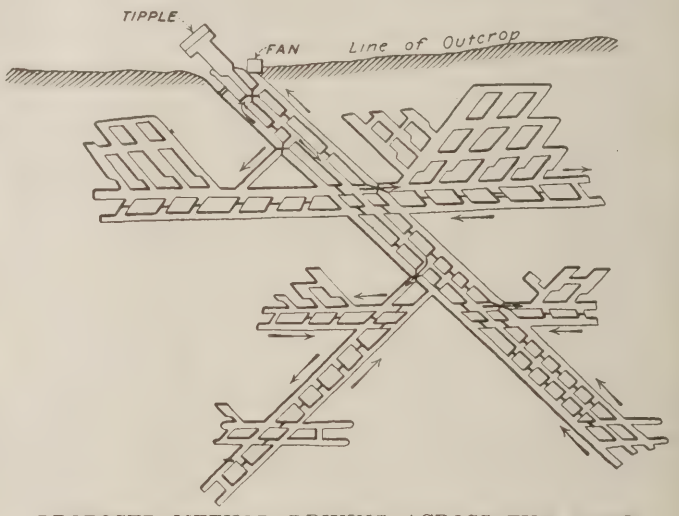
Since it is impossible to reduce the actual figures, the state-wide benefits received from the canal, I am not of the opinion that the construction, maintenance or interest charges should be considered in the computation of ten-mile transportation cost, but the actual boat operating cost alone should be used as the basis.

W. W. Wotherspoon,
Albany, N. Y. Supt. of Public Works.

Working 10-Ft. Inclined Seam

Letter No. 4—Kindly permit me to offer the following suggestions, in regard to the working of a 10-ft. seam inclined at an angle of 10 or 15 deg. and having a sandy-shale roof and pavement, the surface being practically level and traversed by numerous streams, as described in the inquiry, *Coal Age*, Mar. 23, p. 561.

Assuming that the seam dips, at the given inclination, from its outcrop on the surface, if the main slope



PROPOSED METHOD DRIVING ACROSS THE PITCH

is driven at right angles to the outcrop line it would mean that the main haulage road would have a grade varying from 17½ to 26½ per cent., the tangent of 10 deg. being 0.176 and that for 15 deg. 0.267.

In order to avoid this steep grade, I would suggest driving the main slope and air-courses at a suitable angle across the pitch, as indicated in the accompanying figure. The cross-entries can then be driven to the right and left of the main road, on the strike of the seam. As shown in the figure, the rooms are then driven to the rise of the cross-entries and at such an angle as to enable the loaded cars to be handled readily from the faces of the rooms to the gangway.

Taking the dip of the seam as 10 deg. from the horizontal, and driving the main slope at an angle of 30 deg. with the strike of the seam, will give a grade of 100 × tan. 10 deg. × sin. 30 deg. = 100 × 0.176 × 0.5 = 8.8 per cent. This arrangement of entries and rooms driven across the pitch will greatly reduce the difficulty in the handling of the cars and facilitate haulage.

There is one consideration that must not be overlooked in the development of this seam. It may be assumed from the fact that the surface is practically level and the seam has the inclination mentioned, it is practically impossible to open the mine from a point that will afford natural drainage. Had it been possible to do this, such a plan should have been adopted instead of driving a slope to the dip, which makes it necessary to provide means for drainage by pumping.

A careful study must be made of the topography of the country, in order to avoid the endless annoyance, cost, delay and possible disaster that will surely follow the extraction of the coal in this seam, without due regard is had to the streams that may find their way into the mine through cracks and crevices extending to the surface.

In the development of the underground workings, entries should not be driven under the streams, except where it is absolutely necessary, and such openings must be supported by masonry or a tried system of timbering, wherever they pass under these waterways. No room or pillar work should be permitted under or in close proximity to a surface stream.

An accurate map should be made showing all the surface features and the workings below. A "dead line" should be drawn on the map showing the nearest permitted approach of the rooms to the surface streams. In determining this dead line, the high-water mark of the stream should be considered and care taken to avoid any natural crevices in the strata that would permit the inflow of water into the mine.

Assuming that the main haulage slope is driven across the pitch, at such an angle as to give an 8.8 per cent. grade, it will reach a depth of nearly 200 ft., about 2000 ft. from the opening. At this depth, less trouble and expense would be experienced in the extraction of the coal. But, a roof of the character described will always prove an important factor in the safe and economical mining of the coal.

Thomas, W. Va. W. H. NOONE.

Strong vs. Weak Stoppings

Letter No. 1—Permit me to offer a few comments on the question of the advisability of building permanent or resistible stoppings, in contrast to the so-called "resistless or destructible stoppings" suggested by the discussion reported in *Coal Age*, Apr. 6, p. 628. The point of interest is to determine what effect each of these two types of stoppings would have upon an explosion that occurred in a mine. This subject has often been discussed but no definite conclusion has yet been reached.

Each type of stopping has its champions and it is true that each possesses certain advantages; but, so far, I have been unable to form any idea of what might be considered a resistible stopping or one that would successfully resist the force of a mine explosion. It is true that many stoppings have remained intact through violent mine explosions; but this, no doubt, was due to the fact that adjacent stoppings of lighter and weaker construction yielded to the pressure, which was then equalized on both sides of the stouter stoppings.

As a matter of fact, the data available on the maximum pressure attained in mine explosions is very limited indeed, since this depends on the intensity of the explosion, which in turn depends on numerous other conditions, including the resistibility of the mine stoppings.

Propagation of an Explosive Wave

When we consider that an explosive wave travels in every direction from its point of origin and that the intensity of the blast and the distance it is propagated depends on the amount of fuel, in the form of inflammable gas or dust, available for the support of the flame, and the amount of oxygen in the ventilating current available for its combustion, it would seem that neither type of stopping as at present constructed and adapted, would have any effect to arrest the progress of an explosion; except only that the lighter stoppings, by yielding, would allow a more ready expansion of the heated gases and thereby reduce the destructive force of the blast, to that extent.

Realizing that coal dust is the principal factor in the propagation of mine explosions, I believe that, by a modification of our stoppings, overcasts and methods of working, and a restricted use of both types of stoppings, together with the adoption of explosion barriers, in the form of wet areas, and the use of stone or rock dust as hereinafter described, mine explosions can be entirely localized so as to produce no effect whatever on other sections of the mine.

Proposed Method of Building Stoppings

Let me commence with the main headings and suggest building good permanent stoppings of concrete, say not less than 12 in. thick and intrenched at least 6 in. in the coal at the sides. Then, at intervals of 400 ft. or thereabouts, build a self-readjusting collapsible stopping. This may be done by swinging vertically from strong top hinges an iron or steel door, which should be hung between good concrete sidewalls and be free to swing in either direction. Overcasts, likewise, should be built with self-readjusting doors in the bottom sidewalls. A little cement or clay may be used to seal them under normal conditions.

Arriving, now, at the room entries, no rooms or working places should be turned off these entries, for a distance of 300 ft. This space should be maintained as an explosion barrier and must be kept thoroughly wet, at all times, shelves of stone or rock dust must be suitably arranged herein. The same applies to all roads, headings and air-courses that may lead into this section. It is not necessary, however, to leave a solid pillar of coal, here, 300 ft. thick; as No. 1 room can be utilized as a heading to turn rooms back toward the main or branch heading, as the case may be. These rooms, however, should not be allowed to cut through

or intersect the main or branch heading, unless it be the last one, which is sometimes essential in gaseous mines to successfully ventilate the panel or workings during or after the process of pillaring. In that case, this last room should also be an explosion barrier and treated accordingly.

On all room headings, I would suggest building nothing but light destructible stoppings that would immediately yield to the explosive force, thus allowing it to spend itself by expanding as much as possible, before coming in contact with the barriers, and thereby reducing to a minimum any chance of flame passing beyond the area where it started. The self-readjusting stoppings and overcasts will probably take care of any excess pressure that would find vent on the main or branch headings, and the force of the explosion will generally dissipate itself in the section where it originated, without doing any material damage to the ventilating system in other portions of the mine.

From what has already been said we can see that to successfully confine or limit explosions, some panel or sectional system of working the mine must be adopted; but this should not prevent ventilating two panels or sections with a single air-split, providing the connection between the two sections was long enough to form an explosion barrier; and providing, also, that this connecting passage contain one or two iron or steel doors suspended in such a manner that they would automatically drop by the force of an explosion and form stoppings that would prevent the inrush of afterdamp into the unaffected workings—thus allowing the workmen time to retreat to the main heading until the ventilation has been rearranged. I advise, however, that where possible each panel or section be arranged large enough to warrant a separate air-split and, incidentally, to assure some financial return for the additional expense incurred by these safety features.

It is very apparent that no matter what happens, the work of rescue after an explosion would be greatly facilitated by such a system of ventilation, as the air current could be restored in a much shorter period than is possible by the present system. The plan should certainly commend itself to our consideration when we remember the large toll of life that afterdamp has been responsible for in past explosions. E. P. BRENNAN.

Thomas, W. Va.

Safety in Shotfiring in Mines

Letter No. 5—It is true, as suggested by R. J. Pickett, *Coal Age*, Apr. 20, p. 754, that we have in our mines both the "enemy alien" and the "German sympathizer," and for this reason it is of the utmost importance that the work of handling explosives be safeguarded in every manner possible.

My opinion is that the employment of shotfirers, in all mines, is the only guarantee of safety at this time, and these must be men who are fully qualified for the position. Their duty should be not only to inspect and fire all holes, but they should charge, tamp and fire every shot themselves. No one but an authorized shotfirer should be permitted to handle the explosives.

We have but to consider, for a moment, the danger to a shotfirer when miners are permitted to charge and tamp their own holes. A miner so disposed could overcharge his hole to a dangerous extent, and this would not be known to the shotfirer, who might be killed by the blast. The overcharge might cause a blownout shot followed by a dust explosion that might wreck the mine and cause the loss of many lives.

Observation shows that the majority of our coal companies are too slack in their regulations regarding the use of explosives. In the majority of cases, the miner draws his powder check or dynamite check from the office, takes it to the magazine, and is given a full keg of powder or as much dynamite as he wishes, which he takes with him into the mine to use in his own way.

Reason should convince any man that this is not a safe manner of handling the work of blasting coal in mines. There should be an absolute check on the amount of explosives taken into the mine each shift, and this amount should not exceed what is required to perform the work in that shift. The number of shots to be fired should be reported when the miners quit work for the day. This will enable the shotfirer to determine the amount of explosives required for his work.

INDIFFERENT WORK OF SHOTFIRERS IN PLACES

While shotfirers are employed in the mine where I am working, the miners charge and tamp their own shots, and each miner splits his fuse so as to expedite the work of firing the shots. The shotfirer goes from place to place as rapidly as possible, and takes no time to look for danger. Although every shotfirer is fully qualified and should inspect each place for gas before firing a shot therein, this is not often done.

The mining laws of Kentucky and many other states require the shotfirer, upon completing his work each shift, to post a notice in a conspicuous place, showing the number of shots fired and the number not fired, specifying the number of the room and entry where such shots were located and giving their reasons for not firing them.

Each shotfirer must also make a daily record, in a book kept for that purpose, showing the number of shots fired, the number failing to explode, and the number of blownout shots, besides the number of holes that, in their judgment, were not properly prepared. This is an important provision and should be made a part of all mining laws.

It is my opinion that if the work of blasting were made to conform with the requirements of the mining laws, in the several states, there would result a great reduction in accidents from this cause. I believe that the firing of shots in mines has an important bearing on the conservation of life, which is so necessary for the winning of the war. OSCAR JONES.

Worley, Ky.

What's Wrong with the Mines?

Letter No. 1—The editorial that appeared in *Coal Age*, Apr. 20, p. 752, asking what is wrong with the mines that there should be an increase of 21 per cent. in the fatalities reported for the year 1917, as compared with those of previous years, set me to thinking and wondering as to the actual underlying cause for this large increase in the number of mine accidents.

While the dangers attending the mining of coal are quite well known to every mining man, in a more or less general way, I have noticed that there is a tendency with many mining men to treat with almost absolute contempt the greatest dangers. This must arise, I believe, from an ignorance of the real significance of such dangers.

A large majority of accidents can only be avoided by the constant watchfulness and mutual coöperation of every person employed in and around the mines. As a chain is no stronger than its weakest link, so likewise a mine is no safer than the acts of the most careless worker therein would determine.

All coal-mining states have laws regulating the operation of their mines with respect to safety, prescribing what should be done to avoid accidents and prohibiting practices that are considered unsafe. If these laws were strictly enforced by the persons charged with that duty, and if mine workers would coöperate to that extent, there would be a great reduction in the number of accidents that occur each year in the mines.

A word about the timbering of working places: Most state laws provide for some form of systematic timbering at the working face, and it is the duty of every miner to set the timbers as quickly as the required distance is reached. Instead of this, however, the average miner is prone to start first loading his coal, intending to set the needed timbers as soon as this work is finished.

When a mine official, entering a man's place, finds him loading coal and the timbers not set, it is plainly his duty to insist on the work of timbering being done without further delay. He should remain and see that his orders are obeyed. The man should then be warned, and, if found guilty of a second offense, he should be prosecuted.

If this was done, men would soon come to realize that it would be better for them, to obey the law. The leniency of mine officials, in this respect, goes far toward increasing the accident list, as miners are not slow to take advantage of this leniency and defer the setting of timber until their coal is loaded and the place cleaned up ready for a new start.

Accidents That Should Be Avoided

Frequent accidents occur on haulage roads, due to drivers failing to sprag their cars, instead, bracing their backs against the front of the car in an attempt to hold it back from the mule when a single slip of the man's footing may cause his death or serious injury. Tripriders take many chances jumping on and off fast-moving trips, and miners violate the mine rules by riding loaded trips and discarding the traveling road that has been provided solely for their safety. Doors on main haulage roads, bad tracks, and cars left standing on the tracks are the causes of many avoidable accidents in haulage. These all show bad management on the part of mine officials and lack of coöperation on the part of employees.

Regarding the most serious accidents, due to explosions of gas and dust, three elements are to be considered: (1) Accumulation of gas; (2) accumulation of dust; (3) means of ignition of the gas or dust. Let me say that the accumulation of gas must be avoided by an ample ventilating current conducted so as to sweep all working faces and void places in the mine. The accumulation of dust is more difficult to prevent; but the evil may be greatly reduced by loading out all fine coal and the "bug dust" produced in machine mining, and by enforcing strict regulations in regard to the blasting of the coal. All roads and other passageways should be cleaned regularly and watered as may be required to lay the dust and prevent its suspension in the air current.

The use of steam jets on the intake to moisten the air current, and different devices for spraying the cars of coal as they pass out of the mine only partially eliminate the danger from the presence of dust. Rock-dust zones and barriers suspended from the roof in entries serve only to arrest an explosion when one is started. Any system of watering to lessen the dust danger effectively must moisten the dust with, at least, 50 per cent. of its weight of water, as determined by the Belgian Royal Commission on the inflammability of coal dust.

Calcium-Chloride Treatment of Dust

Some years ago I witnessed the experiment of sprinkling, by hand, finely powdered calcium chloride on the walls, roof and floor of a haulage road 1500 ft. in length, in a mine in Lancashire, England. One application was good for three weeks and had the effect of extracting sufficient moisture from the air to make the fine dust so that it could be molded in the hand, and was caked on the floor where men were walking to and fro.

About 1 lb. of calcium chloride was used for every 60 sq.ft. of surface. It was thought that the amount of moisture the calcium chloride extracted from the air, however, was a drawback to the rest of the mine. In my opinion, a mixture of one part of calcium chloride to two parts of rock salt ground to a fine powder is most effective for neutralizing the coal-dust danger, while a plentiful supply of water thoroughly mixed with the dust is next.

Finally, to eliminate the many causes of ignition of gas and dust, allow me to suggest the exclusive use of electric head lamps. Also, no one should be permitted to carry a safety lamp except a duly authorized mine official. Every man entering the mine should be carefully searched for tobacco, pipes and matches. All shots should be fired by competent shotfirers, after the men have left the mine, and only permissible explosives should be used.

Men should not be allowed to work in a place where the lamp shows more than a ½-in. gas cap. Chemical fire extinguishers should be kept at all shaft and slope bottoms and in pump rooms and other places where they may be needed. A trained fire-fighting force should always be available and telephone connection with the surface should be maintained throughout the mine. Fire drills should be carried out regularly once a month.

In conclusion, I would say that the most that is wrong in the mines of today is their lack of system in mine management and the lack of coöperation of mine workers.

Cumberland, B. C., Canada. James Touhey.

INQUIRIES OF GENERAL INTEREST

The Law on Ventilation

In the discussion of matters of general interest in mining, at our regular weekly safety meetings, important questions have often arisen that we have been unable to thrash out. Two of these that were discussed recently pertain to provisions of the bituminous mine law of Pennsylvania relating to ventilation, and we would be glad to see them discussed by readers of *Coal Age*. They are as follows:

1. In Art. 9, sec. 3, the law specifies that the distance between crosscuts in room pillars shall not be more than 35 yd. nor less than 16 yd.; but nothing is said, in that section, in regard to the distance between crosscuts in entry pillars. However, in Art. 6, sec. 4, relating to intake and return entries, the law specifies that said entries "shall not be driven more than 200 ft. beyond the last cut-through, except for exploratory purposes."

The meaning of the law, as would appear from these two references, seems to be that crosscuts in entry pillars can be 200 ft. apart, while those in room pillars cannot exceed 35 yd. or 105 ft. It is needless to say that some good mining men dispute this interpretation of the law, and we shall be interested in hearing what *Coal Age* readers think.

2. The first two sections of Art. 9 specify clearly the amount of air required by law to be circulated in the mine, for each person employed therein; also, the number of men permitted to work on a single split of air. The law reads (sec. 1), in part, as follows:

> The return air, from each split where from 70 to 90 persons are employed, shall be conducted by an overcast or an undercast into the return airway, which shall lead to the main outlet. The ventilation shall be conducted through the main entries and cross-entries to the working faces of all working places in the mine, in sufficient quantity to dilute, carry off and render harmless the smoke and the noxious and dangerous gases generated therein, to such an extent that all working places and traveling roads shall be in a safe and healthy condition for the persons working and traveling therein.

The question has arisen, What, in the meaning of the law, constitutes a return airway, and what are the limitations that require an air current charged with noxious gases to be conducted directly into the return airway leading out of the mine?

To illustrate, suppose there are two pairs of entries, working rooms and ventilated by the same air current, and the first pair, on this split, reports gas in dangerous quantity. Does that circumstance make the rest of the split circulating through the second pair of entries "return air" in the meaning of the law?

Or, again, suppose the air current passes over a gob section generating noxious gases, the said section lying between two live entries, all being ventilated by the same air-split; would this current become "return air," immediately after passing over or through the gob section, and would it be practical to work the rooms on the return side of such a gob section?

Believing that the practical discussion of these questions will be of value to every mining man, they are submitted to *Coal Age*, hoping for their publication.

CHARLES MARTIN, Superintendent,
Smokeless, Penn. Conemaugh Smokeless Coal Co.

Replying to the first question asked by this correspondent, it may be stated that, while the Pennsylvania Bituminous Mine Law permits entries, in the mines of that region, to be driven 200 ft. ahead of the last crosscut, it is not customary to do this, except where special appliances are employed to conduct the air current forward to the face of each heading.

In some cases, where the mine is generating no gas, advantage is taken of this feature of the mine law to reduce the expense for driving crosscuts. In such cases, however, use is made of flexoid tubing, or a canvas brattice is erected in the headings to conduct the air forward to the face.

Regarding the second question, the law clearly specifies that the ventilation shall be conducted to each working face in such a manner that the place shall be safe and healthy for work. This provision would make it unlawful to work men where the air current was charged with gas to a dangerous extent or where the place was unhealthy by reason of being located on the return side of a gob section. The arrangement suggested by correspondent would often limit the number of men employed on a single air-split to less than the 70 persons ordinarily allowed. We hope to hear from others on these important questions.

Track Switch Calculations

Kindly explain the meaning of the "frog number," in mine trackwork, and show how to calculate the length of the "lead rail" of a switch. FOREMAN.
———, W. Va.

In all trackwork, frogs are numbered 1, 2, 3, etc., corresponding to the ratio of the length of the frog rails to their spread. Thus, a No. 4 frog has a spread of 1 ft. in 4 ft. The calculation of the length of the lead rail of a switch is based on the number of frog used and the gage of the track.

Assuming a 3-ft. track gage and a No. 4 frog, the length (l) of lead rail, in feet, required is found by multiplying twice the track gage (g), in feet, by the frog number (n), which gives, in this case:

$$l = 2gn = 2 \times 3 \times 4 = 24 \text{ ft.}$$

The radius of curvature (R), in feet, is then found by multiplying the length of lead rail by the frog number;

$$R = nl = 4 \times 24 = 96 \text{ ft.}$$

These formulas and rules have been fully explained sometime since, in *Coal Age*, Vol. 10, p. 653.

EXAMINATION QUESTIONS

Miscellaneous Questions

(Answered by Request)

Ques.—If 31,983 cu.ft. of air and marsh gas was passing through a section of the mine where the lamp flame indicates that the mixture is at the highest explosive point, what is the quantity of gas given off?

Ans.—A mixture of pure marsh gas and air, at its most explosive point, contains 9.46 per cent. of gas. The volume of gas, in this case therefore, is 31,983 × 0.0946 = 3025 cu.ft. per min.

Ques.—What quantity of air will pass in each of the three following splits: A, 6 x 6 ft., 1000 ft. long; B, 6 x 5 ft., 2000 ft. long; C, 6 x 4 ft., 3000 ft. long; the original airway being 6 x 5 ft., in sectional area, 5000 ft. long, and producing 80,000 cu.ft. of air per min., the pressure being constant?

Ans.—This question, as it reads, appears to be wholly unintelligible. It is not clear what is meant by the original airway 6 x 5 ft., 5000 ft. long. The combined length of the three splits given is 6000 ft., and each of these airways has a different cross-section. It might be assumed that the question intended to ask, What quantity of air would be circulated in the three splits named, under the same pressure that would circulate 80,000 cu.ft. of air per min. in an airway 6 x 5 ft., 5000 ft. long.

However, the pressure that would produce this circulation in a single airway of the dimensions given is practically 510 lb. per sq.ft., which would give a water gage of 100 in. nearly. The velocity of the air current would be 80,000 ÷ 30 = 2666 ft. per min. It is hardly to be supposed that this can be the meaning, therefore it will be necessary to revise the reading of the question before a solution can be given. Such a question has the appearance of being a catch question.

Ques.—The water in a mine is hauled up a shaft 400 yd. deep, in two tanks each holding 400 gal., the one ascending and the other descending. What horsepower is the engine developing when delivering a tank of water every 3 min. at the surface, not including the time lost in emptying and filling the tanks?

Ans.—The depth of this shaft is 400 × 3 = 1200 ft. Assuming that the tanks balance each other and that the weight of the rope acting alternately to increase and decrease the load on the engine may be ignored, and taking the time of making each hoist as 3 min., the effective horsepower of the engine, disregarding friction, is

$$H = \frac{400 \times 8\frac{1}{3} \times 1200}{3 \times 33{,}000} = 40.4\ hp.$$

Ques.—In a certain shaft the cage weighs 2½ tons, empty car, ¾ tons, loaded car, 2½ tons, rope, 2 tons; what should be the small diameter of a conical drum whose large diameter is 28 ft., in order to equalize the load on the engine?

Ans.—In this case, the weight of the cage and car is $W_c = 2\frac{1}{2} + \frac{3}{4} = 3\frac{1}{4}$; weight of material hoisted, $W_m = 2\frac{1}{2} - \frac{3}{4} = 1\frac{3}{4}$; weight of rope, $W_r = 2$ tons. The ratio of the small diameter (d) to the large diameter (D) of a conical drum, in order to equalize the load on the engine, is given by the formula,

$$\frac{d}{D} = \frac{2W_c + W_m}{2(W_c + W_r) + W_m}$$

Then, substituting the given values in this formula, we have for the small diameter of the drum, the large diameter being 28 ft.,

$$d = 28\,\frac{2 \times 3\frac{1}{4} + 1\frac{3}{4}}{2(3\frac{1}{4} + 2) + 1\frac{3}{4}} = 18\tfrac{9}{17}\ ft.,\ \text{or, say}\ 18\ ft.\ 10\tfrac{1}{4}\ in.$$

Ques.—What precautions would you suggest to protect workmen while retimbering a shaft for safety?

Ans.—The work of retimbering a shaft should start at the top and proceed downward, in order that the men shall always be working beneath that portion of the shaft that has been made secure with new timbers. On the other hand, if this work were to be started at the bottom and proceed upward, the men would constantly be in danger of loose material falling upon them from the weakened timbers in the shaft that are to be replaced.

Not more than one or two sets of timbers should be removed at one time, and these should be replaced with new timbers before more sets are removed. Only experienced men should be employed in this work, and the utmost care must be taken in supporting the platform on which the men stand while performing the work. Every precaution must be taken to prevent material falling down the shaft while the work is in progress.

Ques.—A borehole A strikes the coal at a depth of 60 yd.; another, B, reaches the same seam at a depth of 70 yd.; and a third, C, at 80 yd. The hole, B, lies 600 yd. north 30 deg. east from A, and the hole, C, 600 yd. south 30 deg. east from D. Find the direction of (a) a level course in the seam; (b) the direction of the dip; (c) the rate of dip in this seam.

Ans.—The lines joining these three holes form the sides of an equilateral triangle, the length of each line being 600 yd. Since the bearing of the line AB is N.30°E, and BC is S.30°E, the line AC is due east. Assuming a level surface. the seam falls 10 yd. from A to B and 10 yd. from B to C. The fall from A to C is 20 yd., and halfway from A to C the seam will have fallen 10 yd. and have the same elevation as at B, or 70 yd. below the surface.

(a) A level course, or the strike of the seam, therefore, is a line drawn from B to halfway between A and C, and its direction is north and south.

(b) The direction of the dip is at right angles to the strike or due east.

(c) The line AC lies in the full dip of the seam and the rate of dip is 20 yd. in 600 yd., or 1 in 30.

COAL AND COKE NEWS

Harrisburg, Penn.

Seward E. Button, chief of the Department of Mines, has called attention of the United States authorities to the conditions brought about in the coal regions of Pennsylvania by drafting of miners at a time when there is a call for the greatest possible production. He has requested that some arrangement be made which will permit more miners to remain at work.

A statement issued by Mr. Button says that he is "very much concerned over the acute conditions that exist at present in the great mining regions of the Commonwealth owing to the imperative demands of the Federal Government for a maximum production of coal in the face of a constantly decreasing force of mine workers whose ranks are being seriously depleted by the drafting of men into the army." Undoubtedly the present demands upon the operators are the most exacting ever known, but it is the universal desire of the mine owners to give to the Government the greatest aid and support. The desire of the operators, however, is made impossible of fulfillment by reason of the shortage of employees. There has been a constant drain upon certain classes of employees, particularly drivers, runners and electricians, and the result has been to reduce greatly the force necessary to produce the best results in mining coal.

The Public Service Commission on May 27 issued an order on the New York Central Lines to make reparation to the New York and Pennsylvania Co., Lock Haven, of $9245.29, as rebate for overcharges for movement of coal from Munson and Hawk River districts to Bald Eagle Junction. The order is the result of litigation before the commission in which it was claimed that the charges were too high. The sum covers claims in the year ending Aug. 24, last.

Culm piles, though they have been classed as personal property, do not present a case of an ordinary chattel, says Judge Strauss (Luzerne) in his opinion continuing the preliminary injunction brought by C. P. Holden against George J. Llewellyn and Frank Carlucci, restraining the latter from carrying off a culm pile in Pittston township containing between 160,000 and 190,000 tons of coal.

This suit was rather complicated as both plaintiff and defendant claimed title to the property and actual possession, and while the plaintiff produced proofs that he acquired the coal in the pile, subject to royalties, the defendants held that an injunction did not apply and that the plaintiff should have recourse to the law courts.

Fairmont, W. Va.

West Virginia coal men are so well pleased with the proceedings at the annual meeting of the National Coal Association that there is little doubt that the first meeting of the executive committee of the West Virginia Coal Association, the state organization, will be harmonious and highly profitable. The meeting was originally set for June 1, but owing to the meeting of the National Coal Association, the holiday which followed and other matters, the meeting at Huntington was postponed until June 21. The various local associations have elected their representative on the executive board and it now remains for the board to get together and outline a policy. It was at first intended to have the associations vote as units in the state organization, but this may be changed in accordance with the action of the National Coal Association giving each corporation belonging to the local coal associations a vote in the state body as they now have in the national body. W. H. Cunningham, of Huntington, who still retains the secretaryship of the association under the old organization, has announced that the postponed meeting will consider war work as well as actual coal matters.

There were 184 candidates at the recent mine examination held in Fairmont, and the class of men aspiring to be mine foremen, firebosses, etc., was commented upon by W. J. Heatherman, the new mine inspector for West Virginia, and the district mine inspectors, who were here. The interest in the examination was high and the class was the largest yet reported excepting that at Charleston, where there were 230 entries.

The work of organization of the coal miners in the Fairmont district is moving along rapidly. The contract agreement plan of the Consolidation has not proved very successful, and in most places the organization perfected is that of the United Mine Workers. "Mother" Jones is in the region and is making speeches at various points. There are six or eight other organizers in the field. There has been nothing said which could be objected to by operators as far as is known.

Birmingham, Ala.

That the campaign launched some weeks ago to increase production at mines has not been in vain is shown by the greatly improved conditions noted in every section. Coal production for the week shows a most favorable improvement over the output of the last few weeks. However, in some localities it is still maintained that with the labor available the output should have been on a larger scale than that recorded.

Extreme effort is being made to bring labor in the mining district up to a full realization of the absolute need of a maximum production of coal. A special plea has been addressed to the coal miners of this district by the Alabama Fuel Board to give every day possible to mining, and the request is meeting with almost general response.

A movement is on foot to educate the miner to the comforts of life in providing better homes and a means to spend money. It is hoped that through this medium the miners will feel the desire to earn more and will not cease operations, or lag in their work, as soon as their immediate needs have been satisfied.

Backing this effort is the attempt to arouse the patriotic spirit of the men. Speakers from the war-stricken countries are making tours of the mining sections and are telling the employees that every day given to the work of coal production means that much toward winning the war.

Charleston, W. Va.

For the week ending May 25 an increase in the production of coal was achieved in the Kanawha district amounting to about 16,000 tons, the production figures for the week ending May 18 being 137,852 and for the week ending May 25 154,634. The 154,634 tons were produced during 3862 working hours. Owing to car shortage 825 hours were lost, the loss in time owing to labor shortage being only 245 hours, to a strike 40 hours, to mine disability 479 hours. Failure of the power companies in this section to furnish an adequate supply of power was principally responsible for the loss of time included in mine disability, although a wreck caused a half-day's loss. Up to May 28 a total of 31,807 cars were loaded out of the Kanawha district, as against 31,638 empties received. The car quota for the Kanawha district has been reduced in terms of tons to the amount of 1820 tons per week and in the New River field by 2300 tons per week.

Reports from Raleigh and New River fields show that the mines have been experiencing a good deal of difficulty in securing power, mines in the Raleigh field or rather in certain parts of the Raleigh field having been shut down on the 27th and 28th because of lack of power. The mines in the New River field were also handicapped by the same cause, and operators in the New River district are almost up in arms, the power failure coming just at a time when conditions were beginning to become satisfactory and conducive to a greater production.

West Virginia fared well at the recent meeting of the National Coal Association. Jere H. Wheelwright, president of the Consolidation Coal Co. was elected president; C. H. Jenkins, president of the Central West Virginia Coal Operators' Association, Quinn Morton, of Charleston, and J. J. Tierney, of McDowell, were named as directors, and the last three, together with R. H. Gross, of the New River Co. with headquarters at Boston, and T. B. Davis, of the Island Creek Coal Co. with headquarters at New York, were elected directors at large.

Attorney General E. T. England of this state having ruled that women may be employed in work around and outside of West Virginia mines, several mines with headquarters in Huntington are considering the feasibility of employing women at the picking tables, on the tipples and on work of a similar nature.

PENNSYLVANIA

Anthracite

Hazleton—The Dodson Coal Co. has acquired 3300 acres of bituminous coal lands on the Maryland-West Virginia boundary line. The company will develop the holdings at once.

Hauto—The Harwood Coal Co., J. S. Wentz & Co. and the Harleigh-Brookwood Coal Co. are the first in the anthracite field to agree to contribute to the war chest fund in proportion to the amount donated by their men. It is expected that all of the mining corporations will contribute sums equal to the total of their employees.

Duryea—The patriotic spirit was ablaze on May 30 among the workers at the William A colliery of the Lehigh Valley Coal Co. The occasion was the raising of two flags on a fine new steel flagpole 75 ft. in height, which was erected during the week in the center of a grass plot in the colliery yard. One of the flags was an American banner purchased by the employees of the colliery, the other being a Liberty Loan honor flag, presented to the colliery by the Old Forge bank, in recognition of the colliery having achieved a 100 per cent. record in subscriptions to the third Liberty Loan.

Freeland—Charging that the defendant company is about to remove $2000 worth of steel rails from an abandoned mine without authority or right, Charles H. Hemsath has brought a suit in equity against the Harleigh-Brookwood Coal Co. and W. G. Thomas, and has been granted a preliminary injunction by the court. The Hemsath heirs contended that at the time the coal company abandoned the property the leasing company was in arrears about $1500 in royalties and wants this amount from the company before the rails can be taken away.

Barry—The first electric washery ever installed in this state, which will enable six men to recover 500 tons of fuel a day, will be put in operation about June 15, by the Schuylkill Coal Co. The coal company has leased the riparian rights along the Mahanoy Creek for a distance of four miles for a period of 20 years. It is estimated there are 3,000,000 tons of steam and domestic sizes in the tract. On the property in question the company has dredged down 14 ft. without running through the deposit. Decision to utilize electric power for the operation of the washery grew out of the costly experience suffered by steam washeries in the loss of boilers through the heavy percentage of lime and sulphur in the water. The saving in labor (the project requiring only six men) compared with 12 or 14 with steam plants, was also a factor. Power for the washery will be furnished by the Eastern Pennsylvania Railways Co., at Pottsville.

Plymouth—The fire that broke out in the Red Ash vein of Nottingham No. 15 colliery, Lehigh & Wilkes-Barre Coal Co., early in April continues to burn notwithstanding the heroic effort of officials and company hands to extinguish it. During the weeks it has existed much good work has been accomplished, however, and it is now thought the worst is past and in a brief space of time it will be surrounded and quenched which when done will enable the company to increase the output of this famous old mine, one of the largest in the hard-coal regions and one where fatalities and serious accidents are a rarity notwithstanding its heavy daily tonnage.

One or two fires exist in other collieries of this company beyond the river, but from last reports all was going well and they also will soon be overcome.

The last mine fire of any consequence in this section was in Buttonwood colliery when operated by the Parrish Coal Co., and that of the Avondale colliery, D. L. & W. R.R. Co. in September, 1904.

Shamokin—In its program to speed up anthracite production the Susquehanna Collieries Co. is replacing veteran foremen with younger men at the same time taking care of the older men. Recent changes made include transfer of David Hughes, foreman at Pennsylvania colliery, to Richards No. 4, Hughes having been succeeded at Pennsylvania by Michael Farrell, foreman at Hickory Ridge. Ray Hughes, a mining engineer, has been made assistant foreman at the Scott colliery.

Rockville—The Mt. Jessup colliery was shut down by William Potter, Federal fuel administrator for Pennsylvania, on June 3, for loading dirty coal. Thirty-nine cars from this operation were condemned last week. F. H. Ford, general manager of the company, has been ordered before Mr. Potter and will be told there must be a change at his plant and that reports must be made to the county administrator daily.

Bituminous

Connellsville—The tipple at the Kyle mine of the H. C. Frick Coke Co. was destroyed by fire, entailing a heavy loss and the temporary shutdown of the mine. The fire is thought to have been caused by a spark from one of the dinkey locomotives.

Perryopolis—The Alfred Fuller estate, consisting of 510 acres of coal land, has been sold to the Jamison Coal and Coke Co., of Greensburg, for a consideration of $1,760,000, or at the rate of $3200 per acre. This price is considered the highest price ever paid for undeveloped coal land in Fayette County. It fronts on the Pittsburgh and Lake Erie R.R. and the Washington Run Railroad.

Pittsburgh—Director John J. McKelvey of the Department of Charities recently was authorized by the Council's finance committee to open and operate a municipal coal mine at May View. An appropriation of $80,000 already has been made by Council for opening a municipal mine. The bill authorizing Director McKelvey to proceed was amended to provide for employment of a mine superintendent at a salary not to exceed $300 per month.

Philadelphia—James M. Orr, of Clarksburg, W. Va., president of the Orr Coal Mining Co. with offices here, was fined $5000 by Judge Dickinson in United States District Court on May 31 for profiteering in coal. The prosecution was the first in this district. Mr. Orr charged a price for bituminous coal higher than that fixed by President Wilson. The coal was billed to customers at the regular price, but by a secret understanding an excess was collected. Mr. Orr plead guilty, and the Government was satisfied with the imposition of a fine.

Uniontown—Mine Inspector Richard Maize, chairman of the board of examiners for the Fifth Bituminous District, has announced the following as having passed a successful examination: Ralph Miller, of Dunbar, and Elmer Mathews, of Mount Braddock, mine foremen; Herbert Pratt, of Connellsville, assistant mine foreman; George W. Landman, of Dunbar, George Foley, Smith R. Matthews, Thomas Callihan and Arthur Whitlock, all of Mount Braddock, firebosses.

The Whyel Coal Co. of this city has sold 27 tracts of coal land in Harrison and Marion Counties, West Virginia, to John Y. Hite, of Fairmont, W. Va., for $585,000.

ALABAMA

Fairfield—The Tennessee Coal, Iron and Railroad Co. will construct an addition to the Koppers byproduct coke ovens at this place, consisting of two additional batteries of 77 ovens each, or a total of 154 ovens, together with complete byproduct recovery plants. The additional ovens are being constructed at this time to secure the toluol, ammonia and benzol, which is needed for the manufacture of ammunition and also to secure a saving of several hundred thousand tons of coal per annum, which will result by substituting coke manufactured by the byproduct oven process for coke which is now being manufactured in beehive ovens

WEST VIRGINIA

Glen White—The E. E. White Coal Co. has decided to erect a $150,000 steel coal tipple, with a daily capacity of 5000 tons.

Downs—The Rachel Gas Coal Co. will resume full working time shortly, having installed new electrical equipment following the recent fire which handicapped the plant for several days.

Eccles—The mines at this place will hereafter be supplied with cars from both the Chesapeake & Ohio and Virginian railways, as was formerly the custom until a misunderstanding of the orders of the regional director shut off the supply from one of the roads.

Clarksburg—Daniel Howard has purchased two mining plants of the Consolidation company, acquiring control of Mines No. 39 and 46 at Two Lick Station. Mr. Howard is one of the leading operators of the Clarksburg field and this purchase increases the magnitude of his holdings, giving added capacity of something like 1000 tons a day.

Clarksburg—For a consideration of $67,500 the Fairmont and Clarksburg Fuel Co.'s mining plant in this county has been purchased by J. H. Henderson, of Connellsville, Penn., according to a deed filed for record recently in the county clerk's office here. The property, which includes traces of the Pittsburgh and Keystone bed of coal, is routed on the West Virginia & Pittsburgh branch of the Baltimore & Ohio R.R. along McKinney's Run.

Weirton—At a cost of approximately $600,000 a byproduct coke plant and 600-ton blast furnace will be erected across from Steubenville at this city. The plant will be erected near the Phillips Sheet and Tin Plate Co.'s works and will be operated under Government supervision. The contract, which has been awarded to a Cleveland concern, calls for the completion of the plant shortly after the beginning of next year. The plant will afford employment for 500 men and is said to be the first of a number of steel plants to be erected in the Steubenville district in the near future.

Morgantown—J. W. Heatherman, Chief of the West Virginia Department of Mines, has announced that he will hold an examination for mine foremen and firebosses at Morgantown on July 26 and 27. When the details of the Short Course in Coal Mining, which is to be given at West Virginia University from June 17 to July 27, were brought to Mr. Heatherman's attention he was enthusiastic in his praise of the work the university is doing for the miners, and said he felt that the men who took the short course should have an immediate opportunity to take the examination for their mine foremen's and firebosses' certificates. Inasmuch as the short course is given without cost to all who are interested, it is a splendid opportunity for those who are preparing for the examinations, or for those who failed at the May and June examinations and desire to make another attempt to secure their certificates. Prof. A. C. Callen, Morgantown, will be glad to hear from any who are planning to take the Short Course in Coal Mining.

Charleston—An agreement between 90 per cent. of the members of the Central West Virginia Coal Operators' Association and the miners' organization of the district has been accepted by the association. By it the miners and operators bind themselves to produce as much coal as possible during the war, and the agreement brings the two organizations into closer alliance. It is believed that the rest of the operators will unanimously stand by the agreement.

Gross negligence is charged against the mine officials and officials of the state department of mines by Coroner P. S. Shirkey in his verdict on the inquest he conducted in the cases of the 13 miners who met their deaths in the recent disaster in the mine of the Mill Creek Cannel Mining Co. The coroner found that the 13 miners who lost their lives came to their deaths from suffocation and holds the mine and department officials equally responsible through negligence in making proper inspection of the mines.

INDIANA

Petersburg—New mines are being opened by the Atlas Co., just north of here. Seven machines will be used in the new mines and employment will be given to a large force, it is announced.

Frankfort—The supply of coal at the municipal light plant was exhausted, and railroad shops, munition plants and other important industries dependent upon this supply of power have been seriously handicapped. Robert Bracken, fuel administrator for Clinton County, asked immediate relief for this plant. It seems that the city plant at Frankfort has been obtaining a special grade of coal from mines at Panama, Ill., and special machinery had been installed to handle this coal. Under the zoning system, which went into effect Apr. 1, Illinois coal could not be supplied this plant and its machinery would not permit the use of Indiana coal. The case has been referred to the national Fuel Administration at Washington.

Evansville—The Gibson-Moore Coal Co. mine, located between Howell and Evansville, has been closed down. It is not expected the mine will be opened again as it is said it could no longer be operated at a profit. The mine is one of the oldest in the city and for many years was operated by Capt. John Ingle.

On May 22 practically all the coal mines along the Evansville & Indianapolis R. R. resumed operation after many of them had been idle for eight weeks. A dispute over freight rates caused the shutdown of the mines, and this dispute was settled recently by the Government. It is estimated that the resumption of work by these mines will mean an increase of about 25,000 tons of coal a week in Indiana. About 1000 miners are employed at the mines that were closed down.

ILLINOIS

Alton—A river terminal, equipped with loading apparatus, has been completed here and will be used for transferring coal from cars on track to Government barges for delivery to up-river points as far as St. Paul.

Galesburg—A new coal shaft is being sunk at Soperville by Lloyd Pople. The shaft is down 65 ft. and will be sunk 70 ft. more. A good vein of coal is expected at a depth of 135 ft. The mine will be prepared to hoist coal this summer.

Danville—The Big Four R. R. (Cairo division) is storing coal at Lyons for next winter. The company has laid extra track and has extra men to care for the coal. It is estimated that 50,000 tons will be stored at Lyons. The coal comes from the Ledford district, south of Harrisburg, Ill., and is low in sulphur, which fact will reduce the possibility of fire from internal heating. Another precaution is the storing of only lump coal, all other kinds being taken to different points on the road for immediate consumption.

Edwardsville—William P. Early has purchased 80 acres of land near this city for $40,000, the purchase being, it is said, for the Donk Brothers Coal and Coke Co., of St. Louis. Prior to this purchase of top ground necessary for sinking a shaft, Early had bought 10,000 acres of coal rights in the vicinity of Edwardsville, the rights being, it is believed, for the Donk interests. One new shaft will be sunk in June and will be in operation before winter. Later two mines will be sunk and eventually the entire field will be opened. The Donk interests own large mines at Maryville, Troy and Collinsville, as well as the St. Louis, Troy & Eastern R. R. which takes coal products into St. Louis.

Nokomis—The fire which started May 18 in the North Mine of the former Peabody Coal Co., near here, and was thought last week to be under control, gained renewed headway early last week and did a great deal of additional damage. Many heavy falls of slate and coal occurred and concrete props and reinforcements were destroyed. Some of the entries, it is feared, have been damaged beyond repair. The falls have added to the difficulties of the fire-fighters. The state mine rescue car and workers have remained constantly at the mine and although the heat and smoke have made it necessary for the men to work in 15-min. shifts, only one person has been overcome. The latest report is that the flames are again under control and that the mine will not have to be sealed. The damage is so great, however, that it will probably not be possible to work the mine for some time.

KENTUCKY

Carrollton—Business men of Carrollton, Ky., and stockholders of the Beattyville Coal Co., of Beattyville, Ky., operating a coal mine, have formed a new coal company to operate as the Jett Coal Co., which will be largely a transportation and jobbing organization. The new company plans to transport coal by water from the Beattyville mines down the Kentucky and Ohio Rivers to market. The steamer "Sea Lion" and nine barges have been purchased, and the company plans the purchase of another steamer and additional barges at once. The officers of the new company are Col. J. S. Jett, of Carrollton, president; George W. Calhoun, director; John Jetter and Capt. Elisha Woods, directors of transportation. Shipments will begin at once.

Foreign News

Montreal, Que.—On May 24 a fire which broke out at the George Hall coal yards, Wellington Basin, caused damage to the amount of $100,000. About 10,000 tons of coal were destroyed.

Edmonton, Alta.—Duncan McDonald, district inspector of mines in the Drumheller district, has been appointed Fuel Inspector of Alberta with authority to inspect all coal shipped and with special reference to the coal consigned to Manitoba. Care is to be taken that all coal sent to Manitoba shall be of the best grade.

Cairo, Egypt—The fuel problem in Egypt, which at one time threatened to cause the most serious hardship to the whole coun-

try, has been largely solved, says the annual report of the government's financial adviser, Sir William Brunyate, by the development of the Red Sea oil fields and the adaptation of machinery to produce gas distilled from vegetable refuse. The report declared that an "adequate supply of oil for all purposes" should shortly be available. The Hurghdada oil field, for example, although only discovered in 1914, is now yielding 15,000 tons a month.

Edmonton, Alta.—Large increases are shown in the amount of coal mined and exported from Alberta during the first three months of the year, as compared with the corresponding period of 1917. The total amount of lignite coal mined in January, February and March, 1918, was 810,972 tons, as compared with 744,700. The production of bituminous was 712,313 tons as compared with 650,319, and the anthracite output was 39,409 tons as compared with 37,817 in the first three months of last year. The amount of coal exported to Manitoba during the three-months period was as follows: Lignite, 98,195 tons; bituminous, 9958 tons, and anthracite, 602 tons, the increase over the three-months period of 1917 being 66 per cent.

Personals

James Harlor has been appointed general inside foreman of the Spring Mountain operations of the Lehigh Valley Coal Co., at Jeanesville, Penn., succeeding William F. Hamer, deceased.

John Gordon Smythe, chief engineer of all divisions of the Consolidation Coal Co., has been appointed a captain in the officers' reserve corps and will probably be assigned to construction work.

Halver Halverson, formerly mine foreman of the Lucerne mine No. 1 of the Rochester & Pittsburgh Coal and Iron Co. at Homer City, Penn., has been made superintendent of the Luciusboro mines of the Brush Creek Coal Mining Co. at Waterman, Pennsylvania.

Thomas Wendling, of Shamokin, Penn., inventor of many breaker, hoisting and coal-cleaning mechanisms, superintendent at the Bear Valley colliery, has been appointed outside district superintendent of the Pottsville district of the Philadelphia & Reading Coal and Iron Co.

Thomas A. Furniss, mine inspector for the twelfth bituminous district of Pennsylvania, with headquarters at Punxsutawney, has resigned his position. He will become general manager of the new company which will reopen the Onondaga shaft near here. Mr. Furniss, together with Donner Steel Co. interests of Buffalo, N. Y., will compose the new company.

W. M. Downer, superintendent of the Ernest mines of the Jefferson and Clearfield Coal and Iron Co., at Ernest, Penn., has been made general superintendent of the Coal Run Mining Co. and the Tide Coal Mining Co. with headquarters at Indiana, Penn. Mr. Downer will be succeeded at Ernest by Mr. Davis, formerly superintendent of the Luciusboro mines of the Brush Creek Coal Mining Co. at Waterman, Pennsylvania.

J. W. Bell has resigned as superintendent of the Marvel coal-mining operations of the Roden Coal Co. and has accepted the position of general superintendent of coal mines for the Gulf States Steel Co., with headquarters in Birmingham, Ala. Mr. Bell received his training in the coal mines of Scotland and holds a certificate of efficiency from the British Government. He was also at one time chief mine inspector for West Virginia. The scope of his work in the new position will be much enlarged.

Industrial News

Greenville, Ky.—The Beech Creek Coal Co. has filed notice of an increase in its capital from $150,000 to $400,000, to provide for expansion.

Clendenin, W. Va.—The Elk Gas Coal Co., with an authorized capital of $50,000, has been organized by E. W. Smoot, of this city and his associates.

Sergent, Ky.—The Whitley-Elkhorn Coal Co. is considering plans for the immediate installation of electrical equipment for the operation of its mines.

Barbourville, Ky.—T. C. Gilliam, president, and Oscar Jackson, secretary, of the Emanual Blue Gem Coal Co., have filed notice of the dissolution of that company.

New York, N. Y.—Burns Brothers have acquired property adjoining their coal pockets on the Boulevard, Long Island City, about 92 x 123 ft., to be used, it is said, for extensions.

Pikeville, Ky.—Rodgers Brothers Coal Co. has filed notice of an increase in its capital from $75,000 to $100,000, to provide for the proposed improvements in its plant on Shelby Creek.

Lexington, Ky.—The Elkhorn Coal Co. has filed notice of an increase in its capital from $100,000 to $600,000. The company is considering plans for extensive improvements at its properties.

Constable Hook, N. J.—The United States Government, Bureau of Yards and Docks, Navy Department, has had plans prepared for the erection of a large local coaling plant to cost approximately $130,000.

Jersey City, N. J.—Plans have recently been filed by the Central Railroad of New Jersey for the erection of two new coal-thawing plants at its pier No. 18, to cost about $188,000. Contract for the structures has been awarded.

Toledo, Ohio—Mackenzie & Schroyer, Inc., the Ajax Coal Co. and the Marquette Mining Co. announce that they have removed their offices from 1313-1314 Second National Bank Building, Toledo, Ohio, to 507 Union Building, Cleveland, Ohio.

Dorton, Ky.—The Kentucky-Elkhorn By-product Coal Co., of Shelbiana, has been organized with a capital of $50,000 and is planning for the immediate development of a large tract of local coal lands recently acquired. H. L. Cox heads the company.

Sebree, Ky.—The stockholders of the Belcourt Coal and Mining Co., Inc., at a meeting at Belcourt, in western Kentucky, on Apr. 13, decided to dissolve the corporation, and at a later meeting on May 25, officially dissolved. R. N. Carlisle is treasurer of the company.

Chattanooga, Tenn.—A big company capitalized at $1,000,000 was recently incorporated here as the Marion Coal and Lumber Co., by Herbert E. Lettes, C. L. Remtinger and Clement M. Egner. The company proposes development of coal and timber properties.

Madisonville, Ky.—In order to enlarge its operations and make several improvements in its plant, the Circle City Coal Co. has increased its capital stock from $50,000 to $100,000. R. H. Gruschow is president, and has associated with him Frank Fehr and Forest Richardson.

Elkhorn City, Ky.—The Middle Ridge Coal Co. has been organized, and is planning for the immediate development of property recently acquired at Middle Ridge. Millard Burk is president; A. J. Younce is vice president, and G. H. Francisco, secretary and treasurer, all of Pikeville, Ky.

Christiansburg, Va.—The Anthracite Coal Corporation recently incorporated, is planning for immediate development work on its tract of 2500 acres. The company plans for an output of about 300 tons for initial operations, to be increased ultimately to 1000 tons daily. C. C. Mathey, Galena, Ill., is president and manager.

Johnstown, Penn.—To take care of its rapidly expanding business, the Flood City Manufacturing Co., which manufactures section insulators and electrical supplies for use in coal mines, has leased a suite of offices in the Swank Building, Johnstown, Penn. All executive business and sales will be conducted from the new quarters.

Charleston, W. Va.—With the completion of the extension of the Coal River branch of the Chesapeake & Ohio from Seth to Whitesville, further development of mining operations is expected. A river grade will be provided from Dorothy to St. Albans, when the extension is ready for operations, cutting off a mountain grade and tunnel haul.

Louisville, Ky.—Two hundred men employed in the barge-building plant of the West Kentucky Coal Co. and the Paducah Marine Ways Co., at Paducah, Ky., went on strike on May 29, asking for an increase of 10c. an hour in wages, or from 55 to 65c. an hour. The West Kentucky Coal Co. ships considerable western Kentucky coal south by the Ohio and Mississippi, and for several years has operated its own barge-building plant.

St. Louis, Mo.—The Snow Coal Co. has been organized here by Clifford M. Snow, for several years past connected with the Consolidated Coal Co. Mr. Snow is one of the best-known coal men in the southern and western states and he has for many years past been connected with the larger mining interests in the Middle West. It is understood that he has also taken over the Liberty Coal and Supply Co.'s business, as L. C. Meid, manager of that company, has been drafted.

Cincinnati, Ohio—The Reliance Coal Co., one of the largest dealers in Cincinnati, has leased the yards on the river front formerly operated by the Marmet company, giving the Reliance an additional storage capacity of about 50,000 tons, which will be devoted largely to river coal. Additional equipment for the handling of coal at the yard will be installed at once, in order to enable the company to use the entire space, 350 x 400 ft., for the accumulation of a large supply of winter fuel.

Louisville, Ky.—The Sullivan Pond Creek Co., of Stone, Ky., lately incorporated with capital of $500,000 to develop coal properties in Kentucky, is planning big developments on 4000 acres of land and will shortly purchase equipment. Offices are at Tralee, W. Va. Officers are J. C. Sullivan, president; J. J. Morrison, vice president; J. B. Frank, secretary; L. R. Taylor, general superintendent; D. M. Goode, Williamson, W. Va., constructing engineer; W. E. Holloway, Cleveland, consulting engineer.

Toledo, Ohio—Activity prevailed at the Toledo loading docks during the past week, showing an increased movement of lake coal. The lake trade is fairly under way and the vessel movement is brisk. The Toledo & Ohio Central docks during the week ending May 31 loaded 68,000 tons, which was exactly the same tonnage loaded the previous week. The total handled since the opening of the season is 334,000 tons. The Hocking Valley docks during the week ending June 1 loaded 126,841 tons as compared with 125,596 tons the previous week, making a total since the opening of the season of 619,736 tons.

Buffalo, N. Y.—The Donner Union Coke Co. lately began the work of reopening the old Onondaga mine of the Buffalo & Susquehanna Coal & Coke Co. in the Punxsutawney district, and is now engaged in building a big by-product coke plant on upper Buffalo river in this city, convenient to both rail and water transportation. About 2000 tons of coal a day will be used. Nearly a year will be needed to get the coke plant ready, but the mine will go into operation in two months or so. Till needed for coke making the coal will be sold. Both plants will be run in the interest of the Buffalo Union Furnace and the Donner Steel Co., the former controlled by Harry Yates and the latter by W. H. Donner

Columbus, Ohio—An important change in the operation of coal trains in Ohio has been ordered by the Director General of Railroads. In previous lake seasons when the movement of West Virginia coal to the lakes was heavy much of the Chesapeake & Ohio and the Norfolk & Western coal was transferred at Columbus from those roads to the Sandusky Division of the Pennsylvania, and shipped to the port of Sandusky for the Northwest. But with a large amount of that coal going to the Atlantic seaboard the Sandusky line has not been carrying the usual tonnage. In order to equalize matters it has been ordered that coal trains originating on the Toledo & Ohio Central on both sides of Armitage be shipped over the Hocking Valley to Columbus and there transferred to the Pennsylvania for shipment to the lakes at Sandusky. This relieves the Toledo & Ohio Central lines and it is thus more able to take care of shipments from the mines directly on its own line. The rule provides that K. & L. trains be dispatched to the lakes over the Pennsylvania.

Peoria, Ill.—The Illinois Mining Institute has closed its session at the Jefferson Hotel in Peoria. Among the addresses at various sessions of the convention was one by Charles B. Scott, general manager of the National Safety Council, on "Accident Prevention." Other speakers on the program were C. W. Chappelle, of the Ironton Engine Co. of St. Louis, on "Advantages of Storage-Battery Locomotives in Mines"; Joseph C. Thompson, state mine inspector, on "Permissible Explosives"; Frank Farrington, president of the Illinois Miners' Union, who spoke on the patriotic side of the miner's work; A. J. Moorshead, president of the Madison Coal Corporation; E. A. Holbrook, of the Federal Bureau of Mines, and Senator John Dailey, of Peoria. Mr. Moorshead, one of the largest mine operators in the state, emphasized the need of better working conditions in the mines of the state and called attention to the need for greater coöperation, especially during war times, between mine operators and mine workers. A banquet and trips of inspection through various industries of Peoria were other features of the institute.

MARKET DEPARTMENT

Weekly Review

Soft Coal Production Reaches New High Mark—Anthracite Shipments Decrease—Anthracite Allotment Program Announced—Labor Question Serious—Non-Preferred Industries to Receive Little Coal—No Stocks in Dealers' Yards—Lake Shipments Falling Short

DURING the week ending May 25 the production of bituminous coal reached a new high level with a total output of 11,811,000 short tons, approximately 100,000 tons more than was produced in the preceding week. Anthracite coal shipments for the week ending May 25 amounted to 40,752 cars, a slight falling off as compared with forwardings during the week ending May 18. Telegraphic advices regarding production for the week ending June 1 indicate that there will be a sharp decline in output for that week, due to the observance of Memorial Day.

Every effort is being made to increase the output at the mines, though several factors tend to keep production from reaching the maximum. In Iowa mines were closed down during the week of May 18 for lack of orders. The same is true of mines in other Middle Western and Western states. In Alabama the miners continue averse to working regularly.

An interesting feature of the week was the announcement by the Federal Anthracite Committee on Distribution of the long-awaited allotment program. It is estimated by the committee that anthracite production during the present coal year, which will end on March 31, 1919, will total 89,000,000 long tons. Of this amount it is expected that 54,345,783 long tons will be available for domestic consumption, which is 5 per cent. more than was distributed for domestic purposes during the last coal year. The remaining 34,654,217 gross tons represents the quantity consumed at the mines, by industries, and by the railroads. New England is to receive 10,331,000 gross tons of anthracite, which is 1,497,621 gross tons more than was used in that section last year. Canada, on the other hand, will receive only 3,602,000 gross tons of hard coal this year, as against 3,856,021 tons last year. Reductions will also be made in the quantity shipped to the Middle West and the Northwest. No anthracite coal will be sent west of the Mississippi or south of the Potomac and Ohio Rivers.

Of course, it is one thing to make allotments and quite a different matter to produce the coal. The anthracite industry has lost 32,000 men since the United States entered the war—by draft, by enlistment, and by enticing wages in other industries—and now finds itself in a serious situation. Settle the labor question for the hard-coal operators and the problem of a sufficient supply of anthracite to meet all demands would be simplified.

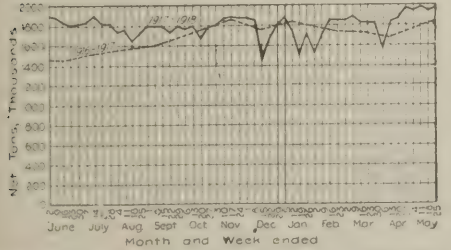
The matter of fuel priorities is being decided rapidly. No attempt is being made to disguise the fact that many non-preferred industries will fail to get coal this winter. There will not be coal enough to go around. However, systematic distribution will eliminate the uncertainties of last winter, and it is expected that domestic consumers and the preferred industries will get the coal they need.

Dealers in the chief cities on the Atlantic seaboard are far behind on deliveries of anthracite, though they report bituminous in fair supply. In the Middle West there exists a heavy demand for prepared coal, the sluggish market on fine coal having caused many operators to take on orders for mine-run to the detriment of those depending on them for lump, egg and nut coal. St. Louis reports an unusually quiet market on steam sizes, with no railroad buying to mention. Elsewhere both steam and domestic demands are insistent.

Shipments of coal by lake routes are falling short of the figures planned by the shippers. The movement in May is calculated to have been under 1,000,000 tons a week. Larger shipments are necessary if the Northwest is to have its requirements supplied before winter.

COAL PRODUCTION

Production of bituminous coal during the week ended May 25 equaled and even slightly exceeded the record week of May 11. The output of soft coal (including lignite and coal made into coke) during the week ended May 25 is estimated at 11,811,000 net tons, an increase of approximately 100,000 net tons over the production of the preceding week. The average



production per working day is estimated at 1,968,000 net tons as against 1,952,000 net tons during the week previous and 1,829,000 net tons in May, 1917. Beehive coke production during the week ended May 25 is estimated at 664,000 net tons, a decrease compared with the week of the 18th of 14,000 net tons, or 2 per cent. The average daily production is estimated at 111,000 net tons, a decrease of 2000 net tons compared with the preceding week.

Byproduct Coke—Production of byproduct coke declined slightly during the week ended May 25 due to shortage of labor in Maryland and greater shortage of labor in Pennsylvania. The ratio of production to maximum capacity for the first time since Apr. 20, fell below the 89 per cent. mark, the production during the week of the 25th being equivalent to 88.5 per cent. of maximum capacity as against 89.2 per cent. during the week preceding. Out of total losses of capacity of 11.5 per cent., 2.6 per cent. was attributed to lack of byproduct coal as against 2.8 per cent. during the week of May 18; 2.6 per cent. was due to labor shortage as compared with 2 per cent.; 4.9 per cent. to repairs to plants as against 5.3 per cent.; 0.2 per cent. to "no market" as compared with 0.3 per cent., and losses due to all other causes rose from 0.4 per cent. during the week of the 18th to 1.2 per cent.

Shortage of coal continues to be the factor limiting production in Indiana and New Jersey, although in the latter state slight improvement was reported during the week of May 25. Labor shortage in Maryland reduced the ratio of production to full-time capacity from 100 per cent. during the week of May 18 to 86.2 per cent. In Pennsylvania losses due to labor shortage rose from 10.7 per cent. during the week of May 18 to 13 per cent. during the week of the 25th. Repairs to plants caused production in Kentucky and New York to decline, while in Alabama losses due thereto were considerably less than during the preceding week. "No market" losses in Minnesota declined from 9.6 per cent. to 7.6 per cent. during the week of May 25.

CARLOADS OF COAL AND COKE ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended May 4	May 11	May 18	May 25
Bituminous shipments, 123 roads	202,558	207,145	205,026*	207,349†
Anthracite shipments, 9 roads	40,570	38,767	41,011*	40,752†

*Revised from last report. †Subject to revision.

Anthracite shipments fell slightly during the week of May 25, amounting to 40,752 cars against 41,011 during the week of May 18.

BUSINESS OPINIONS

American Wool and Cotton Reporter—On account of uncertainty in the wool supply, in available machinery and in other conditions, no good basis can be made for planning a season's distribution of woolen and worsted goods. It is not the total supply of wool which is causing anxiety, but rather the fact that some of the mills operating upon Government contracts are becoming short in supply, and it is feared that unless the situation clears up rapidly there may be a certain amount of machinery idle. There is nothing to justify some of the prices which have been asked. In cotton goods the situation has become somewhat stronger during the week under review mainly because the shortage of goods is becoming greater and buyers seem more willing to pay somewhat higher prices.

Dry Goods Economist—The plan for the coördination of the Government's interests with those of the various branches of the textile industry, announced on May 28,

makes clearer than ever the scarcity, present and prospective, of woolen and other fabrics as a result of the Government's requirements. The selling agents of woolen and worsted dress goods manufacturing concerns state that from 50 to 60 per cent. of their looms are running on Government orders and that the remainder, in so far as there is labor to operate them, are available for the production of goods for civilian use. Deliveries of woolen fabrics by manufacturers are of a hand-to-mouth character, but whatever is delivered is a welcome addition to the stock of the merchant who is lucky enough to get it. The linen shortage is as acute as ever.

Bradstreet's—Further expansion in war activities, ascending wages, excellent crop prospects, greater repression in purely civilian outputs, and widespread complaints of scarcity of goods and scarcity of men, stand out as the more prominent developments of the week. Willingness to buy, as distinguished from ability to get staple commodities, creates an air of activity, but the situation in this regard evidences fears of a famine in goods rather than real present necessity, and merchants in parts of the country are requesting that shipments of products scheduled for fall delivery be hastened.

Marshall Field & Co.—Wholesale distribution of dry goods for the current week shows a pronounced increase over shipments for the corresponding week of 1917. Road sales for both immediate and future delivery are larger than they were the same period last year. Customers have attended market in arger numbers. Collections are very satisfactory, showing a considerable increase over those of the same week a year ago.

The Iron Age—Some days may yet elapse before a balance can be struck between the definitely scheduled demands the Government will make upon the steel industry in the remainder of the year and the country's newly ascertained capacity in the various finished forms required. The committee is still hard at work both in Washington and New York. New reports are brought out of Government plans for laying hold of steel works. The industry continues skeptical as to all such news, but is in no mood to do business except at Government call. The demand for skilled labor for munition plants, shipyards and other vital industries is rapidly increasing, but men are not in sight. Plans are on foot for systematically making heavy drafts through regional committees, upon workers whose ordinary employment is gone or will be because material is withheld.

Atlantic Seaboard

BOSTON

Diminished receipts of railroad fuel a feature. Large number of mills operating on small margins of supply. No more "free" coal from the provinces for the present. All-rail receipts fall off; at tidewater the volume is short of making up the deficiency all-rail. Economies are resorted to in every direction and more and more buyers turn to steam sizes as an expedient. Other than decisions of Priority Board there is no guide for distribution; clear statement of policy much needed. District representatives, except on direct instructions from Washington, are apparently not ordering coal forward to preferred requirements in New England unless contracts are on file. Baltimore & Ohio territory rumored practically cut off all-rail from destinations this side of New York piers. Anthracite trade interested in allotment but not optimistic.

Bituminous—There are fewer cases of tangible distress among steam users than was thought probable for the period June 1 to 15. Somehow the industries manage to keep going, although very likely in the extreme anxiety to get fuel for future needs there has been enough duplication of requisitions to make the situation not quite so close to the danger line as previous estimates seemed to show. In many of the large manufacturing centers there are so many avenues of supply that it is difficult to gage receipts at individual plants with any degree of accuracy. The railroads themselves, for their own supply, frequently find certain of their storage depots almost down to bare boards on short notice, requirements and receipts will vary so from day to day. This is notably true today when all-rail receipts show a heavy reduction in tonnage of engine fuel due to complications over purchases and instructions from Washington to postpone commitments. It is also true that the railroads are suffering from the new attitude of the Fuel Administration in ordering coal to such preferred requirements as steamship bunkers and by-product plants. A year ago most of the New England roads had from three to four times as much reserve as they have today. At Boston, arrivals of water coal are being drawn against for considerable tonnages to supply the local needs of the Boston & Maine. While not in arrears to the same extent, the other roads are often finding themselves in a position where they have to lift coal off the ground instead of taking it from current receipts either by rail or by water.

Many important utilities and industrial plants are in virtually the same predicament. Even those who rely upon rehandlers with large storage facilities are not able to get deliveries on contracts and appeal to the fuel authorities for assistance. Coal is usually forthcoming on such procedure if the plant is of preferred importance, but usually the "help" is at the expense of some other preferred user who is forced into the same difficulty a few days later. No remedial measures seem to be in sight, and buyers are utterly at loss how to proceed to get coal. Such "contracts" as they have made are only 40 to 60 per cent. productive, and the fact is plain that only by doubling up on their requisitions both all-rail and at tidewater, together with other expedients, are they able to keep in operation on slender stocks.

The 100,000 tons of Dominion coal arranged for at Sydney, C. B., to load the lake-built steamers now coming into the coastwise service is all that can be had from this source for the present. The coal having been tried and found desirable by several of the large buyers, the Shipping Board has already been urged to arrange further deliveries. It is understood, however, that the first lot was furnished under such special circumstances that no additional shipments are looked for, at least for the present.

The volume of bituminous received through the great gateways continues to show a serious shortage as compared with a year ago. May showed an average movement of 470 cars per day commercial bituminous, a drop of 80 cars, or 14½ per cent. from the 1917 total for the same month. Railroad fuel showed a drop of 312 cars, or 76 per cent., the average movement of cars passing the gateways daily for this purpose being only 98 as against 410 a year ago.

Tidewater receipts are not any more encouraging except from Hampton Roads, and the latter fall far short of making up the shortage all-rail. Available figures covering Hampton Roads dumpings for New England during May show 983,136 net tons, a gain of 192,038 tons over May, 1917.

The total net loss for May, therefore, is 530,308 net tons, an alarming figure when all estimates were based on heavy gains during the summer months. All this is an argument against zoning of consuming territory as between rail and water delivery, except possibly Maine, where the elimination of all-rail delivery would probably work no great hardship. For the rest of New England, the best opinion inclines to the present distribution unrestricted as to destination whether from the gateways or from tidewater ports. The fact that the nearly 10,000,000 tons received all-rail last year went to make up deficiencies by water should be reason enough for allowing coal this year to run to points adjacent to tidewater, unless there should be a material increase in water-borne coal. At this writing, no sufficient increase is in prospect.

At Hampton Roads the balance between ships and coal has been maintained until within a few days, when once more there is beginning to be a surplus of ships over coal. This excess of bottom is sure to increase the next few weeks for three reasons: the number of new vessels in the service, the number coming out of repair yards, and recent orders of the fuel authorities, directing the flow of coal west rather than to tidewater. At this writing, there is a good chance that submarine activities early this week will materially reduce the number of arrivals at the piers.

The conservation department of the Fuel Administration is busy urging economies in the different steam users, the latter having naturally, of their own initiative, made headway in the same direction. Much attention is being given patent stoking, even by relatively small manufacturers, and there have been some interesting results, particularly with respect to anthracite steam sizes. One mill using 3500 to 4000 tons weekly is able to use three parts birdseye or barley to four parts bituminous, and grades of the latter that were never suspected of working satisfactorily in such combination have been used to excellent result. The demands for washed rice and barley have therefore increased by leaps and bounds, and the prudent buyers are those who are taking liberal shipments now, while the going is good.

Anthracite—Receipts neither all-rail nor at tidewater have as yet shown the expected increase. At tidewater the difficulty is still with barges and towing power, particularly for destinations around Cape Cod. It will probably be several weeks before New England feels the result of restricting domestic sizes from the Middle West and from the South Atlantic States. If there are not barges enough to move what is now reaching the piers at Philadelphia it is hard to see how this movement can be increased materially.

All-rail figures for May show a daily average of 454 cars domestic sizes through the five gateways. In net tons this means 634,005 compared with 556,089 tons in May, 1917. The average daily number of cars of anthracite steam sizes during May, 1918, was 168, or 27 per cent. of the total anthracite receipts at the gateways. This was a somewhat increased proportion of domestic sizes, in itself a favorable sign.

Mr. Storrow has offered to get a certain number of deep-sea barges transferred from bituminous trade should that prove necessary. Developments the next fortnight will bear watching, in the interest of New England.

NEW YORK

Demand for anthracite domestic sizes continues strong, with supplies below requirements. Dumpings at the local tidewater docks show increase over preceding week. Line trade wants coal. Settlement of railroad fuel question results in better car supply, but tidewater stocks are low.

Anthracite—Demand for the domestic sizes continues to be far in excess of the supply, and dealers who are fortunate enough to have good connections have so far been unable to stock any considerable amount in anticipation of next winter's orders. Many of the smaller dealers are still unable to secure sufficient of the larger sizes to take care of their trade, and for that reason the bins are practically empty.

With the Government report for the week ended May 25 showing a decrease of 259 cars shipped than were shipped during the preceding week, dumpings at the New York tidewater piers for the week ended June 3 show 6542 cars, as against 6205 cars the preceding 7 days, an increase of 337 cars. This city did not, however, receive all of this tonnage, much of it being sent by water to Long Island Sound points and into New England.

Further conferences have been held by the local authorities and coal men with a view of providing for the storing of 300,000 tons of coal to be sold to the poor next winter but so far nothing of a conclusive nature has resulted. The principal subject of discussion is to find a place where the coal can be stored. Other conferences are to be held.

Conditions appear to grow more serious. Supplies are not keeping pace with the demand, and the most optimistic of the trade confess to seeing a lack of coal next winter unless further curtailments and restrictions are ordered and more coal is sent to this market.

Dealers are interested in the statement of the Anthracite Committee of the Fuel Administration showing the distribution of anthracite for New York State for the year 1918-1919 to be fixed at 15,855,300 tons, as compared with 14,169,809 tons for the year 1916-1917, an increase of 11.89 per cent.

The line trade is as active as the trade in this city. Dealers are practically in the same position. They are short of coal and their books are filled with orders.

The anthracite steam sizes are moving freely. Buckwheat No. 1 is scarce except in the cheaper grades. Rice and barley are not in over-supply. While some of the cheaper grades of barley were quoted during the week at $4 f.o.b., the better grades were held at $5.25 f.o.b. with rice at $1 higher.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.55	$7.30
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	3.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	.....

Bituminous—The situation shows comparatively no change from last week. Supplies of commercial coal are scarce, except to regular customers, and there is practically no free coal in the harbor. Bunker fuel is in better supply.

The result of the settlement of the railroad-fuel question is already being felt. Cars are in better supply, but the labor situation is such that some operators find it difficult to load all the cars assigned to their openings.

The U-boat ravages along the coast early this week, which resulted in at least the sinking of one coal-laden schooner bound for New England, with nearly 2000 tons on board, will no doubt result in fewer shipments between the Southern ports and the New England States, and a heavier drainage on the New York tidewater market. Heavier insurance rates is one of the direct results of the raids. It is also expected that a reduction in shipments from the Southern ports, will cause consumers in those states to expect larger tonnages from central Pennsylvania.

Producers and shippers are having some trouble to choose between the essential and nonessential industries as indicated by the Fuel Administration. In many instances the consumer is referred to Washington for a ruling.

The dumpings at the New York tidewater piers for the week ended June 3 totaled 6393 cars as against 6285 cars for the previous week, while the Government statistics show that during the week ended May 25, 207,349 cars were shipped to market as against 205,026 cars for the week ended May 18, an increase of 2123 cars.

PHILADELPHIA

Anthracite allotment increased. Mine labor supply slowly decreasing. Doubt as to last year's tonnage being equaled. New England gets preference. New freight rates effective soon. Dealers behind on deliveries. New yard owners to get fuel. Bituminous conditions much improved. Car supply growing satisfactory. Price reduction of 10c. causes little comment.

Anthracite—The most interesting feature of the week was the announcement by the Federal Anthracite Committee on Distribution of the anxiously awaited hard-coal allotments. When the dealers learned through the daily press that Pennsylvania's quota was to be increased by 18.25 per cent. most of them at once clamored for recognition in its distribution. Many seemed to think they were to receive this percentage of increase over their last year's tonnage and were congratulating their shippers and themselves. At this time there is no satisfactory information available to the retail men. The first shock of disappointment came when the sales agents told all inquirers that the increase is over the tonnage of the basic year 1916-17 and that it has not yet been decided into what territories of the state the excess coal will be applied. Unquestionably Philadelphia will need much of it and make an urgent appeal for a large proportion. As a matter of fact word is reported to have come from the office of the local administrator that he is trying to secure 25 per cent. of the added tonnage for the city. It is understood that this increased allotment is made possible by shutting off shipments to the states which are expected to depend upon native soft-coal mines. Yet one important fact seems to have been entirely overlooked, and that is with an increase of 18¼ per cent. over 1916-17 the tonnage will barely equal the amount of coal that came to this market in the past year.

Early in the week the shippers who have been consigning coal to New England received positive instructions to ship into that territory during June one-twelfth of its yearly quota as originally planned plus 50 per cent., or actually one-eighth of its entire year's tonnage in June. These instructions are startling and have greatly upset the dealers here. At the offices of at least two of the largest shippers the local trade is cautioned not to plan for heavy shipments this month and the New England order is being given as the reason. It is beginning to look, too, as if this order will not be effective for one month alone, but may continue for some time; and if continued would give New England its entire supply in eight months. In order to assist the movement via tide to that territory the Government has been assigning barges and also has given heavy orders for new equipment, some being of the new concrete type.

It has been a hard week for the trade here. Some of the heaviest buyers have no stock to speak of and they are being harassed by their customers as never before this spring. Many families planning to leave the city are demanding coal before they close their homes, and also, on account of the advance in freight rates, effective on June 25, practically every buyer wants his coal before the new prices, which will be made to cover the latest freight advance, are announced. There is some speculation as to the recent freight advance, as to whether it will be in addition to the 15c. per ton advance which has been effective but a few weeks. Up to this time the 15c. increase has not affected this city, but outlying points have now been paying it for the past two weeks or more.

On account of the light deliveries recently it will be impossible for the dealers to deliver more than a small proportion of the orders on hand. Yet the fuel authorities continue to advise "promptness in ordering and patience in delivery." The public long ago responded substantially in placing their orders, but it fails to realize that deliveries must necessarily be spread over a period of not only weeks, but months. This week we talked with a number of dealers who are refusing to book any additional business, except from old customers, who for various reasons have delayed placing their orders. They are so hopelessly behind that they fear their inability to furnish even their best trade with more than two-thirds of their requirements. The local administrator continues to cut down on orders as sent to him by the retailers. These reductions as made by Mr. Lewis are seldom substantial but are sufficient to show that his office is scrutinizing every order.

An unpleasant tangle affecting several dealers here has just been straightened out by a ruling covering yards which have been sold or dealers who have commenced business since 1916 and therefore are not covered by the 1916-17 basis. They are to receive a "reasonable" tonnage from the producers or distributors, who furnished the yards previously in business, although as to the very few entirely new yards no exact instructions have been issued other than that they are to receive coal.

Buyers of coal by the carload who for some weeks past have been able to secure their coal supply as usual, except that it had to be hauled by the retailer, experienced something of a jolt this week, when the fuel authorities intimated that they were about to shut down upon the practice. It will be recalled that the National Administration ruled against the practice, but allowed the various state administrators to introduce any modifications they saw fit.

The prices per gross ton f.o.b., cars for line shipments and f.o.b Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5.70	Rice	2.65	3.65
Stove	4.75	6.05	Boiler	2.45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—The bituminous trade is experiencing the best conditions that have existed for months. As has been reported in this column for a period of six weeks past there had been a gradual increase in the tonnage of coal received in this market. Therefore the most gratifying feature of the present situation is that the improvement has been a gradual growth, which indicates permanence, at least for the summer. The car supply has jumped upward, especially in the Central Pennsylvania district. As a matter of fact one large operator in that region states he actually had more cars allotted to him this week than he could load. It has been some time since the bituminous trade has been so optimistic. Of course, the demand for coal is still tremendous and many plants claim they are not getting their full requirements, yet the storage stocks are continuously increasing.

The fact that the Government administrative organizations in the settlement of the railway-fuel price controversy reduced the price 10c. a ton, did not produce a ripple of comment in the trade. Inasmuch as the car supply gives promise of continuing in good volume the shippers are satisfied. They are also particularly gratified at the statement of C. H. Markham, the newly appointed director of railroads for the Allegheny region, who said that as 80 per cent. of the coal in the United States was mined in his territory it was to be his special duty to see that the greatest possible transportation efficiency be obtained

BALTIMORE

Plentiful supply of bituminous due to diversions. Anthracite receipts light. "Coal Week" is abandoned.

Bituminous—A careful inquiry in the trade here shows that coal is flowing into Baltimore in liberal quantities. Not only is there a good supply at tide, where a fuel administration order stopped the rerouting of all coal to line points in and near the city and required all to be dumped over the piers, but enough is coming through on all-rail direct consignment to ease off any other immediate fuel emergency. In some cases, particularly in connection with waterfront factories that have profited by the non-diversion order for coal after reaching the Maryland administrator at tide, there has been the first substantial move toward stocking up for the future. The liberal supply of coal here for business use is due almost entirely to the diversion of coal at the Cumberland gateway. The Railroad and Fuel Administrations are now working hard to prevent congestion through allowing loaded coal cars to be piled up on sidings at northern railroad connection points, and when there is the slightest evidence of a jam the coal is rerouted to this city and other points where it can get through without interruption of traffic. It is this coal that has placed Baltimore in most favorable supply situation for the time being.

Baltimore jobbers are looking with interest to a move to be made following the National Jobbers' Convention in Buffalo for a possible revision of the schedule of profit margin. The executive committee of the jobbers held a conference in Washington recently with Cyrus Garnsey, of Dr. Garfield's force, and it was urged that the margin of profit to jobbers was so small that some were in danger of being forced out. The Fuel Administration has acknowledged the important part being played by the jobbers and is said to be desirous of holding them in effective service. To this end jobbers all over the country have been preparing statements from cost sheets, etc., to prove that a revision is necessary. Revisions granted operators and retailers have encouraged the jobbers to hope for similar concessions when the justice of their claim is shown by facts.

Anthracite—The receipts here of hard coal remain below the normal, while the demand has undoubtedly increased. At the present time there are orders on the books of the retailers here for probably nearly 400,000 tons of hard coal for domestic use. Since Apr. 1 the trade has delivered about 125,000 tons, part of which was drawn from their small yard supplies, so that there probably remains less than 7000 tons in dealers' yards here at present as a reserve. The receipts of anthracite here in April were 67,128 tons, and in May fell back to less than 55,000 tons. The normal receipts for May should have been around 65,000 to 70,000 tons. Baltimore's needs are now figured to be 20 per cent. in advance of former years, due to the fact that bins of dealers and consumers were swept clear before this spring came and due to natural growth of the city and war-plant growth. The result is that a deficit is being built up here for next winter. In view of the short supplies the abandonment of a coal order week here was hailed with delight by the retail dealers. It was pointed out that they could not deliver the two-thirds of their present orders this summer unless deliveries were speeded up, and that the 10 per cent. increase in anthracite allowed by the Anthracite Committee of the Fuel Administration, a total of some 93,000 tons, even if diverted to Baltimore in full would fall some 80,000 tons short of the amount estimated as needed here by the Maryland Fuel Administrator.

Lake Markets

PITTSBURGH

Coal movement quite unsatisfactory, permitting much less stocking than is desired. Advanced freight rates. Lake movement proceeding smoothly.

There is almost universal complaint as to the volume of coal movement, both from the Pittsburgh district proper and from the Connellsville region. It is only in rare instances that there is not enough coal delivered for current operations, but the excess shipments are altogether too small to permit coal to be stocked at the rate that should prevail now to insure full operations through the winter. Naturally little hope can be entertained that coal can be moved at anything like as good a rate as in the summer, hence it is imperative that large reserves should be accumulated both for steaming and heating purposes and for byproduct coking.

The present situation is regarded as particularly unfortunate in view of the advance in freight rates that is to become effective June 25, as coal consumers would like to move a maximum tonnage before the rate advance goes into effect. The advances are 15c. when the present rate is 49c. or less per net ton 20c. on rates 50 to 99c., 30c. on $1 to $1.99, 40c. on $2 to $2.99 and 50c. on higher rates. Generally speaking, the 15c. advance will apply on shipments from the Pittsburgh district proper to consuming points in the Pittsburgh district, also from Pan Handle points to Steubenville. The 20c. advance will apply from the Pittsburgh district to the valleys and lake shipping ports, and from the Upper Connellsville to the valleys, while the 30c. advance will apply on Pittsburgh district to Toledo and Cleveland and from the lower Connellsville to Youngstown. Averaging the tonnages used in byproduct coking, the advance on Pittsburgh

district coal will average somewhat over 20c. and on Connellsville coal the average will run about 30c. The new rate to Youngstown, where there is very large consumption in steel mills for power and producer gas generation, as well as for by-product coking, will be $1.05 from the Pittsburgh district, $1.15 from the Upper Connellsville and $1.30 from the lower Connellsville.

There is a better movement in the retail trade owing to efforts of the Fuel Administration to induce retail dealers and their customers to stock up against the winter. Lake shipments are moving with considerable freedom and no congestion has resulted thus far. Returns from blast furnaces showing their ore requirements for the season indicate that somewhat more than 60,000,000 tons of ore should be brought down the lakes this season, against early estimates of 55,000,000 tons. There will be ample vessel capacity for all the coal that is to be moved, the neck of the bottle being the railroads that serve the Lake Erie docks.

The market remains quotable at the 10c. reduction effective Saturday morning, May 25: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous in good supply. Anthracite supply normal. Lake shipments up to average.

Bituminous.—Canada is not calling for much bituminous except in secluded districts. Some sections are over-supplied and refuse to buy in any quantity. Buffalo has plenty, and the state generally is fairly well supplied. Here and there come reports that certain consumers are stocking up, but as a rule they are buying as they need it. They do not appear to take much stock in the reports of winter shortage, even after the experiences they have had.

Jobbers are not finding much business to do. The operators and the consumers are getting closer together, as is usually the case when coal is not plenty. The prices of bituminous will have to be restated on the basis of a 10c. reduction of mine prices and a 30c. advance in freight for this territory, making the f.o.b. Buffalo list $4.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh mine-run and $3.95 for Pittsburgh slack, all per net ton.

Anthracite—The supply is about normal here and the lake shipments are now well up to the average, though the late entrance into lake loading by all but one shipper has reduced the season amount as compared with last season to June. A holiday last week reduced the total somewhat. City consumers complain that they are not getting their coal when they ask for it, and some of them are inclined to complain; but the authorities are firm. The distribution goes by rule. The Government fuel office is in full operation, but no great amount of regulation work has to be done there. The shippers see to that.

The great pressure for coal comes from Canada, but the rules are fixed and they are kept in that trade the same as at home. Some buying of bituminous there is reported, but considering its plentifulness the consumer is not embracing the opportunity as he should. It is reported that farmers are cutting quantities of wood, but the Buffalo consumer still depends on the mines, even though the partial giving out of natural gas will increase the winter consumption of anthracite perhaps a half.

Shipments by lake for the week were 72,450 net tons, of which 30,900 tons cleared for Chicago, 20,450 tons for Duluth or Superior (consignee's option after sailing), 10,300 tons for Sheboygan, 4500 tons for Milwaukee, 3300 tons for Manitowoc and 3000 tons for Hubbell. Rates are 75c. to Hubbell, 60 to 65c. to Chicago, 55c. to Milwaukee, 50c. to Manitowoc and 48c. to Duluth.

Shipments for May were 293,850 tons as against 424,700 tons for May last season; for the present season, 452,606 tons as against 622,495 to June last season.

DETROIT

Neither bituminous nor anthracite show increase in shipments. Lake movement below expectations.

Bituminous—Both dealers and consumers are inclined to view the outlook in the matter of Detroit's future coal supply with a good deal of apprehension. The present movement of coal into Detroit little more than meets current requirements, and no indications that a more plentiful supply will be obtainable are visible. Receipts of bituminous coal in Detroit during May averaged about 415 cars daily, while to the remainder of the state only 444 cars were supplied. Coal men place Detroit's normal requirements at approximately 700 cars. This estimate, however, was made several years prior to the war and the present needs probably are greater.

The shipments arriving in Detroit differ from the supply received in previous years in that the larger part of the consignments are made up of mine-run coal. While there is a certain amount of slack, nut and pea coal coming with the mine-run, the quantity is said to be insufficient to supply customers who want slack.

The supply of domestic sizes also is said to be much less than dealers would desire. The fact that domestic consumers have not been active buyers has enabled some of the retailers to accumulate large stocks.

Anthracite—Uncertainty as to the supply of anthracite that will be made available in Detroit and concerning the time when it will be sent here continues. Records of the transportation companies show that in May the average daily receipts were only 32 cars, while the remainder of the state was given an average of only 50 cars daily. Domestic consumers who are eager to provide for winter needs are unable in most instances to get orders filled. Retail dealers have only a few tons on hand and are continuing the system in many cases of declining to accept orders when stock is lacking to fill them. The situation is far from favorable to make a success of coal buying week.

Lake Trade—Shipments of coal by lake routes are also falling short of the figures planned by shippers. The movement in May is calculated to have been under 1,000,000 tons a week. Larger shipments are necessary if the Northwest is to have its requirements supplied before winter.

COLUMBUS

Strength characterizes the coal trade in Ohio. Lake trade is booming, and steam and domestic demand holds up well. Production is fairly good.

The coal trade in Ohio territory has remained firm during the past week. Buying for domestic and steam purposes is active. In fact all branches of the trade are vying with each other in getting stocks ahead. The lake trade is active in every way and a large tonnage is being moved to the Northwest. The tone is generally satisfactory under the unusual war conditions. Prospects are for a continuation of the stiff demand.

Domestic business is still one of the most important departments of the industry. The campaign to "Buy Now" is having its effect, and a large amount is being purchased by retailers. Dealers report a heavy demand in all sections as consumers are anxious to get their fuel in for next winter. As a result of the heavy demand many dealers have small stocks and are gradually exhausting their surplus. Retail prices have declined 10c. on the ton to correspond with the reduction at the mines. Little Pocahontas is coming into the local market as most of the production of that section is going eastward. Considerable West Virginia splints are being sold, but the main bulk of the coal now being laid in is from the mines of the Hocking Valley and Pomeroy districts.

Lake trade is strong and the tonnage moving to the Northwest is gradually increasing. The vessel movement is good and lake shippers report greater efficiency than ever. Lake shipping permits have now been granted and all who have lake contracts are participating. The ore movement is also good. Taking it all in all the prospects are good for the early filling of lake requisitions.

Steam business is one of the strongest points in the market. The larger consumers are buying both for present and deferred delivery, following the policy of laying in a surplus to guard against emergencies. Railroads are heavy consumers and in some districts are taking about one-third of the output. The smaller users are also trying to insure a fuel supply by making connections and filling available storage space with surplus stocks.

Production has been rather good despite the fact that a holiday intervened during the week. The day following was also a holiday at most mines. Extreme hot weather is having an effect in reducing the production. Labor shortage is reported in certain mining districts.

Prices on short tons f.o.b mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Sized grades	$2.60	$2.95	$2.60
Mine-run	2.35	2.70	2.35
Screenings	2.10	2.35	2.10

CINCINNATI

Continued heavy demand features all departments, increased freight rates to become effective having given an additional stimulus. Trade is settling down to a summer of unprecedented activity.

One of the outstanding features of the past week in the coal trade was the announcement of increased freight rates, effective June 25. Inasmuch as the increased rates will add about 30c. a ton to the cost of coal in Cincinnati, the immediate effect was a still further increase in the volume of orders, many consumers being brought to an immediate decision to order their winter supply who had until then delayed in placing their orders. Of course, such orders in the vast majority of cases will not be filled before the new freight rates go into effect, as dealers have for some time found it impossible to keep up with their orders. The additional freight cost will be charged from the date indicated, it is generally assumed, even on coal already in the yards, as the higher freight rate will be part of the replacement cost of all fuel in this section. Dealers generally, in accepting orders or in soliciting them, are warning consumers that prices cannot be guaranteed, and that orders cannot be accepted save for delivery at such prices as may be prevailing at the time of delivery. In general, this is not having the effect of retarding orders, however, the number of consumers who are holding off on account of the present undeniably high prices being comparatively small, and of no importance in the market, in view of the inability of the trade to take care of the business already booked.

LOUISVILLE

Demand for all grades of coal good, with numerous inquiries from industrial concerns for stocking coal. Car supply still short, with labor steadily leaving mines for other industries.

A 10c. per ton reduction was made in the mine price of lump coal last week, thus placing the new price at $2.55. However, retail dealers will average inbound shipments en route at that date with coal on hand in yards, and the difference will not be much more than 3c. a ton. During the past two weeks the weather has been hot, and domestic consumption has necessarily been light for immediate use. However, stocking orders have been plentiful, and the domestic demand, from the viewpoint of operators, jobbers and retailers, has been much better than in any former year on record.

The 25 per cent. increase in freight rates recently announced by Director General McAdoo is expected to have little real effect on business, as a general increase affecting everyone alike will merely mean that the ultimate consumer will have to pay the freight. Few orders have been taken by the coal trade that did not carry provisions subject to change in event of increases in freight rates; whereas in many trades prices were made f.o.b. points to which merchandise had first to be shipped, there was little of this in the coal trade. However, with thousands of merchants endeavoring to get under cover between now and June 25, it is expected that railroad tonnage movement will be considerably increased, resulting in a still further shortage of cars and labor.

Retailers through their local board have been endeavoring to secure an increase in margins due principally to the increased cost of all labor, which has resulted in the margin being a bit short of what it was a few months ago, when it was made effective. At the present time it is next to impossible to secure men for loading and unloading cars in the local yards.

The daylight-saving plan has had a remarkable effect on the volume of coal consumed by public service corporations during the past few weeks. The industrial load during the daytime has been much heavier this year than usual due to general industrial activity, but with daylight until nearly 9 o'clock, domestic, store window and other consumption has fallen off materially, resulting in a corresponding decrease in the fuel consumption.

BIRMINGHAM

Trade strong and active in both domestic and steam sizes. Supply perhaps a little improved as a whole. Car supply good, but mine workers are not yet putting in full time, which is preventing any appreciable increase in the output.

As far as inquiries go, local conditions are highly satisfactory, the supply being the matter of concern, as has been the case for some time. Both steam and domestic users are insistent upon shipments, and the deficiency in the available tonnage is furnishing a knotty problem for the brokers and distributing agencies in apportioning it among their customers, with the due regard which has to be given to the priority class.

Domestic wholesale and retail prices were boosted 45c. per net ton on May 16, when the wage agreement allowing this increase was placed in effect, and suffered a reduction of 10c. per ton in accordance with the agreement in connection with railroad-fuel contracts. Receipts of domestic coal continue light, with a good demand from the householder. Retail prices are about as follows on prepared sizes: Big Seam, $5.60; Cahaba and Black Creek, $6.25; Corona, $5.90; Montevalle, $7.15.

There is still a pronounced shortage in steam coal to cover requirements, but as this condition has obtained for some time customers are registering few complaints, merely exerting their efforts to get as near as possible to their approximate needs. Mine price schedules have changed twice recently, and the following prices are now in effect:

	Prepared Sizes	Mine-Run	Slack and Screenings
Big Seam	$2.80	$2.50	$2.20
Cahaba, Black Creek, Brookwood and Blue Creek	3.45	3.20	2.80
Pratt, Jagger, Jefferson, Nickel Plate	3.00	2.70	2.40
Corona	3.10	2.75	2.40
Montevalle	4.35	2.75	2.50

Coke

CONNELLSVILLE

Labor performance unsatisfactory; car supply causes little difficulty. Better coke and more efficient blast furnace operations. Effect of freight advances. Production stationary.

With the increased car supplies in the Connellsville region the past few weeks a shortage of labor has been uncovered, and in general the limit in production now is the supply of labor rather than the supply of cars. Frequently cars have to be held over a day for loading. It is asserted that there is a sufficient number of men on the payrolls, but the men do not work full time, hence there is a shortage in performance rather than in men. However, there have been numerous holidays lately, religious and otherwise, and from now to Independence Day labor performance is expected to be better.

Connellsville coke production has been running at about 340,000 tons a week for several weeks past, and it develops that this amount is nearly if not quite sufficient for the operation of blast furnaces now dependent on the region. In 1916 the movement was about 420,000 tons a week, but since then the completion of many by-product ovens has decreased the requirements for Connellsville coke, though much Connellsville coal is moving out instead. In the winter it appeared, from a study of the losses in production by the furnaces, that for full operation close to 375,000 tons of Connellsville coke would have to be supplied, but it now apears that with regular shipments the quality of coke has come closer to standard while the furnaces do not have to bank or run at gaited rates, the result of these influences being that more pig iron is made per ton of coke and the increase in pig-iron production has been greater than the increase in coke production.

The freight advances that go into effect June 25 are as follows on Connellsville coke: When the present rate is 49c. or less per net ton, 15c., this applying to practically no Connellsville coke; on 50 to 99c., 25c. applying to Pittsburgh and making the new rate $1.15; on $1 to $1.99, 40c., applying on Wheeling and the valleys, making a rate of $1.75, on Cleveland making the rate $2.15 and on Erie making the rate $2.20; 60c. on rates $2 to $2.99, making $2.60 to Toledo and Buffalo.

The Connellsville "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 26 at 340,100 tons, a decrease of 3170 tons.

Middle Western

GENERAL REVIEW

Dr. Garfield's order reducing prices on Illinois and Indiana coal 10, 15 and 20c. per ton the principal event of the week.

Coal producers received a considerable shock during the week past when they were notified of a 10c. per ton reduction in the prices of all grades, and the cancellation of all temporary clean coal permits except to the mines that had washers and mechanical devices.

A noteworthy feature of the past week at several producing centers is the increased car supply, some operators receiving all the cars they could load. Dealers and domestic users were optimistic over the price reduction, but the news of a substantial increase in the freight rate of more than enough to overcome the reduction in coal prices acted somewhat as a dampener.

The continued heavy demand for prepared coal and the slack fine coal market has caused the sales managers of quite a number of companies to take on mine-run orders, much to their dislike and to the detriment of those depending on them for lump, egg and nut coal.

The hard coal situation continues to grow worse each week, and it begins to dawn on all fuel users that they will be compelled to depend on the Middle West producers for coal and forget they have heretofore used hard or Eastern smokeless.

CHICAGO

Decrease in prices of coal and increase in the freight rate cause more or less confusion.

A wild scramble for better grades of coal from the Williamson-Franklin County field was caused by the substantial freight-rate increase during the week. All producers in southern Illinois, including Saline County, have business booked of sufficient volume to operate their mines with a full-car supply for an indefinite period. Dealers are insistent that their orders have preference over those of their neighbors, and the result is that sales managers are compelled to listen to entreaties daily until their position has been rendered one of constant strain.

While there is a good market for all grades of prepared coal in this market, screenings from the central and northern Illinois fields are selling off. Southern Illinois operators are not experiencing any difficulty in disposing of their fine coal at full Government price.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Spring-Springfield	Carterville	Grundy, La-Salle, Bureau and Will.
Steam lump	$2.55@2.70	$2.55@2.70	$2.95@3.10	$2.55@2.70	$2.55@2.70	$3.25@3.40
Domestic lump	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut	2.55@2.70	2.55@2.70	.....	2.55@2.70	2.55@2.70	3.25@3.40
Pea	2.55@2.70	2.55@2.70	.....	2.55@2.70	2.55@2.70	.....
Washed egg	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack	2.05@2.20	.....	.....	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

An organized effort is being made to round up coal orders. Receipts by lake continue slow. Wisconsin's allotment of anthracite reduced.

A coal-ordering drive is on in Milwaukee and consumers are responding satisfactorily, according to State Fuel Administrator Fitzgerald. When the investigation of the cost of handling coal over the docks is completed, and prices are fixed, it is expected that ordering will become more brisk. It ought to be an easy matter to determine Wisconsin's coal needs during the winter season without waiting for individual orders to pile up, as reliable statistics covering the coal business for years past serve as an open book.

The movement of hard coal up the lakes is slow at present. Milwaukee has been averaging one medium cargo per week. Since last week's report one cargo of 7897 tons has been received. Soft-coal receipts during the same period aggregated 100,404 tons. Cargo receipts for the season thus far embrace 73,045 tons of anthracite and 422,091 tons of bituminous.

With one exception, firms which have received hard coal are delivering the same to consumers at whatever price the fuel administrator may name. The leading dock company is holding up deliveries, however, until some adjustment as to price has been reached. The situation is entailing hardship upon a small army of middlemen who have been forced to maintain their teaming outfits in idleness for some time. Coke is being delivered freely, however.

Wisconsin is to get less anthracite this year, a cut of 13.36 per cent. in the state's allotment having been ordered by Federal Fuel Administrator Garfield. The state will be allowed 1,024,000 tons of anthracite for use during the year beginning Apr. 1, 1918, and ending Mar. 31, 1919. Last year's quota was 1,181,926 tons. If increased labor shortage should still further curtail the total production, Wisconsin will get proportionately less. In consequence of the reduction in the anthracite supply, consumers who have been using anthracite exclusively in the past will have to put up with 10 per cent. of bituminous coal.

ST. LOUIS

An unusually quiet market on steam sizes, with no railroad buying at all to mention. A surplus of coal still on hand in the Standard field and a fluctuating market. Car supply fair. Critical situation in the Middle West on account of hard coal ruling.

The situation in the West at the present time is one of extreme anxiety on the part of the public, who have been led to believe throughout the spring months that they would receive their share of anthracite coal. Now comes advice from Washington that no anthracite coal will be permitted to come to Mississippi River points or west.

Throughout the entire State of Missouri there is much hardship and an enormous loss in actual money as a result of this ruling, for equipment in thousands of homes must be thrown out and discarded in order to make room for furnaces that can burn another kind of fuel.

The dealers have booked orders for thousands of tons, and the public are insisting that they get the coal. A small tonnage of anthracite is moving in; so small, that it does not count for anything.

The conditions in the bituminous industry have not changed much in the past several weeks. In the Carterville field there still continues to be a demand that so far exhausts the supply that it will take months before the mines will be caught up.

The car supply is not good on the Iron Mountain or Illinois Central and transportation on those roads is also bad.

Conditions in the Mt. Olive field are extremely good. The demand is equal to the supply. Working conditions are better than usual, the car supply is fair, and the transportation right now is nothing to complain of.

In the Standard field the screening market is in a deplorable shape. Coal restricted to St. Louis brings as low as $1.40 for screenings. Mine-run is $1.90, while lump has been going as low as $2.20.

Railroad buying is extremely light and many mines have coal unbilled daily. Some are unable to work at times on account of no business, and yet in the face of all this there is a crying demand for coal outside of the Missouri zone line that cannot be met. It is freely admitted that the operators in western Missouri and the Kansas field cannot begin to take care of the demand for coal in their territory when the time comes, and yet with the surplus of coal in Illinois, that territory must suffer and the Illinois mines remain idle.

The price of coal was increased 5c. per ton retail. It should have been 15c., but on account of the decrease in the mine price of 10c. on May 25 it was evened up with a 5c. increase.

There is no smokeless coal of any kind or character coming in, with the exception of a little from Arkansas, which is not giving satisfaction.

The prevailing market is, per net ton f. o. b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.90	$2.55@2.70	$2.55@2.70
3x6-in. egg	2.55@2.90	2.55@2.70	2.55@2.70
2x3-in. nut	2.55@2.90	2.55@2.70	2.55@2.70
No. 2 nut	2.55@2.90	2.55@2.70	.....
No. 3 nut	2.55@2.90	2.55@2.70	....
No. 4 nut	2.55@2.90	2.55@2.70	....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	.....
2-in. lump	.....	.....	2.20@2.40
3-in. lump	.....	.....	2.20@2.40
Steam egg	.....	.....	2.20@2.40
Mine run	.....	2.35@2.50	2.00@2.20
Washed:			
No. 1	2.55@2.90	2.55@2.90	.....
No. 2	2.55@2.90	2.55@2.90	.....
No. 3	2.55@2.90	2.55@2.90	.....
No. 4	2.55@2.90	2.55@2.90	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson & Franklin Co. rate is 87½c. Other fields, 72½c.

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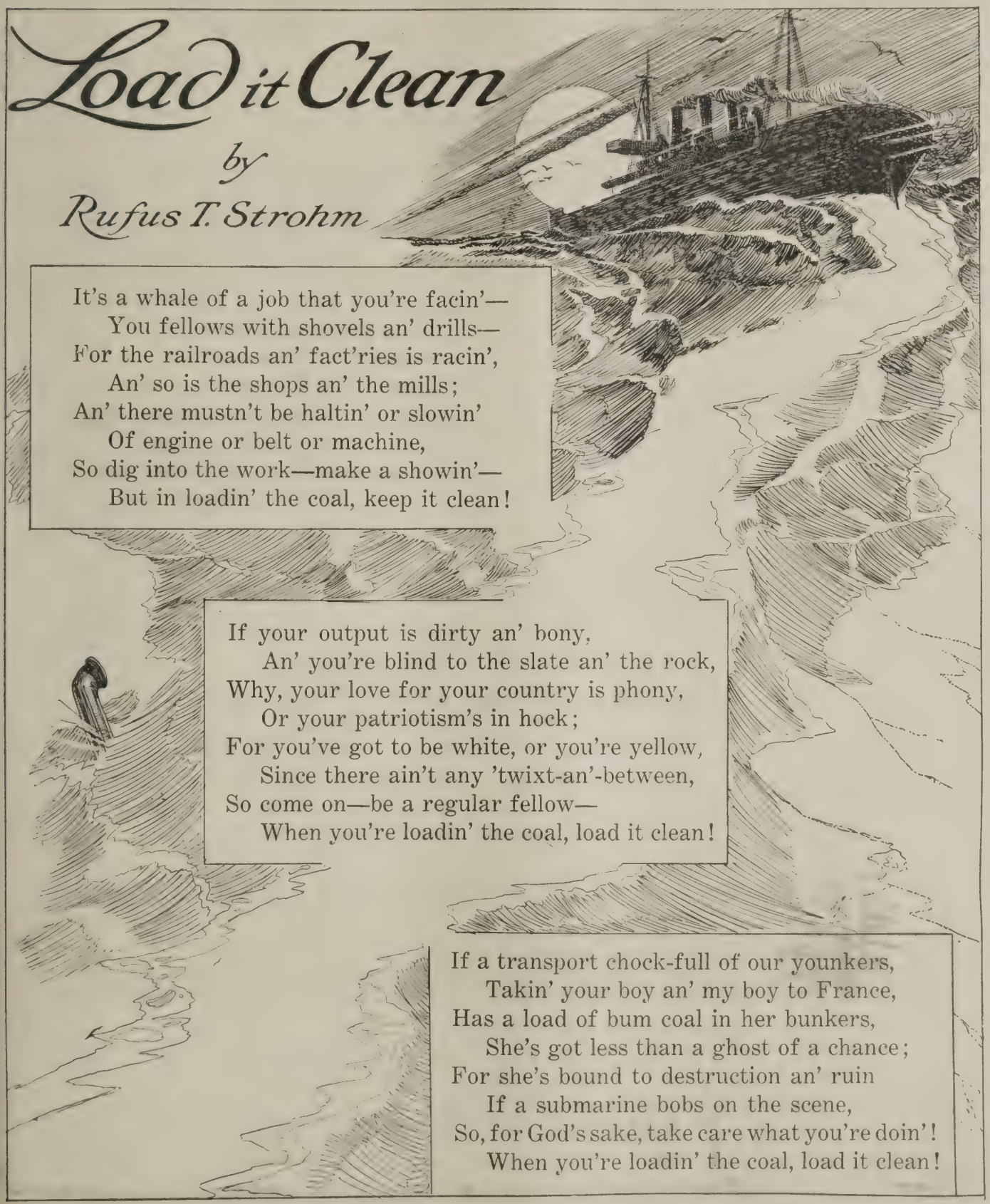
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COAL AGE

Volume 13 NEW YORK, JUNE 15, 1918 Number 24



Load it Clean

by

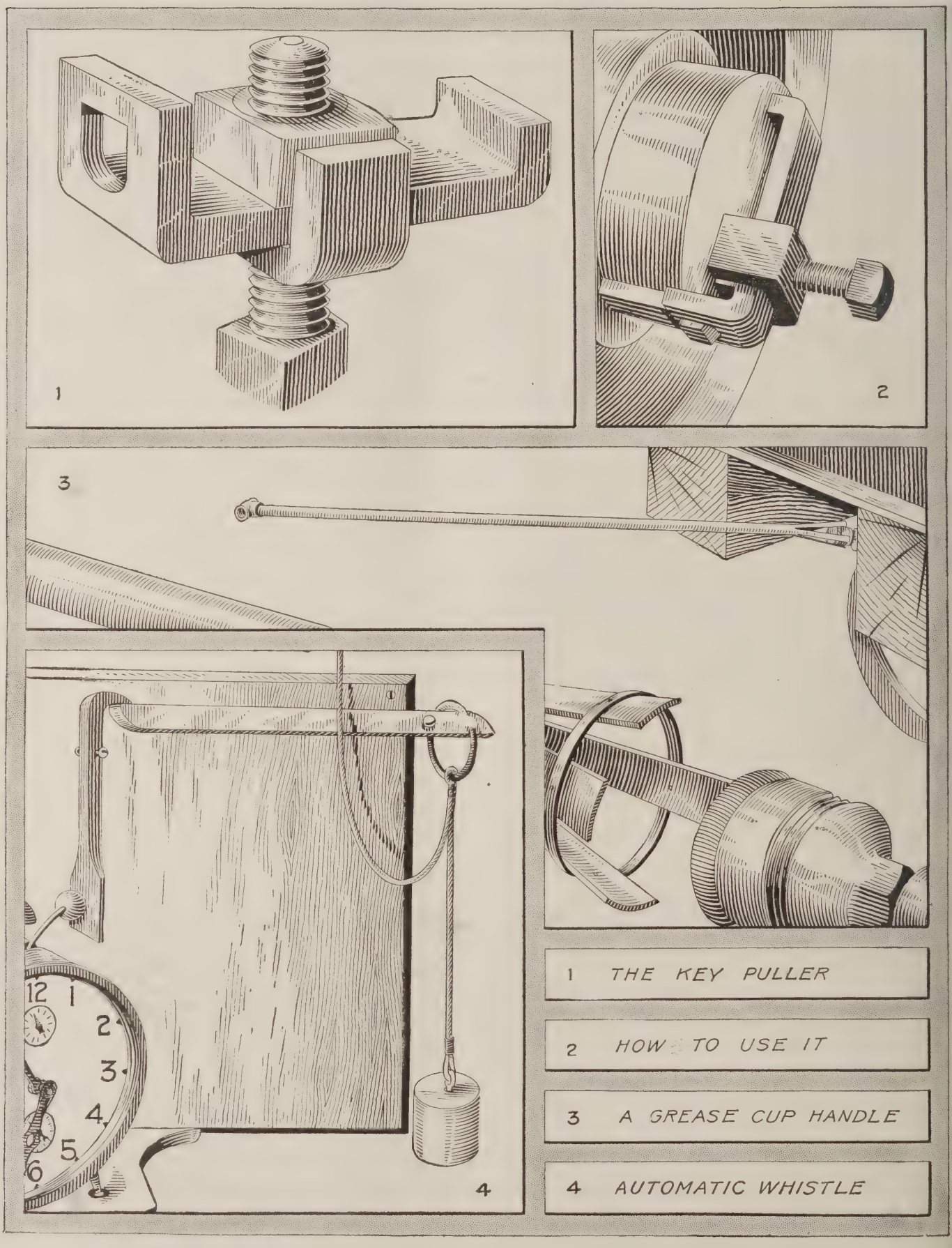
Rufus T. Strohm

It's a whale of a job that you're facin'—
You fellows with shovels an' drills—
For the railroads an' fact'ries is racin',
An' so is the shops an' the mills;
An' there mustn't be haltin' or slowin'
Of engine or belt or machine,
So dig into the work—make a showin'—
But in loadin' the coal, keep it clean!

If your output is dirty an' bony,
An' you're blind to the slate an' the rock,
Why, your love for your country is phony,
Or your patriotism's in hock;
For you've got to be white, or you're yellow,
Since there ain't any 'twixt-an'-between,
So come on—be a regular fellow—
When you're loadin' the coal, load it clean!

If a transport chock-full of our younkers,
Takin' your boy an' my boy to France,
Has a load of bum coal in her bunkers,
She's got less than a ghost of a chance;
For she's bound to destruction an' ruin
If a submarine bobs on the scene,
So, for God's sake, take care what you're doin'!
When you're loadin' the coal, load it clean!

Some Ideas and Suggestions That Have



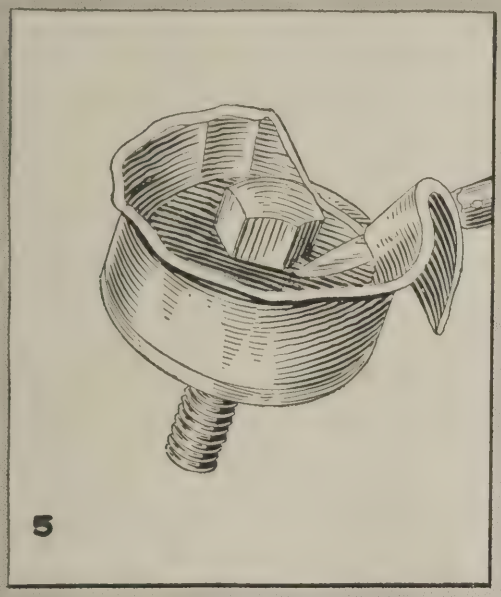
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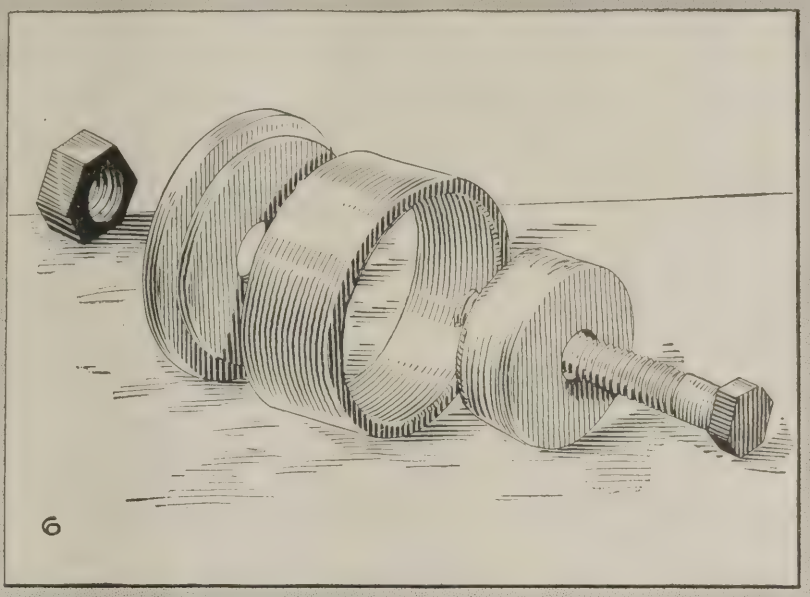
3 A GREASE CUP HANDLE

4 AUTOMATIC WHISTLE

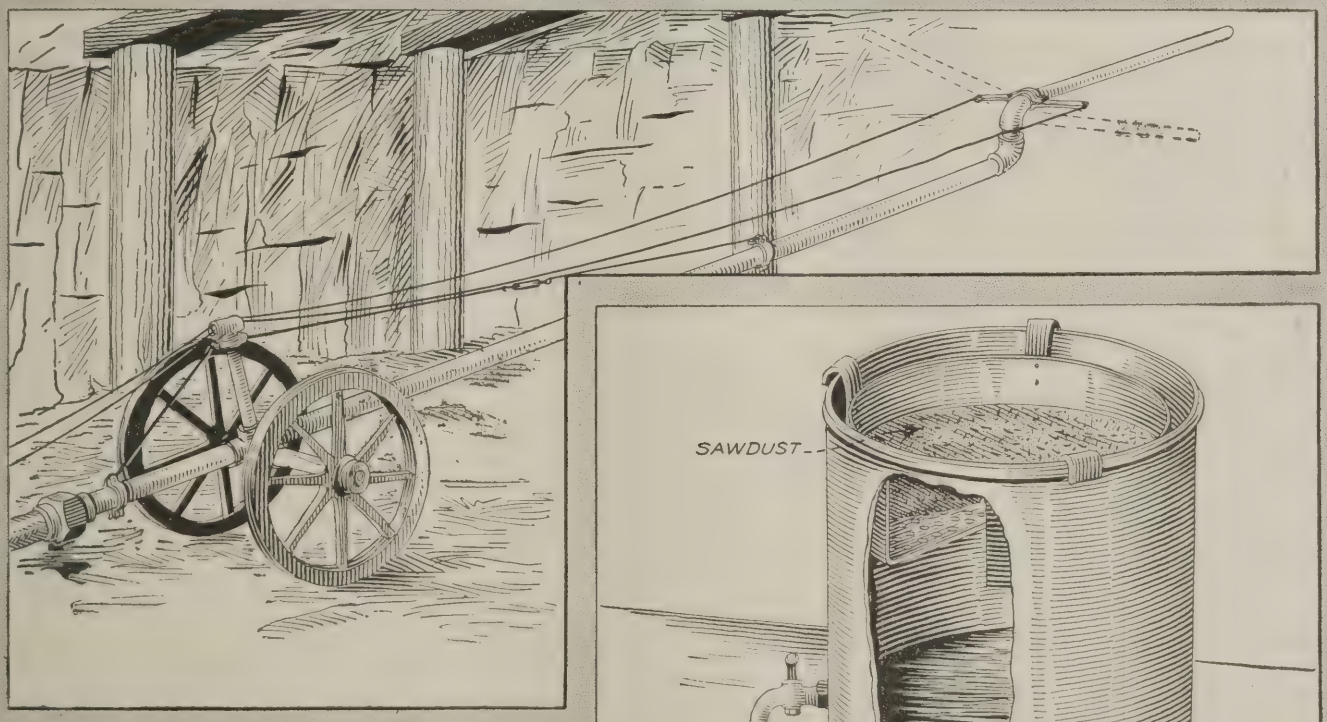
Proved Their Utility Around the Mine

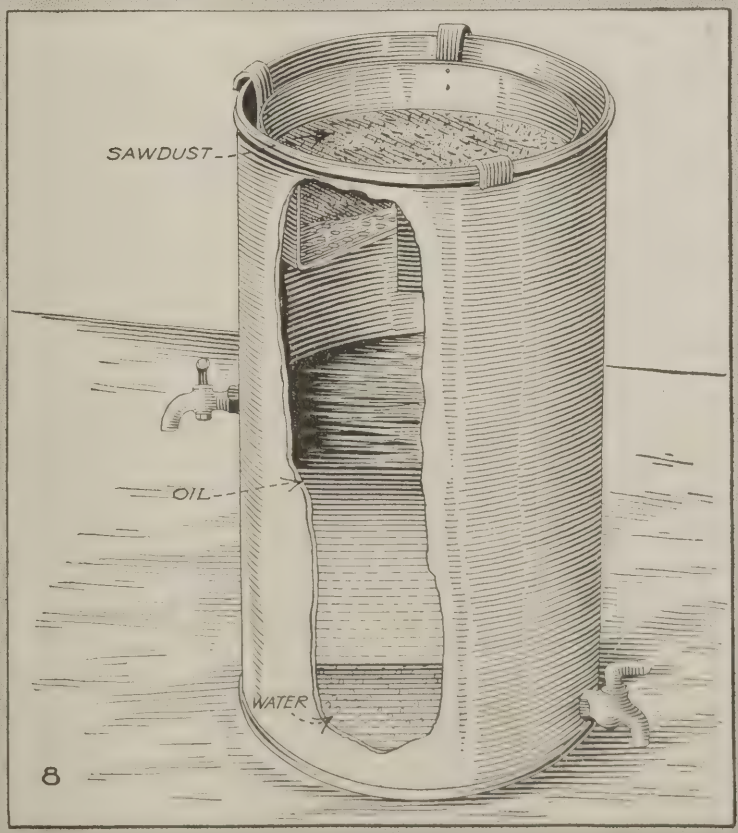


5



6





8

5 LEATHER CUPPER

6 ITS COMPONENT PARTS

7 FIRE HOSE EXTENSION

8 SAW DUST OIL FILTER

Hoisting Water in Tanks by Electricity

By GEORGE W. HARRIS
Editorial Staff, "Coal Age"

"OLD COMPANY'S LEHIGH" for many years has been favorably known the length and breadth of the land wherever anthracite coal has been prized as a domestic and steam fuel. The main source of this coal is the Panther Creek Valley, adjoining the eastern end of which is the celebrated mine at Summit Hill where the old workings long have been burning and destroying thousands of tons of "Big Vein" coal. Mauch Chunk, Penn., is not far distant, and tourists visiting this old town, in the midst of the "Switzerland of America," generally went to this burning mine, which is on a site overlooking the Panther Creek Valley. A few years ago the fire in this old colliery was isolated by building a barrier pillar shutting off the old workings from the main body of coal adjoining. The old town of Tamaqua is at the western end of the Panther Creek or main holdings of the Lehigh Coal and Navigation Company.

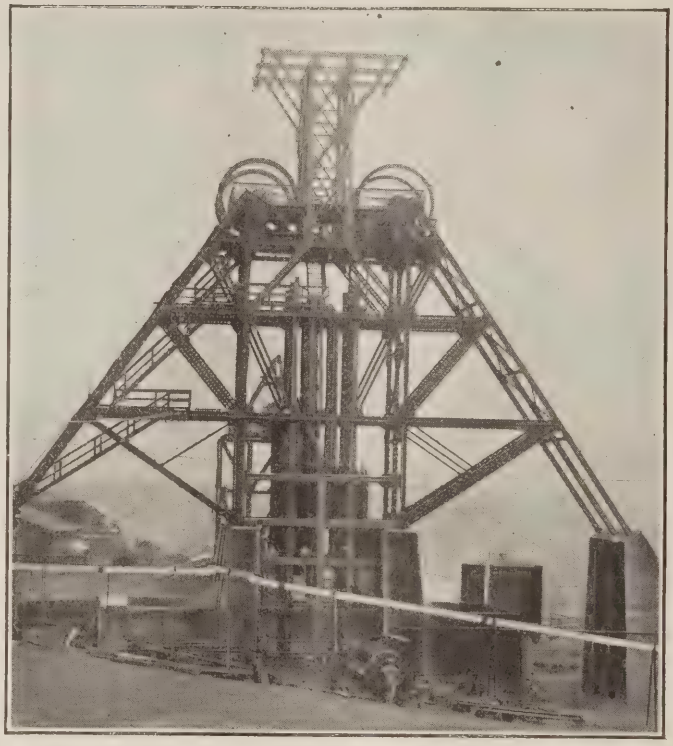


FIG. 1. HEADFRAME AT TAMAQUA COLLIERY

Nearing the century mark of existence, this veteran coal company looks back on many years of achievement. The history of this pioneer organization is most interesting. The original companies, which later were merged into the Lehigh Coal and Navigation Co., were the first coal companies in existence on any scale in the anthracite field. The Lehigh Coal Mining Co. began operations in 1793 and the Lehigh and Navigation Co. was founded in 1818. In 1820 these two companies combined under the name of the Lehigh Coal and Navigation Co., thus establishing its claim to the title of the oldest coal-mining company in existence in the region.

The output of this company in 1917 was about five million tons, or an increase of 31 per cent. over that of the preceding year. Its operations are being enlarged rapidly, and an aggressive policy of expansion and development looks to a substantial increase of tonnage this year over that of 1917—this in the face of a decreasing labor supply and increasing difficulties of operation.

Among the matters of serious import to the Panther Creek operator is the water problem. The steep mountain sides run water quickly to the valley below. In the case of intervening broken surface, on account of mine falls and subsidence of surface, the water is diverted to underground workings. As mining progresses, the difficulties of handling mine water will increase with greater depth and quantity of water to be removed. At times water floods the workings almost beyond the ability of equipment to handle it. The water drainage gangway alone carried 40,000 gal. per min. in one instance during a wet season.

In the early '80's, hoisting water from the mines by tanks was started by the Lehigh Coal and Navigation Co., and during the succeeding years this method has been given a thorough trial. Coaldale No. 8 and Lansford No. 6 shafts are the oldest water hoists in the Panther Creek Valley and likely the first installations of the kind in the anthracite region. Coaldale No. 9 shaft has no headframe, the water being discharged into a water level tunnel below the surface. The two steam water hoists at shaft No. 10 of the Greenwood colliery have a single wooden headframe, common to both hoists, equipped with a unique water seal equipment which will be treated in a separate article. Lansford No. 4 and No. 6 water hoists and the two water hoists at No. 14 shaft, Tamaqua colliery, all have steel headframes. The No. 14 shaft hoists include a steam and an electric motive power; the latter was installed a year or so ago and is worthy of special note.

The water hoists enumerated total eight. In addition each shaft through which coal is hoisted is so arranged that tanks can be installed at once in an emergency. The false bottom of 3-in. plank which rests on shaft timbers about 4 or 5 ft. below the cage landing at the bottom can readily be removed; a 30-ft. sump is thereby available in which water tanks can be filled. When the false bottom is in position it tends to keep mine cars or other large objects which fall into the pit from going to the bottom of the sump.

At Nos. 4, 6, 10 and 14 shafts the water hoisted to the surface is spilled into reservoirs from which the water runs by gravity to the respective breakers. At other breakers the creek water must be used. The wet preparation of anthracite coal necessitates the use of large quantities of water. For every 1000 tons of coal prepared, practically 1000 gal. of water are required per minute. Possibly about the only good word a coal operator will have for mine water is in this connection. In very dry seasons or during an extremely cold winter water for breakers and boilers may be a most serious matter. In portions of the anthracite region during the past winter the water in some colliery reservoirs froze

to such a depth that driven wells were substituted to supply the requisite water for certain operations.

At shaft No. 14, of the Tamaqua colliery, there is a steam-operated hoist and another one operated by electric power; the latter hoist has been in operation almost two years. The plan of Tamaqua colliery is shown in Fig. 2, and a section of the basin at shaft No. 14 is given in Fig. 3.

Tamaqua colliery adjoins the town of Tamaqua and is situated in Schuylkill County, Pennsylvania. The seams at this point were developed by shafts from which tunnels were driven to intersect the various beds at different levels. The water shaft No. 14 (*A*) and the coal shaft (*B*) were both started about the same time in 1906. Shaft *A* was sunk to a depth of 826 ft. and a short tunnel driven from the bottom to serve as a sump. Other tunnels were driven as shown on the section and map—also several shafts for various purposes. Three levels were opened up from the main shafts at depths of about 406, 589 and 829 ft. respectively, below the surface. These tunnels mainly developed the coal seams on the south dip. The second level tunnel constituted the principal development; it was extended to cut all seams in Locust Mountain on the north, a distance of 2160 ft.; on the south, this tunnel was driven a distance of 4300 ft. from shaft *A* to reach the seams in Sharp Mountain. Seven seams are worked on 2nd level north —the Sandrock, Top, Middle and Bottom splits of the Mammoth, the Seven-foot and the Buck Mountain beds. On the 2nd level south, the Orchard, Primrose, Top and Bottom splits of the Mammoth and the Buck Mountain seams are mined.

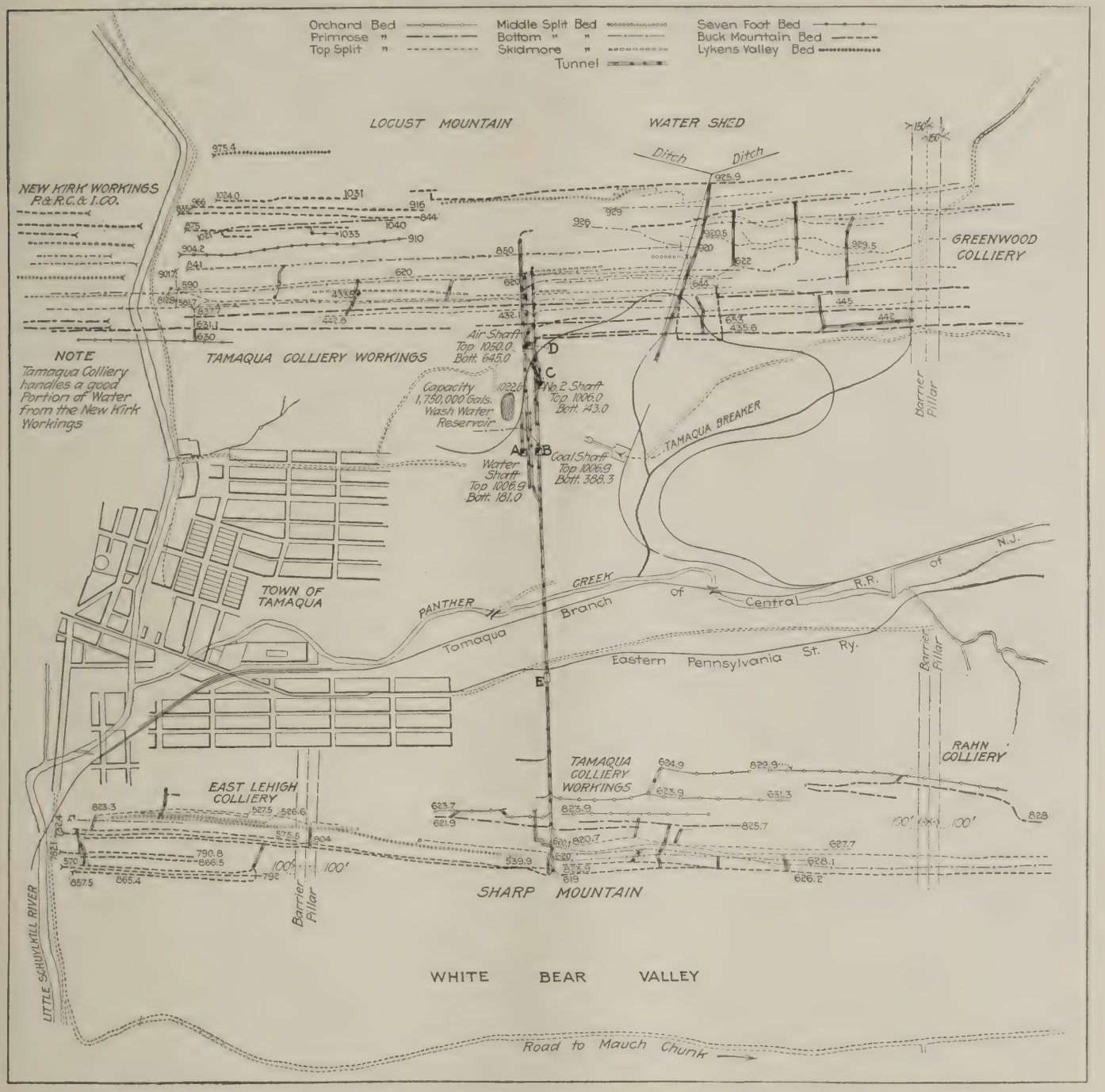


FIG. 2. GANGWAYS, TUNNELS, SHAFTS AND SURFACE FEATURES OF TAMAQUA COLLIERY

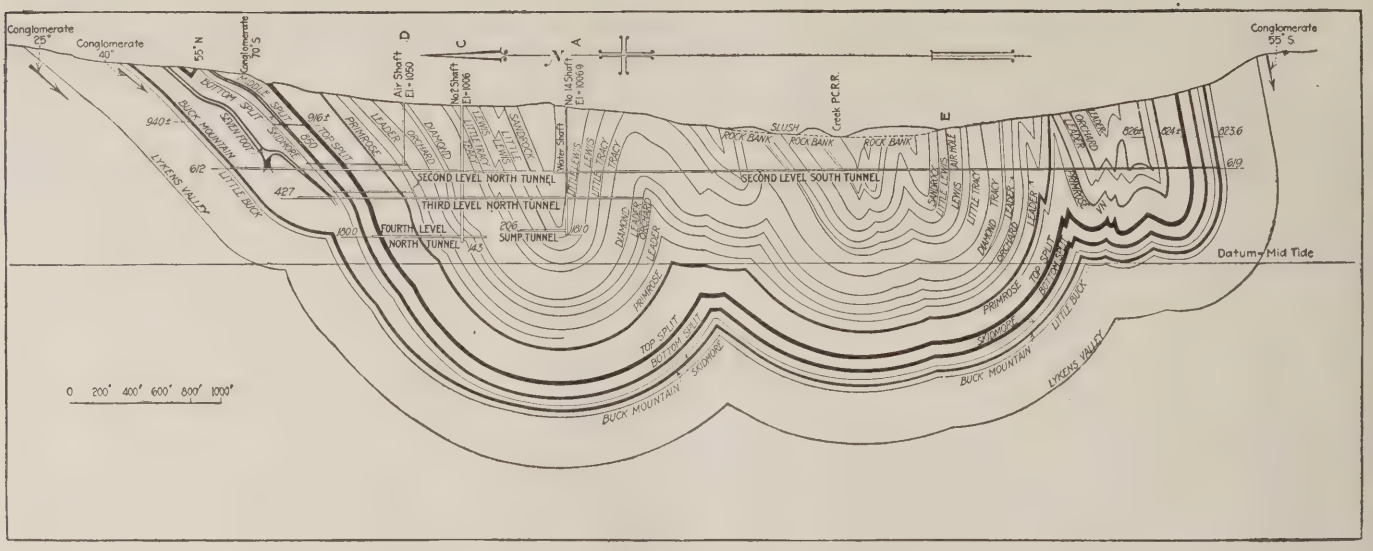


FIG. 3. CROSS-SECTION OF BASIN AT WATER SHAFT AT TAMAQUA COLLIERY

Development to the east and west of the main or 2nd level is as follows: The south tunnel workings extend 3400 ft. east to a barrier pillar between Tamaqua and Rahn collieries, and 2400 ft. west to a barrier pillar between Tamaqua and East Lehigh collieries. The north tunnel workings extend 3600 ft. east to a barrier pillar between Tamaqua and Greenwood collieries, and 3800 ft. west to Little Schuylkill River, the center of which is the dividing line between the Lehigh Coal and Navigation Co. and the Philadelphia & Reading Coal and Iron Co. at the latter's New Kirk old workings. Limited mining in the Primrose seam was carried on during early times and abandoned in 1874. Thus it is seen that a large amount of territory has been opened up. As to the drainage area, the situation can readily be grasped by reference to the map and section. From the top of Sharp Mountain on the south, extending over the adjoining mine workings, there is a drainage area of about 110 acres on the Tamaqua colliery tract. Similarly on the north, Locust Mountain furnishes a drainage area of about 240 acres. Between these two areas, in the center of the valley, the water drains into Panther Creek, which flows into Little Schuylkill River at Tamaqua.

It can readily be seen that considerable water will find its way into the workings of the Tamaqua colliery in wet weather. Conditions are somewhat improved on a portion of the Locust Mountain water shed by ditches above the outcrops. These ditches catch water running down the mountain slope above and divert it to a trough which carries it over the workings to Panther Creek. Underground, the bulk of the water at Tamaqua col-

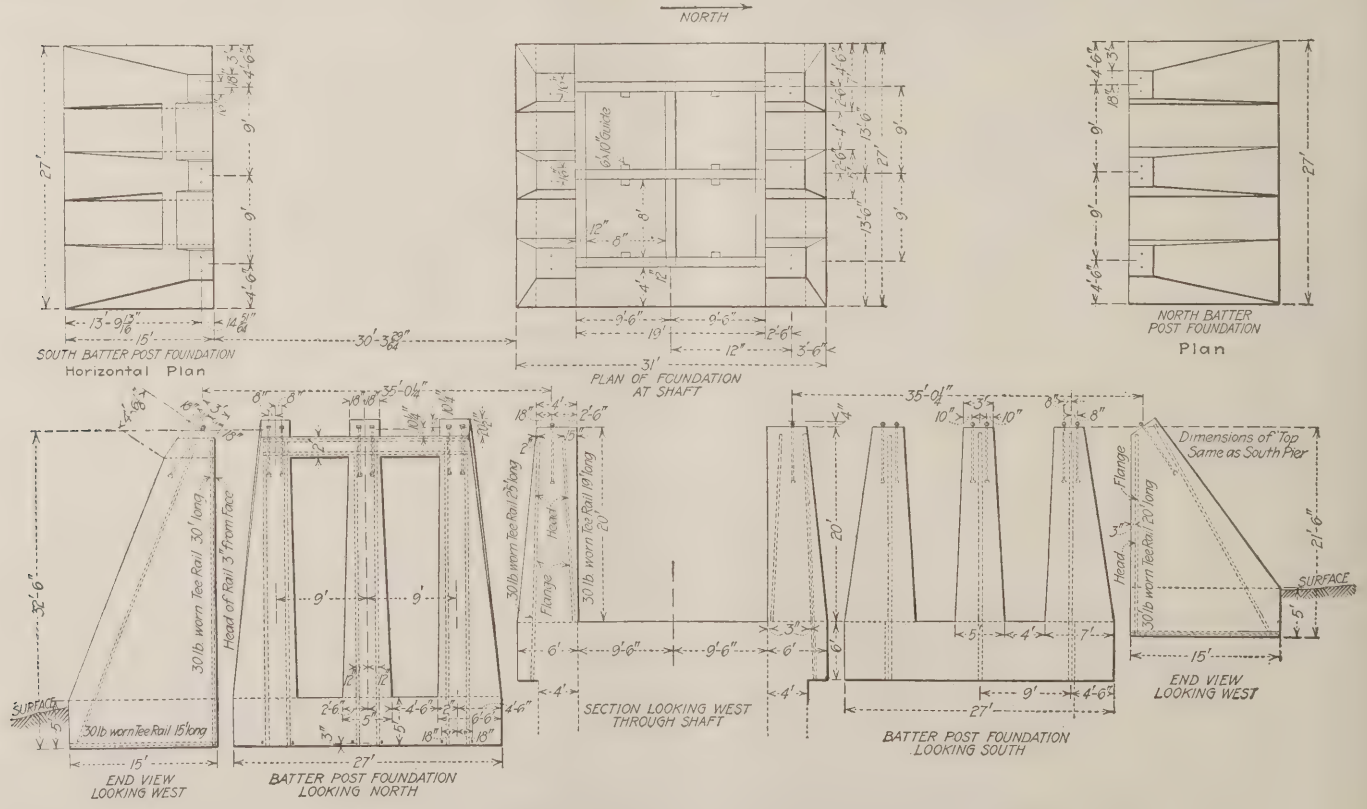
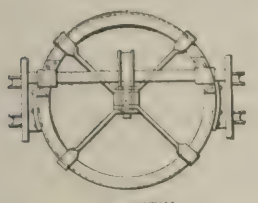
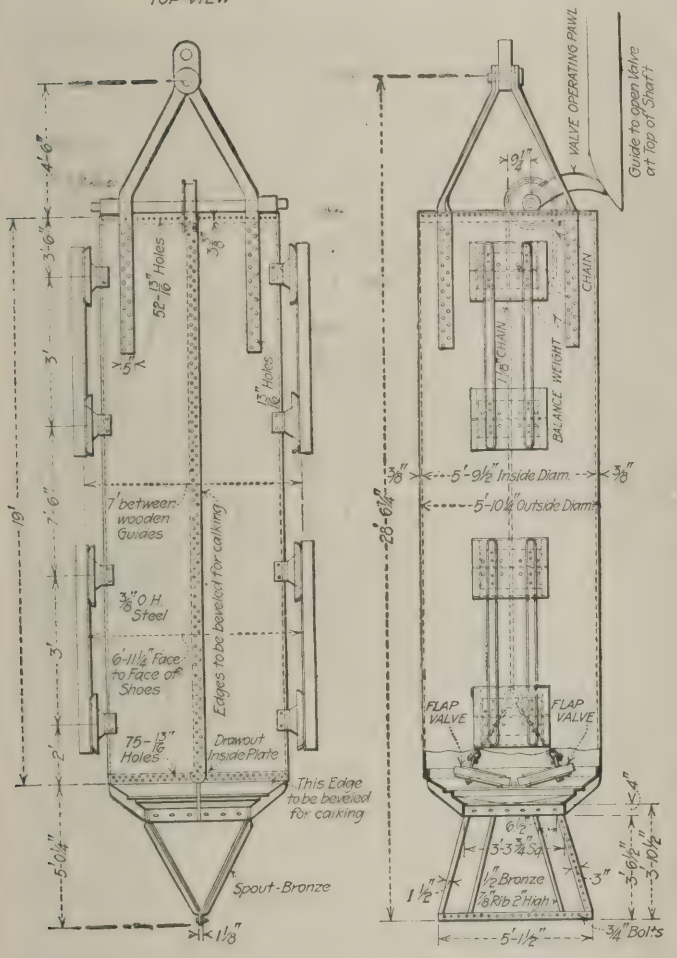
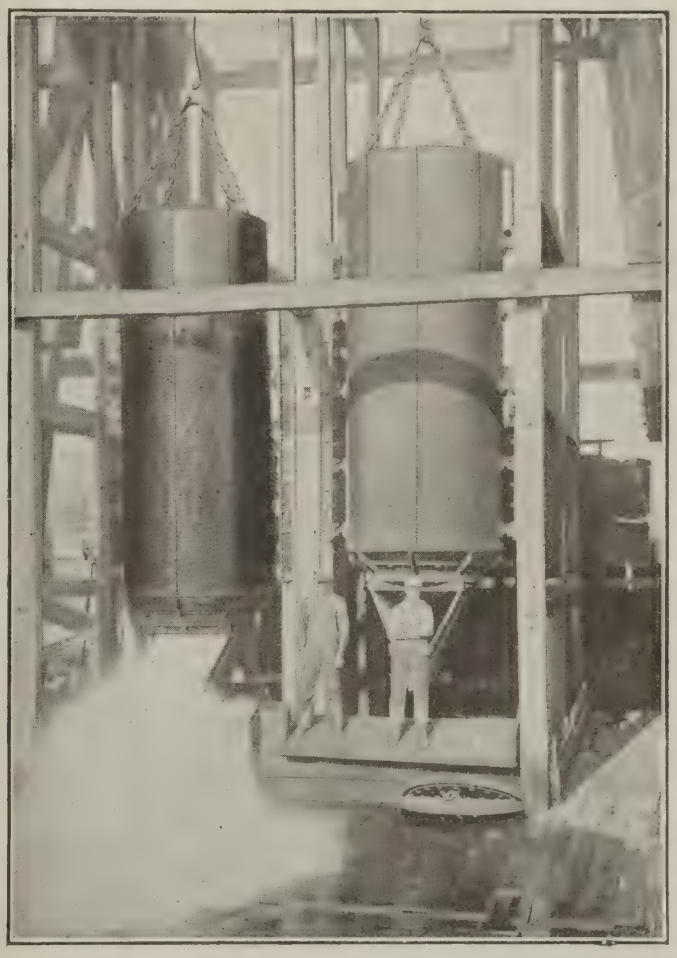


FIG. 4. DETAILS OF HEADFRAME FOUNDATIONS AT SHAFT NO. 14 WATER HOIST

liery is handled by the water hoists at shaft No. 14 during normal times. In the south tunnel a 2000-gal. centrifugal pump is now being placed which will be used in wet weather to pump water up a 300-ft. columnway to the surface. Ordinarily this water will run to the water shaft. On the 4th level now being developed at shaft No. 2 there will be installed a triplex pump of 1500-gal. capacity and a 3000-gal. centrifugal. During normal times the triplex will pump water to the 3rd level, where the water will be handled by the tanks.







FIGS. 5 AND 6. DETAILS OF WATER TANKS AND VIEW OF TANKS AT SHAFT

But in wet weather when the water shaft plant cannot hoist all the water, the centrifugal will pump direct to the surface.

In 1916 at Tamaqua colliery, 3,374,000 tons of water were hoisted on a production of 343,000 tons of coal, or 9.8 tons of water per ton of coal. The average for all the collieries of the Lehigh Coal and Navigation Co. in the same year was 6.68 tons of water per ton of coal. The removal of water from mines is a fixed charge whether the colliery works or not. The larger the output of coal per year, the less per ton should be the expense of pumping water. In March, 1917, at shaft No. 14, there were hoisted 29,000 tanks or 88,000,000 gal. of water by the electric and steam hoists. Shaft No. 14 has four compartments, each being 8 x 8 ft. in dimension. Connections between the various tunnels are provided underground at each of the several levels so that all coal is hoisted through the two-compartment coal shaft near the water hoist. The coal shaft compartments are each 7 x 11 ft. in dimension. Tamaqua colliery now produces about 2000 tons of coal daily.

Among the various water hoists of the Lehigh Coal and Navigation Co. perhaps the most interesting installation and the one most deserving of special note is the twin hoist at shaft No. 14. The headframe at this shaft is shown in Fig. 1 and the details of the foundations are given in Fig. 4. An interesting proposition developed in connection with the foundations. Two sets of plans were prepared showing concrete piers for the headframe; one set called for piers 10 ft. high and in the other plan they were made 20 ft. in height. It was found on submitting these plans to the steel companies for bids on the headframe that the plan calling for piers 20 ft. high was the cheaper proposition. The cost of the extra 10 ft. of concrete was considerably less than the cost of the same height of steel work. This was the reason for making the piers as high as they are—the situation is clearly shown in Fig. 1.

The headframe foundations at the shaft were placed on the shaft lining, which is about 4 ft. thick all the way down to rock—a distance of some 30 ft. The concrete is a 2: 4: 6 mixture and is reinforced by old 30-lb. tee rail. Everything connected with these water hoists should be of especially heavy and substantial construction. The electric hoist tank weighs 8½ tons empty and has a capacity of 3600 gal., which adds 15

tons of water, and brings the load to be hoisted up to 23½ tons irrespective of the weight of the hoisting rope. The duty on the hoist is somewhat less as the tanks are in balance.

The steel headframe is shown in Fig. 1. The sheave wheel shaft is 50 ft. above the top of the concrete foundation, and the center of the shaft compartment, on the electric hoist side, is 125 ft. from the center of the hoist drum. An interesting feature of all the Lehigh Coal and Navigation Co. headframes is the contrivance at the top for handling sheaves, etc. In Fig. 1 it is shown as a steel frame rising between the two sets of sheaves with cross beams at the top carrying I-beam and trolley directly over the center of the sheave shaft. In operation the sheaves are hoisted, when necessary, by a block and tackle, run over by the trolley to clear the headframe and then lowered to the ground. When repairs are to be made, a device of this kind is needed quickly and it is a great labor saver.

The tanks used in handling the water at shaft No. 14 are good servants but dangerous enemies. They each weigh 8½ tons empty and when loaded 23½ tons; should the wire hoisting rope break this heavy mass would gain terrific momentum with any distance to fall. Or if a wooden guide works loose, an accident resulting may put the whole shaft out of commission. Overwinds are practically an impossibility in the case of the electric hoist, but in some other installations where it has occurred the shaft has been idle for a day or so and the tank was ruined.

The details of the tanks are shown in Fig. 5. The flap valve at the bottom of the tank is balanced, so that when the empty tank strikes the water at the sump the valve readily opens and the tank quickly fills. As the tank reaches the top of the shaft, a pawl at the side comes in contact with a guide; the valve is thus opened at the bottom of the tank and is held in that position until the water is discharged. A tank discharging its load is shown in Fig. 6. The spout at the bottom deflects the water to one side. The two men in the illustration serve as a scale and impress one as to the capacity of the tanks. One of the tank flap valves can be seen on the floor below the men in question. The photograph from which Fig. 6 was made illustrates conditions at a water hoist where the headframe is constructed of wood. However, except for the presence of timber work and the absence of the massive concrete foundations of shaft No. 14, it might be taken for the latter installation.

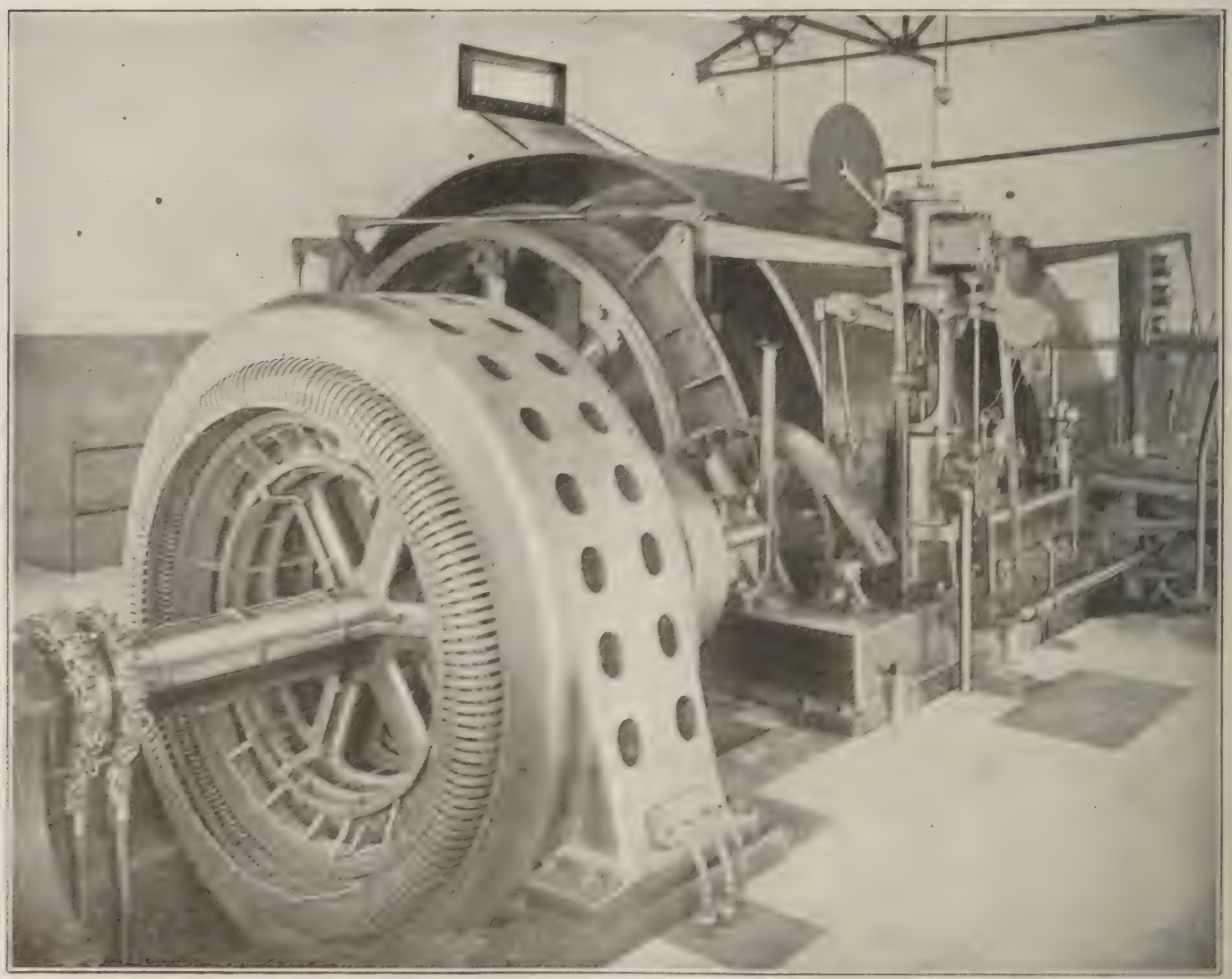


FIG. 1. ELECTRIC WATER HOIST AT SHAFT NO. 14 OF LEHIGH COAL AND NAVIGATION CO.

At the time the headframe foundations (see Fig. 4)

were built at shaft No. 14, provision was also made for handling water as it was discharged from the tanks. These concrete basins, one on either side of the shaft, are shown in Fig. 1; from here the water runs by gravity to a storage reservoir. In the background at the right of Fig. 1 is a water tank built by the W. E. Caldwell Co., of Louisville, Ky. It is a storage reservoir for water for boilers in the vicinity. In commenting on its good qualities, a Lehigh Coal and Navigation Co. official stated that it was painted inside once a year and gave no trouble.

Possibly the point of special interest at shaft No. 14 water hoist is the electrical hoist itself in its substantial building of concrete. Its operation is practically noiseless, the rush of water as it leaves the tank alone calling attention to the operation of unwatering the mines. With the steam hoists the night silence is broken by the exhaust of the engines, accentuated by the periodical stopping and starting of the hoists.

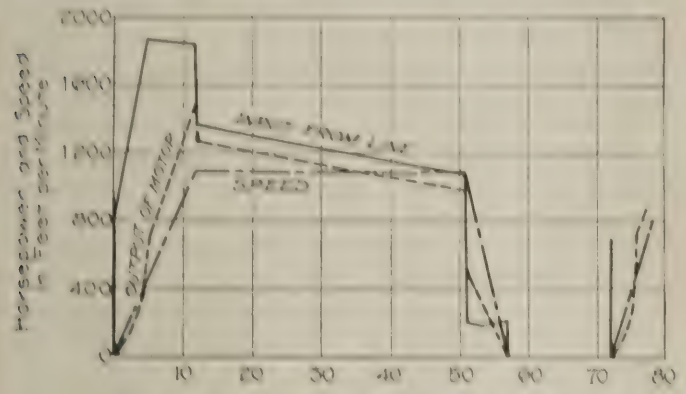


FIG. 8. DUTY CYCLE OF WATER HOIST

The electric hoist (see Fig. 7) at shaft No. 14 is a 1200-hp. machine driven by a slip-ring, three-phase, 2200-volt, 25-cycle induction motor. The hoist itself was built by the Vulcan Iron Works, of Wilkes-Barre, Penn., while the electrical end was handled by the General Electric Co., of Schenectady, N. Y. During the proposition stage, before definite plans were settled upon, three methods of driving this hoist were under consideration. One was by means of a flywheel motor generator set (the Ilgner system) and direct-current hoist motor. Another method called for a synchronous motor-generator set and direct-current hoist motor. And a third method by means of a slip-ring induction motor having a polar-wound rotor to permit of the addition of external resistance to the rotor circuit. The third method was the one adopted. Duty cycles of the three methods were made up and calculated, when it was found that so little was to be gained by the use of either of the first two and much more expensive apparatus that the Lehigh Coal and Navigation Co. was justified in deciding in favor of the induction motor.

This motor operates normally at 300 r.p.m. and is controlled by a liquid rheostat and contactors (see Fig. 9) which are used for reversing on the 2200-volt circuit. The hoist itself is driven from the motor by a single herringbone first reduction gear; the motor shaft is connected to the pinion shaft by a flexible coupling. The pinion shaft carries a band brake. The two drums of the hoist are each 12 ft. in diameter and 5 ft. 2 in. between flanges; they are grooved to stow 865 ft. of 2-in. rope with 23 turns. Each drum is provided with a double post brake, the two being controlled from a common compressed-air cylinder. The hoist is, of course, provided with a modern overwinding and over-speeding device. The engineer's platform is directly behind the center of the hoist, the control levers showing plainly in Fig. 7. A striking feature of this powerful hoist is its compactness. The drums would be practically the same whether steam or electric driven. Contrast this induction hoist with its bedplate 12 ft. square and the floor space which would be required for a 1200-hp. steam motive set.

It is particularly interesting to note just how closely a hoist of this nature can be precalculated. Fig. 8 shows the duty cycle which was calculated during the proposition stage of this job, and the duty from which the duty cycle was calculated is as follows:

Depth of shaft	865 ft.	Maximum r.p.m. of drums	38.75
Inclination of shaft to horizontal	90 deg	Time of acceleration	12 sec.
Weight of bucket (tank)	17,000 lb.	Time of full speed, running	79 sec
Weight of water in bucket	30,000 lb.	Time of retardation	6 sec.
Size of rope	2 in.	Rest period	15 sec.
Weight of rope per foot	6.25 lb.	Equivalent weight of rotating parts of hoist mechanism at 6 ft. radius	75,000 lb.
Type of drum	Cylindrical		
Maximum rope speed in ft. per min.	1,080		

From the duty cycle, the General Electric Co. advised the Lehigh Coal and Navigation Co. that it could guarantee the kilowatt-hours per trip of somewhere in the vicinity of 15.5. After a year's operation of this plant the Lehigh Coal and Navigation Co. divided the total kilowatt-hours consumed by the total number of trips and found that the calculated figure was correct. By inspection of Fig. 8, it can readily be seen that there is an interesting relation between the input from the line, output of motor and speed of the hoist. When power is thrown on, about 800 hp. is instantly developed which in 5 sec. increases to 1850 hp., while the output from the motor is only about 650 hp. During the next 7 sec. the input from the line drops slightly while the output from the motor increases to its maximum of about 1450 hp. Up to this time the speed uniformly accelerates until it reaches 1080 ft. per min. The remainder of the cycle can also be readily followed and requires no special comment. After a rest of 15 sec. the cycle is repeated.

Bird's-eye View of Operations

After close attention to details it often rests the eye and brain to climb to some height and take a bird's-eye view. The main operations of the Lehigh Coal and Navigation Co. are distributed over a valley about 14 miles long by 1½ miles wide at its greatest width. Quite noticeable at a number of points are concrete buildings with red-tile roofs; these are the substations which receive the high-voltage alternating-electric current from the Hauto power plant and convert and transform it to meet local requirements. These substations are the finest of any in the anthracite region.

The Hauto power plant is located on the other side of Locust Mountain in the Nesquehoning Valley, about half a mile west of the Lansford tunnel. It was built in 1909 largely through the efforts and by the financial support of the Lehigh Coal and Navigation Co.; it was recently sold to the Electric Bond and Share Co. Power from this 26,000-kw. station goes to all the plants of the Lehigh Coal and Navigation Co. and also the Bethlehem

Steel Co. and the cement companies in the Lehigh Valley.

The policy of unwatering its mines by water hoists was adopted by the Lehigh Coal and Navigation Co. many years ago. These machines have been efficient and have many points which recommend their continuance. When everything works smoothly, water hoists are satisfactory; but to keep them up to the mark requires considerable inspection of ropes, timber guides, sumps, etc. When the human element enters often too much depends on the personal equation—whether the right man is on the job or not. Of late certain objections to water hoists for local service in the Panther Creek valley have developed. However, this is not a general statement. Whether water hoists should be installed at a mine in another section is a matter for an engineer to investigate and settle on its merits in each case.

The Lehigh Coal and Navigation Co. is a pioneer as regards the introduction of mechanical devices at coal mines—in the last five or six years, especially, it has installed much labor-saving machinery. This company has also conducted many experiments. An account of

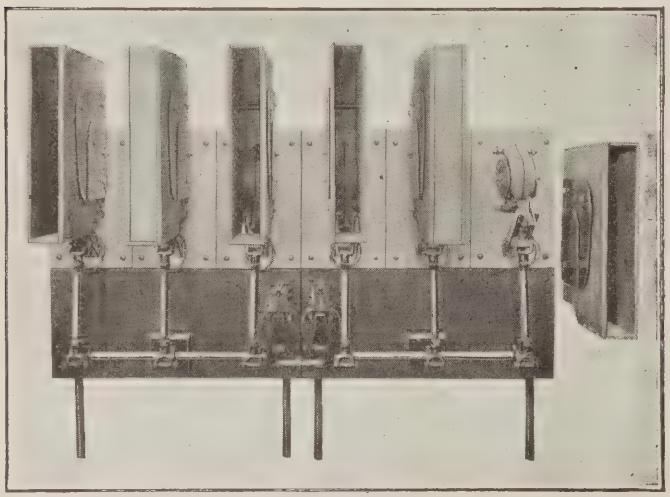


FIG. 9. CONTACTOR PANEL OF WATER HOIST

one of these was read before the American Institute of Mining Engineers and was published in the Mar. 23, 1918, issue of *Coal Age* under the title of "Economy of Electricity Over Steam for Colliery Power Purposes," by R. E. Hobart, Mechanical Superintendent of the Lehigh Coal and Navigation Co. This experiment shows a notable saving effected by the use of electricity over steam in hoisting and pumping at the Rahn colliery. Doubtless this first-hand evidence so strengthened the opinions expressed by other engineers as to the great advantage of electricity, that the Lehigh Coal and Navigation Co. settled on a policy of electrical development. Other changes of policy have also developed as the merits of various devices have become prominent as a result of recent improvements.

In view of the foregoing statement it is not surprising that the Lehigh Coal and Navigation Co. has decided not to continue with the water hoists as in the past. This company considers that water hoists are preferable to steam pumps, but claims that with the conditions at its operations electric pumps do the work better and cheaper than any other method of unwatering its mines.

Low-speed centrifugal pumps have been used at Lansford for four years without repairs—a number of points have been worked out by this company which makes these pumps particularly valuable for its special service. Both steam and electric apparatus have troubles peculiar to each, but the weekly reports of the Lehigh Coal and Navigation Co. show that the electric machines give only half the trouble that steam types do.

The new electric hoist would not have been installed at shaft No. 14 except for the fact of the shaft being ready for it. Furthermore, a steam hoist would have necessitated enlarging the local boiler plant, which would have been inconsistent with an electrical policy. Of course, the water hoists include valuable equipment in engines, etc., and it is not the intention to scrap them and put in pumps at once. They are to be retained to serve the purpose for which they were installed—some of them may be efficient for 10 to 15 years. But in planning for the future and in new development work, it is expected to gradually install electric pumps. Acid mine water does not have the terrors for operators which it did formerly, as it is now overcome by some form of bronze or other acid-resisting metal. Also fine coal and grit, so destructive to the vanes of centrifugals and the valves of triplex pumps, is readily removed by a series of catch basins so that practically clear water runs through the pumps.

From the improvements made in the mechanical end of the coal proposition we might judge that mining was entirely subordinate. As a matter of fact few radical changes have been made in the actual mining of coal for many years. All the developments looking to lowering the cost of coal on cars for shipment are connected with the mechanical end. Better haulage, pumping, undercutting and drilling coal, minimizing breakage from the face to railroad car, all are mainly due to the mechanical engineer. The mining engineer has hardly kept pace with his brother at arms. There are some notable exceptions in the successful treatment of local difficulties, prominent among which are the Lehigh Coal and Navigation Co.'s methods of working its abnormally thick Mammoth seam.

For the assistance given in the gathering of material, both for text and illustrations, used in the preparation of this article, the writer takes great pleasure in acknowledging the courtesy of the officials of the Lehigh Coal and Navigation Co. Also similar thanks are extended to the manufacturers of apparatus described.

Can Dry Coal Without Distillation

Driers are now manufactured which are able to eliminate moisture without distilling any of the volatile combustible matter in the coal; they are fired by hand or with pulverized fuel. The heat first surrounds the shell of the drier, being confined within a chamber where complete combustion takes place; the heated gases are then led through a duct to the discharge end of the drier and enter the inside of the shell at a temperature not exceeding 300 deg. F. This temperature is maintained by the operator and is indicated by a pyrometer. Volatile combustible matter is not likely to be distilled until the temperature rises above 400 deg F.—*H. H. Collins in paper to be presented September, 1918, to American Institute of Mining Engineers.*

Exhaust-Steam Turbine Installations at Coal Mines—II

By E. I. ROBERTS
Cardiff, Alberta

SYNOPSIS—*With an exhaust-pressure turbine it is of course necessary to install a condenser. The choice of condensing equipment depends largely upon local conditions. Surface and jet condensers each have their particular advantages. If the supply of circulating water is not copious, it is sometimes necessary to install either cooling towers or spray ponds.*

WE WILL now consider the means for taking care of the fluctuation of exhaust from the hoist engine, the same considerations will apply to any other units which operate on a fluctuating or intermittent load. If we do not make such a provision, all of the steam above that which the turbine is taking, at the time, will be discharged into the air and wasted; and when the hoist stops running the turbine will then be forced to draw upon live steam to carry the load.

There are two ways of taking care of the steam-quantity fluctuation: One by means of a tank, moving vertically between guides on the gasometer principle, and the other by the absorption of the steam in water in a stationary tank called a regenerator.

In the gasometer method the steam enters the tank at the bottom and at a predetermined back pressure the tank rises. The tank is usually water-sealed and provided with a relief valve, so that if an excess of exhaust steam is made, over and above that taken care of by the gasometer tank, it will exhaust into the air. As the steam quantity becomes less the tank lowers and sends this surplus steam to the turbine. While such tanks are efficient, this method has not yet been used to a great extent on this continent, probably because of its high first cost.

The regenerator method depends on the principle that as the temperature of water is increased over 212 deg. F. it absorbs certain quantities of steam in proportion to the heat increase. The law follows the formula:

$$\text{Quantity of water for storing steam in pounds} = \frac{\text{Total quantity of steam in pounds} \times \text{average latent heat of steam}}{\text{Temperature of steam at highest gage pressure—temperature of steam at lowest gage pressure}}$$

Assuming that the total quantity to be stored is 680 lb. of steam and the highest gage pressure is 4 lb. per square inch and the lowest 0 lb. per square inch, the quantity of water theoretically necessary to store this heat would be 26 tons.

In the Rateau regenerator this intimate mixing of the steam that is necessary for the proper heat absorption is carried on through perforated mixing tubes which extend the full length of the tank. The perforations are small and are all a few inches below the water level. Thus as the steam bubbles through these perforations a circulating current is produced which brings new water in contact with the steam as it enters. This absorbed steam is again given off when the pressure is reduced in the main leading to the turbine. As the regenerator is fitted with a dome, and also as its action is such as to drain all condensed water from the steam, the steam becomes dry and saturated and usually contains less than 1 per cent. of moisture. This feature is important as at the high velocities of turbine blading small quantities of water erode the blades.

We will now consider a regenerator for the hoist outlined above. The regenerator is to be used in connection with a twin 24 x 36-in. simple noncondensing engine (hoisting) discharging an average of 12,000 lb. of steam per hour. The engine averages three trips per minute and the steam inflow is for 6 sec. per trip. The exhaust of the engine reaches a maximum rate of 650 lb. of steam per minute for 6 sec., and no steam for 14 sec. The regenerator is then to receive steam at the average rate of 10.8 lb. per second for 6 sec.—that is, 64.8 lb. during the hoisting cycle. In 20 sec. approximately 65 lb. of steam enters the regenerator, or with three complete hoists per minute the regenerator will receive 195 lb. of steam.

Conditions Influencing Choice of Installation

A regenerator for this duty will be approximately 9 ft. in diameter and 25 ft. long. It will discharge in a steady flux the steam it receives under the foregoing conditions, providing that the pressure is permitted to drop from 4-lb. gage to 0-lb. gage. A relief valve, inlet and outlet connections, gage glass, water filling and overflow connections and water regulating floats and valves should be furnished complete with the regenerator.

Several conditions enter into the choice of types of condensers and auxiliaries. Of first importance is the cooling water, which should be plentiful, pure, and of normal temperature. Preferably the supply should be close to the plant. There should be no possibility of water famine. The feed-water for boilers is the next consideration. This, as is well known, should have no scale-forming impurities, for it means an increased cost for generating power, of 15 per cent. with $\frac{1}{16}$ in. of scale, and as much as 70 per cent. with $\frac{1}{2}$ in. of scale. This latter thickness is not at all unusual around plants using mine water. Of course, these percentages vary with the boiler area that is covered by scale and also the quality of scale. In any case the fuel costs are excessive.

If surface condensers are installed, for the purpose of returning the water to the boilers, provision must be made for extracting the oil from the exhaust steam before it reaches the condenser. This is best done with

exhaust steam oil separators, which are guaranteed to extract as much as 95 per cent. of the oil from the steam, and as much as 97 per cent. in other cases, particularly when the separators are properly cleaned. These separators should not be placed within 5 ft. of any elbow, valve or other arrangement that would prevent a straight, uniform flow to the separator, as the efficiency is much reduced when the steam contains too many eddy currents.

There are two general types of condensers—the jet and the surface condenser. The former intimately mixes the steam and water and the latter keeps separate the cooling element from the steam with a thin metal wall. The jet condenser, because of the mixing method of causing a vacuum, throws away the condensate; and the boiler feed in consequence must be taken from the main source of supply. Further, if precautions are not taken with the jet type of condenser, there is the possibility of flooding the condenser and turbine, should a stoppage occur at the pumps. There are, to be sure, the high-level and low-level jet condensers, but we consider that under the usual mine conditions in the low-level jet condenser is most suitable. There are several types of low-level jet condensers on the market. One of the simplest is the Rees roturbo jet condenser, which occupies a small space and may be direct-connected to an electric motor or driven by a small turbine through reduction gears.

Should the main source of water-supply be reasonably free from impurities, the jet condenser has several advantages over the surface condenser. Among these are lower first cost, lower maintenance, less space and the advantage of being able to use mine water and, under certain conditions, dependent upon the class of boiler fuel used and its cost, it is cheaper for 9-hour-per-day loads than is the surface condenser.

The disadvantages of jet condensers are that they require about 40 per cent. more power to operate than do the surface condenser auxiliaries; this is due to the jet condenser handling more air and also having to discharge against the atmosphere. The condensate is thrown away and its heat lost, the consequent use of only moderately pure feed-water causing boiler scale and consequent cleaning. There is also danger of flooding the condenser and turbine. The surface condenser is suitable where the cooling water is not adaptable for boiler feed, but contains no acid. If it is acidulous it would be cheaper to neutralize it and use a jet type of condenser than to replace surface condenser tubes continuously.

The amount of circulating water necessary is usually more than that required by a jet condenser, but as the head through the surface condenser is not usually more than 15 ft. (this presupposes tubes not corroded) the power required for circulating purposes is less.

Baffles in the surface condenser for the purpose of making the steam take a course close to the cooling tubes, should not be used unless the frictional resistance is less than $\frac{1}{10}$ in. of mercury. Besides the circulating pump an air pump and a condensate pump are necessary. The air pump is used to remove the air that is entrained in the steam or what enters the system through leaks. A small quantity of air in the condenser makes a decided difference in the vacuum. Thus 5 per cent. of the volume of feed water taken from the pond is air, and assuming that 5 per cent. more is added for leakage in the system, then if the leakage is doubled or made 10 per cent. the decrease in vacuum will roughly be $\frac{1}{2}$ in. of vacuum when the vacuum is between 27 and 29 in. referred to a 30-in. barometer. Thus it is important that the vacuum line be made as short as possible and that air leaks of all sorts are thoroughly stopped.

The condensate pump is necessary for the purpose of taking the water from the hotwell of the surface condenser and delivering it to the feed-water supply of the boilers. This unit must be set lower than the hotwell of the surface condenser.

The advantages of the surface condenser are that less power is necessary for driving the auxiliaries; the condensate may be used for feed water, consequently giving less boiler-cleaning troubles; no danger is present of flooding the turbine; and in case of a good quality of coal being used for firing the boilers the surface condenser is the cheapest, even for 9 hours daily running time, because as much heat as possible is retained in the condensate, and the condensate when fed back to the boilers keeps them free from scale.

The amount of vacuum to be carried by the condenser is important. The temperature of the circulating water, however, places a limit on the vacuum. This is shown in the following example: Assume that the ratio of cooling water to steam condensed is 60 to 1, and a permissible temperature rise of 15 deg. F. is the difference between the intake and discharge connections of the condenser, then with intake temperatures as follows:

At 50 deg. F., the highest theoretical vacuum obtainable is 28.9 in. vacuum
At 60 deg. F., the highest theoretical vacuum obtainable is 28.5 in. vacuum
At 70 deg. F., the highest theoretical vacuum obtainable is 28.0 in. vacuum
At 80 deg. F., the highest theoretical vacuum obtainable is 27.3 in. vacuum
At 90 deg. F., the highest theoretical vacuum obtainable is 26.4 in. vacuum

Suppose, however that we figured we could afford to pump 80 lb. of water for every pound of steam, the following would be the vacuum theoretically obtainable:

At 50 deg. F., we can obtain 29.1 in. vacuum referred to a 30-in. barometer
At 60 deg. F., we can obtain 28.7 in. vacuum referred to a 30-in. barometer
At 70 deg. F., we can obtain 28.4 in. vacuum referred to a 30-in. barometer
At 80 deg. F., we can obtain 27.7 in. vacuum referred to a 30-in. barometer
At 90 deg. F., we can obtain 26.8 in. vacuum referred to a 30-in. barometer

These vacua are never reached in practice since the cooling water never rises fully to the temperature of the vacuum. It is customary to specify the temperature of the water under average summer conditions, when the load around the mine is usually lower than the winter loads. By following this custom we have a much higher vacuum when the loads are heavy and thus utilize the steam to better advantage. This then brings us to the water supply and its cooling. If the plant is adjacent to a river and not too high above the water level to cause an excessive pumping charge, the circulating water may be drawn therefrom. Again, if considerable mine water is being pumped, this can be made to pass through the condenser, and in the event of a surface condenser being used, this may be done without the installation of a circulating pump.

The quantity of circulating water necessary depends on the vacuum carried and will vary from 50 to 100 lb. of water per pound of steam. In the case of the unit under consideration we will assume that the ratio is 60 to 1, which will mean that for 20,000 lb. of steam per hour we shall pump 2400 gal. per minute. Further, assuming an average summer temperature of 80 deg. F. for the water, we can obtain 27 in. vacuum, referred to a 30-in. barometer.

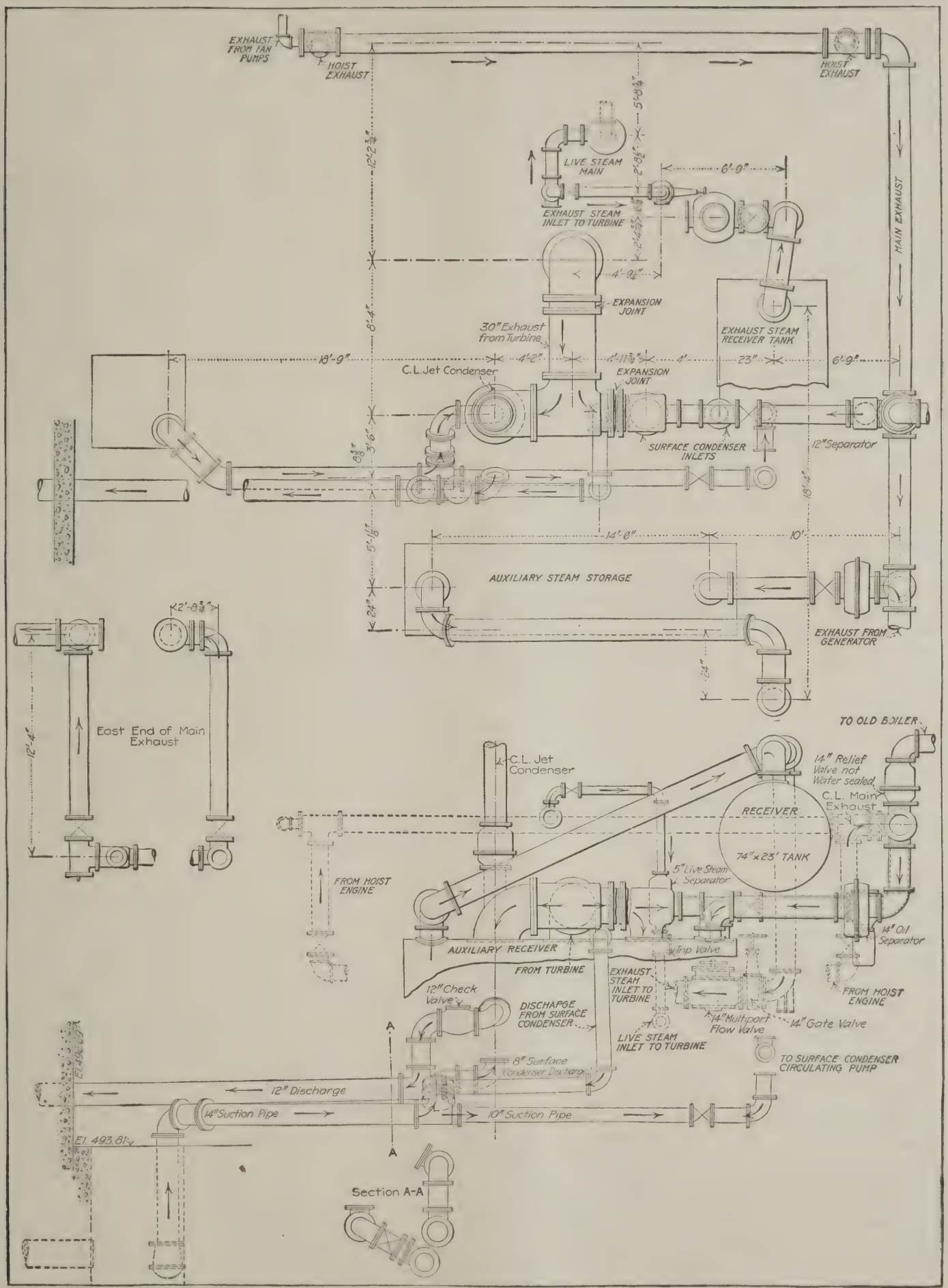


FIG. 3. LAYOUT FOR THE MAIN PIPING OF A 500-KW. EXHAUST STEAM UNIT

The following is a brief draft of specifications covering a surface condenser to comply with the assumed conditions:

1. The condenser is to furnish 27 in. of vacuum, referred to a 30-in. barometer, with 80 deg. F. intake water. The quantity of steam to be handled at full load of turbine is 20,000 lb. per hour.

2. The condenser is to be of the surface type and to work on the "wet system"—that is, to have one pump to handle the air and condensate and another to handle the circulating water.

3. According to the requirements of the coal company the exhaust inlet shall be at the top or at the side of the condenser; these shall be 30 in. in diameter, flanged and drilled with standard drilling.

4. The friction head of the condenser shall not be more than 15 ft. nor less than 5 ft. at the above-mentioned or other normal capacities.

5. Terminal difference is permitted of 15 deg. F. at the full load rating of the condenser.

6. Ample steam space shall be provided near the inlet for steam distribution.

7. Condenser shall be equipped with drain plates, to avoid flooding of tubes by condensation and to insure this reaching the hotwell with the least possible loss in temperature.

8. A heat transmission coëfficient of 300 to 400 B.t.u. per square foot of surface per hour for each degree Fahrenheit difference shall be used in the design of this surface condenser.

9. The design shall be such that the steam shall take the shortest path through the condenser possible; and the frictional resistance through the condenser shall be less than ½ in. mercury.

10. Auxiliaries shall consist of the following: One vacuum pump of rotary design for air and condensate; one centrifugal circulating pump, 30-ft. head; one steam-driven unit, turbine preferred, taking 100-lb. gage pressure, live saturated steam, noncondensing, all to be mounted on one base, direct-connected or through reduction gears; one 30-in. gate valve, for placing between turbine and condenser; one 30-in. corrugated expansion joint; one 14-in. atmospheric relief valve, multiport type preferred.

In the absence of a river or lake of water of sufficient capacity to supply the condenser and keep the water cool, or when little mine water is handled, cooling towers or sprays will have to be used for cooling purposes. Such devices permit the circulating water to be used over and over because the heat is extracted by either one of these methods.

With towers, the water is cooled chiefly by evaporation, which absorbs 75 to 85 per cent. of the heat, while convection and radiation absorbs the balance. This is accomplished by bringing a sufficient quantity of air in contact with the circulating water broken up into fine sprays. The quantity of water evaporated will equal about 75 to 85 per cent. of the weight of the steam passing through the turbine, and this loss must be replaced by a fresh supply.

Cooling towers are of two types—the natural draft and the forced draft.

The first method of cooling depends on air circulating naturally in and through an open tower. The latter method depends upon a fan forcing a certain quantity of air through a closed tower. The other method of cooling is by spraying. The spraying apparatus consists of several banks of nozzles, discharging the water into the air in fine, globular particles, and as these fine particles fall to the pond beneath an intimate contact is made with the air, which absorbs the heat taken up in passing through the condenser. The pressure necessary to make the spray varies according to the coolness of the weather. In summer it may be as high as 15 lb. per square inch and in winter as low as 3 lb. per square inch. Because of evaporation and drifting caused by breezes, etc., from 1 to 3 per cent. of make-up water will have to be added. Under general conditions with a well designed pond this is less than 1½ per cent.

Considering the 500-kw. plant which we are contemplating, the spray cooling system necessary will be as follows: Assuming 30 gal. of water per minute for every 2-in. nozzle, with an $\frac{11}{16}$ in. diameter opening, 80 nozzles should be sufficient. However, for the purpose of replacement and additional cooling, we will assume that eight more nozzles are installed, making a total of 88. The size of pond necessary for these nozzles will be approximately 1 sq.ft. for every 100 lb. of water cooled per hour, or in this case 12,000 sq.ft. This assumes that the nozzles are placed four in each group and the groups on 20-ft. centers. At least 20 ft. should be allowed, also, between the centers of the nozzles and the side of the pond. If the area available does not permit this, a fence will have to be constructed to prevent excessive water drift. The pond need not be deeper than 3 ft., but there should be a slight drainage toward the cold well. The power consumed by sprays varies from 0.75 per cent. of the turbine power at low heads to 2 per cent. of the turbine power at high heads. This power then has to be taken into consideration with the circulating pumps and their driving arrangements when the condensers are specified.

Power Consumed by Low-Level Jet Condenser

The amount of power consumed by a low-level jet condenser varies from 5 to 8 per cent. for units of from 200-kw. to 500-kw., and the power used by auxiliaries for surface condensers varies from 0.75 hp. to 1 hp. for every 1000 lb. of steam per hour passing through the main unit, for circulating pumps. The amount of this power is governed by the head. The figure given is for 20-ft. head and 70 per cent. efficiency. The air pump requires from 0.20 hp. to 0.5 hp. per 1000 lb. of steam, and the condensate pump, depending upon the head, from 0.07 hp. to 0.15 hp. per 1000 lb. of steam.

It is preferable that small turbines or other steam-driven units be used for the driving of auxiliaries, for although motors may be used to operate pumps, etc., and are connected up behind the circuit breakers, there is always a danger of something stopping the unit. Furthermore, if motors are used, they must be started by a separate generator, and it is preferable that they be driven by a separate generator entirely if the turbine is to carry the mine load. By studying the chart (Fig. 2, page 1050, *Coal Age*, June 8, 1918) it will be noticed that the vacuum varied as much as 1 in., partly because of the steam admission but chiefly arising from the variation in the speed of the motor, which was driven by the turbine. This unit was later connected up and driven by a separate generator, one not operating on a fluctuating load, and a much steadier vacuum resulted.

The space occupied by a unit of this size with condenser, auxiliaries, etc., with top exhaust from the turbine to the condenser, and the condenser set at the side of the turbine, will be approximately 24 ft. wide and 40 ft. long, including a passageway and room for a switchboard.

The steam connections for the usual unit will consist

of exhaust steam piping, vacuum piping, circulating water piping, drains and traps. Mixed pressure turbines will in addition require live-steam piping, and a surface condenser installation will require air and condensate piping.

For the exhaust-steam connection a pipe the same size as the turbine inlet should be used from the regenerator to the turbine, and an expansion joint of corrugated sheet copper, about one diameter in length between flanges, fastened to this inlet to take all pipe and expansion stresses off the turbine casing. Next to the expansion joint it is usually advisable to install a multiport flow valve, to prevent the vacuum backing up on the exhaust-steam main and drawing air through minute leaks. No. 10 or No. 12 gage spiral riveted pipe is possibly the cheapest to use for exhaust purposes, but the larger sized pipe—10 or 12 in. diameter—should not be allowed to carry more than 4 lb. per sq.in. pressure. A relief valve, preferably of the multiport type, should be installed either in the exhaust main or at the regenerator to prevent more than this pressure causing damage to the exhaust mains. The regenerator should be placed as near as possible to the turbine so that the driest steam available will be used in this machine. In the absence of a regenerator a large receiver should be used, so as to extract all water from the exhaust steam. A trap of ample capacity should take the water from this receiver, and if an oil separator has been installed to extract the cylinder oil from the steam before it reaches the receiver this condensed water may be returned to the heater or source of boiler feed.

The vacuum piping should be designed and installed with the greatest care. A loss of but ½ lb. through friction in the pipe line means a loss of 1 in. vacuum at the turbine, and as 120 to 130 cu. ft. of steam passes through the vacuum line for every cubic foot passing through the live-steam line, the reason for large vacuum lines is obvious.

It is also extremely important that these connections be short and have few bends and obstacles. For as explained previously the loss of 1 in. of vacuum, say from 28 to 27 in. of mercury at the turbine, will mean an increase of 7 per cent. in the steam consumption for the same power. This increase, although made on exhaust steam—that is, as it were, recovered for nothing—still means a definite loss per annum.

Construction Details of Vacuum Piping

The vacuum pipe may be made from riveted steel pipe, cast iron or regular welded steel pipe. The flanges, however, should be made of wrought iron or cast steel. The gaskets should be made from adhesive gum, as this softens with the heat and sticks to the flanges, thus preventing the gasket being drawn in by the vacuum. If valves are necessary, they should be of the gate type and of standard size, to prevent warping under continued vacuum. A water-sealed relief valve, preferably of the multiport type, should be installed at some point in the vacuum line between the turbine and condenser, but does not have to be larger in size than the exhaust steam inlet into the turbine.

It is preferable to so install the vacuum line that there shall be no low spots or pockets for the accumulation of condensed steam. Where this cannot be avoided vacuum traps will have to be used; as a general rule, however, vacuum traps are a decided nuisance and require constant attention. It is important that the expansion joint in the vacuum line be placed in such a manner that the vacuum does not tend to draw the condenser and turbine together. In one plant with which I am familiar, for several months a bad vibration was noticed in the turbine. It was ultimately found to be due to the vacuum tending to draw the turbine toward the condenser and thus throwing a decided stress on the turbine casing. Long bolts were inserted in this expansion joint to limit the travel of the piping on expanding, and no further vibration occurred. When connected up the vacuum line should be tested with the highest vacuum possible, and while the vacuum is still on the line, two applications of thick paint or hot pitch should be applied on all joints, and at least one coat of paint over the entire piping carrying vacuum, so that all minute air leaks may be properly stopped.

Intake Piping for Circulating Water

For the circulating water the intake piping will first be considered. As a general rule the pond is at some distance from the turbine site, and the intake piping has to be buried. It is not absolutely necessary that pipe be used for this waterway, for in the majority of cases the intake is of such size that it would ultimately be cheaper to use wooden casing, tile pipe or concrete, particularly if the entire conduit is below the usual water level of the pond. If this intake is longer than 200 ft., wells should be placed every 100 ft., and the height of the waterway should be such that a man can walk easily in it, even if there is a foot or two of sand at the bottom. Concrete is probably the best material to use for the intakes since the life of metal pipe when buried is short. Of all the cheaper metals cast iron has the longest life, and if this can be procured at a moderate figure it is wise to use it.

Whatever the construction of the intake may be, it is necessary to guard its mouth so that the entrance of leaves, sticks, fish, ice, logs, etc., is prevented. To do this screens of different mesh must be used, so arranged that they can easily be removed for cleaning. Provision must also be made for closing off the intake line from the pond, so that the cleaning of the intake may be properly done. The suction lines from the cold well must be installed with considerable care, fitted with foot valves and tested for leaks. These lines should also be provided with vacuum gages, so that trouble can be detected at once. The importance is readily seen for having the condenser set as near the water level as possible, so that the water is not elevated more than absolutely necessary.

For the discharge piping, it is important, in the case of a surface condenser, that the discharge connection be at the same elevation as the intake. The condenser should not be burdened with friction other than that caused by the water in the tubes, passageways, etc., which cannot be avoided. If the discharge piping is also placed under ground, the remarks that have been made concerning the intake will also apply here. In cases where oil separators are not installed to extract the grease from the steam, oil catchers should be placed at the mouth of the discharge to prevent the oil going into the pond, and afterward being drawn in with the feed water.

The air and condensate piping is subject to the same

provisions as the vacuum piping, and if leaks are present they may be located in the following manner: The line may be filled with water at a pressure of about 10 lb. per sq.in., and while the piping is full and under this pressure a thorough inspection should be made of the entire system. In cases where the vacuum piping is subject to this water pressure, extra supports should be placed under the piping to take care of the weight of water in the system, which in large piping, such as is usually used for turbines, would make an excessive weight on the permanent supports. If gas is available near the plant, the piping may be filled with it, testing for leaks with a candle. To fill the system with gas it is necessary to fill it first with steam, then close up the line, and as the steam condenses permit the piping to fill with the gas.

The condensate may be sent back to the open heater and then fed in the usual manner through the feed pumps to the boilers. In the case of a closed heater the condensate may be fed from the pump to the boilers.

All exhaust piping, live-steam lines and tanks should be covered with pipe covering. At 3 lb. back pressure per square inch, and 70 deg. F. room temperature, the steam condenses at the rate of 0.47 lb. per sq.ft. per hour. If 10-in. pipe is used and it is 100 ft. long, 135 lb. of steam will be condensed per hour if pipe is without covering. At 8000 ft. per minute velocity a 10-in. pipe will carry 9000 lbs. of steam per hour, and with the loss mentioned it means that 1½ per cent. of the steam is wasted in this length of piping alone.

In Fig. 3 is shown the main piping of a 500-kw. exhaust steam unit. Provision is made for the installation of both a surface and a jet condenser, each of sufficient size to carry the turbine itself. This arrangement was made so that at certain times in the year the mine water could be used, and at all other times the surface condenser would be operated. The surface condenser also is run at a reduced capacity at night, in order to save all of the exhaust steam, returning the condensed water to the heater. As deliveries would not be promised at an early date on regenerators, the tank, an old boiler, shown on the drawing, was used temporarily for storage purposes. The regenerator, when installed, was placed just outside of the building, and to avoid too much heat loss was covered with magnesia.

The costs for a 500-kw. unit will be approximately as follows:

	Per Kilowatt
Turbine and generator on its foundation	$25 to $30
Condenser and auxiliaries	10 to 12
Regenerator	6 to 7
Piping and fittings	6 to 7
Erection and installation of complete unit	5 to 7
Total cost of installation	$52 to $63
Operating Charges:	
Fixed charges—5 per cent. interest and 8 per cent. depreciation	$6.76 to $8.19
Oil, waste and other supplies	.60 to .90
Attendance, if necessary	2.00 to 3.00
Total annual cost	$9.36 to $12.09

As a general rule extra attendance is not necessary, as this unit is either placed in a building with other units or the old generators are dispensed with and their attendant takes care of the turbine. Assuming then that an attendant is an extra cost, and that the power factor is 80 per cent. of the full load, and that the turbine is operated for 9 hours for 250 days per annum, the cost per kilowatt-hour to the company will be from 0.52 cents to 0.672 cents per kilowatt-hour.

Disastrous Mine Fire at Villa

The mine of the Mill Creek Cannel Coal Co., at Villa, W. Va., took fire about 2 p.m. Monday, May 20, following what is believed to have been an explosion of the gasoline engine by which the mine fan was propelled. Thirteen men lost their lives, and much damage was done to the mine. Villa is a small town about 10 miles north of Charleston. Both the gasoline engine and the fan for which it generated power were located within the mine.

The chief inspector of mines at Charleston was promptly notified, but in the absence of a fan and other safety equipment for rescue work it was found impossible on the first night to make much progress in the exploration of the mine, as the cannel coal was burning fiercely. A fan from the mines of the Lebow Brothers, at Big Chimney, eight miles north of Villa, was brought to the burning mine. By Tuesday morning the fan had been placed in operation. Sometimes it was used to suck out the smoke and at other times to pump air into the mine. It was hoped that enough air might be supplied to save the 13 imprisoned miners. A line of hose was laid to the mines and a stream of water pumped into the drift in an effort to localize, as far as possible, the fire raging within.

In its efforts to extinguish the fire and to reach the men imprisoned, the State Mine Department was aided by the Federal rescue car, which reached Villa early Wednesday morning. Owing to the fire it was not till late that morning that the rescue party, headed by Chief Heatherman and State Inspectors Zach Evans, W. B. Riggleman, Eli Mason and B. S. Buckner, mine boss, and James Martin, superintendent for the Laing coal interests, were able to penetrate any distance into the mine. In a chamber about 400 ft. inside the mine they discovered the bodies of nine miners who, in an effort to brattice themselves in, had succeeded in building a wall of dirt and other material within a foot of the top of the tunnel. Conditions tended to indicate that all had died soon after the fire started.

The Mill Creek Cannel Coal Co., which operates the mine at Villa, is a Cleveland, Ohio, concern, J. L. Deegans being its president and general manager; F. M. Wattles is its vice president and B. R. Taylor its secretary and treasurer. The mines at Villa have been operating in a 3-ft. seam of cannel for 19 or 20 years, and they are among the oldest of the plants in the field in which they are located. The output of this particular operation is about 700 tons a month. Having had an opportunity to inspect the mine at first hand as the leader of the rescue party, Mine Chief Heatherman has been very severe in his criticism of the way in which the mine has been operated. He declares that it has been conducted in disregard of the fundamental principles of safety.

It seems that most mechanical stokers are smokeless not because they burn the smoke, but because they burn the coal in such a way that very little soot or smoke is produced. Hand-fired furnaces are smoky because soot is produced in or near the fuel bed, and can not be burned in the limited combustion space of the furnace.—*Bureau of Mines Bulletin No. 135.*

Coal Mine Photography—II

By H. A. WILLIAMSON
Fairmont, W. Va.

SYNOPSIS—*Various shades possess various actinic powers. By proper intensification shades actinically weak may be brought into prominence, or any color or combination of colors may be brought out while other tints may be rendered neutral. Thus by the aid of the camera and suitable screens one map may be made to serve several purposes.*

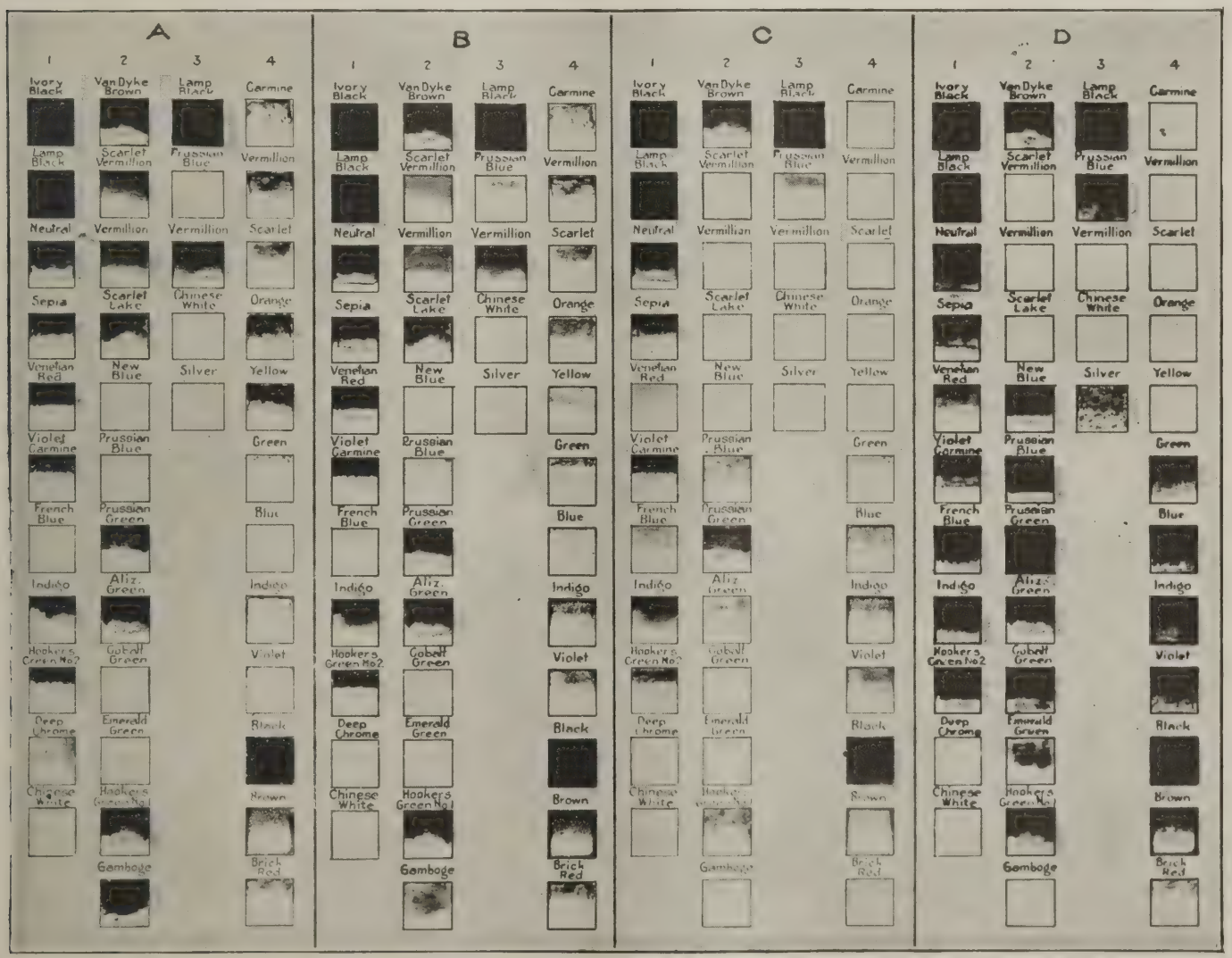
IN THE production of maps, particularly those made on tracing cloth or paper, little or nothing is to be gained, except in rare instances, by the use of other than black ink. It is not usually possible for more than a few people interested to see the original map, and blue or other prints made from the original do not show the colors. Errors are frequently made in using various colors, by getting a line in the wrong shade; and in many cases colors are more confusing to the eye than the simple black.

There are times, however, when it is essential to use various tints on a map, and it is necessary for the mapmaker to know the relative photographic value of colors if the maps are to be used in connection with photographic work.

The accompanying illustrations show the result of photographing various colors commonly in use in drafting rooms. With the exception of the blacks, which are laid on solid, these colors are made heavy at the top and shaded lighter toward the bottom in order to show the variation in value between a color heavily laid on and a thin wash.

Chart *A* represents the results of the use of an ordinary contrast, or commercial, plate. Chart *B* is from a panchromatic process plate. Chart *C* is from a panchromatic process plate and a light yellow screen, or ray filter. Chart *D* is from a panchromatic process plate with a bright red screen.

On each chart, column 1 consists of standard pan water colors, which are opaque in character; that is, they obliterate anything over which they are laid. Column 2 is shaded with standard pan water colors, translucent in character, or which do not entirely obliterate other



THE RESULT OF PHOTOGRAPHING VARIOUS COLORS WITH VARIOUS PLATES AND SCREENS

colors beneath them. Column 3 consists of special liquid water colors for drafting-room use. Column 4 is colored with standard "waterproof" inks for drafting-room use.

In general it may be said that blues and greens have the least effect on a photographic plate, while reds and oranges have the greatest. Thus a yellow or brown consisting largely of blue (a cold color) will have little effect on a plate, while a yellow or brown consisting largely of red (a warm color) will have great effect.

There are commonly in use seven screens—yellow, orange, orange-red, bright red, dark red, green and blue. The four charts, however, will serve to illustrate the purpose of these screens or filters. The orange and orange-red screens are intermediates between the yellow and bright red, and the dark red goes beyond the bright red. The blue and green screens perform exactly the opposite duties to the red screens; that is, where the red screen intensifies greens and blues, the green and blue screens intensify reds and yellows and cut out the greens and blues.

From these charts the draftsman can select the colors best suited for his maps. It is immediately noted that on all the plates the drawing inks do not have anything like the value of the water colors; yet, on the other hand, water colors are much more difficult of preparation in quantity, and it is therefore necessary to use the inks except in special cases. It is also true that no matter what plate or what screen is used, black ink and black water colors have practically the same effect.

The charts show, for instance, that it is possible to make a map lettered and showing political features in black ink, showing streams with indigo or violet ink, contours with brown and other features with scarlet, orange or yellow. From this map then, by the use of a proper plate and suitable screen, a reproduction may be obtained showing all the features, or those features in black, and any particular one of the others made prominent, with the balance eliminated. Thus from the same map we may have a plate showing political features and streams only; another showing political subdivisions and contours; one showing political features and triangulation, and so on in variety to meet the needs.

In order to successfully photograph a blueprint, one has only to use a panchromatic plate and red screen. Conversely, should you have a valuable map on which a bottle of red ink had been spilled, a plate which will show no indication of the blot may be obtained by using a proper plate and red screen.

It is not possible, in an article such as this, to more than point out a few of the possibilities along the lines indicated, but the interested draftsman can obtain extremely valuable detail literature from any of the large dry-plate manufacturers on the use of panchromatic and trichromatic plates and color screens (color screens are often called ray filters). The reader is also referred to the first installment of this article and to the article on the "Camera vs. the Pantograph," which appeared in the *Colliery Engineer*, January, 1915.

(To be continued)

Care and Management of Coal Cutters

By "MACHINE MAN"
Sullivan, Ind.

THE proper care and operation of electric coal-cutting machines play an important part in deciding the cost of production at any colliery where these machines are used. Supplies are hard to get at present, and air-ship prices prevail in everything manufactured of iron, steel, brass or copper. These four materials, together with a little carbon, mica and rubber insulation, compose a coal-cutting machine. When properly cared for, however, such a machine is a great help to larger production, as a man can load about one-third to one-half more machine coal than pick coal.

It seems to me that a great deal of the efficiency of coal-cutting machines depends in a large measure on the efficiency of the machine men and electricians who look after them. I have been employed on machines for the past 10 years, both as helper and runner, and during that time I have seen men working on machines who had all the chance in the world to cut a large quantity of coal, but whose tonnage was low. If I were an employer, I would take two good machine men and a poor machine in preference to a good machine and two poor machine men.

The most important item in the economical cutting of coal is to keep the machine in good running condition. This is where the poor and inexperienced men fall down and heap up the repair cost. An inexperienced man should never be permitted to work as a runner on a machine. It is better to let the machine stand idle. Such a man will work a few days, and work hard, but he does not possess sufficient knowledge to successfully operate the machine. He becomes disgusted and quits, leaving the machine in a run-down condition, which will be a detriment to the hiring of a man capable of handling it. As a general rule a man wants to see the machine before he takes a job to run it, and it is hard to get a qualified man to take a machine that he knows is run down and not in proper shape to do the work required of it. This is even more so now than heretofore, on account of the scarcity of labor.

Much hard feeling is caused among miners because of the machines. Every man wants a trial on the machine as it pays a little better than other mine work. But every man is not mechanically inclined and many could never make successful machine men.

In some cases the electrician or machine boss is to blame for hiring incompetent men, while at other times the mine management is at fault. In some instances the machine man is to blame. I have known of cases where men who were fairly competent to operate machines would deliberately tear them up owing to some trifling difference which had arisen between them and the mine management or electrician. When the mine management is to blame it is generally a family or pet affair. As a general rule the foreman has some close friends or relatives. These naturally look to him to be favored with a good job, and in

nearly every instance influence him until they get it. If it is a machine they want, it is given them, and in a great majority of cases they fail on account of insufficient mechanical ability.

Where the electrician falls down is in hiring strangers. They come to him with a good recommendation, possibly given by some one who had never seen a machine. He hires them, as he is pressed for good machine men. In some cases they prove to be O.K., but a large percentage fail.

I believe a stranger should always be hired on condition—on probation, so to speak. Let the electrician go with him and watch him cut a few places. A poor man can be detected at once when at work. If he can't get around and keep things humming, he should be given a job at something else in the mine.

A mining machine is built to stand a great deal of abuse, but the less mistreatment you give it the better off you are both physically and financially. Before starting to work in the morning the runner should go over the machine and oil every bearing and examine all nuts, chains, etc., for loose or broken parts. If any are found, they should be repaired before starting. If only some small nut or rivet is loose, this can usually be remedied by the machine man quicker than he can get the electrician. But let me emphasize again that any difficulty of this kind should be rectified before starting the machine on an 8-hour grind.

Electrician Only Should Rectify Electrical Troubles

If some electrical part is not in working order, the electrician should be summoned in every instance, as this is the most delicate part of a coal-cutting machine. Here is where many men fail who otherwise would be good machine men. If a small nut or bolt breaks, one that is not sufficiently important to stop the operation of the machine entirely, they go ahead and run it, thinking perhaps they haven't time to make repairs just then, expecting to let the electrician know about it that night. Of course this is only a bolt, but it weakens the machine to that extent and perhaps throws double stress on another bolt, which in turn will affect the whole machine.

I have known instances where this very thing has happened—and before night the machine would be laid up for a week or two for repairs. The old saying that "a stitch in time saves nine" proves out in operating machines if in nothing else. Perhaps the fact that a little 5c. or 10c. bolt is gone will cause a piece to break that costs $100 or more and necessitate waiting until the manufacturer sends the piece.

Just figure this out for yourself. Suppose an order will reach the manufacturers and be filled in four days, which is a shorter time than they generally take. Figure the machine at 150 tons per 8-hour shift, which is a low figure if shortwall machines are used. This would be 600 tons in four days lost to the operator and machine man. It means $33.69 in Indiana for each of the machine men and that much, if not more, for the operator. It also means just that much less coal for the support of the factory or railroad to which fuel is being sold. This loss will run into many hundreds of dollars in a year's time in three or four mines.

It seems to me it would be an economical investment for a company operating three or four mines to hire an expert machine man to make the rounds of the mines in turn, spending a day at each mine and doing absolutely nothing but watch the operation of machines and stopping them when he saw that it was necessary for the welfare of a machine. This stoppage would probably also be to the advantage of the machine men and company as well. A man who has successfully operated a coal-cutting machine for five or six years would use better judgment in this position than a shop man or electrician, for such a man knows the weak points of every machine after he sees it run a short time. He might not know the first principles of repairing the defect, but here is where the electrician or shop man should be called upon.

Good sharp bits are essential to the efficient cutting of coal. A machine should never be run after the bits become so dull and rounded on the point that they drag down the speed of the motor, as this only tends to heat the resistance and possibly burn it up. Pick-point bits are better for shortwall machines. If the coal is a little woody and tough, a half dozen chisel points interspersed along the chain are advantageous, as these will knock out the core left in tough coal when using all pick points. I do not think it advisable to use all chisel-point bits in shortwall machines, as they become blunt—or rather the edge becomes rounded—and drag down the speed until the machine men get behind with their cutting and possibly tear up something.

I once worked in a mine where the electrician got it into his "noodle" to use all chisel-point bits. In about three days the machines were so far behind with their cutting that the runners had to come back and cut at night. Furthermore, two bedplates were broken which cost over $100 apiece. Sullivan longwall machines were used in this case, and every drag chain became stretched to such an extent that it was almost impossible to load the machine after a room was cut.

I believe this strengthens my argument that a good machine man knows better what is needed to successfully cut coal than a shop man or electrician. I would like to see other articles in *Coal Age* regarding the care and management of coal-cutting machines, as we all will be helped by an interchange of ideas.



POWER PLANT, ENGINE HOUSE AND TIPPLE AT CHICAGO & CARTERVILLE COAL CO., MINE B, AT HERRIN, ILL.

National Coal Jobbers Hold Convention

SYNOPSIS — *Jobbers meet to discuss the coal situation and their relation to it. Speakers urge necessity for coöperation with Fuel Administration. Excellent addresses made at the banquet which followed first day's session. Wednesday's session witnessed an active discussion of the question of cost reports.*

THE second annual convention of the National Coal Jobbers' Association, which was held in Buffalo on June 4 and 5, was a notable affair. More than 200 members came from all parts of the country to participate in the proceedings, to discuss their status in the coal industry, and to affirm their readiness to coöperate with the Federal Fuel Administration in every way. President E. M. Platt conducted the proceedings with an even hand, and in his opening address recounted the energy with which the work of organization had been carried on.

Organization Making Rapid Strides

Less than nine months ago the association was originally projected at Washington, and since the formal organization at Chicago in October, 1917, the membership has grown to 600—a membership thoroughly representative of the jobbers of the entire country. President Platt pointed out that there is no longer any question raised by the Fuel Administration as to whether the jobber is essential, the association having obtained the complete recognition of the Fuel Administration and established itself firmly as a coördinate branch of the coal industry, with a representative on Dr. Garfield's staff.

The first day's session was made especially valuable and interesting by Noah H. Swayne, 2d, who acted as the Commissioner of the association in Washington and did yeoman's work for it, to the sacrifice of his jobbing business in Philadelphia. Mr. Swayne appeared on the platform several times, first giving a chronology of the proceedings in the coal trade since the Fuel Administration was appointed, then returning to urge the jobbers to furnish reports to the authorities when asked, as these reports were made the basis of intelligent action. Abuses were creeping into the trade, said Mr. Swayne, and instanced the application for jobbers' licenses by men who had no right to them. Many of these applications, continued the speaker, came from producing interests.

In the afternoon Mr. Swayne answered questions from the floor regarding trade regulations, but usually convicted the questioner of not having read the Fuel Administration's bulletins. (At the banquet a speaker made some humorous remarks about Mr. Swayne's ability to quote from these bulletins, now about 40 in number, by page and line.)

Secretary Leo Romanski reported that the association was in good financial standing, and in a later report on the jobbing situation in Chicago asserted that the local fuel administrators in the west were usurping the place of the jobber, who is not being treated fairly. The banquet given Tuesday evening was largely attended. The toastmaster, Harry D. Williams, took a notable part in the speaking, and the addresses made were eminently fitting for the occasion. Vice president William R. Coyle, who is about to return to the marine service, uttered words of counsel and inspiration. He spoke of the interests of producer, distributor and consumer being equal, and urged that all should do their utmost to pull together.

Alfred W. Calloway had come up from Washington to reason with the jobbers, and he told them they ought to coöperate in every possible way with the Fuel Administration, to the end that the most be made of what promises to be an inadequate coal output. He condemned the dirty coal that many operators and jobbers were offering. To mine and distribute this coal was a great waste of time and resources, and it actually curtailed production. The utmost effort must be made to keep production from falling off. Another draft was near, and it would carry off many men. He believed that working hours must soon be regulated by authority. Mr. Calloway does not like the word "jobber," and suggested that the name of the body be changed to National Association of Coal Distributors. (The association next day left the decision to the executive committee.)

Francis S. Peabody in an address took up the question of compensation and illustrated his idea by quoting Ralph Waldo Emerson. Mr. Peabody believed that cooperation and loyalty were synonymous. With the other speakers he eulogized Dr. Garfield and said that the latter was loyal to the jobbers. Let us help Dr. Garfield, said Mr. Peabody, and the jobber will receive a just compensation.

Valuable information as to cost reports was imparted at Wednesday's meeting by Jean Paul Muller, of Washington, an expert accountant. He urged the freest and fullest reports. The difficulty so far was that the reports made were not on a uniform basis. The speaker promised that nothing would be made public by the Fuel Administration.

Cost Reports Came in for Much Discussion

There was much discussion of the question of cost reports. It was insisted that the association, as well as the Fuel Administration, ought to know what it cost the jobbers to do business. Mr. Platt stated that the anthracite trade knows to the fraction of a cent what its costs are, while the bituminous jobber knows nothing. Mr. Swayne said that if the bituminous jobber did not function 100 per cent. there would be disaster. The costs should be based on zones. An entering wedge had been obtained in adequate reports from the smithing trade, and the bituminous trade must drive it further. Also, concluded Mr. Swayne, the jobbers need this information for their own self-education.

Officers for the ensuing year were elected as follows: President, George M. Dexter, of New York; vice president, Charles E. Cartwright, of Toledo; secretary and treasurer, Leo Romanski, of Chicago.

A Great Disaster

By Edward Mott Woolley

A great disaster threatens the readers of trade papers. When the new zone system of postal rates goes into effect next July these papers will be affected more than some other kinds of publications, and this means that their readers will suffer heavily by being shut off more or less from this wonderful fund of information.

Trade papers carry a large proportion of advertising and therefore the burden of the postal increase, ranging from 50 to 900 per cent., will fall very heavily on them. Now anyone who uses the trade papers knows that the advertising pages, while published for profit, are read for information just as much as the editorial pages. If the publishers were to eliminate the advertising and print simply articles, what a vacuous magazine we would have! The advertisements reflect the whole industry represented by any given trade publication. In the aggregate the advertisements of all the trade papers stand as the index of American industry. Indeed, the status of each industry is presented in undeniable truthfulness every week or month. Shopkeepers, mechanics and students depend upon these journals for their broader knowledge of the particular industry in which they are engaged.

The ill-advised postal zone law will make it impossible for these trade papers to exist in any such form as they do now. Inevitably they must be curtailed so radically that the benefits we now get from them will be largely wiped out. If you don't want this disaster to fall on you, make the fact so plain to your senators and congressmen that they will repeal this destructive zone law. Write to your Congressman to repeal this destructive and disastrous postal "zone" law. And do it right away.

Illinois Mining Men Visit Pittsburgh

During the week beginning May 6, a party of about 20 mining men from Franklin County, Illinois, visited the Pittsburgh district at the invitation of the United States Bureau of Mines, observing explosion tests in the Experimental Mine of the Bureau, and also studying the mining methods of the district. The party was under the leadership of Evan D. John, Director of the Department of Mines and Minerals of the State of Illinois, and consisted of a commission appointed by the Governor of Illinois to study Franklin County conditions, and of superintendents and foremen representing a number of coal companies, and of official representatives of the miners. This trip was made possible by the enthusiastic efforts of D. W. Buchanan, president of the Old Ben Coal Corporation. The program for the week was arranged by J. W. Paul, of the Bureau of Mines.

On Monday and Tuesday, May 6 and 7, demonstration explosion tests were held at the Experimental Mine, which is located near Bruceton, about 15 miles south of Pittsburgh. For these tests coal dust was prepared from a sample of coal from Franklin County, Illinois, which was furnished by the Old Ben Coal Corporation. The coal was crushed to the same size as the road dust samples which had previously been taken in the same mine from which the coal sample was obtained. Care was taken in the handling and preparation of this dust so that the natural moisture of the coal was practically all retained. On Monday, the coal dust was mixed with enough incombustible rock dust so that the explosion died out within the test zone. On Tuesday, the conditions of the test were changed so that a strong explosion was obtained. The explosion was stopped, however, by a special form of rock dust barrier (the Rice concentrated rock dust barrier, described in Technical Paper 84) developed under the bureau's auspices. Although pure pulverized Pittsburgh coal dust was loaded on the outby side of this barrier, a guncotton tuft nearly 6 ft. away remained unburned after the test, showing that the flame of the explosion was effectually stopped by the rock dust. On Wednesday, the party visited the Filbert mine of the H. C. Frick Coke Co., which is near Brownsville, Penn., and also the Continental No. 1 mine of the same company, near Uniontown. On Thursday, they went to the Keystone shaft mine of the Keystone Coal and Coke Co. On Friday, some of the men returned to the Experimental Mine to see a third explosion test, in which a small percentage of gas was used, while others visited the Montour No. 4 mine of the Pittsburgh Coal Company.

Most of the men returned to Illinois Friday night, feeling very well repaid for the trip. It is hoped that mining men from other districts will follow the example of these progressive Illinois men and make trips into fields other than their own in order to study modern methods which may have been developed in such other fields.

Conservation of Technical Engineers

Technical engineers of every branch of the profession who are taking part in the war activities of the Army and Navy are alarmed at the unfortunate waste of technical training caused by the drafting and enlisting of engineers for regular service with little or no regard for their technical attainments. These technically educated and experienced men are essential to the successful conduct of the war and cannot be replaced. There is continuing evidence that America is repeating in some measure England's mistake of sending technical men into the ranks when they should be carefully conserved for special duties in the fighting forces or on the technical staffs of the Army, the Navy and the essential war industries.

The Engineering Council, founded by the American Society of Civil Engineers, the American Institute of Mining Engineers and the American Institute of Electrical Engineers and other engineering societies, and representing some 50,000 engineers has addressed an appeal to the Secretaries of the Army and Navy that these men be placed in such places as will enable them to do work for which they are best fitted.

For this purpose it recommends that all engineers suited for technical service be enrolled and conserved for technical duties. Already from 10 to 15 per cent. of the members of the societies mentioned are in the uniformed service of the country, and it is safe to say that the majority of their remaining members are in the Government civilian service or are otherwise directly or indirectly engaged in the war.

Lubrication as an Aid in Stimulating Coal Production

By REGINALD TRAUTSCHOLD
New York City

SYNOPSIS — *The labor supply at coal mines is diminishing, and the car supply shows no signs of continuous adequacy. All possible mechanical aids to mining should be adopted, but first present equipment should be brought to capacity. In transportation equipment poor or inadequate lubrication means unnecessary and expensive frictional losses as well as an output not at a maximum. Oil as a pitcar lubricant has many shortcomings, most of which a semi-grease obviates.*

THE war, the weather, labor scarcity and curtailed transportation facilities all combined last winter in a drive upon the industrial activity of the country, a drive which failed in its objective only through the moderation in effectiveness of some of the forces mobilized. The cost of averting a serious coal famine was colossal. The most stringent measures had to be resorted to, much privation and no little suffering had to be endured. Yet in spite of the price paid, the drive was not entirely arrested, but simply retarded, with the prospect of a resumption next winter with added force, for the labor situation then will probably be even more acute than during the past cold season.

The war, the direct cause of the unprecedented demand for fuel, will tax our coal resources to the utmost. The weather may not be as severe as last year, it is true, but the car shortage cannot show any substantial improvement in view of the fact that no reserve car capacity can be built up while there is such a crying demand for every foot of carrier space that can be constructed, in spite of any degree of efficiency which may be realized by the Government in handling the available number of freight cars.

Mining Methods Must Be Bettered

The claim has been made by certain coal-mine interests that more coal could have been mined last winter with the labor then available had the railroads been able to transport it. Even if this be true, conditions will doubtless be much more critical next winter, for men and mules will then be much more scarce. It may be almost impossible to maintain even the coal output of last December and January with the present-day average efficiency in coal mining. Coal-mining efficiencies and methods must be bettered, if a catastrophe is to be averted.

Every mechanical aid for the miner must be adopted. Mining machines must be more extensively used to cut the coal, greater care must be taken in laying out trackage and proper attention to rolling stock will be mandatory. All this, and more, must be done with the least possible interference with the present rate of coal production. No curtailment of output can be tolerated, nothing but increased production countenanced.

The very first requirement, then, is to bring present equipment up to the highest possible standard of efficiency and maintain such improvement. This will materially lighten the labor of the underground workers, facilitate the handling of the coal on the tipple, etc. It is a necessity, if output is to be stimulated with a decreased number of men. With a limited working force, fatigue will be an unusually vital factor in the efficiency with which the underground workers and the mine mule can labor.

The work of the miner can be lightened and output maintained (in spite of fewer available skilled workers) by supplying him with every mechanical aid, by the more general use of mining machines, and the loading of mine cars with mechanical loaders; simultaneously the transportation of the mined material, between the face and the tipple or shaft bottom, can be made much easier, if the mine-car journals are kept properly lubricated.

Efficient Lubrication Means Economy

The lubrication of mine cars offers one of the most profitable of fields for betterment in mine operation. Any improvement attained therein represents a net monetary saving without a cent of initial investment. At any time, proper lubrication of mine cars pays a handsome profit, but in periods of stress the gain is increased several fold. Thousands of mine-car journals are not properly lubricated today, and, compared with those which are, they entail not only a serious waste in power, whether this be man, mule or mechanical, but a lubrication cost of from 10 to 20 per cent. more than in the case of properly lubricated cars—frequently, even a larger percentage. In this waste, for it is nothing else, no account is taken of increased deterioration, breakage and replacement charges for poorly lubricated mine cars. The figures given cover only the waste resulting from decreased lubrication efficiency.

The variety of running gear on mine cars naturally has a decided effect upon the ease with which the cars can be handled, and consideration should be given the question of substituting improved bearings for those of less efficient type. But the first step taken should be to secure the most efficient lubricant for the existing journals and see that such lubricant is properly employed.

The lubrication problem in a coal mine is a serious one, for the service to which the mine cars are put is severe. More or less dust and dirt is present in the air; the bearings are subjected to marked variations in load, on account of the unavoidable heaving of the cars as they pass over inequalities in the roadbed; the tracks are apt to become slippery through dripping lubricant, thus reducing the effective tractive power of

the haulage motor. Also, in certain sections of the mine, at least, illumination is insufficient to permit satisfactory inspection of bearings.

The requirements for an efficient car lubricant are: "Body," or viscosity, sufficient to prevent contact of surfaces; freedom from corrosive acids; as much fluidity as is consistent with body; effectiveness in reducing friction; high flash and burning points; freedom from substances likely to cause gumming or oxidation.

A lubricant to possess these six essential properties can only be produced from non-gumming, paraffin base, petroleum oils. It should have the "tenacity" of grease and reasonable durability if it is also to possess the necessary quality of being economical in use. In addition, it should be nonvolatile and not liable to change under the variations in temperatures encountered in mine service. Such temperatures are fairly constant throughout the year within the mines, but out in the open are subject to variations from zero in winter to around the hundred mark in summer.

The requirements of an efficient mine-car lubricant have thus been emphasized before considering the shortcomings of "black strap," or "black oil," the usual lubricant for mine-car journals since almost the days of the first coal mine, in order to show the lubrication problem confronting every coal-mine operator.

Without going into a scientific analysis of black oil, the composition of which is found to vary considerably in different localities, some of its admittedly common failings will clearly demonstrate that it cannot successfully discharge the functions of an efficient mine-car lubricant. In the first place, its body is readily affected by heat, as are also its lubricating qualities. At some definite temperature it is doubtless of the desirable density, but when subjected to heat, frictional or otherwise, it becomes so fluid that from 50 to 90 per cent. escapes from the bearings. These leakage figures have been repeatedly confirmed by carefully conducted tests under actual working conditions. Consequently, from two to ten times as much black strap has to be employed as is effective in reducing journal friction.

Serious as is the monetary loss from this direct waste of lubricant—cheap, though the oil may be—the after results are nearly sure to be even more expensive. The dripping oil is liable to fall on the track, resulting in a decreased grip of driving wheels on the greased rails and unprofitably taxing the haulage locomotive. The footing for haulage animals is in some cases made insecure and the galleries and passages become more or less saturated with an inflammable oil. The flash and fire points of black strap are relatively low, so that the already high fire risk of a coal mine is increased—particularly should there be any wooden trestles for the cars to pass over such as overcasts, and the like. Furthermore, an oil that so readily increases its fluidity in ordinary service as black oil, will as readily gum.

A lubricant of insufficient body—whether its excessive fluidity is characteristic at ordinary temperatures or developed under slight heat—cannot prevent contact of bearing surfaces under load, so that the coefficient of journal friction remains high. In mine-car service this is particularly disastrous, for the heaving of the car as it travels over any inequality on the track first squeezes the thin lubricant from the bearings and then sucks it back again charged with whatever dust and grit has been gathered from the air. The abrasive material thus carried into the bearings proceeds to "gouge" the wheel bores and axles.

A summation of even the few disadvantages attendant upon the use of black strap as a mine-car lubricant here enumerated would total to a considerable amount if valued in dollars and cents.

The essential properties of an efficient mine-car lubricant—requirements which will not only stimulate production but are demanded by economic considerations for minimizing coal-mine risks—are not all to be found in any one natural oil or grease. For a lubricant to possess the six functional properties combined so as to discharge effectively the exacting duties demanded in mine-car operation, it must be a blend of mineral oils scientifically, accurately and intimately compounded.

No coal mine has the facilities or the experts with the necessary experience to produce such a lubricant, even if the various ingredients were available. This is a task for the highest skilled specialist, with the facilities afforded only at the works of an oil refiner actively engaged in the production of lubricants.

The Swan & Finch Co., of New York, produces the mine-car lubricants marketed under the trade name Slo-Flo. These lubricants are the result of much experience and testing in the light of an intimate knowledge of the requirements to be met. The use of these semi-greases has been so satisfactory that a number of mine-car manufacturers now recommend the particular grade of this lubricant best suited to their particular running-gear construction.

Successful Mine-Car Lubrication

Such lubricants must obviously be procurable in more than one grade, for the lubricant best suited for one type of bearing is not necessarily the most desirable for one of a different class of construction, even though the service for the coal cars which the bearings are to serve may be identical. For instance, the lubrication of a plain cast-iron bearing does not present the same problem as does that of one of hollow flexible roller construction, such as the Hyatt. A comprehensive study has been made of mine car lubrication and lubricant suitable for each specific construction developed. Though this may multiply the number of lubricants for the coal mine to stock, it has the decided advantage of furnishing the mine owner with the concrete results of years of experimenting and testing on the part of lubrication experts.

Furthermore, the quality of these lubricants is invariably backed by comprehensive guarantees for satisfactory results, so that the mine owner who will use the product of a lubricant producer of standing, assumes no risk. No reputable oil refiner dares to make claims for his products, today, which cannot be substantiated in competitive tests. The efficient compounding of lubricants has become a science, the importance of which is daily becoming more generally recognized, and sales are now more often closed on the strength of economic and efficient results than, as frequently in the past, on the basis of initial cost.

Proper lubrication of mine-car journals lessens the arduous task of handling the cars and permits the transportation of maximum loads. It is an invaluable aid in stimulating coal production.

Book Reviews

Shows Where Coal of Given Quality Is Obtainable

THE COAL CATALOG COMBINED WITH THE COAL FIELD DIRECTORY. Pp. 671; 9 x 12⅝ in.; 96 ill. Keystone Consolidated Publishing Co., Inc., 302 Penn Ave., Pittsburgh, Penn.; price $25, Cloth boards.

The "Coal Catalog" is the first attempt we have seen to supply the coal purchaser with such facts regarding the coal industry as he has long needed. Judging by the many letters which come to *Coal Age* regarding the places where coal can be purchased of a certain specific kind, it is evident that a book of the nature of the "Coal Catalog" is in great demand, and it is therefore not at all surprising that the number of copies disposed of is already large, especially in view of the disorganization in distribution resulting from the coal shortage and the zoning regulations. The reader of this notice will probably judge from the title that the book is a catalog of mining machinery with a minimum of directory. He will be surprised, therefore, to learn that the book has no advertisements whatever and makes no mention of mining equipment except in listing the outfits owned by the various mines. Even in this case the names of the concerns by which the equipment was manufactured are not given.

The volume opens with twenty pages on the geology of coal, followed by four pages on geological and mining terms. These are doubtless included as a concession to completeness. The real interest to the coal buyer starts with page 33, where a description of the coal areas of the United States is given followed by a map of the United States with all the fields plainly delineated.

Listed by Mineralization, Use and Structure

Then follows a classification of coal, and this the coal purchaser will find most interesting. The matter is generally none too well understood, and Mr. Zern has done well to quote from Marius R. Campbell's "The Coal Fields of the United States" for the first classification, which is "according to rank," that is, "according to the degree of mineralization," which, by the way, would probably be a better way to describe the method of division. The second classification, "according to use," is probably the most interesting of all classifications. The purchaser is apprised in this section regarding the type of coal that will suit his particular purpose whether he needs it for beehive coking, bunkering, byproduct coking, cement burning, domestic use, export, the manufacture of illuminating gas, use on locomotives, metallurgical use, use as powdered fuel, the manufacture of producer gas, the raising of steam, smithing, tile and pottery burning, or the making of water gas.

The third division is according to physical structure. In this division block coals, splint coals and smokeless coals are described. It may be noted that the author does not say what the structure of smokeless coals is, and it may be doubted whether a smokeless coal must necessarily have any given structure. The smokeless coals of Pennsylvania are different from those of Maryland.

Three pages on preparation of coal and seven on coal storage follow those on classification, and three pages are given to coal analysis, in which the bearing of the presence of moisture, volatile matter, fixed carbon, ash, sulphur and phosphorus in coal are discussed.

A tabulation is made in Part II of all the types of coal and the fields and seams of their occurrence, and in these tables the places in the book in which such types are described are correlated. Thus the reader can readily find where the coal in which he is interested is described, where its analyses are given, where the operators of the seam or field are listed and where the directory of the mines operating in the seam or in the field is to be found, and this for the whole United States.

The coals are divided up not only according to mineralogical rank but also according to their use. Thus if you desire anthracite coal you will find it is produced in the Gunnison County field of Colorado, and the details just noted can be found on certain specified pages. If a search is being made for a coal suited to brick and tile burning, the reader will find that the Hartshorne lower seam in Oklahoma is adapted to that purpose, and that references to the seam and its characteristics can be found in four pages specified.

Pennsylvania Has 57 Per Cent. of All Wasteful Ovens

A long list of coke ovens follows. Pennsylvania is credited with 48,708 beehive and rectangular ovens, West Virginia is said to have 16,511 such ovens and Alabama has 6111. It is interesting to note that Illinois has only 104 such ovens, Ohio 178 and Oklahoma 200. A list of byproduct ovens is given with the consuming capacity of the ovens, and the estimated coke production.

In Part III we come to the separate states, Alabama leading. It is fair to take it as a sample, seeing that it is a state where the editor of the "Coal Catalog" has, if we mistake not, never been domiciled. Columnar sections of the coal measures are followed by a map of the state with the basins clearly outlined. Each basin is described at length in the sections that follow. Almost a page of typical analyses are also given. The mines are then listed by basins and seams, and some account of the customary modes of preparation are given. Then follows the regular directory material with which our readers are already familiar.

About each mine new information has been added regarding the character of the product—whether it be steam, coking or smithing coal, for instance; the trade name—Blue Creek, for example; the mining district—Warrior, let us say; the size shipped—run of mine, slack, pea, nut, egg and what not; the preparation equipment—shaking and revolving screens, washery or some like description. Thus the reader knows that the particular type of coal for which he is looking can or cannot be provided for by the firm listed.

How the Coal Fields Are Delimited

In some states the fields are so naturally distinct that it has been possible to map them. In others the device is to use a circle round the natural center of the field described. Thus in Arkansas circles mark out the Bates-Coaldale, the Greenwood-Huntingdon, the Bonanza-Jenny Lind, the Denning-Coal Hill, the Spadra and the Paris fields. But in Colorado there is a different plan, the fields being clearly separated, though here the coals of any one field are not of uniform character. In Maryland, of course, it is quite easy to name and chart the fields and consequently it has been done.

The anthracite region of Pennsylvania is admirably treated in this volume. A number of cross-sections are given, the character of the coal in each region is noted and a valuable map of the different districts has been added. No attention is paid to the seams mined. Most concerns mine and mix the coals from many seams, and the many different names used to designate a single seam and the many splits of the same seam make identification almost impossible.

The editor, E. N. Zern, has done the best he could with the Pennsylvania bituminous region. Some day something better will be done, but at present the trade names being used are quite vague and misleading. Owing to the

difficulty of securing a more perfect nomenclature these trade names have been used by the author and no definite limits to the areas designated have been drawn.

For instance, DuBois is allowed by the editor to choose its own district. It can make its selection between the Reynoldsville, the Shawmut and the Clearfield districts. Though DuBois is in Clearfield County, the coal more closely resembles that from the Reynoldsville field adjacent. Probably it will ultimately be classified in that field. The Clearfield coal might be better called Moshannon or First Basin coal. But in that event something will have to be done for the naming of the two intermediate basins.

Mr. Zern has merely attempted the possible. Had he boldly broken with trade names, the trade would doubtless have only been confused and he would have involved himself in endless discussion. Still, some day the work must be done, and surely the tidewater pooling arrangements might be held to serve as a guide wherever they are in effect. It would do no harm in future editions to give the groupings in which these pools are divided.

There is in this book much of great value to every one who produces, trades in or uses coal. It is a wonderful compilation, made by one who is probably more capable of performing the work than any other man except some of the officials of the United States Geological Survey. The work has been done conscientiously. It is a model production in every way and one the industry may be proud of. The 671 pages are full of material that it took much labor to assemble and much scholarship to compile. We have no hesitation in giving it unqualified approval.

Must Make Drastic Coal Saving

After a detailed survey of the fuel situation, Dr. Garfield, on Monday, June 10, called the newspaper men into his office and told them that the matter of fuel supply for the coming year "is one of the most difficult and threatening problems the war has presented." Requirements aggregate 80,000,000 tons more than was produced last year. It was pointed out, however, that unexpected additions to estimated fuel requirements are taking place all the time, and it was admitted that 100,000,000 tons is an estimate which provides only a nominal margin of safety.

It is estimated that the 360 non-war industries will require about 100,000,000 tons of coal. It is believed that production of coal this year will exceed by 50,000,000 tons that of last year. To prevent serious curtailment of industry, fully 60,000,000 tons of coal must be saved by various means of conservation. At the conference, the correspondents were furnished with a written statement of the situation. This extract from that statement shows the seriousness with which Fuel Administration officials regard the outlook:

A saving of sixty million tons of coal is the one possible avenue of escape from national disaster. Necessities of war must be supplied. The coal deficit must inevitably come out of the necessary fuel for non-war industries. These industries employ millions of our population and furnish the backbone of our national wealth. Factories will shut down and men be out of work in proportion to the coal deficit. Every ton of coal saved will keep fifty workmen from idleness and permit an additional creation of several hundred dollars worth of national wealth. The Fuel Administration has frankly given to the public statistics of an alarming fuel situation. It desires to state just as frankly and with all the emphasis possible that it is in the power of the American people through fuel economy to save the country from the effects of the fuel famine.

Since fuel and steel are the two factors which are limiting the non-war industries, Dr. Garfield explained that the reduction of supplies in these two commodities will be equal. Steel plants might find it possible, for instance, to furnish 50 per cent. of a plant's requirement of some specific kind of steel, but the Fuel Administration, in its allotment, might find that that plant is entitled to only 25 per cent. of its normal fuel supply. In such a case, only 25 per cent. of steel would be allotted. Arrangements have been made whereby the maximum reduction is to apply both to coal and steel.

Dr. Garfield told of his efforts to find the country's non-essential industries. He admitted that he has been unable to find any such industry. The Fuel Administration, however, has compiled a list of the non-war industries from which it will be necessary to take such fuel as may be required to meet the demands of the war industries. P. B. Noyes, the head of the conservation division of the Fuel Administration, told of efforts being made to build up war industries in communities supported largely by non-war industries, so that there would be no unemployment or disruption of established conditions of the community.

The velocity of combustion of hydrocarbons is faster than velocity of decomposition; therefore, combustion will take precedence over decomposition. For this reason air supplied over the fuel bed should be admitted as near to the surface of the bed as possible and mixed with the hydrocarbons, so that they will be burned before they are decomposed by heat and form smoke, which is difficult to burn in the rarefied oxygen of the furnace.—*Bureau of Mines Bulletin No. 135.*

Ideas and Suggestions

LARGE numbers of men have left the mines for employment in more lucrative industries. Thousands have been called to the colors, thousands more will be called in the future. Meanwhile the country is confronted with the likelihood of a fuel shortage that promises to curtail seriously the output of supplies essential to the welfare of our army in France and to interfere grievously with our war plans. In bituminous coal alone the mines of the United States must furnish over 630,000,000 net tons to satisfy the voracious appetite of our war machine and to keep the country warm the coming winter. It readily can be appreciated, therefore, that all ideas or plans which enable a mine to function to maximum capacity should be the common property of the entire coal-mining industry. If you know of a device that saves in time, labor or money; of a makeshift that was employed to prevent a shutdown while waiting for parts from the factory; of a system of mining that resulted in greater coal production; of a plan that filled the men with patriotic enthusiasm so that they labored more steadily and more efficiently—in short, if you have a suggestion that will help to win the war by the mining of more coal, it is your duty to write it up for publication in *Coal Age* for the benefit of its many readers. Sketches, diagrams or photographs should accompany the text in all instances where these are necessary to convey the message clearly. Aside from enabling you to do your part is the fact that if your contribution is accepted it will be paid for liberally.



To Increase Coal Production

It is necessary to add 1,000,000 tons to the weekly coal production if a serious shortage is to be avoided this winter. Having established the certainty of this fact, the Fuel Administrator has placed the difficult task of securing this production in the hands of James B. Neale. Mr. Neale has been placed at the head of a new section of the Fuel Administration, which is to be known as the Production Bureau.

While the weekly average production is now running over eleven and one-half million tons a week, it is now clearly apparent that a weekly average of a million tons more must be maintained from now until the end of next winter if the greatly increased demand for coal is met in its entirety.

The Shipping Board estimates that 30 per cent. more coal will be required for bunkering purposes than in 1917. Expansion of war industries will call for 18 per cent. more coal in 1918 than in 1917. Public utilities will call for 15 per cent. more coal. Thirteen per cent. more coal will go to domestic consumers, while the railroads must have at least 7 per cent. more coal than they had last year. The details of the Fuel Administration's estimate of the requirements are shown by the following:

	1917 Amount	1918–19 Amount	Per Cent. Increase 1918–19 Over 1917
Industrial	204,907,000	242,024,000	18
Domestic	66,915,000	75,678,000	13
Gas and electric utilities	33,038,000	37,941,000	15
Railroads	155,000,000	166,000,000	7
Exports	24,000,000	24,000,000	0
Beehive coke	52,450,000	52,450,000	0
Bunker—Foreign	7,700,000	10,000,000	30
Bunker — Domestic, including Great Lakes	5,000,000	5,000,000	0
Used at coal mines for steam and heat	11,000,000	12,500,000	14
Total	560,010,000	625,594,000	12
Used from storage	4,375,000	.....	....
Exports	907,000	.....	....
Estimated production	554,728,000	.....	....
Substitution of coal for oil, mainly in west	.....	2,000,000	....
To increase stocks of industrial plants and public utilities outside of New England by ten days' supply	.....	7,000,000	....
Total requirements for 1918 without allowance for estimated conservation	.....	634,594,000	....
Production 1917	554,728,000	.....	....
Production 1918 required for needs	634,594,000	.....	....
Increase required	79,866,000	.....	....
Percentage	.....	.....	14.4

The Fuel Administration has moved into its new building at New York Ave. and 20th St., Washington, D. C. The entire Fuel Administration now is housed under one roof.

Weekly Production Statistics

Despite a generous car supply coal miners at many properties insisted on observing Memorial Day. This resulted in a slump of more than a million tons in production during the week ended June 1. Total bituminous production during that week was 10,774,000 tons. Anthracite forwardings, largely for the same reason, decreased 22 per cent. Total shipments were 31,762 cars.

Beehive coke production fell off 7.7 per cent. during the week ended June 1. Total production was 612,000 tons. Byproduct coke production for the week ended June 1 was 479,776 tons, a decrease of 4626 tons as compared with the week preceding.

The figures used above are based on estimates made by C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

M vement of West-Bound Coal Further Restricted

Further restrictions are to be placed on west-bound movement of eastern coal. An order effective June 20 has been issued prohibiting west-bound movement from all mines located on the Chesapeake & Ohio in the Kanawha district from St. Albans, W. Va., eastward. The movement to Indiana of any high-volatile coal from the Kanawha and Kenova-Thacker districts of West Virginia and the Big Sandy district of Kentucky will be prohibited.

Warns Against Unnecessary Use of Electricity

United States Fuel Administrator H. A. Garfield has warned the public against prodigal and unnecessary use of electricity for outdoor advertising purposes and other display illumination.

The Fuel Administrator said this waste must be stopped. Unless official reports show that display illuminations are kept within reasonable bounds, and are limited to the hours of darkness, the suspension of the so-called "lightless night" order will be revoked and even more stringent restrictions will be ordered against all forms of outdoor lighting and display illumination. The consumption figures recently compiled reveal the necessity of the utmost economy in fuel during the summer as well as the winter, and require the early enforcement of the strictest economy of all fuel-generated electricity.

Coal Exports During April, 1918

Exports of bituminous coal, during April, show an ıcrease over the corresponding month of last year. In .pril of 1918 exports were 1,554,579 tons. This com- ıres with 1,389,899 tons in April of 1917. Anthracite ‹ports show a decrease. In April of this year 340,783 ›ns were exported, whereas in April of 1917 exports ere 586,367 tons.

Increased exports were shown to the following coun- ·ies:

	April 1917 Tons	April 1918 Tons
Canada	912,653	1,127,705
Cuba	112,802	212,355
Panama	48,094	70,870
Uruguay	4,329	6,107

Decreased exports were shown to the following coun- ·ies:

	April 1917 Tons	April 1918 Tons
Italy	72,771	2,016
Mexico	16,161	12,675
West Indies	35,941	28,063
Argentina	31,612	9,869
Brazil	51,807	25,097
Other countries	103,729	59,822

Coke exports in April of 1918 were 141,003 tons. In ıe corresponding month of last year they were 79,759 ›ns.

Reduction in Carload Prices from Lake Docks

Reductions have been ordered by the Fuel Adminis- ·ator in prices charged for bituminous coal shipped in ırload lots from Lake docks. The new prices are: oal from Youghiogheny, Fairmont, Greensburg, West- ıoreland, No. 8 seam Ohio, Hocking and Pomeroy elds, lump $5.80; run-of-pile, $5.55; screenings, $5.30; :arlan, Thacker, Kenova, Kanawha fields, lump, $6.30; ın-of-pile, $6.05; screenings, $5.80; Pocahontas, New iver and Tug River fields, lump, $6.30; run-of-pile, 6.05; screenings, $6.05.

The order provides that any increase in freight rate ıay be added to the prices. Licensed jobbers are al- ›wed a margin of 20c. a ton for handling coal from ıe docks

L. A. Snead Resigns

L. A. Snead, who has been associated with the Fuel .dministration since its foundation, has resigned. ·or some time, Mr. Snead was in direct charge of the nportant work of apportionment and distribution for ıe Fuel Administration. He served the Fuel Adminis- ·ation as a volunteer.

Freight Rate Order to Be Modified

Important modifications are to be made in general rder No. 28 issued by the Railroad Administration. : was this order which made the recent drastic increase ı freight rates. Paragraph C of section 1 of that order eads: "All intrastate class rates shall be cancelled ·here there are interstate class rates published be- ween the same points and the interstate rates, as in- reased, shall apply." This paragraph, it is under- tood, is to be modified so as to permit the application f intrastate rates to which an increase of 25 per cent. has been added. Regional directors have been instructed by the Railroad Administration to preserve all existing parities and differentials affecting imports and exports. The regulation providing a minimum charge of $15 for carload shipments is likely to be stricken out.

Rates to "Short-Haul" Territory Found Unjust

The coal rate adjustment from mines in Pennsylvania to "short-haul territory" has been found by the Interstate Commerce Commission to be unduly preferential to Alicia, Bridgeport, Pike and Braznell, Penn. It was also shown to be prejudicial to Diamond. The Commission holds that the rates from Diamond should not be higher than those contemporaneously maintained from mines in the vicinity of other places mentioned. What is known as the short-haul territory is the region including Buffalo, Rochester and Pittsburgh on the east and is bounded on the west by a line running through Lorain, Ohio, and Orville.

Furloughs for Really Indispensable Men

In response to appeals from all over the country the War Department has decided upon a policy that will permit conscripted men who are highly skilled in necessary industries to return to their former employments. The system of furlough will be automatic, and will not in the future, as in the past, leave to the discretion of company and other subordinate commanders the question whether such furloughs should be granted.

An application blank has been prepared by the War Department known as the "Application for return of enlisted man in highly skilled class of labor to necessary industry." The application when filled must state the direct Government contracts held by the applicant or the names of the persons having such Government contract with whom contracts have been made by the applicant. The applicant must add a statement that the status of his business as a "necessary" industry has been filed with the district board. The application must be duly sworn and a Government inspector conversant with the facts must sign the papers.

The signed application then goes to the Adjutant-General's office with a request from the interested Government department stating that it desires that the man be granted an indefinite furlough without pay. The employer makes a promise that after the need for the man's service has passed he will be returned to the Army and the Government notified.

While on furlough he will not be allowed to wear the uniform. Every month the company employing such men must furnish the Government a report that such men are still in employment and state the class of work they are engaged in. In case such men leave their employment the employer must immediately notify the Government.

John W. Poe, of Roswell, N. M., has been appointed fuel administrator for his state. He succeeds W. C. McDonald, recently deceased. Mr. Poe is president of the First National Bank of Roswell and is a member of the state tax commission.

THE LABOR SITUATION

General Labor Review

While the patriotic purposes of the bulk of the miners and other mine workers have made strikes infrequent and short, other causes for tonnages below capacity still remain. There is an important minimum of mine workers everywhere who are not patriotic enough to work day after day. They satisfy themselves by working just enough to make a living, and when that is achieved, or appears likely to be achieved, they absent themselves from the mines or work short hours.

This absenteeism is quite a serious matter and the method to prevent it taken by the Lehigh Valley Coal Co., illustrated and described elsewhere in this issue, is certainly worth imitating. There are enough patriotic men in every colliery to put this plan in circulation and surely it ought to be done. It is a sign that a man has not bought as many Liberty Bonds as he can carry if he is "lazing" away his time when the mine is working.

Unions Should Squelch Mine Absenteeism

In places where the union is strong, the unions themselves should take up this matter. One hundred per cent. working and 100 per cent. production by those who are working is what the country needs and has a right to expect so long as the war lasts. Steady work made an aim in itself, duly recorded and posted at the mine, will correct many of the evils that now need correction. Many of the men who refuse to work more than half time can prove to the satisfaction of everybody that at the existing rate of pay they cannot buy bonds and support their families. Once they work with 100 per cent. regularity and with 100 per cent. of energy they will find they are capable of helping their country in much larger measure.

The United States Fuel Administration is very wisely endeavoring to stir up that enthusiasm which alone can meet the difficulties and sweep away in its powerful current, strikes, absenteeism, holiday making, inefficiency of day men and underproduction of miners. Coal production is one of the most worthy occupations of all those pursued by civilians behind the fighting lines, and, duly presented, this fact will not fail to do its work.

The administration's speakers at a recent meeting at Jamison No. 2, near Greensburg, Penn., were Sergeant Major J. Armstrong Young, of Virginia, a member of the Canadian Heavy Artillery; Alfred Korzybski, of Warsaw, who was a staff officer in the Second Russian Army under the Grand Duke Nicholas of Russia, and Lieutenant Klymnecky, who also served with the Russian Army. The first of these, the Virginian, served in France for 21 months. He was wounded twice and gassed at Vimy Ridge.

Funeral Layoffs Still Slow Down Business

An unfortunate idleness at the Stanton Colliery of the Lehigh & Wilkes-Barre Coal Co., June 8, illustrates the fact that some men are not any too anxious to work. This company announced some years ago that it would pay $100 to the family of any mine worker killed if the men at the colliery would work on the day of the funeral. It had been the custom to lay the mine idle on the day of the ceremony though only a few attended the funeral. Of course, the pall bearers and the kin of the deceased were allowed to keep the day in the appropriate manner, but still attendance was in the main restricted to these men.

However, when the legislature recognized the fact that it was well that every employer should indemnify the families of those killed in his service by a larger indemnity than $100, the Lehigh & Wilkes-Barre Coal Co. paid the larger amount and that only. The men do not recognize their obligation now to keep at work and think that by celebrating the funeral by an abstention from labor and by shutting down the mines they can force the coal company to pay $100 extra to the families of mine workers killed at duty.

As against the action of these Lehigh & Wilkes-Barre Coal Co. men may be set that of the men of the Lehigh Valley Coal Co. By the way the Lehigh Valley men are always loyal to the nation and leaders in loyalty, wherever you find them. Strange to say, the men who show the characteristic most markedly in the week's news are the men at the Broadwell Colliery, at Moosic. The public never speaks without displeasure of Moosic and its neighboring towns in the south. It is the home of the Industrial Workers of the World. Its neighbors are Avoca, Dupont and Old Forge and other towns which are peopled by strange men of Bolshevic tendencies, men with eruptive follies of every kind. But the Broadwell Colliery is the first oasis beyond a land of trouble. The broad-gauged policy of the Lehigh Valley Coal Co. may have something to do with this.

Want to Work Sunday for American Red Cross

This colliery has worked every day except Sundays, Christmas and New Year. It has also asked to be allowed to work some one Sunday, celebrating it as a "Red Cross Day," the proceeds of its earnings to be turned over to the American Red Cross. The men have unitedly gone on record against any and all miners who feel inclined to stop work on any pretense, and they indignantly repudiate any "slacker" charges made against the mine workers in the anthracite region. And now they have taken the further step of opposing the drafting of men from the anthracite mines until the present scarcity of men comes to an end, and that end unfortunately is nowhere in sight.

They are absolutely right in this stand. If it is justifiable for the United States Government to take 6000 lumber men out of the New National Army to cut spruce for airplanes, as has been done—and justifiable indeed it is—surely it is right to keep enough men in the anthracite industry to supply at least the minimum of coal needed for the conduct of our national life and war industry. A maximum output cannot be secured if the 145,000 men now trying to get out the coal needed is to be further reduced by the draft. Already 32,000 men have been taken from the anthracite mines since the war began.

Supreme Importance of Anthracite Production

It is essential that the coal production be maintained in that field of coal which is nearest to the great national gateways and the leading national industries. The East has altogether too many war factories. The railroads cannot supply them with the needed transportation and consequently the extension of these factories will not be permitted. Their operation, however, is needed at full strength, and that operation will be found impossible if the anthracite field near by them has a reduced output and as a result the domestic coal used by the industrial workers and the steam coal used by the factories has in larger measure to be brought even longer distances than heretofore over the overburdened national roadways.

The miners in general have not, so far, sought exemption because it appeared on its face unpatriotic and cowardly, and there is nothing that the miner more bitterly resents than an aspersion of his patriotism and his bravery. The coal-company officials, fully realizing the national needs, were willing to sign exemption papers, but the mine workers did not present them for signature to their employing companies even when the former were prepared to ask, and did ask, exemption. They frequently had the request for exemption signed by a "buddy" or a neighbor.

And, furthermore, the officials of the draft boards, realizing that it would be impossible to obtain a quota in the anthracite region without taking mine workers, were but little disposed to exempt anyone or place anyone in the deferred classification, no official recommendation to that effect being in existence to justify such an action. Captain W. A. May, president of the Pennsylvania Coal Co., states that his company lost 265 men to the draft last month and that the situation is quite serious. The shortage of men in the mining industry of Lackawanna County is 7932, out of the 35,744 men employed in the coal industry of that county. It is easy to see how the work is hampered.

Action though deferred is coming at last. Acting under the instructions given at a conference at the state draft headquarters which occurred June 6, most of the coal companies have filed exemption claims for those men who are scheduled to leave either June 24 or in future drafts. The local draft boards have been informed that they have authority to commend deferred classification for miners and to reopen cases of such workers on the same basis as railroad men and farmers. The conference was attended by Major W. G. Murdock, chief draft officer; Seward E. Button, chief of the Pennsylvania State Department of Mines; George F. Buss, sheriff of Luzerne County; James M. Donnelly, former mayor of Pittston; George P. Gallagher, district superintendent of the Lehigh Valley Coal Co., at Pittston, and H. R. Johnson, superintendent, Lehigh Valley Railroad Co.

The strike at Honey Brook No. 5, of the Lehigh and Wilkes-Barre Coal Co., mentioned in the issue of last week, ended June 6, the 12 men who would not pay their union dues being discharged. Whether they were really Industrial Workers of the World or not has been a matter for argument. But this much is certain, the I. W. W. did try to establish itself at McAdoo and Tresckow, nearby towns to Audenried, where the Honey Brook operation is located. They could not obtain meeting quarters and they had to meet in the woods near McAdoo. This marks the failure of the first and, let us hope, the last attempt to build up the "I Won't Works" in the Lehigh field.

Ohio Men Want No Foreigners in Union

The miners in parts of Ohio are determined to make the mines 100 per cent. American. The largest local union in Ohio, that comprising the miners at Webb mine, Bellaire, has resolved that every miner have at least his first naturalization paper or forfeit membership in the union.

Its action will probably not lay off any men, for few foreigners have arrived in America since the war started and so all have had a chance to declare their intention. But, as has been stated, the spirit of Americanism is not conferred by naturalization, and lacking it the naturalized foreigner is like the unconverted reprobate at the mourners' bench. If he is disloyal he is likely to create a scandal sooner or later. It is not well to try to convert anyone to anything by offering the "loaves and fishes" of a job.

Unionization is progressing in the Fairmont region of West Virginia under the sanctioning provisions of the recent contract. The mine workers of the large "New England" mine of the Consolidation Coal Co., at Watson, W. Va., were recently organized by the United Mine Workers, between 200 and 300 joining the union. The organizers were C. H. Bradley, an international representative, and C. F. Keeney, the president of District No. 17, with James Diama, whose work it was to round up the Italians.

The new plan is not working as smoothly as hoped. It had always been feared by those who opposed the union that the Colorado system might prove to be a plan under which the union would be recognized, instead of one in which the union is allowed to exist, but is not permitted to make a contract. In West Virginia it appears that the mine workers of some places chose the same men for union leaders as they had selected for their representatives under the contract. The company is therefore dealing with an organized opposition backed by the funds of mine workers throughout the country. That fact was to be expected.

The Consolidation Coal Co. has graciously submitted to the inevitable. Frank Keeney, the president of District No. 17, declares that he has 3500 members in the vicinity of Fairmont and that at two mines the men would not organize although urged to belong to the union by the superintendent. Mr. Keeney says that the operators have been extremely courteous to himself and to "Mother Jones."

After all, the union starts its existence with friendly feelings where bitterness might well have been expected. The Consolidation Coal Co. wisely realizes that the union should either be a friend or an enemy. The company has elected to be friendly to the union, and it is quite probable that it will find the union will reciprocate. Most companies sign up with the union and then refuse to bury the hatchet. They do all they can to maintain the hostility. The better plan is to try to get along with your partner if you know or believe that he is to be your partner for life.

Operators in the Illinois fields are complaining of the increasing difficulty of getting men to work in the mines and in keeping them at work when they get them. The trouble is not so much desertion of the industry for other lines of work, although there is some of that too. Principally it is the disinclination of the miners to work regularly when they can make a living by working only part of the time.

Patriotic Workers Round Up Rest

Anti-slacker committees made up of anthracite miners bent on singling out their fellows who are taking days off without legitimate excuse, are at work at the mines of the Lehigh Valley Coal Co. They are an answer to a patriotic



TO KEEP TRACK OF THE MINE SLACKER

appeal that the officials of the company have made to the employees urging them to eliminate unnecessary absence from work during the present grave labor shortage in the anthracite fields.

"The results are already better than we had dreamed," said President E. E. Loomis. "Following the 'Four Minute Man' idea, we are having good speakers talk to our people, pointing out existing conditions and appealing to them, from patriotic motives, to coöperate with us to their fullest extent that a maximum coal output may be attained. At every colliery we have erected giant thermometers which show the tonnage produced by that colliery each day as compared with its best record, and alongside are the names of absentees with an estimate of what the tonnage would have been if all had been on the job. The effect is electrical. Practically every man has been put on his mettle, and there is a general demand by the men to be put on these 'slacker' committees."

EDITORIALS

HEAVY and unequal taxation has been so oppressive in Turkey that it has always served to prevent that country's development. Such taxation is proposed for the United States by persons of undoubted patriotism. But no matter how patriotic they may be, the reasons for objecting to extremely high taxes on essential industries are by no means unpatriotic. Without dogmatically assuming any unusual certainty on these matters, it may be well to state the arguments of those who are opposed to extremely large taxes. Washington may well have facts permitting of a different point of view to that here taken. So far it has not presented them.

If every man had his money and time invested in a single enterprise, and the Government took 90 per cent. of his profit, he would be left with 10 per cent. and might be well content. He would say it was the war, and admit the justice of the tax. But men are not engaged in only one line of endeavor. Most wealthy men have a large number of industrial investments. Some are losing ventures and some are prosperous. The investor balances one against the other and in normal times shows a satisfactory balance.

* * *

NOW heavy taxation upsets that balance. The prosperous businesses make a tenth, let us say, of what they did before the taxes were raised and considerably less than before the war because of price regulation, while losing ventures—and there are not a few of these—are in more desperate straits than ever. Clearly, then, the investor does not merely give 90 per cent. of his income to the Government. The Government gets 90 per cent. of the earnings of his successful investments, while the investor gets his 10 per cent. and loses steadily in the conduct of all his other business.

The investor is on the way to penury. It is clear that he will run no risks whatever in the future. He will buy Liberty Bonds and keep out of danger. But who will make the munitions under such circumstances? There is but one reply—the Government. It is inevitable that when the Government gives the manufacturer a minimum of profits and lets him shoulder the losses unassisted, no one will want to undertake the risk. In Great Britain the outcome of high taxes on necessary industry has been Government factories.

* * *

IF, HOWEVER, any industries should be marked out for destructive taxation, clearly those chosen should be the luxury industries. Obviously the manufacturer of unnecessary articles should pay the higher tax, and not those war industries which are performing an essential service.

There is a large degree of Bolshevism abroad in this and other lands. It existed long before the word Bolshevism was coined, and long before the war commenced in Europe. Great Britain has been affected by it from the start. The belief was that commercialism started the war and that the gun factories and steel industries desired the struggle in the hope of enriching themselves. What more natural decision, then, than that which was made—the decision to prevent these industries from profiting by the war they were alleged to have started?

Even though the Allied governments knew that the industries were not guilty, yet it seemed necessary to appease those who believed with the fervor of fanaticism that the guilt was proved to the hilt. The politicians, especially in Great Britain, well argued that they could not save their faces if the war industries in the warring countries profited generously from the struggle.

* * *

SO THE burden of taxation was put on them, though these much abused industries were the nation's real defenders. In fact nothing was more necessary than that they should increase in numbers and activity. To this end it was needful that they be enabled to secure capital. Strange to say, a fair profit does not insure the rapid growth of an industry, for an industry grows almost wholly from the inside outward.

A man whose business it is to sell ribbons will not enter the steel industry no matter how prosperous it may be. He may invest a little money there, but industry chiefly grows from the reinvested earnings of its own capitalists. They have the knowledge needed and they desire to invest their money in their own industry. Tax that industry higher than other industries and you not only remove the means for expansion from the industry in question, but you make the capitalist leave the essential industry for one less essential and thus your Bolshevism proves to be your undoing.

* * *

AS FOR the taxes on luxuries that have been proposed, they are, perhaps, desirable; but more important are taxes on the profits of those industries that manufacture luxuries. So long as luxuries are advertised they will be sold. It will be represented that the spirits of people must be stimulated, that the home fires must be kept burning, that good cheer is as important as military service, and every possible excuse will be made for the unnecessary expenditure of money.

Over-tax the luxury industry, and the luxuries will cease to be flaunted in the eyes of would-be buyers, and the public will give them up without a qualm. The home fires will burn just as vigorously and on less expensive and less labor-wasteful fuel. The luxury advertising of the luxury producers is the cause of half our heartburnings, and it acts as a diabolic reproach to every one who has loaded up on Liberty Bonds and paid generously to the Red Cross. "The sacrifice," it seems to say, "was not necessary. Only a happy, well-fed, prosperous family at home will be able to hearten the warrior for the fray, and here you have been skimping till your heart is dead within you. Cease saving for Liberty Bonds. Buy a piano-player on time."

THE luxury trade shouts from every car advertisement and shop window that the army needs your spirit as much as your money. Fine clothes tone up the spirits; a bracing trip in an automobile elevates the flagging heart; a trip to Palm Beach renovates a run-down system, and so on.

Tax the luxury industry and you will remove such temptations and allay a large amount of discontent. What reason is there that in a world war unessential industries should be the only ones free from price regulation? What logic is there in permitting them to be exempted from special taxation? Their prosperity is certainly as conspicuous as that of the war industries; in fact it seems far more conspicuous and less justifiable.

Reasons for the defense of these industries from taxation and control are not so much reasons as excuses. Patriotic people are trying to avoid investment in luxury trades. When investors improperly succumb to the temptation that the large dividends paid by these stocks afford are they to be further enriched by the action of the Government itself, which apparently favors by exemption the luxury industry whenever a decision has to be made as to where the burden of taxation shall lie?

Lantern-Slide Talks for Mine Workers

MANY things to which an operator is entitled he does not get. The workman does not deny that the operator is entitled to them, but because the workman is not trained the operator does not get them. One of these things is a reasonable protection against the fire hazard. The workman knows he should not burn down his employer's property. Incendiarism is usually farthest from his thoughts. Yet because the employee has not been trained to avoid fire hazards the property of the operator is subject to many unnecessary risks. Would it not pay to give the workman and his family training that would make this hazard less menacing?

A little book on "Safeguarding the Home Against Fire," prepared for the United States Bureau of Education and written by the National Board of Underwriters, has just come to the editor's desk. It has 91 pages of excellent type matter, with cartoons which would make appropriate lantern slides and serve as cues to a good lecturer, such as every large mining town should have.

Freedom from accident is another right of the employer. He is, or should be, trying to secure safety. Why should the employee in many cases be creating and not removing hazards? No invidious criticism is intended or even justified. Neither employer nor employee is any too clear about his whole duty to safety. But in the work of securing it lantern slides and a lecturer is the appropriate medium.

Unfortunately lecturing skill is rare, but that is largely due to the lack of opportunity. So few of us have any chance to practice oratory unless we are labor leaders, politicians or lawyers. These people soon develop into real orators, and there is no reason whatever why an engineer cannot be brought to do the work successfully. Unless he is constitutionally ill fitted, he is a good man for the job. Not being in administrative control of the men he is usually in better accord with them than the manager can well be.

Some One Should Make a Start

THE anthracite operators and the Fuel Administration seem to be drifting onto the sunken rocks of the army draft for lack of a firm hand on the rudder. It would be better by far to stop the miners of the hard-coal region from joining the army than to bring them back, as Great Britain did, from the trenches in France.

No one seems to want to draw odium on himself by opposing the draft of these much needed men. Everyone acknowledges that they do a larger work in the coal mine than they can ever hope to do in France, for without coal we might as well give up the struggle. It is also well understood that the culm banks are shrinking and will soon cease to make up for the shortage in the coal mined from the face. But everyone is waiting for someone to rise who will take the burden on himself of making the unpopular proposal that anthracite mine workers be exempted.

Another bold spirit is needed—someone who will ask for the repeal of the Gallagher bill so that men with a few days of intensive training can be placed in charge of a mine breast, as is customary in bituminous mines. No American wants to work two years under a foreigner as a common laborer, especially an uneducated foreigner, and the law is keeping Americans and the better type of foreigner out of the mines.

The act was planned from the first to limit the introduction of labor into the anthracite fields, especially during a strike. It has done that work admirably, but we doubt if at the present any patriotic American, miner or other, feels any admiration for a law which keeps our mines short-handed in the face of the enemy.

The trouble arises from the fact that the Gallagher bill was passed after a long fight. It is a labor trophy, but like the cups and medals won in past contests it must now be cast into the melting pot. There are lots of men around the mine workings and elsewhere who could readily be transformed into miners if the law were modified. We are not at all convinced that there would not be fewer accidents, because in general a greater sobriety and carefulness mark the day worker.

It would seem that the matter of excluding miners from the draft and modifying the Gallagher act should be tackled by the Fuel Administrator himself, with the assistance of John P. White. There are no strikes to break up, and if there were the Gallagher act could be restored to meet such an emergency. Why not pass an act permitting the Governor to suspend the Gallagher act at his pleasure during the continuance of the war? The legislature would take such action if requested by Doctor Garfield.

Furthermore, the draft boards would refuse to accept miners if the Fuel Administration made it clear that acceptance jeopardized the fuel situation and that the prosecution of the war would be seriously hampered if the hard-coal supply failed. But so long as the highest authority is silent as to the necessities of the case, no wonder the legislators and draft officials are in doubt. Some one must take a place at the wheel before it is too late, and the man of all men seems to be head of the Fuel Administration. It is gratifying to read that Doctor Garfield has already taken some steps and that operators, draft officers, mine workers and the public are being gradually aroused to the great necessity.

Uncle Sam is Commandeering Steel



UNCLE SAM TO THE STEEL PRODUCTS CIVILIANS:
"Some of you will have to fall in behind the boys at the camp, so get busy!"

If we don't want to use wood rails and wood ties, we must take good care of the steel rails, steel ties and steel spikes now around the mine. Keep them out of sulphur water and lift them before the roof falls on them.

DISCUSSION BY READERS

Waste in Lubrication

Letter No. 1—In frequent visits to the different coal fields I have been struck with what, to my mind, is a serious detriment to the successful operation of any coal mine, to say nothing of the great waste of material and machinery that results from a practice that is inexcusable from the standpoint of efficiency.

In this letter I will confine my remarks to one subject only, regarding which all practical mining men will admit there is an unwarranted waste; namely, the lubrication of mine machinery and equipment. In the large majority of mines this work is done in the most slovenly manner. Not only is there a great waste of the lubricant, but efficient operation is impeded and loss inevitably results.

Before proceeding further, let me say that there appears to be a most woeful lack of information and, I may add, also, of intelligence on the part of many men in charge of mine operation and equipment requiring lubrication. I am at a loss to say whether the operating officials are more to blame in this matter than are the manufacturers of lubricants, for their failure to disseminate needed information in regard to the proper use of their products.

Recently, I observed a plant in West Virginia where the general superintendent, who is supposed to be a thoroughly high-grade man, compelled his employees to use a low-grade oil commonly known as "black strap" to lubricate, or I might better say, to *smear* the bearings of their mine fans, trolley locomotives, hoisting and winding engines, and mine cars. The use of such a lubricant takes one back several years in mining practice, when it was practically the only oil used about a coal mine, but which is today largely supplanted by higher-grade lubricants.

THE BEST EQUIPMENT CHEAPEST IN THE END

In my wanderings I have observed instances where air compressors have frozen stiff, because of the use of a wrong kind of lubricant. Hundreds of thousands of mine-car wheels have been gouged out in the hub, because of improper or insufficient lubrication. The purchase of any kind of cheaper lubricant other than that adapted to the purpose intended is the most expensive in the end. The best motor one can buy, the best type of mine-car wheel and bearings, will certainly fail when a proper lubricant is not employed, and the loss to the operator will often amount to thousands of dollars in a year's time.

The saving of lubricant at this time is a most vital question, inasmuch as the supply barely exceeds the demand. Yet when one goes about the coal mines it is a common thing to find the floor of the tipple, or the shaft or slope bottom, coated with the drippings from wheel hubs. At times the timbers will be covered almost an inch thick with a cake of the lubricant, which has become mixed with the dirt and dust of the mine and hardened. Likewise, the cars, wheels and axles are caked with the same deposit, which means not only a waste of lubricant but a loss of power in hauling trips.

While such conditions prevail at a large number of mines, the same is not true at mines where the management has given more attention to the selection and use of a proper lubricant. In the majority of such cases I have found that the mine cars in use are equipped with roller bearings, which permit of the use of a higher grade of lubricant. The use of grease to lubricate this type of bearing avoids waste both of material and labor in its application. At such mines it is rare to hear of a bearing giving trouble.

Believing that this is a vital question in mine management, I hope that it will receive the attention it merits and be discussed by practical men who can throw much light on the subject by giving their experience in the lubrication of mine equipment. OBSERVER.

Pittsburgh, Penn.

Gathering Motors

Letter No. 5—Perhaps *Coal Age* can find space, in its interesting columns, for another letter on the subject of gathering motors, from a man who has tried all three of the types of locomotives mentioned in previous letters.

Before coming East in the employment of the Fuel Administration Board, I had charge of a small mine in Pennsylvania, where, a few years ago, a trolley locomotive was installed to take the place of mule haulage on the main roads. We still used mules for gathering coal at the face, but found that the new machine greatly accelerated the work of hauling the coal out of the mine, and I felt that we had made a step forward.

It was with much pride that we watched the trolley locomotive, the first day, as it rolled into the mine, only to emerge a little later with a loaded trip of cars. Every man in the mine was glad to be rid of the troublesome mules, on the haulage roads, and the advent of the locomotive in the mine was hailed gladly and quickly proved to be an efficient part of the equipment.

Two years went by, and I began to consider a further improvement of the haulage system, by the adoption of complete motor haulage, from the face of the coal to the tipple. After a little investigation, naturally, the storage-battery locomotive appealed to me as the best type of machine for this work, because of the ease with which it could enter the low workings.

Someone now told me, however, that battery locomotives were not economical on long hauls with heavy loads; and, regarding it as impracticable to extend the trolley system to the working faces, I compromised and bought a combined trolley-battery locomotive, being fortunate enough, as I then thought, to sell my trolley locomotive at a good figure.

As time went on, however, results convinced me that I had made a mistake in the choice of this machine, which was fast proving a disappointment. As has been explained clearly by the writer of Letter No. 3—the man with a distinguished name—while the battery locomotive is theoretically ideal, in mine haulage, certain electrical considerations and requirements make its use unpractical. I learned by experience that these two types of locomotives cannot be combined without a serious sacrifice of the good qualities of both types.

A year passed, and I became convinced that it was necessary to take further steps to improve the haulage system in our mine. I removed the batteries from the machine and replaced them with pig iron to give the necessary weight to enable the locomotive to haul its load. I then used the machine as a trolley locomotive, on the main road only, and bought two small storage-battery locomotives for the gathering haul. These machines proved very efficient as they could go wherever track was laid, without the expense and labor required to install a trolley system.

The trolley locomotive operating on the main road handled heavy trips that would have drained the batteries had they been employed to supply the power. My story may seem long drawn out, but I believe that there are many other operating men in charge of small mines who must find by experience, as I have done, what equipment is best suited to the conditions in their mines. There was one further development that was important as it has proved by several years of successful operation to have effectively solved the haulage problem in that mine.

Advantage in Roller-Bearing Equipment

Having heard that a neighboring mine was using storage-battery locomotives, not only for gathering cars at the face, but for the complete haul, from the face to the tipple, I went to the mine to see what type of locomotive they were using that would stand up to that work an entire shift without midday charging. Much to my surprise, I found that they were using the same make of storage-battery locomotive that I had installed at our mine.

Further investigation showed, however, that their mine cars were equipped with roller-bearing wheels, which enabled the locomotive to make the long haul without a serious drain on the batteries. The superintendent told me that he had never found it necessary to charge the machine except at night.

Impressed with these results, I returned home and began at once to make the change from plain bearings to roller bearings, on a few cars at a time. The result is that my two storage-battery locomotives, today, are performing successfully the entire work of hauling the coal from the face to the tipple.

The experience I have narrated convinced me that where the mine cars are equipped with roller bearings, a storage-battery locomotive can be used to haul the coal from the face to the tipple more economically and conveniently than any other type of equipment. Let me say, in closing, that practical mining men should be encouraged to give their experiences in these columns which cannot fail to be of interest and profit.

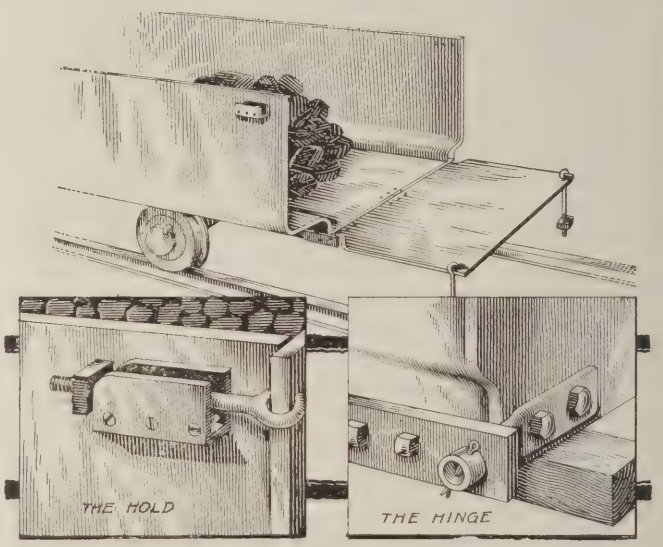
Bayshore, L. I. Steven D. Otis.

Mine-Car Door

Letter No. 1—Replying to the inquiry of V. C. Robbins, *Coal Age*, June 1, p, 1031, kindly allow me to present the accompanying sketch showing the door end of a mine car that may possibly answer Mr. Robbins' purpose and solve the problem he has put up to *Coal Age* readers.

No definite measurements are given in the figure, since the plan submitted is a general one and can be applied to most any low-seam car, with slight change if that is necessary.

As shown in the figure, the door is hinged at the bottom, swinging on an iron bar or steel piping. The details of this are clearly shown in the figure. The two ends of the bar or pipe on which the door swings pass through holes drilled in stout pieces of strap iron and a



DETAIL OF CAR DOOR IN LOW SEAM

cotter holds it in place. The door is further strengthened by an iron strap passing around the bar and bolted to the door at the center.

When the door is raised, it is held in position by a latch on each side of the car. This is an eye-bolt and nut, the eye being bent through a hole in the door, as shown in the figure. By adjusting the nut on the bolt the door can be brought snugly against the end of the car. This arrangement may seem to be crude, but it has proved satisfactory in our case and costs very little to install. H. J. Tracy.

Lakewood, N. J.

[The arrangement proposed by this correspondent is a simple device, but does not provide for the automatic releasing of the door when the self-dumping cage reaches the top of the shaft, as specified by Mr. Robbins in his inquiry. Some of our readers can possibly improve, in other ways, on this arrangement and we hope to hear from them.—Editor.]

Letter No. 2—The inquiry of V. C. Robbins, in regard to a mine-car door that will permit a car to be loaded through the end gate, in working a low seam of coal where a self-dumping cage is used in the shaft, reminds me of a similar instance in my own experience, at a shaft mine of which I had charge.

In that case, we experienced a good deal of trouble from the coal falling back down the shaft when the car was tilted to dump the coal into the screen chute. I may say that, in one day's average run, from 3 to 4 tons of coal had to be cleaned out of the shaft bottom every night.

The miners, of course, loaded mixed coal, large and small sizes together. The style of the cage, which was self-dumping, was the "drop-bottom" type and, as I said, much coal fell into the shaft. We tried various schemes to overcome the difficulty; but still a considerable quantity of the fine coal and slack would find its way into the shaft when the cage was dumped; and it had to be cleaned out once a week.

Double Doors for an End Gate

Finally, I concluded to try a new kind of end gate that I believed would be more suited to a self-dumping cage. Instead of a single door or end gate, I proposed to use two half-doors, each swung on hinges from the side of the car. When closed, the doors would be locked with a catch that could be knocked loose by an automatic arrangement similar to that in use at the present time.

As the cage was tilted, the catch was loosened automatically and the doors swung open each way from the center and prevented the coal from dropping into the shaft, as it was prone to do when the old style of end gate was used.

It may be suggested that the two half doors swinging outward would strike the bottom of the chute when the cage was tilted to its full position. This was obviated, however, by cutting short narrow slots in the floor of the chute into which the ends of the doors sank. The slots were sufficiently wide to allow the doors to fall into them readily and an apron below caught what fine coal went through the slots. The scheme worked fairly well.

Since Mr. Robbins states he is loading only hand-picked coal in the cars, there may be little trouble experienced with coal falling back down the shaft in the manner I have described. Still, I thought the scheme of dividing the end gate in this manner was worthy of mention.

R. W. Lightburn.

Perryopolis, Penn.

Gas Encountered Reopening Mine

Letter No. 1.—In reading the inquiry of J. M. Kemp, who describes his experience in reopening an abandoned mine that had filled with water, *Coal Age*, May 11, p. 894, I was both interested and surprised. Mr. Kemp states that, after pumping out the water he encountered gas that gave a 4-in. cap on a Wolf lamp, but would not explode though the flame was much disturbed in the lamp. He states that he even attempted to explode the gas by black powder, but failed.

To my mind, it is fortunate for him and his companions that the attempt did fail and, to this fact, they probably owe their lives. The first advice I want to give our friend is: Never again attempt to explore an old mine under the same conditions; but, first use some means to obtain a current of fresh air and conduct it into the mine by erecting a brattice in the slope. Permit no one to advance ahead of the fresh air. It would seem that in the former working of this mine, some means must have been employed for its ventilation, although it is stated that there was but one opening, which made it necessary to start a second slope.

Assuming, however, that no available means of ventilation was found, and that it was necessary to ascertain if the mine would warrant being worked, before going to the expense of installing ventilating apparatus, some inexpensive method should have been adopted. For example, it would have been a simple matter to have erected a wooden chimney, say 15 or 20 ft. in height, on one side of the slope mouth and connect this with the brattice forming a return air space in the slope. The cost of doing this would have been small and it would have provided an air current sufficient for the exploration of the mine.

Strange Adventure in a Gas-Filled Mine

What appeals to me as strange is that one could proceed into a mine "a half mile," after having observed a 4-in. cap in his lamp when passing down the slope. In my opinion, there were grave chances of the men being trapped and unable to get back. This may seem harsh criticism, to Mr. Kemp, but it appears to me that he undertook a very foolish task and one that ought not to be repeated.

The explanation given in the reply made to this inquiry is enlightening as to the character of the gas and the reason why it did not explode. However, I understand that a 4-in. gas cap, on a Wolf lamp, indicates approximately 12 per cent. of marsh gas. Then, taking the explosive range of this gas as varying from 7 to 16 per cent. when the oxygen content is normal, it would seem to indicate that the mine air in the slope where the lamp showed a 4-in. cap was highly explosive.

Effect of Lack of Oxygen in Mine Air

It appears to me that the fact that it was not explosive can only be attributed to an insufficient supply of oxygen, owing to the presence of an excess of nitrogen or carbon dioxide in the air. It may be assumed, from Mr. Kemp's description, that there was an excess of both of these gases, which would reduce the oxygen content.

But, when the oxygen in the air is reduced to 15 per cent., lights will not burn; and as Mr. Kemp's light was not extinguished, there must have been at least 15 per cent. of oxygen present together with the 12 per cent. of marsh gas indicated by the 4-in. cap, which would leave 73 per cent. of nitrogen and carbon dioxide in the air. This would be a very dangerous atmosphere to breathe.

It has been explained, in the editor's reply, that flashdamp produces a gas cap that disappears quickly and the lamp flame, is dimmed or may be entirely extinguished depending on the purity of the flashdamp mixture. Mr. Kemp says, however, that the flame cap decreased in height the further he went into the mine until he was forced to turn back.

It seems to me that the cause of the gas cap diminishing the further the lamp was carried into the mine,

and the reason the lamp did not explode, were chiefly due to the lack of oxygen in the mine air, whether this was caused by an increase of nitrogen or of carbon dioxide. JAMES TOUHEY.

Cumberland, B. C., Canada.

[Our correspondent is wrongly informed in regard to the percentage of marsh gas indicated by a 4-in. cap on a Wolf lamp. When testing with a reduced flame, with the Wolf lamp burning naphtha, a 4-in cap would indicate about 4½ per cent. of marsh gas present in the air, assuming a normal oxygen content. With a normal flame, 6 per cent. of gas will cause the flame to reach a height of 3 or 4 in. and be greatly disturbed, twisting about in a weird manner when the oxygen content is normal.

The presence of more or less carbon dioxide in the mine air, as in the case mentioned by Mr. Kemp, has the effect to dim the flame and shorten the duration of the gas cap produced. The amount of the dimming of the flame and the duration of the cap will depend on the purity of the flashdamp mixture, as we have stated on page 894, in reply to this inquiry.

Both nitrogen and carbon dioxide are extinctive gases and their presense in the air causes the depletion of the oxygen. It makes little difference, therefore, whether the effect be ascribed to a low oxygen content or an increased percentage of either of these gases.

While nitrogen is a neutral gas, having no toxic effect, carbon dioxide has a distinctly toxic effect; but both of these gases have practically the same extinctive effect on a flame. The characteristics of flashdamp will vary with the constitution of the mixture or the percentage of noxious gases present.—Editor.]

What Caused the Explosion?

Letter No. 3—In seeking for the cause of the explosion mentioned in the inquiry of "fireboss," *Coal Age*, Apr. 6, p. 645, I favor the suggestion made by Oscar Jones, Apr. 20, p. 755; namely, that there probably existed gob fire in some portion of this mine and that this was directly responsible for the ignition of the gas, which it is very natural to suppose accumulated during the period of idleness.

The existence of a gob fire, in this mine, seems all the more reasonable to suppose, because the place where the explosion started is described as the old workings that were wet. Now, since it is stated that "the mine was ventilated wholly by natural means, there being no fan or furnace," it strikes me that these conditions were very favorable to the production of a gob fire.

Especially would this be the case if there was some fine coal and slack mixed with the slate, in the gob. The heating of the gob, under the slack ventilation in the mine, would generate carbon monoxide, which would greatly assist the starting of a gob fire.

From the question of "fireboss," as to whether this was a gas or dust explosion, it is natural to assume that the mine was somewhat dusty; and that, in addition to the gas which evidently accumulated in the old workings while the mine was idle, made the conditions very favorable for the explosion of the gas and dust that I assume and believe was ignited by the fire burning in the gob.

In my opinion, the dust factor is not a slight one, since a small percentage of dust thrown into the air by the first explosion of the gas would generate a dangerous condition for the propagation of the explosion, which might otherwise have been local in its extent. It is my belief that this was both a gas and a dust explosion combined. GASTON LIBIEZ.

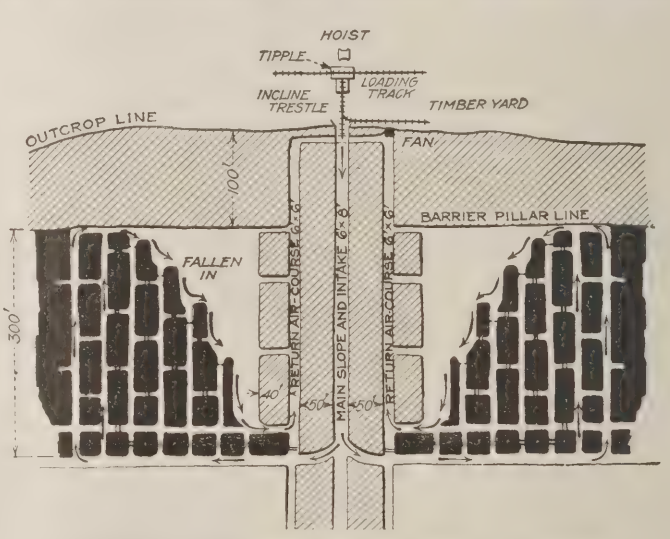
Peru, Ill.

Working 10-Ft. Inclined Seam

Letter No. 5.—A large recovery of coal at a low mining cost, in the 10-ft. seam inclined between 15 and 20 deg., described in the inquiry of "Superintendent," *Coal Age*, Mar. 23, p. 561, will prove a rather difficult problem. The cost of the operation will naturally be the deciding factor in determining the completeness of the extraction or, in other words, the amount of coal that must be left in the ground.

Because of the disturbed conditions in this seam it will not be possible to follow a rigidly uniform system of mining. The success of the undertaking will depend, to a large extent, on the roof coal that must be left up in the first working for the support of the frail stratum overlying the seam.

In considering such a proposition, I would be inclined to estimate on a 400-ton output and assume the worst conditions existing underground. The seam being badly faulted, it will be useless to open wide places. In the accompanying figure is shown the general plan



WORKING THE COAL ON THE PANEL SYSTEM

that should be followed. This consists in driving a single slope on the full dip of the seam. The slope should be 6 x 8 ft. in the clear, after being timbered with 14-in. timber sets spaced 5 ft. centers and lagged with 6-ft. lagging, which will permit of a 6-in. overlap above each timber set. In order to secure a uniform grade when driving the main slope, the line of the slope should be previously prospected by drilling, so as to permit of the construction of a profile for determining the grade of the incline.

When the slope has reached a sufficient depth to provide for a 300-ft. lift below the crop-coal barrier, gangways should be started to the right and left of the slope. As shown in the figure, these should be turned off on an easy curve so that the loads will have

a straight pull as they reach the heavy grade of the slope.

As appears in the figure, a 6 x 6-ft. air-course is now driven up on each side of the main slope, starting from the gangway and leaving a 50-ft. pillar of solid coal, or whatever the state law may require, between the slope and each airway. There should be no cross-cuts driven in these pillars; but ventilation should be secured by the use of flexoid tubing while driving the main slope and the air-courses. When near the surface the air-courses must be connected by driving a crosscut under or over the slope and leading to an exhaust fan.

The gangways should be driven 8 ft. wide and 7 ft. high, taking up enough of the footwall, on the rise side, to bring the floor of the seam just above the top of the car. A low car should be used, having a capacity of 3000 lb. of coal. Chutes are then driven to the rise of the gangways, on 30-ft. centers, 8 ft. wide and from 4 to 6 ft. high. About 7 yd. up from the gangway the first croscut or counter is driven between the chutes and made 6 x 6 ft. in section.

Construction of the Chutes

Three rows of props are carried up each chute, the timbers being spaced 4 ft. apart center to center. The middle row should be placed 30 in. from the inside rib row. On two of the rows, nail 2 x 6-in. strips 8 ft. long, to which can be spiked No. 18 sheet iron, 30 x 96 in., so as to form a trough in which the coal will slide to the gangway. Boards 1 x 12 in. can be used for the sides of the chutes. This system requires "bucking the coal," which, if dry, will slide freely on this pitch.

When the chutes have reached the top, bring back the full width of the pillar, or 11 ft. on each side of the chute. When drawing back the pillars only sufficient timber should be used to properly control the roof weight, which will serve to break the coal as quickly as it can be mined and removed. With proper care, the caving of the roof should not be dangerous on this pitch.

A single-drum hoist should be employed capable of hauling two- or three-car trips up the main slope to the tipple. Each trip should be pulled into a rotary dump and the coal dumped into the loading chutes, without uncoupling the rope from the cars. A back switch at the foot of the trestle will enable the handling of supplies from the ground level. Provision should also be made to handle cars loaded with rock, as there will be considerable refuse of this kind to be hauled to the surface. The mine should be equipped with an air compressor having a capacity of 500 cu.ft. of air per minute for operating drills and jackhammers.

Delmar, Ore. SUPERINTENDENT.

Miners and the War

Letter No. 11—The great organized body of the United Mine Workers of America, enlisted so largely in the service army of Uncle Sam, should know and realize their responsibility in the great struggle for democracy in which they form an element as important as the soldiers in France who are working night and day and fighting with magnificent courage. The duty of the one section of this great army of workers is to supply the material that the other needs and must use. The army at home must supply the fuel that gives power to the army in the field.

This is a war of the people and concerns every individual citizen. Upon its issue hangs not only the future of this country but that of the world. The battle is on and must be fought with every energy at our command. Success on the firing line depends on the earnest and effective work at home. Life is the last full measure of devotion that our brave boys in France are offering for their country, and all they ask is the needed support and backing at home that they have the right to expect. United action at home means decisive results on the field of battle.

Responsibility of Home Workers

The great army of mine workers are being put to the test to prove whether or not they possess that spirit of loyal devotion that shall enable them to stick close to their work and produce the coal that is sorely needed in abundance to help us win the war. America has lifted high the ideals for which it is fighting and now looks to its army of industrial workers to strengthen the sinews of war and make it possible to banish forever the autocratic power that has come to be known as "Kaiserism."

The responsibility rests upon every individual, as well as upon every organization of men, to advocate the necessity of an increased production of the munitions of war. We must maintain a deaf ear to the German propaganda with which the Kaiser has assumed to attempt to tie up our industries, and thereby to paralyze the efforts he has been so loath to believe that America could or would put forth in the great struggle in Europe. He has hoped to block our railroads and prevent the sailing of our ships by sapping the work in our coal mines and cutting down the production of coal.

An Appeal to the Loyalty of Miners

To the miner, let me say, Stop, look and listen! Think of the vital importance that an increased coal production is to our country and future life. Upon the miners of America devolves the sacred duty of keeping alight the torch of liberty, which alone can insure justice and peace throughout the world. In the struggle for democracy, let us not falter or count the cost, but work and strive for the preservation of American liberty.

The best news that we can send to our boys in France is that we are behind them to the last minute of the last hour, in thought, word and deed. Knowing this will inspire them with new courage, strength and confidence, and victory is certain.

It is my hope and belief that the great army of mine workers, 400,000 strong, will stand by their guns and keep the coal moving. It is only in this way that we can avoid the future necessity of maintaining an armed force for defense against the incursion of the enemy. Prussianism must be forever put down. Let us live up to our behest that "all men are created free and equal" and continue to live and let live; but, to do this, we must do our part in the struggle in which we are engaged, and our work at home, as miners, is to increase the production of coal.

Plymouth, Penn. JOSEPH R. THOMAS.

INQUIRIES OF GENERAL INTEREST

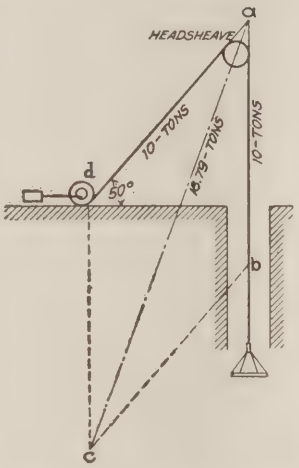
Load on Headsheave

Kindly show me how to calculate the load that is exerted to break the axle of a headsheave when the load on the hoisting rope is 10 tons, including friction, and the rope leading from the winding drum to the headsheave makes an angle of 50 deg., with the horizontal.

MINER.

Cumberland, B. C., Canada.

Referring to the accompanying figure, which shows a load of 10 tons supported by a hoisting rope in a vertical shaft, it is evident that, since the rope passes over the headsheave, the load on each branch of the rope is equal and a force of 10 tons is likewise exerted at the circumference of the winding drum.



LOAD ON HEADSHEAVE

In order to calculate the resulting load on the headsheave, extend the lines of each branch of the hoisting rope, until they meet at *a* above the sheave. Then, from that point lay off, to any convenient scale, the distances *ab* and *ad* to represent 10 tons each. Now, complete the parallelogram of forces *abcd* and draw the diagonal *ac*. The length of this diagonal, measured by the same scale as previously employed, will give the load on the headsheave or the load tending to break the axle of the sheave. This load is calculated as follows:

Since the rope leading from the drum to the headsheave makes an angle of 50 deg. with the horizontal and the other branch of the rope is vertical, the angle between the two branches of the rope is the complement of 50 deg. or 90 — 50 = 40 deg. Again, since the load on each branch of the rope is the same, the resultant *ac* divides this angle equally, making the angles *bac* and *dac* each 20 deg.

From the principle of a parallelogram, $ac = 2ad \cos 20$ deg. Then, since *ad* is 10 tons and the angle *dac* is 20 deg., the load on the sheave is

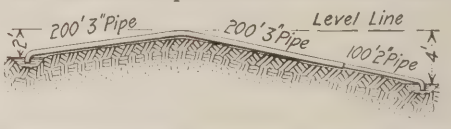
$ac = 2 \times 10 \cos 20° = 2 \times 10 \times 0.939 = 18.78$ tons.

Blasting a Ditch in a Mine

Kindly advise the best method of dealing with the following proposition: We have a slope mine that was driven in about 200 ft. to a point where we encountered some water and made a small local sump. From this point the seam rises about 1 in. in 4 ft. It has been decided to drain this local sump into the main sump by digging a ditch, which will be 2 ft. or more deep, at the deepest place, and 120 ft. long. The bottom is hard and will have to be blasted. Our difficulty arises from the fact that the timber frames, made of 10 x 10-in. timber, are all set on mudsills 4 x 10 in., 9 ft. 4 in. long, and spaced 4 ft., center to center. The ditch must be dug under the mudsills. Can this be done without damaging the timber sets?

Burnside, Penn. GEORGE SMITH.

We do not think that it is possible to blast this ditch out of a hard bottom without disturbing the timbering, and would advise draining the local sump in some other way. It may be possible to siphon the water, which would be far easier to perform and cost less.



In the accompanying figure is shown a successful siphon line having a rise of 2 ft. and a fall of 4 ft., which is suggestive.

Will Carbon Monoxide Support Combustion?

I have just noticed two contradictory statements regarding carbon monoxide as a supporter of combustion. In the "Coal and Metal Miners' Pocket Book," ninth edition, page 350, this gas is described as a "colorless, odorless and tasteless gas." The statement continues: "It is combustible, burning with a light blue flame. . . . Also, a supporter of combustion, being the only mine gas that burns and also supports combustion."

On page 852 of the "Coal Miners' Pocket Book," eleventh edition, I find the folowing statement: "Carbon monoxide, formerly known as carbonic oxide . . . is odorless, colorless and tasteless, and supports neither life nor combustion. It burns with a bright bluish flame and is explosive when mixed with air in the proper proportions." Kindly say which statement is correct.

Cucumber, W. Va. A. G. JOHNSON.

Carbon monoxide (CO) contains no available oxygen and the gas cannot therefore be said to support combustion. A lamp flame introduced into an atmosphere of this gas unmixed with air, if this were possible, would be promptly extinguished. In this respect, the gas behaves the same as methane (CH_4). Both of these gases being explosive when mixed with air in proper proportion, and both being combustible burning in air with a pale blue flame, it would be difficult or practically impossible to introduce a lamp flame into an atmosphere of the pure gas, in either case.

The statement that carbon monoxide is an "odorless gas" is questionable, because the extremely poisonous character of the smallest percentage of the gas in air would make it difficult to judge of its odor or taste.

EXAMINATION QUESTIONS

Tennessee Mine Foremen's Examination, 1918

(Selected Questions)

Ques.—What are the esential elements to efficient mine ventilation?

Ans.—The velocity of the air, the quantity in circulation and the manner in which it is distributed and conducted throughout the mine are the essential elements of efficient ventilation. The quantity of air in circulation must be at least equal to the amount required by the mining law of the state. In addition to this, the quantity of air in circulation must be sufficient to dilute, render harmless and carry away any accumulations of gas and make the mine safe for work. The air current must be conducted so as to sweep the coal face in every working place, besides all void and abandoned places, falls and cavities where gas might accumulate. The main air current must be so divided as to distribute the air to each district of the mine according to its needs and reduce the velocity in each working place so that it will not inconvenience the men or render the place unsafe for work.

Ques.—What instruments are used to determine the condition, volume and temperature of the air current in a mine?

Ans.—The anemometer and a tape measure and watch are required to measure the volume of air passing in an airway. The water gage is used to determine the unit of ventilating pressure or the pressure in pounds per square foot causing the circulation. The hygrometer, or wet- and dry-bulb thermometer is used to determine the amount of moisture in the air and the temperature.

Ques.—Describe how the volume of air in a mine is correctly measured by the use of the anemometer.

Ans.—The instrument is held at arm's length by the observer and in such a manner that its vane will revolve in a plane at right angles to the air current A place is first chosen in the airway where the current will have a straight course and not be deflected unequally to either side, and where the sectional area of the passage can be accurately measured. An effort must be made to obtain as close an average reading as possible, according to the best judgment of the observer, after taking a few preliminary readings at different points in the cross-section. With watch in hand, the instrument is exposed for one or more minutes, and the reading of the dial taken before and after the exposure. From these readings is found the velocity of the air, in feet per minute. The sectional area of the airway, in square feet, multiplied by the velocity of the current, in feet per minute, gives the volume of air passing, in cubic feet per minute.

Ques.—In a mine where 275 men are employed, how many splits in the air current will be required according to law.

Ans.—The Tennessee mining law (Sec. 32) specifies that it shall be unlawful to work more than fifty men and eight mules in any single split or district, except where the judgment of the chief mine inspector decides it is practicable to do this. To work 275 men will therefore require $275 \div 50 =$ say 6 splits of air.

Ques.—At what points in a mine should air measurements be taken regularly, and how often?

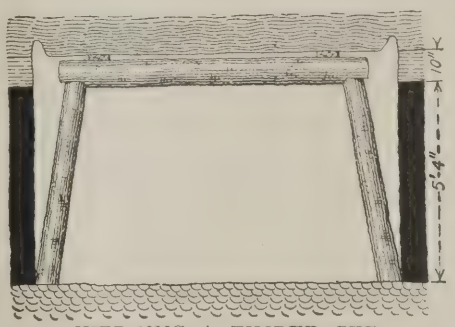
Ans.—Sec. 24 of the law requires the mine foreman to measure the ventilating current each week, at places throughout the mine as designated by the chief mine inspector or the district inspector, and keep a record of the measurements in a book kept for that purpose.

Ques.—An airway 12.9 ft. wide and 8.9 ft. high is passing 50,000 cu.ft. of air per min.; what is the velocity of the air current?

Ans.—The sectional area of this airway is $12.9 \times 8.9 = 114.8$ sq.ft. The velocity of the air current, therefore, is $50{,}000 \div 114.8 = 435.5$ ft. per min.

Ques.—What is double timbering? Show by sketch how you would put up a set of double timbers, and how you would wedge them and why.

Ans.—By "double timbering" is understood a frame of timbers consisting of a collar and two legs supporting it. The manner of setting such a timber frame and wedging the same against the roof is shown in the accompanying figure. The wedges should be driven over the collar a short distance inside of the top of each leg so as to arch the pressure of the roof over onto the legs. No center wedge should be driven, the pressure would then break the beam.



WEDGING A TIMBER SET

Ques.—If you were taking air measurements at a mine and found 25,000 cu.ft. per min. at the intake, and only 4000 cu.ft. at the face, how would you account for this loss, and how can it be prevented?

Ans.—Assuming that the mine is ventilated by a single current of air, and the temperature of the mine air, at the face, is the same as that at the intake where the first measurement was taken, and assuming also there is no gas generated in the mine and no leakage of air through stoppings and doors, the quantity of air passing at the face should be equal to that on the intake. In this case, if there is but a single current, the loss of $25{,}000 - 4000 = 21{,}000$ cu.ft. must be attributed to a large number of leaky stoppings or a door partially set open. The mine temperature is usually somewhat higher than that of the outside air, and the rise in temperature, and the generation of mine gases in the workings, would increase the air volume.

COAL AND COKE NEWS

What Happened in May

[The bracketed figures in the text refer to pages in the present volume, reference to which will give fuller information regarding the matters discussed in that item to which the bracketed figures are attached.]

May 1—The 45c. allowance is conceded to the coal operators of Alabama, but will only be in effect from May 15, when the wage increase granted Apr. 21 becomes operative—The Department of Mines of Pennsylvania declares its intention to enforce the law prohibiting women from doing anything but clerical labor about the mines [841, 859, 886]—New prices go into effect in Brazil district of Indiana; in Montana; in Macon County, Illinois, at the mines of the Williamsburgh Slope Coal Co., Florence, Fremont County, Colorado; in Knox and Whittier Counties, Kentucky; and Campbell County, Tennessee [883]—A cave-in at the White Coal Co., Pittston, Penn., destroys 20 houses and kills one man and injures another [889]—Parrish Colliery breaker, now belonging to the Lehigh and Wilkes-Barre Coal Co., falls, but without casualties [889]—New concrete breaker is started by Delaware, Lackawanna & Western R.R., Coal Department, near Storr's breaker, Dickson City, Pennsylvania [946].

May 2—Railroad Administration announces that it has let contracts for the construction of 100,000 freight cars—Special convention of mine workers is held at Birmingham, Ala., to consider the recent wage increase tentatively accepted by the union officials for the mine workers in that state.

May 3—Special orders providing for the diversion of coal to New England, issued during the critical period of last winter, are revoked by the Fuel Administration [882].

May 4—First issue of "Saward's Journal," a coal trade weekly edited by Frederick W. Saward, former editor of the "Coal Trade Journal"—End of subscription period for Third Liberty Loan—Collision of cages in Loomis shaft of Delaware, Lackawanna & Western R.R., Coal Department [898].

May 6—Attorney-General Gregory condemns Prager lynching at American Bar Association Meeting.

May 7—Screened and sized crushed beehive coke in Colorado is set at $9.80 per ton by Fuel Administration—Order announced penalizing the New York and Philadelphia Coal and Coke Co. for providing low-grade quality of coal for the bunkering of a Belgium relief steamship—Albert H. Wiggin resigns as Fuel Administrator for New York State [883].

May 8—The shipment of coke produced in the New England States to points outside is forbidden except to Albany, Cohoes, Green Island and Troy, N. Y. No coke other than petroleum coke and crushed coke for domestic purposes may be shipped into the New England States from Maryland, New Jersey, New York, Pennsylvania and West Virginia [933]—Fuel Administration makes preliminary steps in fuel conservation by appointing Thomas R. Brown, of Pittsburgh, Penn., and C. P. Billing, a special staff assistant, to classify and rate plants as to their fuel efficiency [932]—C. P. White is appointed manager of Lake and Canadian coal distribution [932].

May 9—Representatives of the United States Steel Corporation and the independents meet with Samuel Gompers, president of the Federation of Labor, and other representatives of organized labor and the members of the United States War Labor Board, to discuss the principle of collective bargaining whereby the Government will be guaranteed against any interruption in the iron and steel industries during the war—The Fuel Administrator authorizes the employment of fuel inspectors for anthracite coal—George T. Watson announces that the Consolidation Coal Co. will put in force an equivalent of the Colorado Industrial Plan [934, 935, 976, 977]—All the mines of the Broad Top-Huntingdon field of central Pennsylvania but one are on this date found to be on strike [934, 976, 1022].

May 11—Prices changed for Wise and Lee County coal in Virginia and a price set for coke from the Howe plant of the Howe-McCurtain Co. in Oklahoma [933].

May 13—Shipment by way of the Great Lakes of smokeless coal from New River and Pocahontas districts in Virginia and West Virginia to Wisconsin, Minnesota, North Dakota, South Dakota and Iowa is forbidden where the fuel is to be used for domestic purposes. The sale, distribution and use of bituminous coal from Pennsylvania, Ohio, Maryland, West Virginia, eastern Kentucky and Tennessee, shipped by way of the Great Lakes, is prohibited in Illinois for domestic purposes [933].

May 14—Manager and a mine blacksmith are killed and three men injured by the explosion of a powder magazine at the Oliphant-Munson Collieries, Coal Spur, Alberta [987].

May 15—Meeting of operators of the Central West Virginia Operators' Association with a representative of the Fuel Administration. The Association agrees on behalf of its members to put the Colorado Industrial Plan into operation [976, 977]—New scale of wages goes into operation in Alabama [797].

May 16—Grievance strike at the Maxwell No. 20 colliery of the Lehigh & Wilkes-Barre Coal Co., at Ashley, Penn. [976].

May 17—Button strike at No. 5 colliery of the Delaware & Hudson Co., Larksville, Penn. [976].

May 18—Decision of Judge Henry in Dauphin County court in favor of three miners who had been docked for dirty coal. Susquehanna Coal Co. directed to pay them $350 [978]—Fire breaks through into the workings of the Peabody No. 2 North mine [1034, 1083].

May 20—Announcement is made that the railroads will spend about a billion dollars this year for additions, betterments and equipment, said to be approximately three times as much as in any of the last three years [1024, 1025]—Fire at gasoline fan in the mine of the Mill Creek Cannel Coal Co., at Villa, near Charleston, W. Va., smothers 13 men and does much damage [987, 1033, 1106].

May 21—National Retail Coal Merchants' Association holds its first annual convention at Atlantic City, N. J. [986, 987].

May 22—James Brothers colliery near Pottsville, Penn., closed down for shipment of dirty coal [1033].

May 23—The Fuel Administration requires that permission be obtained before opening a new mine and announces that it will require proof that the new mines will not secure laborers for opening and development from other mines and will not add to the difficulties of the Railroad Administration [1021].

May 25—Price of all bituminous coal reduced 10c. per ton, it being announced that the President has ordered the railroads to pay the Government price for coal [571, 779, 839, 885, 975, 839, 1020, 1025].

May 27—Freight rates on coal and other shipments raised roughly 25 per cent. by order of Director of Railroads, McAdoo and the Interstate Commerce Commission. Passenger rates are also increased to 3c. a mile. Railroad gross income should be increased $900,000,000 a year by the new schedules [932, 1020, 1021].

May 28—National Coal Association meets for its two-day session, and before it adjourns votes for incorporation [933]—John P. White is appointed a representative of the Fuel Administration on the Labor Policy Board [1025].

May 29—Fuel Administration prohibits use of coal or oil fuel after June 11 for private yachts except for the purpose of returning the yacht to its home port.

May 31—James M. Orr, president of the Orr Coal Mining Co., of Charleston, Va., charged with having secured an excessive price for coal from the Edison Portland Cement Co. and others, is fined $5,000.

Harrisburg, Penn.

The state compensation board has affirmed the disallowance in the case of Paolis vs. Tower Hill Connellsville Coke Co., in which the question arose whether payment of a hospital bill can be construed as payment in compensation when no agreement was entered into and the claims not made until a year after the accident. The decision was based on the time limit having expired. New hearings were awarded in the claims of Simurda vs. Lackawanna Ry. and Thomas vs. Aetna Explosive Co. In a dozen cases appeals were dismissed.

As a result of an investigation made by a special committee of the Scranton Board of Trade it has been learned that the mines in Lackawanna County are now working with 35,744 employees, almost 8000 less than the number needed to have the mines worked to their fullest capacity.

The investigation shows a big scarcity of laborers. When operated to capacity at least 8800 laborers are needed, but today finds only 4400 such men employed. The percentage of shortage in three branches is: Miners, 14 per cent.; company men, 7 per cent., and miners' laborers, 47 per cent.

Six Pennsylvania coal companies on June 7 asked the Interstate Commerce Commission for $250,000 damages from the Pittsburgh & West Virginia Railroad Co. They charge that the railroad unfairly gave mines, in the ownership of which it was interested, preference over the complainant in the distribution of cars from September, 1917, to March of this year, when they allege the discrimination was removed by the railroad administration.

William Potter, State Fuel Administrator, on June 1 cut the word "anthracite" out of the vocabulary of residents in 29 counties in Pennsylvania. In one of the shortest orders yet issued by the fuel administrator anthracite supplies were denied the following counties during the coal year of 1918-1919: Crawford, Warren, McKean, Potter, Tioga, Cameron, Elk, Forest, Venango, Mercer, Lawrence, Butler, Armstrong, Clarion, Jefferson, Indiana, Clearfield, Huntingdon, Blair, Cambria, Fulton, Bedford, Somerset, Allegheny, Beaver, Washington, Green, Fayette and Westmoreland.

These counties will be denied anthracite of domestic sizes, which embraces pea, nut, stove and egg grades. The principal reason given for the action was that these sections are in the soft-coal mining districts, where bituminous is the chief fuel burned.

Charleston, W. Va.

There was a material slump in coal shipped from the Kanawha district last week, the production being 141,272 net tons, representing a decrease compared with the previous week of about 13,000 tons, the decrease being due principally to an insufficient number of cars, the supply last week being only about 45 per cent. In other words, while the hours lost because of car shortage for the week ended May 25 was something over 800, the hours lost for the week ended June 1 amounted to 1605. Hours lost because of an inadequate labor supply totaled 357 and mine disability, or rather lack of power, was responsible for the loss of 274 hours. During the month of May the total loading for the Kanawha district was 37,620 as against 34,627 empties received, the car shortage for the month almost reaching 3000. Last Saturday, while the supply was almost equivalent to requirements, on Sunday 1227 cars were loaded out and only 868 received. On Monday 1427 cars were loaded out and only 893 received. On June 5 1360 cars were loaded out as against only 902 received.

Complaint is being made by many of the operators that while some of the larger mines are not receiving cars, yet the "snow bird" mines are receiving an ample number. Some of the operators are also at

a loss to understand why one mine in this territory supplying railroad fuel was able to load 4800 tons on Monday, 1630 on Tuesday, 1200 on Wednesday, 2200 on Thursday, 2240 tons on Friday and on Saturday last 1000 tons, when no one else on that day had any cars, it being regarded as a remnant of the old assigned-car system.

Conditions are even worse in the New River field, where the failure of the Virginian power company to supply the district with power is not only proving a blow to the industry but is materially interfering with war plans, since much coal from the New River section is bunker coal. Furthermore, it is defeating the effort to increase the total production for the year at a time when every coal operator is bending every energy to produce enough coal now to prevent a fuel famine next winter. Government agents have been investigating the power situation, but no action has been taken so far as is known here.

A slump is shown in the production of coal and coke in the Pocahontas and Tug River districts for the week ended June 1 due in large part to a shortage of labor, although cars are not as plentiful as they might be. A loss for the week ended June 1 of 26,137 tons is reported. The total tons produced amounted to 428,972. Car shortage was responsible for a loss of 158 hours, but labor shortage was responsible for a loss of 1013 hours.

Fairmont, W. Va.

The car supply in the Fairmont district, which is the Monongah division of the Baltimore & Ohio and the northern end of the Monongahela R.R., which is jointly operated by the Pennsylvania and the New York Central, had a good car supply all last week, with the exception of one day on the Monongahela, when a wreck tied things up. The Baltimore & Ohio car supply has been a full run for the mines, which are short of labor at this time.

Shipping facilities on the Kanawha & Michigan seem to be ample, though that road is much congested at this point owing to heavy Government traffic, affecting to some extent the ability of the Coal & Coke to accept empty coal cars for the mines on its line, since the capacity of the yard at this interchange point is limited. Under the rating of mines on the Coal & Coke between Charleston and Elkins the total number of cars to which all mines on the line are entitled is 259½. The development of mines on the Coal & Coke during the last year has been little short of phenomenal.

Plans to increase the efficiency of the mines are being discussed by the operating committee of the Central West Virginia Coal Operators' Association, and a program is being worked out by which meetings will be held at Fairmont, Clarksburg, Elkins and Morgantown, with the idea of having foremen and bosses gather together for talks which are inclined to cultivate efficiency and increase patriotism.

Terre Haute, Ind.

The car supply to Indiana coal mines for the week ended May 25 showed a further falling off, with a result of a loss of 107,005 tons. The per cent. of car shortage was 14.14 and the per cent. of time the mines actually worked was 75.52. There was hoisted during that week a total of 591,078 tons, according to reports to the district representative of the Federal Fuel Administration. The market for domestic coal continues to be large, but slowness of public utilities corporations to stock screenings is interfering with the marketing of domestic coal. As the market for mine-run continues strong, less screening is being done than could be done at this time of the year. The increase in freight rates, which amounts to 30c. a ton from the Terre Haute market to Chicago, is expected to stimulate the market for screenings during the coming weeks. If the public utility corporations do not start storage soon there will be a marked shortage of lump coal.

PENNSYLVANIA

Anthracite

Treskow—The slate banks, which consist largely of the smaller sizes of coal discarded for 50 years, will be loaded into cars by steam shovels and run through the Lehigh & Wilkes-Barre Coal Co.'s breaker at Audenried No. 4 colliery. Officials expect to retrieve thousands of tons of good anthracite coal out of this bank.

Pottsville—The Anthracite Consumers' League, through Frank C. Reese, on June 7 asked the Government experts, who started to check up accounts of coal operators, to pay special attention to the large profits on washery coal. This product is simply scooped up from culm banks and with little preparation is put on the market at the full price for freshly mined coal. They also ask the Government to reduce the price of coal from washeries.

Scranton—Charges that the Delaware, Lackawanna & Western R.R., Coal Department, is removing pillars on an extensive scale in its mine workings under West Scranton have been made in a special report filed with Council by City Engineer Long, who recently conducted a survey of the mine workings. He directly accused the company of bringing about recent costly caves through such action. Engineer Long stated that practically all of the pillars have been removed in the 5-ft. seam of the Hyde Park mine of the company under Grant Ave., and that the miners are removing others.

Bituminous

Phillipsburg—James Stratton & Sons, of Cuba, are now shipping coal from their new Pauline mine, near Osceola.

Connellsville—George W. Deeds, county commissioner of Westmoreland County, is opening a coal mine near Champion, in the Indian Creek Valley. Mr. Deeds purchased 50 acres of the Snyder farm.

Indiana—Mine Inspector Thomas S. Lowther, of this city, has announced the successful applicants at the recent mine foreman and fireboss examinations. The list includes five first-grade mine foremen, three second-grade mine foremen, eight first grade assistant foremen and eight firebosses.

Dixonville—The new mines of the Milbar Coal Mining Co. here have been sold to the Estep Brothers, of Lovejoy, who are operating a large mine here. The new management has increased the force of workmen on the new operation and expects to be shipping coal next month. The mine is located on the Clymer branch of the Pennsylvania and New York Central railroads.

Fayette City—"Black Row," a well-known section of miners' houses here, was destroyed by fire recently. The origin of the fire is unknown, but police are searching for one of the miners, in whose house the blaze started, as he is blamed by the other families with starting the fire. The houses were occupied by five families and were owned by the Pittsburgh Coal Co. Little or no household goods were saved by the occupants.

Indiana—The tipple of the Armerford Coal Mining Co., at Armerford, near here, was destroyed by fire on Monday morning about three o'clock. Ex-Sheriff D. E. Thompson, of Blairsville, president of the Armerford company, preferred charges aginst Martin Maloney, until recently the mine foreman at the Armerford mine, and Andy Smelke, formerly the assistant foreman, for arson. The trial will be heard at an early term of Indiana County court.

WEST VIRGINIA

Lillybrook—A new conveyor line is being installed by the Prince Wick Coal Co.

Rock Bottom—Another mine will be opened by the Rock Bottom Coal Co. as soon as a new power plant is installed.

Millstone—The Elkhorn Junior Coal Co. whose plant is near here, plans to begin the shipment from its mine within the next 30 days.

Point Pleasant—Half a hundred miners' houses will be built in the near future by the Mason Coal and Chemical Co. at Hartford, W. Va.

Amherstdale—A new mine in the No. 2 gas seam is being developed by the American Rolling Mill Co. of this place, under the direction of H. A. Jepson, general manager.

Lumberport—The New Superior Coal Co. is opening a mine to develop 66 acres between Shinnston and Lumberport. A tipple is being erected. The plan is to mine coal by July 15.

Dingess—New openings and haulways are embraced in improvements being made by Andrew Dingess, it being estimated that the capacity of the plant will be increased by 4500 tons when improvements are completed, giving the plant a total capacity of 20,000 tons per year.

Charleston—The Bengal Coal Co., with W. C. Robinson as superintendent in charge, has nearly completed improvements to its drift mine at a cost of $200,000 which will increase the company's output by 25,000 tons a year, giving the company an estimated capacity of 100,000 tons a year. Ten new miners' houses are under construction.

Logan—The McBeth Coal Co., of which John Laing is president, has awarded to the Dravo Construction Co., of Pittsburgh the contract for its new plant on Rum Creek, Logan County. The plant is to be most complete. There will be a slope of 400 ft. and a shaft of 100 ft. of a 5 ft. 4 in. seam of Eagle coal, the company holdings amounting to 1400 acres. In addition to the plant proper 30 four- and six-room houses for miners are to be built as well as a Y. M. C. A. clubhouse and a modern store and office building.

Kingwood—The Preston County Power Co. is an organization which will eventually have a plant near Trowbridge on the Morgantown & Kingwood R. R. for the purpose of maintaining a large central electric power station. The war interfered with putting the existing plans into effect, but the company is going ahead with its mining operations. I. B. Bowermaster, for many years superintendent of Elkins Mine No. 4 in that vicinity, now has the management of the plant. The men can work at the mines and live in Kingwood with present train service.

Fairmont—The South Fairmont Coal Co. which has a capital stock of $150,000, owning in fee 617 acres of coal land in Barbour County, near Century, plans early development. Application for sidetracks have already been passed upon favorably by the Baltimore & Ohio R. R. There are three veins of coal—the Mahoning, Upper Freeport and Kittaning. The Upper Freeport is the tipple-height vein, which will be developed first. The vein is 6 ft. deep at a wagon mine adjoining the tract. John W. Poling is president of the company, M. C. Lough is vice president, C. F. Crane is secretary.

Morgantown—Everything is in readiness for the opening on Monday, June 17, of the sixth annual short course in coal mining which is to be given at West Virginia University. Prof. A. C. Callen, head of the mining department, will be assisted by the mining extension instructors, D. H. Perdue, of Bluefield, and R. Z. Virgin, of Elkins. Mr. Perdue is well known to mining men, having been in the extension work for some time. Mr. Virgin, who came to the University in January, was formerly superintendent of mines for the Wheeling Steel and Iron Co. and is known all over West Virginia and Pennsylvania. An enrollment of about 40 students is expected, and the probability is that this number will be increased by late arrivals.

KENTUCKY

Middlesboro—The United States Coal and Coke Co., operating the Lynch mines at Middlesboro, has the distinction of leading the mines in that concern in the amount donated to the Red Cross, this mine having donated $11,650.

Richmond—Lee, Conley and Claude Congleton, of Richmond, who have been operating a coal mine at Chavies, Perry County, have sold the property to the Bewley, Darsh Coal Co., of Knoxville. The Congletons expect to start new developments on other property shortly.

Barbourville—The Manchester Coal Co. has begun operations on Horse Creek, Clay County, and expects to start running coal about Nov. 1. The company is incorporated with a capital of $40,000. The stockholders are: F. M. Maxey, of Barbourville; M. Miller, Lebanon Junction; W. C. White, Louisville; and L. R. Lam, of Greenville.

Frankfort—The Court of Appeals on June 4 held that circuit courts acting for miners and guardians cannot lease the mineral rights of infants' land beyond the time when such infants reach their majority, and held void the act of 1916 in so far as it granted the power and reversed the Pike Circuit Court in the case of the Tierney Coal Co. against Jake Smith's guardian.

Louisville—About 130 miners, representing almost as many coal companies, were recently in Lexington, where they took examinations in order to receive mine foremen certificates. During the time that the men were in Lexington they adopted resolutions, addressed to President Wilson, in which they pledged themselves to do all in their power to keep production of coal up to the maximum, and endorsing the war program.

INDIANA

Gary—The American Coal and Supply Co., with headquarters at Chicago, has been prohibited from selling coal in Gary, Hammond, Whiting, East Chicago, Indiana Harbor and other northern Indiana points by order of W. S. Fuer, federal fuel administrator of Lake County, Indiana. He alleges violation of Government orders.

Evansville—Matthew Duncan and son David, of Evansville, are engaged in sink-

ing several coal shafts in western and northern Kentucky. Many of the coal mines in the Green River country, in western Kentucky, are being reopened this summer and the coal is being hauled to Evansville on barges. Evansville capital is interested in the development of some of the Green River mines.

Petersburg—The Globe Coal Co., of Terre Haute, Ind., has purchased 450 acres of coal land along Sugar Creek in Pike County, Indiana, and will begin stripping the land to begin operations for coal. The coal tests showed a 5-ft. vein of coal at depths varying from 7 to 40 ft. The price paid was $100 an acre. Contracts have been let for ten new houses on Sugar Creek for employees to live in. The contract for the building of a railroad bridge across Patoka River, three miles west of Winslow, has been let, and also the contract for three miles of track.

Bicknell—The Vandalia Railroad Co. has begun, after the lapse of nearly a year, the double-tracking of its road between this city and Bushrod, a distance of 15 miles. With the extension of the five miles of track laid a year ago to the terminal at Bushrod, the railroad company can handle coal shipped from this city in a shorter time and without interference with passenger traffic. The new track will be ready for use, it is planned, by the time the busy season arrives again this fall. Day and night shifts are being used. The company has experienced great difficulty in securing men to do the work.

ILLINOIS

Clinton—The Illinois Central Railroad Co. has completed a new coal chute at its shops in this city. This chute is modern in every respect and will do several times as much work as the old chute.

Belleville—The first constitutional convention of the newly organized subdistrict No. 7, United Mine Workers of Illinois, will be held here June 17. Forty-five delegates will each represent 100 miners. Belleville will make a fight for the permanent headquarters of the subdistrict.

Carlinville—Test holes drilled on the farm of Mrs. Frank W. Burton, south of here, struck a vein of good quality coal 6 ft. 4 in. thick at a depth of 240 ft., with a satisfactory rock top. A local company has been organized by C. G. McIntosh to sink a shaft at once on the Teal farm just at the south edge of town to supply the local needs. A large acreage has been secured. The mine of the Carlinville Coal Co., which formerly supplied local needs, was sold last winter to the Standard Oil Co., which requires the output and that of three additional mines which are being sunk for its refineries. The local trade is being supplied temporarily, however, by the Standard people.

OHIO

Redfield—The Kehota Coal Co., organized about a year ago by Pennsylvania and Illinois capitalists, will soon start a stripping operation in the thin-vein Hocking district near Redfield. It is planned to have an output of about 1200 tons daily. All the machinery has been ordered and much of it is on the ground.

Crooksville—The C. M. Wilson Coal Co., of which C. M. Wilson is the head, will soon open a mine on the Toledo & Ohio Central near Crooksville. The company holds 106 acres of No. 6 seam at that place. The switch has now been completed and loading will start soon. The output will be sold through the H. W. Jenkins Coal Co., of Columbus.

MONTANA

Roundup—The contract for the construction of 25 four-room houses, a boarding house and other buildings at Mine No. 4 of the Roundup Coal Co., has been let and as soon as completed the company will put a large force of men at work on increasing the production of the mine. By early fall it is planned to turn out 500 tons per day with a probable production of 1000 tons. The present temporary tipple will be replaced by a permanent plant and additional mine cars and other equipment will be purchased at once. An additional electric hoist will be constructed also, and a second power line built.

WASHINGTON

Sedro Wooley—Development work on the coal mine at Cokedale near here has been completed by Superintendent Capt. F. A. Hill, who states that the property will be ready to ship out 300 tons per day as soon as the spur track being built by the Great Northern Railway Co. is completed. The mine will employ 300 men at the start. The property is leased by the Cokedale Coal Co.

Seattle—Fifty tons of the first Alaska coal sent to the outside from the Matanuska coal fields is being returned to the Northland to supply consumers in the Nenana Valley. The coal when it finally reaches its destination will have traveled something over 8000 miles, and yet as the crow flies those who will consume this coal are only 200 miles from where the coal was mined. So much for transportation facilities in Alaska. Owing to the long, hard winters and impassable trails between the Matanuska coal fields and Nenana, it was found necessary to ship the coal out of Alaska to Anchorage and from there to Seattle and thence by steamer to far-off St. Michael, there to be transshipped on Yukon River steamers to the Nenana.

Foreign News

Sault Ste. Marie, Ontario—The Algoma Steel Corporation has decided to further enlarge its byproduct coke-oven plant, and a contract for an additional battery of 25 Wilputte ovens has just been let to the Wilputte Coke Oven Corporation, of New York City, making 50 new ovens now in process of construction. It is expected that the two new batteries will be ready for operation late this year.

Granby, B. C.—Important progress has been made in the construction of a large coking plant, docks, sea-going vessels, a railway and other equipment on which much of $1,000,000 is to be expended by the Granby Consolidated Smelting and Power Co. At Graves Point the company has completed excavation for the coal bunkers and will start work on the superstructure at once. The bunkers will be 52 ft. wide and 300 ft. long and will have a capacity of 12,000 tons of coal. The coal will be transported by vessel from the mines on Vancouver Island, 400 miles distant, now being opened up by the Granby company. Besides coke to be used in its smelting operations the plant will produce gas, also valuable in smelting, and coal-tar products. It is estimated that the company will save 50c. a ton by the use of its own coke.

Obituary

Fred W. Nay, a successful coal operator of Shinnston, W. Va., part owner of the Hardesty & Nay Coal Co., succumbed last Tuesday in a Clarksburg hospital to injuries received in an explosion of a can of gasoline at the company's plant at Shinnston.

Coming Meetings

American Concrete Institute will hold its annual meeting June 24-26, at Atlantic City, N. J.

American Institute of Chemical Engineers will hold its summer meeting June 19-22 at Berlin, N. H.

American Institute of Electrical Engineers' annual convention June 26-28 at Atlantic City, N. J. Secretary F. L. Hutchinson, 29 W. 39th St., New York City.

Illinois and Wisconsin Retail Coal Dealers Association will hold its annual convention June 26 and 27, at Hotel Wisconsin, Milwaukee, Wis.

Illinois and Wisconsin Retail Coal Dealers Association will hold its annual convention June 26 and 27, at Milwaukee, Wis., with headquarters at Hotel Wisconsin. Secretary, Isaac L. Runyon, Chicago, Ill.

American Institute of Mining Engineers will hold its Colorado meeting Sept. 2-7. The tentative plan calls for one day at Denver, one day at Colorado Springs, one at Cripple Creek, an automobile trip to the top of Pike's Peak, one day at Pueblo and one day at Leadville. Secretary, Bradley Stoughton, 29 West 39th St., New York City.

Publications Received

Annual Report of the Mines. Department of Public Works and Mines, Province of Nova Scotia. Unillustrated, 79 pp., 6½ x 9½ inches.

The Storage of Bituminous Coal. By H. H. Stoek. University of Illinois Bulletin. Circular No. 6. Illustrated, 187 pp., 6 x 9 inches.

Bibliography of Petroleum and Allied Substances, 1915. By E. H. Burroughs. Department of the Interior, Bureau of Mines. Bulletin 149. Unillustrated, 123 pp., 6 x 9 inches.

Monthly Statement of Coal-Mine Fatalities in the United States, January, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, 21 pp., 6 x 9 in.

Monthly Statement of Coal Mine Fatalities in the United States, February, 1918. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated, 19 pp., 6 x 9 inches.

Use of Permissible Explosives in the Coal Mines of Illinois. By James R. Fleming and John W. Koster. Bulletin 137. Department of the Interior, Bureau of Mines. Illustrated, 103 pp., 6 x 9 in.

Use of the Interferometer in Gas Analysis. By Frank M. Seibert and Walter C. Harpster. Department of the Interior, Bureau of Mines. Technical Paper 185. Illustrated, 16 pp., 6 x 9 inches.

Effects of Moisture on the Spontaneous Heating of Stored Coal. By S. H. Katz and H. C. Porter. Department of the Interior, Bureau of Mines. Technical Paper 172. Illustrated, 23 pp., 6 x 9 inches.

Manufacturing Opportunities in the State of Washington. By Harry F. Giles, Deputy Commissioner. State of Washington, Department of State, Bureau of Statistics and Immigration. Illustrated, 240 pp., 6 x 9 inches.

Safeguarding the Home Against Fire. Prepared for the United States Bureau of Education by the National Board of Fire Underwriters. Illustrated, 91 pp., 5 x 8 in. A fire-prevention manual for the school children of America.

Percentage of Extraction of Bituminous Coal with Special Reference to Illinois Conditions. By C. M. Young. University of Illinois, Bulletin No. 42. Engineering Experiment Station, University of Illinois, Urbana, Ill. Illustrated, 173 pp., 6 x 9 inches.

Oil-Storage Tanks and Reservoirs. With a brief discussion of losses of oil in storage and methods of prevention. By C. P. Bowie. Department of the Interior, Bureau of Mines. Bulletin 155, Petroleum Technology 41. Illustrated, 70 pp., 6 x 9 inches.

Trade Catalogs

Unless otherwise stated, a copy of the publications listed below may be obtained free by addressing the manufacturer.

Coxe Stokers. Combustion Engineering Corporation, New York. Bulletin Cl. Pp. 21; 6 x 9 in.; illustrated. Views and diagrams of typical Coxe stoker installations.

Class "FP" Steam Engines. Ingersoll-Rand Co., Easton, Penn. Form 883A. Single-page flyer on this engine, which is of the horizontal center crank type with piston valves.

"Little David" Evaporator Tube Cleaner. Ingersoll-Rand Co., Easton, Penn. Form 888. Pp. 4; 8½ x 11 in.; illustrated. Describes "Little David" evaporator tube cleaning and other labor-saving pneumatic tools.

Sullivan Duplex Air Compressors. Sullivan Machinery Co., Chicago, Ill. Circular 58-B (second edition). Pp. 24; 6 x 9 in.; illustrated. Instructions for installing and operating classes "WI" and "WJ" belt-driven air compressors.

"Ideal" Tilting Crucible Furnace. Ideal Furnace Co., Chester, Penn. Booklet. Pp. 16; 5 x 8 in.; illustrated. Gives description, test data and features of coal and coke furnaces for melting copper, brass, aluminum, bronze and other metals.

Centrifugal Boiler-Feed Pumps. De Laval Steam Turbine Co., Trenton, N. J. Bulletin N. Pp. 4; 8½ x 11 in.; illustrated. Describes the De Laval combined steam turbine and centrifugal boiler-feed pump. Electric motor-driven units are also described.

Safety First Motor Switch Condulets. Crouse-Hinds Co., Syracuse, N. Y. Bulletin No. 1000 H. Pp. 16; 8 x 10½ in.; illustrated. Describes what the company calls the "last word in small motor switches." The ZY condulets afford protection against shock, withstand rough usage, and cannot be operated by accident.

Lakewood Trackless Haulage Systems. Lakewood Engineering Co., Cleveland, Ohio. Bulletin No. 25. Pp. 24; 8½ x 11 in.; illustrated. Describes the trucks, trailers and tractors developed by the Lakewood company to meet the need for the economical handling of freight and machinery parts in large plants.

CR 3105 Drum-Type Controllers. General Electric Co., Schenectady, N. Y. Folder. Pp. 6; 8 x 10½ in.; illustrated. These controllers are recommended for use with direct-current adjustable speed motors driving machine tools. They are provided with armature and field control points and are supplied for reversing or non-reversing service.

Medart Steel Lockers. Fred Medart Manufacturing Co., St. Louis, Mo. Catalog A-5. Pp. 16; 7 x 10 in.; illustrated. Quite a pleasing example of the printer's art is this little catalog describing the steel lockers and locker-room equipment manufactured by the Medart company. The excellent halftone illustrations convey better than text the quality of the Medart products, though construction details and a price list for the standard sizes of lockers are given. Mine officials contemplating the purchase of locker room equipment should by all means procure a copy of this catalog.

Industrial News

Charleston, W. Va.—The Sunset Mining Co., whose plant is in the New River field, has changed hands, V. P. Veazy, of Mt. Hope, having disposed of his interests to Charles Ash, of Glen Jean, W. Va.

New York, N. Y.—There was shipped from the Port of New York during April 7107 tons of anthracite, valued at $49,785; 3081 tons of bituminous, valued at $21,304, and 633 tons of coke, valued at $16,757.

Morgantown, W. Va.—The National Fuel Co., of this place, has contracted with the Willis E. Holloway Co., Cleveland, Ohio, for a complete tipple for its new mine at Flaggy Meadow, W. Va. The operation will produce 2000 tons daily.

Barbourville, Ky.—The Trace Branch Coal Co., which recently filed notice of an increase in its capital to $15,000, is now developing about 40 acres of property having a capacity of about 20 tons daily. R. Bassett Minton is president.

Cleveland, Ohio—The Willis E. Holloway Co., consulting and contracting engineers, have been awarded contract for complete steel tipple for the No. 3 mine of the Elm Grove Mining Co. at Triadelphia, W. Va. The tipple is to have a capacity of 2500 tons a day.

Whitesburg, Ky.—The coal operators of Letcher County, Kentucky, met at the Whitesburg Hotel on June 4 and organized themselves into the Letcher County Coal Operators' Association. J. Henry Hall, of the Whitesburg Coal Co., was chosen president and John F. Maurice, of the Ulvah Coal Co., secretary and treasurer.

Charleston, W. Va.—One thousand nine hundred and forty-nine injuries were reported and 1772 applications for compensation were received in the month of May by the State Workmen's Compensation Department. Sixty-one of the injuries proved fatal. Of the injuries reported 876 nonfatal and 50 fatal occurred in coal mines. One thousand five hundred and five claims were awarded.

Sussex, N. J.—The Lehigh & New England Railroad Co. has awarded a contract to Fairbanks, Morse & Co., 30 Church St., New York, for the construction of a large concrete coaling station in the lower section of its local yards. The new plant is estimated to cost in the neighborhood of $40,000, and coaling machinery of the latest type will be installed immediately upon completion of the construction work.

Birmingham, Ala.—At a recent meeting of the Alabama Coal Operators' Association the following officials were reëlected for the ensuing year: President, George B. McCormick, Pratt Consolidated Coal Co.; vice president, Charles F. DeBardeleben, Alabama Fuel and Iron Co.; secretary and treasurer, James L. Davidson. Executive committee: George G. Crawford, J. B. McClary, Walter Moore, A. H. Woodward and George F. Peters.

Birmingham, Ala.—The Railway Fuel Co. has increased its capital stock from $10,000 to $200,000. This company, which is officered by officials of the Southern Ry., is developing coal properties in Walker County, where work has been under way for several months, the mine being opened up to be equipped with modern tipple and washery facilities. The output from this operation will be used exclusively in the operations of the Southern Ry. system.

Louisville, Ky.—With approval of Wiley B. Bryan, Kentucky fuel administrator, the Jefferson County fuel administration has issued a new regulation under which a charge of 30c. a mile from yard to destination will be made for coal delivered by local retailers to consumers outside of the city limits. It was held that the 75c.-a-ton delivery allowance was unfair on long hauls and had resulted in city dealers, in many cases, refusing to accept orders.

Grafton, W. Va.—At the second annual meeting of the Grafton Coal Operators' Association, held here on Thursday, June 6, the following officers were elected: President, George S. Brackett, of Flemington, general superintendent of the Pitts-Vein Coal Co.; vice president, Thomas Murphy, of Austen, general superintendent of the Gorman Coal and Coke Co.; secretary and treasurer, W. J. Carnahan, general superintendent of the Deaker-Hill Coal Company.

St. Louis, Mo.—August A. Busch, president of the Anheuser-Busch Brewing Association, who is the principal owner of Nigger Hollow Mines No. 1 and 2 near French Village, Ill., operated by the St. Louis & O'Fallon Coal Co., in a statement given to newspapers asserting the loyalty of the Busch interests to the Government, says that the output of the mines, the capacity of which is more than a million tons a year, has always been sold at a price considerably below that fixed by the Government.

Toledo, Ohio—Activity in the lake trade still prevails at the Toledo docks of the various coal-carrying roads. During the week ended June 7 the Toledo & Ohio Central docks handled 71,000 tons as compared with 68,000 tons the previous week. The total handled since the opening of the season is 405,000 tons. The Hocking Valley docks during the week ended June 8 loaded 11,744 tons as compared with 126,841 tons the previous week, making a total of 731,580 tons since the opening of the season.

Buffalo, N. Y.—Members of the grain trade here have organized the Cadiz Coal and Lumber Co., with $300,000 capital stock. They have 700 acres of coal land near Cadiz, Ohio, which will produce an estimated 3,000,000 tons of No. 8 coal and which is covered with 3,000,000 feet of hardwood timber. The Government has given them an order for the lumber. The incorporators are H. A. Smith, C. J. Meyers and M. C. Burns, of Buffalo. Operations will begin soon. The coal is tributary to the Cleveland market naturally.

Columbus, Ohio—H. S. Riddle, of the Ohio Board of Administration, is again figuring on the proposition for the State of Ohio to own its own coal mines. The Ohio Board of Administration has charge of 22 state institutions and uses about a half million tons of coal yearly. Mr. Riddle reports that several attractive propositions have been made to the board recently by owners of coal lands in the Hocking Valley. Pending decision in the matter the board has taken no action toward buying its coal supply for next winter.

Indianapolis, Ind.—The new Indianapolis board of health expects to build at the city hospital a large concrete coal bin for the storage of coal for the winter. The bin will have a capacity of 1000 tons and the coal will be maintained under water so as to prevent combustion. This amount of coal will run the hospital only 60 days, but it is the expectation to use this supply only as a reserve to tide over a possible fuel shortage next winter. Last winter, on two or three occasions, it was feared that the hospital would have to close on account of being entirely out of coal.

New York, N. Y.—Preparations are under way whereby shipments of coal from Rochester (and possibly another point) to New York will soon be made on the New York Barge Canal. G. A. Tomlinson, general manager of the New York Canal Section of the Railroad Administration, made an inspection of the canal last week and has his plans under way. It is pointed out that by shipping coal to Rochester from the mines and dumping it into barges for shipment through the canal, a car can make four trips between the mines and the canal docks while it is making one trip from the mines to tidewater.

Moundsville, W. Va.—By utilizing 15 big trucks to haul coal from its Marshall County mines to the Riverside and La Belle mills, and from its Belmont County mines to the La Belle mills, L. L. Salomon, local manager of the Philadelphia & Cleveland Coal Co., estimates that one truck in a single day releases 20 coal-car days, or in other words, does the work of one coal car that it would take 20 days to do and that, therefore, 15 trucks means the release of 200 coal-car days every day they work. It is also estimated by Mr. Salomon that a week's haul by the company's trucks represents 4860 tons of coal hauled.

Columbus, Ohio—Rate increases in Ohio on coal shipments after June 25 will be increased in accordance with the announcement of Director General of Railroads McAdoo. The present rate from the Hocking Valley to Columbus is 80c. and the new rate will be $1. From the Hocking Valley to Toledo, Lima, Dayton and western and northern Ohio points the old rate was $1.15 and the new rate will be $1.45. From the Hocking Valley to Marion the old rate was $1 and the new rate will be $1.30. The rates from the Jackson field to all points, except Lima, will be the same as from the Hocking Valley. From the Pomeroy field the same rates prevail.

Columbus, Ohio—While in Washington last week to secure from the Railroad Administration some relief in the matter of car supply for Ohio wagon mines, James B. Dugan, of the Ohio Public Utilities Commission, was informed that so far from any more open-top cars being given to these small mines, the supply may be curtailed, as an order is contemplated by the Administration, postponing the requirements of such mines to those of mines with tipples. If this is done, Mr. Dugan declares that the wagon mines, whose production forms an important item to consumers in a considerable territory in central Ohio, will be put out of business completely, as the car supply is recognized as being inadequate to give all tipple mines a full supply.

Pittsburgh, Penn.—The Dravo Contracting Co. has announced it will operate its Neville Island plant as a separate department, to be known as The Dravo Contracting Co., Engineering Works Department. It has been manufacturing whirlers, steel towboats and barges for some time, and due to increased business has found it advisable to make this change. The concern has contracts for 33 towboats and barges, the majority of which are for use by the United States Government. In addition to this, it has a large number of orders for tower whirlers for handling material at shipyards. An entirely separate purchasing, accounting and engineering organization has been installed. J. D. Berg has been made vice president of the Dravo Contracting Co., in charge of the Engineering Works Department.

Springfield, Ill.—W. C. Hurst, vice-president and general manager of the Chicago, Peoria & St. Louis Railroad Co., has written to the mayor and commercial organization of every town on the line offering storage space for coal along the right-of-way to all who may need it. His motive, he says, is not only to help the Fuel Administration but to make business for his road at a time when coal can be hauled to the best advantage. His engines, he explains, can haul full loads of coal now, whereas in cold weather they can pull only one-half to three-quarters of a load. Besides, freight traffic is not so heavy now as it will be later, and his road has a maximum equipment available for coal transportation. He insists that the deterioration will be slight. The company has already, he says, begun to store coal for its own needs next winter. Responses are being received from the towns and he thinks that his campaign will have substantial results.

St. Louis, Mo.—J. D. A. Morrow, in charge of distribution for the Federal Fuel Administration, was the guest of the Fifth and Ninth Districts Operators' Association and the Missouri Retail Coal Dealers' Association at the Jefferson Hotel Tuesday evening, June 4, during a stopover on his way to Kansas City, and delivered an address in which he told them why St. Louis cannot have any anthracite this year and forecasted a coal shortage next winter. He explained that this was practically inevitable because even if the mines produced sufficient coal and the railroads were able to transport it, the movement would have to be consistent with the movement of other materials needed for the production of war essentials. In answer to a question he cleared up the uncertainty that has surrounded the railroad coal situation. The order that the railroads were to pay the same as other consumers meant, he said, that producers could ask the maximum Government price but could also sell at less than the maximum if they chose. He said the railroads would be required to distribute cars equally to all mines and that contracts for coal made by railroads since Dec. 29 were automatically abrogated. He explained that St. Louis could not have any anthracite because the difficulties of transportation necessitated giving it to the munitions-manufacturing districts of the East. In answer to a question of E. D. Nims, Chairman of the St. Louis Fuel Committee, he said that the railroads would be required to store for next winter to their full capacity and said that but for the dispute about what the railroads were to pay, which had caused the loss of three months time, millions of tons would now be in storage.

MARKET DEPARTMENT

Weekly Review

Slump in Both Anthracite and Bituminous—Question of Adequate Labor Supply Disturbs Hard-Coal Operators—Production Bureau to Stimulate Coal Output—Need of Conservation—Automobile Industry Receives Drastic Cut in Fuel Allotment

THE decrease in production of bituminous coal during the week ended June 1, owing to the observance of Memorial Day in the mines of the northern states, seems to accentuate the fact that only by full-time operation will the mines be enabled to furnish the minimum of 634,000,000 net tons of soft coal necessary to keep war industries going and warm the homes during the coming year. To secure this output it would be necessary to maintain an average weekly production of more than 12,000,000 net tons. This tonnage has not been produced in any single week during the history of the bituminous coal mining industry. In the week ended June 1 the output fell considerably more than one million tons below this average, only 10,774,000 net tons being mined.

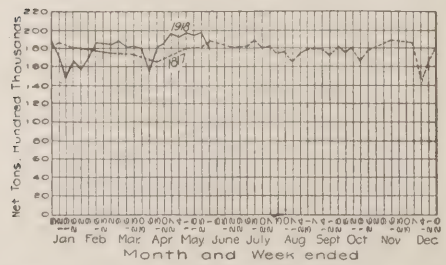
Anthracite production, too, suffered a decrease during the week ended June 1. Both the laying-off for the holiday and an inadequate labor supply contributed to keep hard-coal shipments down to 31,762 cars, a decrease of 8832 cars when compared to the anthracite shipments the preceding week. The labor question seems to be the main disturbing factor to maximum hard-coal production at the present time, and it is one that should receive the immediate attention of interested officials. Not only has the anthracite industry lost more than 32,000 men since we entered the war, but the draft is continually making further inroads. It is hard to see how the necessary quantity of anthracite can be produced with the labor force that is now available. By eliminating skilled miners from the draft, and suspending for the duration of the war the Gallagher bill (which prohibits the employment of miners underground unless they have had two years' experience in the mines of Pennsylvania), the situation would be helped materially.

It is evident, therefore, that two things are essential to a solution of the coal problem—intensive production and the strictest kind of conservation. The former has already received the recognition of the Federal Fuel Administration by the formation of a "production bureau," headed by James B. Neale, who has been acting as advisor to Mr. Garfield. It will be the duty of this bureau to do everything possible toward increasing the volume of anthracite and bituminous coal mined. The matter of conservation rests in large measure with the consumer, who must at all times exercise the greatest watchfulness in the manner in which he burns his coal. Industries not engaged in war work will have the utmost difficulty in obtaining coal in the future, the automobile manufacturers being the latest to have their fuel supply curtailed. By an order of the Fuel Administration the allotment of coal to this industry has been cut down to 25 per cent. of its 1917-1918 requirements.

So far as trade conditions are concerned, dealers are making deliveries as fast as they can and generally are bare of stocks. Demand for all grades of coal is greater than the supply. Lake shipments so far have been below expectations, though carrying capacity is plentiful.

COAL PRODUCTION

The observance of Memorial Day at the mines in the northern states caused production of bituminous coal during the week of June 1 to decrease 1,025,000 net tons, or 8.7 per cent. The output of soft coal (including lignite and coal made into coke) is estimated at 10,774,000 net tons as compared with 11,779,000 net tons during the week of May 25. The average per working day for the week ended June 1 is estimated at 1,796,000 net tons as against 1,966,000 during the preceding week and an average daily production during May, 1918, of 1,918,519 net tons. Although Memorial Day



was not universally observed, the curve showing production per working day has been based on 6 days in the week.

Preliminary estimates place production of beehive coke during the week ended June 1 at 612,000 net tons, a decrease of 51,000 net tons, or 7.7 per cent. compared with the week of May 25. The average daily production amounted to 102,000 net tons as against 111,000 net tons during the week preceding.

Beehive Coke—Beehive coke production in the Connellsville and adjacent regions declined slightly during the week ended June 1. The principal operators located in the Connellsville, Greensburg and Latrobe districts report production of 308,735 net tons, or 76.2 per cent. of their present rated capacity as against 77 per cent. during the week preceding. Out of total losses of 23.8 per cent., 19.4 per cent. was attributed to insufficient yard labor against 15.4 per cent. during the week of May 25 and 4.4 per cent. to all other causes as compared with 7.2 per cent. The same operators produced 140,100 net tons of coal operating at 44.6 per cent. of their present rated capacity.

Byproduct Coke—The production of byproduct coke during week ended June 1 again declined slightly and is reported at 87.7 per cent. of maximum capacity as compared with 88.5 per cent. during the week preceding.

Of the factors limiting production shortage of coal losses increased during the week from 2.6 per cent. to 2.8 per cent., labor shortage losses from 2.6 per cent. to 3 per cent., repairs to plants caused losses of 5.4 per cent. as against 4.9 per cent. and "no market" losses rose from 0.2 per cent. to 0.3 per cent. Losses attributed to all other causes declined from 1.2 per cent. to 0.8 per cent.

Material decreases in production for the week of June 1 are reported by Alabama, Minnesota, Pennsylvania, Tennessee and West Virginia. In Alabama and West Virginia the decrease in production is attributed to repairs to plants, in Minnesota to "no market" and other causes, in Pennsylvania to insufficient labor and in Tennessee to lack of byproduct coke.

Kentucky and Maryland are the only states reporting material increases, the former state attributing the improvement to repaired plants and the latter state to better labor conditions.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended May 11	May 18	May 25	June 1
Bituminous shipments, 123 roads.	207,145	205,026	207,036*	188,864†
Anthracite shipments, 9 roads...	38,767	41,011	40,594*	31,762†

* Revised from last report. † Subject to revision.

Anthracite shipments during the week ended June 1 decreased 8832 cars, or 22 per cent.

BUSINESS OPINIONS

Marshall Field & Co.—The wholesale distribution of dry goods for the current week is very much ahead of that of the corresponding week in 1917. Road sales for both immediate and future delivery show a slight increase over those of the same period a year ago. Customers have been in the market in greater numbers than during the corresponding week last year. Collections are very good, being even larger than they were for the same week a year ago. The prices of domestic cottons are firm.

American Wool and Cotton Reporter—There is no definite prospect of any shortage of wool now, but on the other hand there is no bright outlook for civilian fabrics which require certain wools. The stand which the War Industries Board has taken should be enough to indicate that the supply of woolen cloth will not be overlarge for some time to come, and that conservation is much more necessary than it has been previously. The consumer will not feel any effect of the shortage for a long time, if anything like a reasonable policy be adopted.

Bradstreet's—Government domination of a myriad of lines of industry and trade and almost unanimously favorable crop reports are the two great outstanding features of the situation. Government commandeering of the iron and steel, wool and heavy leather outputs are accomplished facts, and further extension of its control of manufactured textiles and of food supplies and prices of same seem inevitable.

Great basic changes are therefore proceeding under the new and fast-moving monopolization of human activities, directly or indirectly, in the war. Man power is being taken up steadily and rapidly by the second draft, and the attraction of female labor into lines formerly monopolized by men is growing apace.

Dry Goods Economist—The most important development of the week is the prospect of relief to the raw-cotton price situation afforded by the Government report as to the condition of the growing plants. This is placed at 82.3 per cent., against 69.5 on May 25, 1917, and an average of 79 for the last ten years. The Government has not yet published its estimate of acreage, but there is every reason to believe that it will be unusually great. The only offset to this is the large number of negroes—nearly 30,000—who have been summoned to the colors from the cotton states and must respond during June, many of whom doubtless would otherwise be available for work in connection with the raising and gathering of cotton.

The Iron Age—In an order dated June 6, which no one in the steel trade fully understands, the War Industries Board has put in the hands of J. L. Replogle, Director of Steel Supply, the distribution of the entire iron and steel output of the country. Starting with the sweeping provision that no pig iron or steel products shall be shipped except under priority certificates, the order provides that after all priority requisitions have been filled producers may supply their customers if the latter are on a preferred list, which, as revised, is to be sent out later. Steel ingot production in May, unlike that of pig iron, shows a slight falling off from the April rate. In 27 working days, May 30 not being a steel works holiday, the output of companies which made 88 per cent. of the country's total in 1916 was 3,256,965 gross tons, or 120,628 tons a day, against 3,163,410 tons in April, or 121,670 tons a day. The May rate, estimating companies not reporting, would mean about 42,300,000 tons a year.

Atlantic Seaboard

BOSTON

New distribution plan announced. Elaborate system of checks devised. Receipts continue short. Trade much interested in probable effect on shipments. Losses during May due to various causes. Not enough emphasis upon "balanced production." Difficulty of policing any plan for distribution. Railroad fuel difficulties not yet solved. New England railroads feel the pinch on supply. Hampton Roads dumpings sag. Submarine menace causes slow movement. "Zoning" of smokeless coals a misnomer. Fuel authorities prepare the most rigid supervision yet of cargo disposition. Only coal to preferred requirements moving all-rail via Shippensburg. Continued alarm on the part of New England buyers. Renewed buying of anthracite steam sizes. Directions issued to favor New England destinations all-rail on domestic sizes. Water coal slows up materially. Continued comment on "allotment," but actual shipments decrease.

Bituminous—The news most interesting to the trade this week concerned the program for distribution recently given out by the Fuel Administration. The burden of deciding upon the disposition of what coal comes forward to any state is now shifted from district representatives to state administrators, following out the theory that those on the ground are better qualified to exercise this function. The order of preference designated by the War Industries Board is to be followed strictly. Railroad requirements and those of the Army and Navy and other departments of the Federal Government are to be cared for from Washington, at least in theory; all other needs, except in certain special cases, are to be met by state administrators. Jobbers are to be allowed to have coal running in their names, subject, however, to supervision by the state administrator who has jurisdiction over the port of discharge.

Meanwhile, bituminous receipts continue to show a marked falling off. The number of cars passing the gateways the first six days of June showed a total of commercial coal amounting only to 446 cars daily, a drop of 24 cars from the May average, which was the lowest for the year thus far. Railroad fuel, however, showed a slight gain, 121 cars daily having been received against the May average of 98.

There are many reasons advanced for the serious shortage in the volume of bituminous all-rail. It has been represented to be largely due to the large demand for bunker fuel at New York and at Philadelphia, but this alone would not have been sufficient. Neither is there any ground for talk of railroad congestion when much of the coal was diverted to the most congested area in the country, about Philadelphia, and the New England roads were not only clamoring for coal to haul but complained bitterly over their small receipts for supply purposes. The great obstacle from a New England standpoint was the Preference No. 1 list and the drastic way in which the Washington instructions were interpreted by the district representatives. This territory has a large number of preferred requirements, although in volume of coal used the needs are relatively small. Enormous industries in Pennsylvania were obviously entitled to preference, and it took no great effort on the part of anybody to get them on the list. Many important New England plants, however, are among the 10,000 or more who are represented in applications to the War Industries Board which have not yet been acted upon. It should be said that at the present rate of progress it will be several years before they are acted upon, and should this plan have been followed implicitly there would have been real disaster to many important industries and untold delays caused to the war program.

On other accounts the previous program had to be abandoned. Steel and rolling mills would have been favored with coal when the small plant in New England would have had to go without, although its output was just as necessary for war purposes, in many cases furnishing a part that was indispensable. Not enough emphasis has been placed upon "balanced production," and merely because coal requirements are relatively small is no reason for passing them over. In tons of material the output of Pennsylvania, for instance, is much larger, but in the number of men employed per ton of coal New England doubtless makes a better showing. This territory is working from 65 to 75 per cent. on war orders, and it is a keen realization of the necessity that work be kept going that so many officials high in the Government are trying to see to it that New England gets its share.

The submarine threatenings have a marked effect upon the movement of coal coastwise. For days at a time the ports have been closed, and there is talk of systematic convoy for all coal carriers. Such a practice would slow up deliveries and the efficiency of units now in use would be much impaired. The effect upon the volume of coal dumped at Hampton Roads, and indeed upon coal sent to the piers, is already considerable. No sooner did a few bottoms appear at the terminals than the tonnage of coal in transit at once fell off and opportunity was taken to supply Virginia hospitals and other local necessities on the line of the principal railroads and on connecting roads as well. Thereby a further possible increment to New England's budget was lost.

It develops that byproduct plants must now have certain arrears in tonnage made up, and by direction of the Fuel Administration several shippers are obliged to make allotments from tonnage that would ordinarily be sent to the piers for export and for New England. It further appears that while great efforts were made to "zone" Pocahontas coal east, away from the Western market, the 35c. price differential made the Western trade peculiarly susceptible, and through "permits" the actual tonnage of Pocahontas moving west is on a basis fully as large as last year. In that respect, therefore, the zoning plan was a misnomer.

While there is no operating embargo against shipments in open-top cars all-rail to New England via Shippensburg from the Baltimore & Ohio and the Western Maryland, there is in effect an order of the Fuel Administration that effectually prevents any but deliveries in box-cars and to preferred requirements. This only adds to the alarm of most buyers, who see little chance of relief in any direction. Manifestly, stocks were greater than supposed, or several large plants would have been shut down by June 10. The new distribution plan will give some encouragement, for it will be felt that a local fuel administrator will be much more competent to deal with real emergencies than an official 500 miles or more away. Renewed buying of anthracite steam sizes is also notable, a decided impetus having been given this trade within a few days. There is more discrimination between grades than was the case last winter, and many coals of demonstrated value suffer somewhat in finding a market through the wholesale abuses last winter of the term "screenings."

The trade is certainly relieved to find that the drastic method of distribution through district representatives is being supplanted by a better considered program. The idea that preferred consumers were to be "taken care of" before deliveries were to be allowed to come forward to any others was hopeless for the community at large.

Anthracite—For the first six days of June the average daily movement of domestic sizes all-rail was only 420 cars, a loss of 34 cars each day from the May average. Of this movement 26.6 per cent. was steam sizes, or a daily average of 152 cars This also was below the May average.

Due to the submarine activity the anthracite shippers had instructions a week ago to increase deliveries all-rail to such New England points as ordinarily are served by water. It will be interesting to see to what extent the movement can thereby be increased.

There are few developments in the anthracite trade as a whole. Receipts by water have sagged to a remarkable degree, and there is increasing confusion over instructions from Washington as to distribution. Retail distributors are now disturbed over a new regulation requiring apartment houses to be furnished with bituminous rather than anthracite, although hitherto preferences for anthracite were regarded.

NEW YORK

Dumpings of anthracite at the local tidewater docks show slight decrease from previous week, while bituminous dumpings show large increase. Dealers and consumers anxious for coal. Producers look for action regarding mine workers going to war. Bituminous situation little changed. Demand continues strong.

Anthracite—The effect of the order of the Anthracite Committee of the Fuel Administration that, on account of the interruption to water shipments to points east of Boston, as large a tonnage as possible be shipped to points in New England west of and including Boston, and also that liberal shipments be made into the various New England States all-rail, has not, so far, been felt to any extent here. Dumpings at the various local docks for the week ended June 10 totalled 6522 cars, or 20 cars less than were dumped the previous week.

Dealers and consumers here are anxious as to receiving sufficient supplies to meet their needs. Receipts locally do not appear to have increased to any extent, and consumers are strong in their demands for coal. These demands are strongest in Brooklyn, where a majority of the consumers live in individual houses. A telegram received by the Brooklyn "Daily Eagle" from Dr. Garfield said that the Fuel Administrator expected coal production and distribution sufficient to prevent any domestic suffering or curtailment of essential industries, provided only that the public coöperate with the Administration in stopping thoughtless waste and using coal efficiently in summer as well as in winter.

However, there is much uneasiness among the trade and public because of the lack of deliveries, and this urgency is becoming more apparent as the time draws near for many persons to close up their homes for the summer.

Similar conditions exist throughout Long Island, most of which is supplied with coal from the New York tidewater. Fuel Administrator Hawkins, of Suffolk County, has announced that he has asked for and needs 200,040 tons of coal this year, an increase over the consumption of 1916 and 1917.

Early this week there were reports that a state fuel administrator was to be appointed shortly to succeed Albert H. Wiggin, who resigned several weeks ago. The appointment of Mr. Wiggin's successor has been urged by the trade, who believe that the position should be filled now.

Producers here believe that the time has now come when the authorities should take some action to prevent a further depletion of the working forces in the mines, if it is desired to keep production up to the present mark. It is intended to ask that all mine workers be placed in Class 5 of the draft call, otherwise it is pointed out it will be impossible to get out the coal necessary to meet the country's needs.

The order of William Potter, state fuel administrator of Pennsylvania, discontinuing shipments of anthracite to 29 counties of that commonwealth, is not expected to add anything to the tonnage allotted to this state.

Announcement has been made that plans have been nearly perfected whereby the city authorities will be able to obtain a reserve stock of coal with which to take care of the fuel needs of the poor next winter. All of the domestic coals, including pea, are scarce both for tidewater and line delivery. The trade is willing to take

whatever it can get in the way of tonnage. There is a good demand for the buckwheat coals. The larger of these is short. Rice is easier while barley moves freely. Prices on all are held firm.

Current quotations, per gross ton, f.o.b., tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$6.55	$7.30
Egg	6.05	6.80
Stove	6.30	7.05
Chestnut	6.40	7.15
Pea	4.90	5.65
Buck	4.45@5.15	4.80@5.50
Rice	3.90@4.10	3.80@4.50
Barley	3.40@3.65	3.00@4.00
Boiler	3.65@3.90	.....

Bituminous—The local situation shows no big improvement, either in supplies or in lessening of demand. While the dumpings at the local tidewater docks for the week ended June 10 show a total of 7569 cars as compared with 6393 cars for the previous week, an increase of 1176 cars, it does not indicate that the local trade received any more coal, as the demand from New England and nearby water points have increased considerably because of the interruption in shipments from the Southern ports.

Locally, commercial coals are scarce. Efforts of shippers to pick up a stray cargo or two have been failures. Bunker fuel is easy and shipping has not been delayed to any extent.

PHILADELPHIA

Anthracite retailers' receipts continue light. Resume agitation against basic year plan. New England preferential continued. Planning division of increased allotment. City wants 25 per cent. increase. Local zoning plan again considered. New ruling on consumers' orders. Buckwheat exemptions being felt. Bituminous supply continues in fair volume. Car supply good. Submarine activity discounted in tide shipments.

Anthracite—It has been another discouraging week from the retailers' standpoint which has made them more pessimistic than ever. Those who have suffered the most and received the least coal are those who in March, 1916, prudently filled their yards to capacity in order to care for their trade that spring, in the event of expected troubles in the mining region. As their receipts for the months of April and May that year were necessarily light, it is becoming more apparent that these buyers are now paying a penalty for their forethought. This year no dealer was furnished with more coal in April and May, more particularly by the big companies, than was purchased during the same period of 1916.

For June the sales agents are advising their customers quite frankly that owing to the heavy consignments to New England it is possible their quota will not be filled. In fact we have complaints from some, including the largest firms in the city, that their May proportion did not reach them. This is in strong contrast to what was expected, for in April a number received a little surplus and it was felt that this would be the case right through the season. However, the New England preferential instructions have been continued in force and it now looks as if this would be the case right into fall. It is known that at this very time the shipments to the Port Richmond piers are particularly heavy, and at times it looked as if a congestion might result, which is the only chance of the local dealer getting a little extra coal.

Until late in the week no definite policy had been announced as to the distribution of the excess tonnage of 18.25 per cent. over the 1916-17 tonnage as allotted to this state. It would appear that the state and city fuel authorities are not in entire accord with the Federal Distribution Committee as to its distribution.

Some of the largest retail buyers are disappointed because as yet no official announcement has been made that this city will receive 25 per cent. of the additional tonnage. There seem to be assurances emanating from the local distributors' offices that such a statement would be given out ere this.

The distribution committee is doing its utmost to meet the increased demand from this city, as is witnessed by their latest order in cutting off anthracite from 29 counties in the state, which are located in the heart of the bituminous district. The community most affected by this move is Pittsburgh in Allegheny County, as local operators have shipped quite a tonnage of anthracite to that city for years.

The German submarine activities for a while had a considerable effect on tide shipments here, to the extent that an increased shipment via all-rail had been ordered, which means more cars with the subsequent delays in returning the empties to the mines. It is not thought this will continue for any length of time, as it is felt that the present warlike activities off the coast will soon subside.

This week Chairman Lewis, of the city fuel administration, issued an order that is causing considerable comment. He calls the dealers' attention to the fact that as their allotment for the present coal year is based on their requirements he refuses to allow any further shifting of the orders of the consumers. In other words, where an order has been placed with one dealer it must not be cancelled and filled with another.

The state fuel administrator has made a cheering announcement to the retailers. Mr. Potter stated that the supply of anthracite domestic sizes of coal needed by essential industrial plants would be held back as long as possible to give householders the opportunity to lay in a reasonable stock. The only exception will be to plants working on war materials, and these must obtain the indorsement of the department of the Government for which they are working. In the same connection Mr. Potter again calls attention of all citizens to the need of the strictest economy in the burning of coal. It is understood that churches are to be allowed but two-thirds of their normal supply, and that other steps are about to be taken to insure more coal for domestic use.

The buckwheat exemption which the steam plants were required to procure from Washington is making its impress heavily felt in the steam trade. On applying for this exemption certain plants have been advised that it cannot be allowed and they must adapt their boilers to smaller sizes of coal. The great difficulty in this latter case is that the consumers do not know where to get the smaller sizes of fuel, as practically every company is sold up on these sizes

The prices per gross ton f.o.b., cars for line shipments and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4 90	$6.05	Buckwheat	$3.15	$3.75
Egg	4.50	5 70	Rice	2 65	3.65
Stove	4.75	6.05	Boiler	2 45	3.55
Nut	4.85	6.10	Barley	2.15	2.40
Pea	3.45	4.35			

Bituminous—A good supply of coal continues to come in and the important plants are storing away quite a considerable tonnage. There continues, of course, to be much pressure on all sides for increased shipments, but it can be said that conditions are closely approaching the point of being satisfactory. While some shippers do not report the car supply as being as favorable as last week, yet there are others who report an improvement.

Operators were hardly more than just interested in the ruling cutting off anthracite shipments to soft-coal producing counties. They state that there would be no particular trouble in taking care of this increased local domestic business, and as a matter of fact took the stand that it belonged to them and expressed the wish that in normal times it would stay with them.

For a while this week during the submarine attacks off the coast nearby there was some tendency toward congestion of bunker fuel at the piers, but this has now practically been eliminated and vessel movement is now going on about as usual.

An interesting case was heard of this week where a big power plant had adopted the plan of screening all its bituminous ashes and burning the screenings. It is claimed that the results are most satisfactory, a carbon content of as much as 15 to 20 per cent. being obtained from the ashes.

BALTIMORE

Bituminous receipts here comparatively heavy, but there is much complaint against poor quality fuel. Anthracite dealers have troubles and also ask that freight-rate increase be suspended for coal.

Bituminous—Considerable soft coal for all purposes is arriving here, but all of it is not desirable coal by any means. Many rejections have been made recently from the pool on coal consigned to the Maryland fuel administrator. The officials here say that they are determined to have only good coal shipped into this zone. Probably Baltimore felt the condition worse than other points, as among the considerable amount of coal diverted here at the Cumberland gateway because of railroad congestion, improper marking or attempts to consign out of specified zones, was some that did not appear to come up to requirements and which was redestined here for further inspection. This coal in large quantity was thrown out of the pool and had to be cared for by the jobbing trade. Because of the fair amount of good coal to be had here at Government prices, it was not always easy to dispose of the less desirable kind at the same prices. The jobbers are still working for a reclassification, and many of those here expect to forward cost sheets to Washington shortly in the move for a revision higher of their profit margins.

Anthracite—The hard-coal men here are having many troubles. Receipts for April were below average on even a three-quarter supply basis, May was worse, and in June so far only one big shipper has held anything like up to average. The result is that while a few dealers have been able to handle a fair proportion of coal, many others have had so little fuel to distribute that their forces and equipment were practically idle on some days. A meeting was held with the city fuel committee of the state fuel administrator and predictions were made that unless some new plan of relief and more equitable distribution is established by the Government shortly that a number of dealers will have their efficiency as distributing agents seriously curtailed. Among other things a protest was sent to Washington against any move to increase the freight rates on coal before Sept. 1. A jump of 50c. additional a ton at this time, the retailers say, when the business is already under heavy stress, would be a mistake. The representative of the United States Coal Merchants' Association at Washington has been asked to present this view to the Fuel Administration and Director of Railroads McAdoo.

Lake Markets

PITTSBURGH

Better car supplies uncover more labor shortage. Market sales somewhat heavier. Not enough stocking.

There has been a slight improvement in coal production in the district. Car supplies are unsatisfactory in many instances, but on the whole are much better than a fortnight ago. The increased car supplies have uncovered more of a labor shortage, and the percentage of lost production ascribed to car shortage is decreasing while the percentage ascribed to labor shortage is increasing. This does not mean that the supply of labor has actually decreased, though if the condition were considered without thought, and particularly the figures shown in the weekly report of the Geological Survey, such an inference might be made. The aspect at the coal mine is that to determine the day's operations the cars for loading must be in sight, and the operator counts the cars that are waiting to be loaded rather than the men that are waiting to see what the day's operations are to be. If there were no cars at all, there would be no labor shortage disclosed, but if there is a 100 per cent. car supply, a shortage of labor is almost certain to be uncovered.

Lake shipments are proceeding with a considerable degree of smoothness. Calculations have been somewhat disturbed, however, by a prospect that the shipping season, with respect to coal, is to be shut off by formal decree about Oct. 1, instead of running to the end of lake navigation, and doubts are entertained whether sufficient coal can be moved by Oct. 1.

Sales of coal in the open market are somewhat more frequent, and a fair amount of this business is being handled by brokers who are still able to collect the commission from many customers. There is a moderate amount of stocking by large consumers, particularly byproduct coke producers, but not nearly so much as is considered necessary to avoid a shortage next winter when, at the best, transportation will not be so good as in the summer. The market remains quotable as follows: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, subject to 15c. brokerage allowed to be charged by brokers to customers.

TORONTO

Heavy demand for anthracite. Consumers anxious to stock up for winter. Dealers overwhelmed with orders. Increased prices anticipated.

Conditions in the coal trade show little change. The receipts of anthracite are quite inadequate to meet the heavy demand of consumers anxious to lay in their winter stock. Dealers are busy endeavoring to overtake orders in arrears, and some of them are refusing to accept new orders. The public appears to have become thoroughly aroused to the need of stocking up early in the season. Bituminous is in heavy demand with fair supplies. Prices

remain unchanged for the present, but an advance is anticipated shortly.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove, nut and grate, $10; pea, $9, bituminous steam, $8.50; slack, $7.50; domestic lump, $10; cannel, $13; wholesale, f.o.b. cars at destination, three-quarter lump, unprepared, $6.11; prepared, $6.31; slack, $5.18.

BUFFALO

Jobbers get promises, not much else yet. Fair demand for bituminous. Anthracite running down. Car supply good.

Bituminous—Jobbers differ somewhat as to the demand. Many of them are doing a small business, both here and in Canada, but the consumer seems to be pretty well satisfied with the supply. In spite of the continued report that a shortage will appear at the end of the season, stocking is not very general, nor does it appear that conservation is being practiced.

The jobbers are taking heart, especially since the predictions and promises made at the convention, but actual business has not increased visibly of late. Still the feeling is better than it was. The efforts of the Fuel Administration to make a short supply go as far as possible and meet the greatest needs are becoming better understood. If the car supply continues good the trade may be able to distribute coal more freely and possibly get something out of it.

Prices appear to be entirely on Government basis here, in spite of reports of bonuses paid elsewhere. For Buffalo, by new schedule, they are $4.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh lump; $4.20 for Pittsburgh mine-run and $3.95 for Pittsburgh slack, f.o.b. Buffalo.

Anthracite—The supply is not so liberal as it was, especially to the local trade. Much effort is made to keep up the lake shipments, though all the shipping agents are complaining. They can get lake tonnage enough, but vessels will not wait long, as the demand for ore carriers is active.

Reports are coming in from Canada that consumers of anthracite are buying bituminous now, sometimes up to 50 per cent. of their winter needs, though it is likely that they will buy as much anthracite as they can get at the same time. If the way they are clamoring for it here is an indication, they would buy several years' supply if they could get it.

It appears that country consumers are getting a better supply of anthracite than they did last summer. They do their own carting and are sometimes able to get a full supply on the asking. The distribution is not regulated exactly according to needs yet.

Anthracite shipments to the lakes are again confined to the larger ports, as most of the small ones are supplied for the time. The amount loaded for the week was 112,200 net tons, of which 65,500 tons cleared for Duluth or Superior, 38,000 tons for Chicago, 7300 tons for Milwaukee and 1400 tons for Port Huron. Freight rates continue firm at 48c. to Duluth, 55c. to Milwaukee, 60 and 65c. to Chicago and $1 to Port Huron.

DETROIT

Shrinkage in coal receipts continues. State fuel administrator and county representative clash. Lake trade lacks volume.

Bituminous—Though the daily average of coal receipts in the Detroit market in May fell below that of the first four months of the year, a further reduction in volume of shipments is taking place this month. Receipts for the first week of June are said to average about 420 cars a day. With so greatly curtailed a movement of coal into the city now, when conditions are perhaps the most favorable of the year for liberal shipments, jobbers and consumers view the outlook for next winter with apprehension, fearing there will be a shortage of coal that will result in much suffering for many people.

The disagreement between W. K. Prudden, state fuel administrator, and Edgar B. Whitcomb, his Detroit representative, who is chairman of the Wayne County fuel committee, reached an acute stage a few days ago, when Mr. Prudden, in a letter from Lansing made peremptory demand that Mr. Whitcomb resign. Mr. Whitcomb declined to do so and appears to have the support of the coal committee of the Detroit Board of Commerce. The immediate cause of the strained relations was the attitude of Mr. Whitcomb and his associates on the Wayne County committee in opposing as too low a $2.50 a ton margin, allowed Detroit dealers by Mr. Prudden for domestic coal delivered through the summer. Coal men say there has been a lack of harmony between the state and the local fuel administrations for several months.

Anthracite—Shipments of anthracite coming into Detroit are far short of the needs of domestic buyers, and few of the consumers have been able to get delivery of anthracite for next winter's needs. While demand from the household consumers continues active, there is no sign of improvement in supply. Efforts are being made through the Detroit Board of Commerce to obtain a larger allotment of both anthracite and bituminous.

Lake Trade—Movement of coal over the lake routes is disappointingly light. With lake cargo coal prices fixed by the Federal Fuel Administrator late in the week, shippers and vessel owners are hopeful a larger volume of shipments will be delivered at lake loading docks from now on, making possible an early finish of coal shipments to the Northwest. So far shipments have been much below expectations though carrying capacity is plentiful.

COLUMBUS

Activity prevails in the Ohio coal trade. Lake requisitions are large, and the same is true of the demand from steam and domestic users.

Reduced car supply and growing labor shortage in several mining districts of Ohio is reducing the output materially. As a result the records of production are falling behind, and it is estimated that the shortage during May was about 1,000,000 tons. But this state of affairs is expected to be remedied in part, and it is believed that under coöperation between the railroads and the Federal Fuel Administration an increase in the output will be noted soon. Demand for all grades is strong, and the Lake trade is especially active. The tone of the market is generally satisfactory.

The Lake trade is now absorbing a large tonnage, variously estimated from 50 to 70 per cent. of the entire production of Ohio mining fields. The remainder of the tonnage is distributed among steam users and the domestic trade. The vessel movement is good and with it the ore movement is growing. Lake trade is expected to be pushed without the use of a Lake priority order, although shippers would not be surprised to learn of a priority Lake order by mid-season. Reports show that the tonnage to the Lakes is about 1,000,000 short of anticipations earlier in the season.

The domestic trade is active in every respect. Dealers are placing orders both for immediate and later shipment. Their reserve stocks are generally depleted, and they have not sufficient supplies to take care of all business booked. Pocahontas is a scarce article in the local trade. There is considerable West Virginia splint on the market, however, and New River coal is also being offered. The main supply for domestic purposes is coming from the mines of the Hocking Valley, Pomeroy and Crooksville. There is a slack in the demand for Jackson lump. "Fuel Week" caused an appreciable increase in the domestic demand.

The steam business is still one of the best features of the industry. Large steam users are endeavoring to stock up to guard against an emergency and consequently they are buying more than current needs warrant. The smaller users are following the example of the larger consumers whenever they have available storage space. There is little extra mine-run or screenings on the market, as it is readily absorbed.

CINCINNATI

Storage demand continues at a heavy rate, and dealers are unable to take care of orders. Improvement in transportation conditions is noted and may help the situation.

With a demand for coal which breaks all records for this time of the year, the trade is still running behind on deliveries, with no immediate prospect of catching up with its orders. The retail trade has been compelled to adopt the expedient of numbering its orders and notifying its customers that delivery will be made as their numbers are reached, and at prices then prevailing. Receipts are reported as somewhat improved during the past week, in spite of the growing volume of the movement to the lakes, which normally takes the bulk of the coal going through this gateway during the summer season. This movement, in fact, is expected to be the principal obstacle to the local demand being fully satisfied during the summer, inasmuch as it is the policy of the Fuel Administration, as established last season, as well as the natural policy of the operators, to move coal forward to the Northwest while the lakes are open for navigation. Dealers who look ahead, therefore, are still uneasy over the possibility that they will not be able to secure enough coal during the summer to satisfy the demands of local consumers. However, more coal than usual has already been placed in storage, and to that extent the possibility of a shortage next winter has been disposed of.

LOUISVILLE

General demand for all grades of coal greater than supply. Eastern Kentucky coal scarce in Louisville due to heavy gas demand. Domestic stocking heavy.

A prominent coal jobber in discussing the situation said: "There are easily orders to be had for one hundred domestic lots of eastern Kentucky coal for one that is being filled. Gas, run-of-mine and domestic coal are all in big demand. Domestic consumers are buying steam coal even at this season. There is practically no gas coal to be had, as the mines are sold up."

A western Kentucky operator said: "The draft has interfered with us considerably through breaking up our clerical organizations. The labor situation is critical, and due to the shortage of cars we are losing many men, who are going to farming. The car supply at present is about 50 per cent. of requirements. The demand is good and all grades are selling easily, but we haven't the production necessary under existing labor conditions."

In eastern Kentucky the mines at present have about a 75 to 85 per cent. car supply, which with a full supply of labor would be reduced to about 50 per cent. Cars are not making the usual mileage as they can't be loaded out fast enough with the short labor supply, and this has increased the car supply, but not the production.

BIRMINGHAM

Troubles in local market all center around the short coal supply. Inquiries for domestic and steam are holding up well in excess of available tonnage. Output averages around 75 per cent. normal, due to lax working conditions, and, in a measure, labor shortage.

The complaint in local trade circles is almost totally centered on the shortage of coal to supply the demand for both domestic and steam product. The cause of this shortage is attributed almost wholly to the indifference of mine workers to the situation and the dire need for 100 per cent. efficiency in coal production. More labor could unquestionably be used to advantage at many operations, but there is little or no hope for betterment. Every measure is being taken to induce the organizations at the mines as now constituted to refrain from laying off from one to three days per week and work steadily at least five and one-half days, and the success of such efforts would result in a wonderful improvement in the coal supply. The output has been gradually dropping off for the past several weeks, and unless the situation is speedily retrieved the 1918 production will fall under that of 1917.

Consumers will face an increase of 15c. per ton in the delivered price of coal on and after June 25, when new freight rates are effective. The demand for steam coal from Georgia territory slackened slightly during the past week, due to a more liberal supply being received from the Kentucky-Tennessee fields, but inquiries from the immediate district and within the state have shown no diminution. Calls for lump coal are strong and insistent from every section of the zone. The retail trade is good and deliveries are almost on a par with receipts at local yards.

Coke

CONNELLSVILLE

Connellsville output unchanged for six or seven weeks. Prospects of more coal production but perhaps less coke. Screenings from dumps bring better prices.

Production and shipments of Connellsville coke continue at about the same rate as for six or seven weeks past, about 340,000 tons a week. Shipments of Connellsville coal, for byproduct coking, have increased a trifle. The blast furnaces are not fully supplied with coke as yet, but this desired condition is now nearly attained. Few furnaces actually in blast are suffering from lack of coke, but the majority are unable to accumulate any stock as a margin of safety. Several furnaces tributary to the Connellsville region are out of blast because there is no assured supply for them.

From the outlook it seems improbable that there will be any material increase in the output of Connellsville coke, and if the blast furnace industry gets more coke in

future it will be through the medium of the byproduct oven. The probability is that as a large number of byproduct ovens are completed in the next few months the production of Connellsville coke will decrease, although the production of Connellsville coal, for byproduct coking, may increase in greater ratio.

There will be scarcely any change in the alignment of contracts over July 1. A few contracts that were to expire June 30 have been renewed, but they were merely contracts that called for a regular supply at the going price. The market remains quotable at $6 for furnace, $7 for foundry, 72-hour selected, and $7.30 for crushed, over 1-in., per net ton at ovens. The industry of screening the old dumps in the region is expanding, and as the contractors doing the work are particular about the product, they are selling the screenings at still higher prices. When this industry first appeared, a couple of months ago, the screenings brought about $4, but now they are sometimes bringing as high as $6.50. The Government limit would be $7.30, as the regulations are construed.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended June 1 at 343,020 tons, an increase of 2920 tons.

Buffalo—The consumers of coke of all grades are complaining of shortage and are having difficulty in getting what they need, but they have not shut down and probably will not need to, for there is some to be had as yet. The jobbers as a rule get only the refuse breeze coke, but they can sell it for steam-making as fast as it appears. One jobber reports shipping 10 cars to New Hampshire lately. Iron ore comes in liberally. The amount received here to the end of May was 802,210 gross tons, as against 548,299 tons to the same time last season.

Middle Western

GENERAL REVIEW

Production insufficient to take care of the demand. Many dealers have orders that will keep them busy far into the fall.

An alarming condition prevails in the coal-producing sections due to the constant drain upon the man-power by the army draft. In some sections operators are badly handicapped for men to drive motors, and they also have lost heavily of their mule drivers and trackmen. The fact that good drivers are scarce and hard to get in normal times would be sufficient evidence of the seriousness of the present situation, when almost 50 per cent. of this class of labor has been drafted.

Tonnage produced during the past week has shown an improvement over the previous week, with an average of 77 per cent. equipment supply. In some sections more cars were available than could be loaded, while in other localities many hours were lost owing to lack of cars.

CHICAGO

Demand still heavy for prepared coal. Screenings moving slowly at an off figure.

There is no let-up in the demand for prepared coal produced in Illinois and Indiana, and many operators would be able to operate their mines to full capacity if they did not take another order in six months. Particularly is this true of miners in Saline, Williamson and Franklin County, Illinois. Central and northern Illinois screenings have been a drug on the Chicago market for the past week. Indiana fine coal has also been selling slightly off.

The curtailment of anthracite has been helpful to Illinois mines, and the fact the public now realizes that no Eastern bituminous can possibly reach this market makes a market situation that is far in excess of anything ever heretofore dreamed of.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will.
Steam lump	$2.55@2.70	$2.55@2.70	$2.95@3.10	$2.55@2.70	$2.55@2.70	$3.25@3.40
Domestic lump	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut	2.55@2.70	2.55@2.70	.....	2.55@2.70	2.55@2.70	3.25@3.40
Pea	2.55@2.70	2.55@2.70	.....	2.55@2.70	2.55@2.70	.....
Washed egg	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack	2.05@2.20	.....	.....	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

Fuel administrators disturbed over the outlook for an adequate supply of coal. Efforts being made to accelerate Lake shipments. Consumers warned of a prospective shortage of anthracite.

Fifty-nine cargoes of coal, aggregating 448,563 tons, were received at Milwaukee during the month of May. Of this amount 85,066 tons were anthracite. During the first ten days of June the receipts amounted to 164,430 tons, of which 22,497 tons were anthracite. This is not a bad showing, but the fact that the docks were bare at the opening of the present season, whereas last year there was a goodly amount of anthracite held over, makes those having the fuel supply in hand somewhat nervous. State Fuel Administrator Fitzgerald is fearful that this part of the country will receive only two-thirds of the usual supply, and he has gone to Washington to stimulate the coal movement to the Northwest if such a thing is possible.

Consumers in the city and throughout the state are being warned that they may be forced to resort to soft coal to the extent of at least one-third of their regular allotment. Operators of power plants are also being notified that they will have to practice the strictest economy in the use of fuel. Mr. Fitzgerald will appoint an advisory engineer whose duty it will be to check all needless waste of fuel in power plants. It is figured that a saving of from 10 to 20 per cent. can be made by this means.

Notwithstanding that a fair amount of anthracite has been received thus far, only one company in Milwaukee is making deliveries of this grade of coal. The other yards are holding back until prices have been fixed by the Government. Just as soon as the price schedule has been received Mr. Fitzgerald says deliveries by coal dealers will be made compulsory. The books of small coal dealers are filled with orders, which they are unable to take care of because the dockmen are holding the coal from the market.

The steamer W. B. Davock unloaded 7000 tons of hard coal in 8 hours and 40 minutes at Sheboygan, Wisconsin.

ST. LOUIS

Car supply improved and a slight improvement in transportation. Carterville and Duquoin shipments light, Mt. Olive normal, and Standard overproduction continues. Domestic demand continues good, with light steam buying. Outside coals practically shut out from this market entirely.

The market at the present time continues without much change. There has been an improvement the past week in the car supply on all lines in all fields, due perhaps to the fact that transportation shows considerable improvement. There are quicker deliveries on coal from all fields than there have been for some time past.

In the Carterville field a heavy tonnage is being taken for railroad purposes. This, in the estimation of large buyers and the public in general, is not a proper procedure, for this high-grade coal is hauled by the railroad through the Standard and Mt. Olive fields for railroad purposes when the Standard and Mt. Olive coal would probably fill the bill to the same extent. Carterville coal is more valuable for domestic and other purposes than for railroad fuel, and the feeling on the part of the public is that the proper authority has not been exacted in compelling the railroads to take the kind of fuel that is best adapted for them.

The same condition prevails in the Duquoin district. The car supply is much better, but the labor problem is going to be a serious one shortly, with the draft making inroads. The month of June will see a decreased tonnage in all mines in the entire field on account of the draft.

The Mt. Olive field continues normal. The car supply is good, movement is fair, and the labor supply, while not all that could be desired, is maintaining a good tonnage at all mines. The demand for this coal is about equal to the supply at this time.

The Standard field continues to have an over-production. There is no market for screenings, which are down as low as $1.40. Mine-run is going at about $1.90 to $2 and lump coal is as low as $2.20, whereas the Government maximum is $2.55. The other miscellaneous sizes correspond, and the operators will not push production because it means the fixing of lower prices. In the face of this there comes an insistent demand daily from users in western Missouri outside of the Illinois zone for this same coal.

The railroads are not buying. They are hauling Carterville and Duquoin coal through the Standard field, where the mines are idle and where unbilled coal remains on track, and the Carterville mines are almost 100 miles farther away than the Standard field mines.

A few straggling cars of anthracite continue to come through, but this will all be shut off after this week. There is practically no Arkansas coal coming in and the local market is trying to load up on coke. The prevailing market is per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.90	$2.55@2.70	$2.55@2.70
3x6-in. egg	2.55@2.90	2.55@2.70	2.55@2.70
2x3-in. nut	2.55@2.90	2.55@2.70	2.55@2.70
No. 2 nut	2.55@2.90	2.55@2.70	.....
No. 3 nut	2.55@2.90	2.55@2.70	.....
No. 4 nut	2.55@2.90	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	.....
2-in. lump	.....	.....	2.20@2.40
3-in. lump	.....	.....	2.20@2.40
Steam egg	.....	.....	2.20@2.40
Mine run	.....	2.35@2.50	2.00@2.20
Washed:			
No. 1	2.55@2.90	2.55@2.90	.....
No. 2	2.55@2.90	2.55@2.90	.....
No. 3	2.55@2.90	2.55@2.90	.....
No. 4	2.55@2.90	2.55@2.90	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson & Franklin County rate is 87½c. Other fields, 72½c.

SEATTLE

Greater demand to be made for Washington coal, and shortage in fall and winter predicted unless fuel is stored during summer.

Though the State Fuel Administration has reports showing that the mines of Washington could produce 1,500,000 more tons of coal during the year than in 1917, it is seriously questioned whether or not this record will be made. Unless it is made there will be a serious shortage, for it is estimated now that the increased demand upon Washington mines will total 1,250,000 tons during the year. The consumption last year was 4,161,000 tons, and the estimated consumption this year is 5,411,000 tons, with an estimated production of 4,600,000 tons.

The coal operators will have to overcome a labor shortage already existing and likely to become worse if there is no coal buying during the summer months. Already the United Mine Workers of America, District No. 10, report that during one week last month 500 members went into the shipyard work as assuring steadier employment. The crews of many of the Washington coal mines are bein scattered, and it is going to be a problem to secure enough men when fall demand begins.

The fact is, coal operators, railroad officials and the Fuel Administration agree that the West gradually is being drained of its supply of freight cars to supply Eastern demands. If the cars were in service here, it is pointed out, they could not be loaded with goods destined to Eastern lines. Since the cars are not in use in coal service they are being taken for other shipments, and once they reach an Eastern line the chances of their return grow slim.

Washington coal mines last year had little real responsibility beyond supplying a part of this state's requirements. During the coming year it will be asked to not only supply its own needs but those of Oregon and Alaska, with incidental supplies for other territory. Washington has never had to store coal. Under the most severe circumstances the state has managed in some manner to get fuel from near-by mines before it suffered. For that reason, the mines, large dealers and big consumers have not provided storage facilities. The coal business of Seattle is split up among 104 retailers, exclusive of teamsters. Because of the shortage in storage room it is insisted by those who are handling the fuel problem that every bit of room will have to be used to provide against the winter's demands.

Practically all plants now burning oil will have their supply withdrawn by November, only a few war-essential industries being permitted to continue using oil.

COAL AGE

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People Worth While

By FLOYD W. PARSONS

MONDAY evening in Washington I had dinner with a real American—an editor and writer of national repute. He had given up an enviable position affording him comfort, safety and family associations to serve his country.

This man is no longer young. He has a wife he loves and a boy in his teens. Yet in our present crisis he could not remain at home. Few men worked harder than he did, but for months he had worried because he was only helping indirectly.

Within him there was a conflict with conscience, and the mental struggle made him a shadow of his former self. Day after day he pictured the future, and in his vision he saw himself an embittered old man who had failed his country in its hour of need.

This was too much. He went to Washington, got into a uniform, and will soon be "over there." Once again he is happy, for he knows now that the wife and boy who understand will be proud some day when "dad" comes back.

In comparison with such nobility how mean are the profiteers and how despicable the slackers, old and young. Sacrifice for material gain is not sacrifice at all. When this war ends, America will have new standards for the determination of high breeding. An inability to pick the right fork at a society dinner will no longer be the sole measure of a citizen's character. The true patriots will be those who have found a satisfactory reward in the self-consciousness of duty well performed.

Through what process of reasoning can anyone arrive at the conclusion that this war is only a fight of the men and women who have gone to France? Every drop of blood shed by American soldiers on the battle front calls for a thousand drops of perspiration on the brows of American workmen toiling in our mills and mines.

Let us label as traitor every man today who can work and doesn't. Let us brand as disloyal every company and every corporation official who now attempts to exploit workmen under the guise of patriotism and the Nation's need. Let us avoid association with all men and women who are false to our Government and to freedom's cause.

The heat of midsummer is now upon us, and the miner does not live who would not rather roam the woods, or fish, or swim, or lounge in the shade than dig coal in the dark recesses of Mother Earth these wonderful days. But the boys in France have no choice. A bullet will pierce their heart as speedily when the thermometer registers 90 as when the snow covers the ground.

We, likewise, have no choice. Every man must work every day until there is enough coal to make all the guns, shells and ships necessary to destroy German autocracy and forever end the rule of men who laugh at treaties, and who through rape and murder have added a new meaning to the word "frightfulness."

Let us no longer view our country as a certain area of land with mountains, rivers and woods, but as a principle based on humanity and justice. Never was there a time like the present for the coal miners of America to serve, not only the nation, but humanity at large. If the men who mine coal lay down today our cause is lost. What is needed now is simple, unadorned, unpurchasable, incorruptible loyalty; and that means work every minute every day when there is an empty car to load with coal.

IDEAS AND SUGGESTIONS

Winding and Forming Armature and Stator Coils

By Frank Huskinson
Lafayette, Colo.

An important pump motor burned out so badly recently that it was necessary to rewind it completely with new coils. Not having any coils on hand, and as it would take months to get them from the factory, I decided to make up a set. With slight variations, the methods I used can be employed to make up a set of armature or stator coils for almost any motor.

The motor in this case was a 25-hp., 440-volt, three-phase, 60-cycle machine, with 72 coils. In Fig. 1 is shown the stator without the windings, except for one coil placed in the slots to show the proper span. The coils were rather difficult to make on account of the shape, there being two No. 13 wires in multiple, eight turns per coil, two wires in width and eight wires in depth. In making up the coils I used the winding device shown in Figs. 4, 5 and 6. I wound the proper number of turns and then secured the wires with heavy tin clips at four points, so the whole would retain its shape. In taping the coils the leads were first insulated with cotton sleeving and the linen tape was started at one of the leads. Holding the coil in a vise, the tape was wound on, the tin clip being moved just ahead of the tape. After a portion of the coil was taped the clip was removed and placed on the coil over the tape. This was necessary in this case on account of the flat shape of the coils. The heavy tin clip held the wires in their proper position; otherwise the coil would have buckled and become just a bunch of wires without any semblance to a coil. All the coils were taped, given a dip in thin shellac varnish and dried before forming to their proper shape.

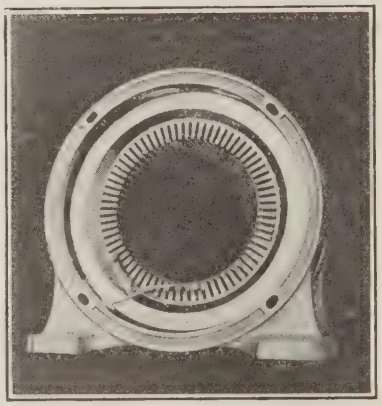


FIG. 1. STATOR WITHOUT WINDINGS
One coil is placed in the slots to show the proper span

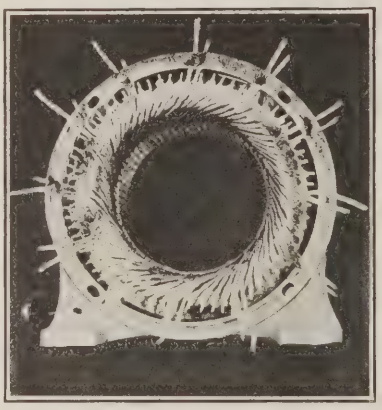
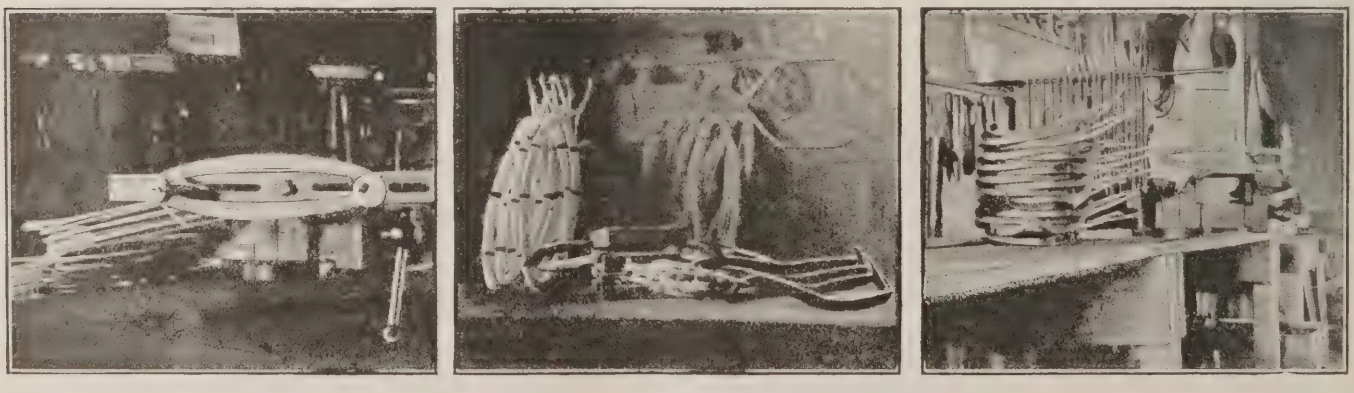


FIG. 2. STATOR WITH WINDINGS
The coils are in place and the group connections made

To form the coils to the proper shape a former block was made out of a suitable piece of wood, as shown in Figs. 3, 4 and 5. The bottom half of the former block was fastened in the vise, the bottom half of the coil was centered in the block, and then the top half of the block was centered on the top half of the coil. The top half of the block was then pressed down and shoved over to the stop block. Holding the blocks in this position the ends of the coils were bent downward as far as necessary to get the proper shape. It requires only a few seconds to form the coils to shape. The whole operation is simple, and each coil is a duplicate of the other. In Fig. 6 is shown the details of the adjustable coil-winding tool and the forming blocks used for this particular job. It is only necessary to change the dimensions of the forming blocks in order to shape any desired coil. I make a set of forming blocks for each style of armature or stator coil that I have to wind. I then mark the forming blocks and put them away for future use. Also, in winding a set of coils for the first time, I wind two extra coils. One of these I finish up complete, the other is left just as it comes off the coil winder. These two coils are kept with the forming blocks, so that all the necessary data and information on that one particular style of winding is at hand with the necessary forming blocks, and a new



FIGS. 3, 4 AND 5. OPERATIONS IN WINDING AND FORMING ARMATURE AND STATOR COILS

set of coils can be made up therefrom at any time. The adjustable coil-winding tool, shown in detail in Fig. 6, has a broad range of adjustment and can be used for almost any style or size of coil by simply setting the tool to the desired size. The disks are adjusted to the proper width and depth of coil. The center distance is adjusted to suit the requirements.

It is a simple and easy matter to wind coils rapidly

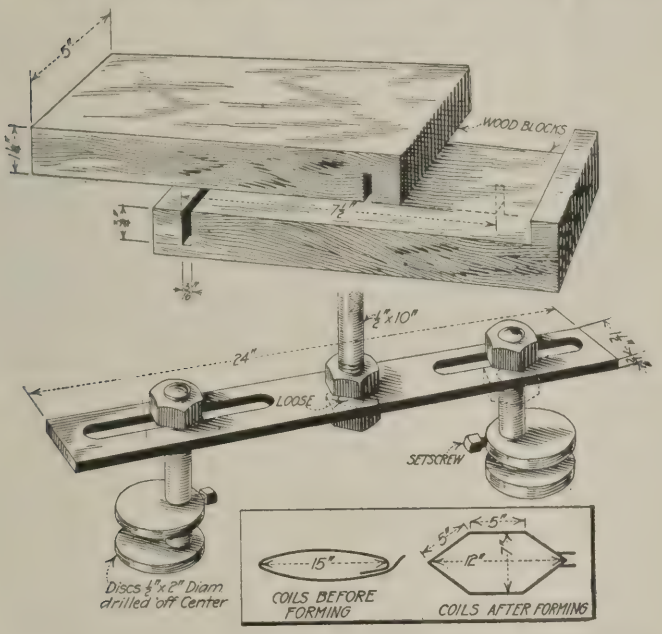


FIG. 6. DETAILS OF WINDING TOOL AND FORMING BLOCKS

and effectively with this coil-winding tool, and for giving the coils their proper shape there is nothing simpler than the forming blocks described. In Fig. 2 is shown the same stator illustrated in Fig. 1, with the coils all in place and the group connections made. This stator is completely finished, with the exception of the cross-connections and the phase connections.

Proper Housing of Mine Labor

The general manager of a large anthracite operation took me through a group of modern houses recently completed for his workmen. While he pointed to the improvements with considerable pride, he also spoke of the uphill struggle to teach certain foreign labor modern ways of living. It is not encouraging to go through one of your new houses and find an enameled bathtub filled with coal.

There are two ways to meet this problem. One way is to drop back to the workman's living level and build his house accordingly. The other way is to attempt to improve his domestic habits, and it may be well to add that the latter method is far from easy.

The wives and daughters of mine officials can and do play an important part in this work. They can accomplish results where men would meet failure; and yet a point is reached where even they are handicapped by the wide social gulf between them and the foreign workman's family.

The wife of a prominent coal operator who devotes much of her time to this important work is attempting to meet the difficulties with a New York architect skilled in housing labor. They erected modern houses and determined to lift the foreign element among the miners to our American ways of living. A scheme was tried of giving one house in a row rent free to an American family to be an example of cleanliness to the foreign neighbors. But the neighborhood got wind of this and refused to be decoyed into decent living. These foreigners seem to be shy of anything having the appearance of organized uplift. Thwarted in this plan they have resorted to bribing selected foreign families to be neighborhood models, but success depends upon the arrangement being kept secret. Where there are children in the family the foreigners are easier reached, as the youngsters carry American ideas home from school.

Those who have had the widest experience in work among this class know that great patience is necessary. It is no easy matter to uproot methods of living which have been handed down for generations. After unceasing efforts, you are encouraged by signs of improvement and you imagine the force of the old habits is yielding to treatment. Then there is a slump and you must start all over again. The discouraging thing about the work is the way these people can vary the form of their uncleanliness. If you succeed in correcting one bad habit it is apt to crop out elsewhere in an entirely different form, but the same old habit just the same. For instance, you persuade them to stop giving animals free run of the house. On your next visit you are impressed by the clean appearance of things. In passing a bed you wonder why wire netting is strung around the four posts near the floor. Looking closer you are apt to find that chickens are being kept under the bed. But patience and the right methods win in the end.

What Is Meant by Specific Heat?

By W. D. Owens
West Pittston, Penn.

What is mean by specific heat when this term is applied to material bodies? Water is with one exception supposed to be the most difficult of all substances to heat. The exception is hydrogen gas, which requires 3.40 times as much heat to raise its temperature over a given range as does water. But water is the standard by which other substances are compared. The increment of heat necessary to raise the temperature of water 1 deg. is called unity, or water is said to have a specific heat of 1; hydrogen, therefore, has a specific heat of 3.40.

All other bodies known require less heat to raise their temperatures 1 deg. than does water, therefore their specific heat is written as a fraction, usually expressed decimally. For instance, the specific heat of steel is 0.11 or 11 per cent. of 1. The specific heat of silver is 0.055, while that of gold is only 0.03. Air is more difficult to heat, its specific heat being 0.2375; that of carbon dioxide is 0.2183, while that of methane gas, or firedamp, is 0.593.

Where the term specific heat is mentioned the reader will now understand that it is the ratio of the amount of heat required to raise a given weight of any given substance (say 1 lb.) through any given temperature range (say 1 deg. F.) to the amount of heat required to raise the same weight of pure water through the same range of temperature.

Present Illinois Coal-Mining Industry

By GILBERT H. CADY
Urbana, Illinois

SYNOPSIS—*The coal-mining industry in Illinois is flourishing. Since 1900 the output has tripled and the percentage of machine-mined coal is steadily increasing. Stripping activity is also becoming pronounced. Large operations are becoming more numerous. The recovery of pyrite has not as yet received serious attention.*

STATISTICS recently published by the Illinois Department of Mines and Minerals, and general information coming to the attention of the State Geological Survey, furnishes abundant evidence of the flourishing condition of the Illinois coal-mining industry. The mines are working as large a proportion of the time as ever before, and an increasing number of operations of large capacity are being opened. The use of Illinois coal is being forced upon many consumers, many of whom probably will never return to fuels formerly used.

This and the additional fact that large corporations having a rather steady demand for coal have entered the mining field doubtless exercises a stabilizing influence which promises well for the future. The following review and summary of statistics compiled from the 1917 Coal Report of the Illinois Department of Mines and Minerals, with other information available, it is thought will be of interest as indicating the present condition and trend of the industry. The statistical data are summarized in Table I, which reveals interesting facts which may be listed briefly as follows: Since 1900 production from all mines and from shipping mines alone has tripled. The amount of machine-mined coal has increased more than eight times. The total number of employees has doubled since 1900, but the number of miners has been steadily decreasing since 1909. The number of shipping mines was steadily decreasing between 1906 and 1915, but has been slightly increasing during the last two years. The number in 1917, however, was only one more than the number in 1900. Since 1900 the number of mining machines has increased nearly five times and the average annual



MINE NO. 3 OF THE SPRING VALLEY COAL CO.
Distant photograph of the surface plant and a typical gob pile in the longwall district near Spring Valley, Illinois



TYPICAL SURFACE PLANT AT A MINE IN THE HARRISBURG (ILLINOIS) DISTRICT

TABLE I.—STATISTICS OF COAL PRODUCTION IN ILLINOIS SINCE 1900

Date	No. of Mines	Mines Shipping	Total Tonnage, Million Tons	Tonnage of Shipping Mines, Million Tons	Tonnage Mined by Machines, Million Tons	Working Days, Shipping Mines	Per Cent. of 300	Estimated Million Tons, 300 Days	Average No. of Miners	Total Number of Employees	No. of Mining Machines	No. of Motors	No. of New Mines	No. of Abandoned Mines	Date
1917	810	324	79	77½	47½	215	72	108	27,114	80,893	1,920	744	41	5	1917
1916	803	284	63⅜	62¼	39⅜	185	62	110	27,272	75,919	1,817	648	22	18	1916
1915	779	280	57⅛	56¼	34	172	57	98	29,560	75,607	1,686	602	6	63	1915
1914	796	340	60⅜	59⅓	31⅓	174	58	102	32,262	80,035	1,828	540	10	41	1914
1913	840	371	61¾	60⅓	30⅝	179	59	102	35,401	79,497	1,689	467	15	24	1913
1912	879	380	57½	56	25⅓	172	57	99	39,149	79,411	1,581	381	22	15	1912
1911	845	387	50	48¾	20	169	56	87	39,912	77,410	1,430	303	29	32	1911
1910	881	390	48¼	47¼	18½	179	59	80	39,069	74,634	1,289	229	27	71	1910
1909	886	384	49	48	16⅓	189	63	76	50,834	72,733	1,246	210	18	41	1909
1908	922	407	49¼	47⅔	15½	191	64	74	48,931	70,841	1,160	185	16	20	1908
1907	933	411	47⅔	46⅓	14⅓	209	69	67	45,498	66,714	1,105	129	0	8	1907
1906	1,018	419	38⅓	37	9⅓	189	63	58	42,920	62,283	962	...	22	...	1906
1905	990	397	37¼	36	8¼	198	66	54	41,202	59,230	784	...	...	...	1905
1904	932	380	37	35⅔	7	213	71	50	37,987	54,774	623	...	...	...	1904
1903	933	353	35	33⅔	7⅜	222	74	45	34,904	49,814	522	...	...	...	1903
1902	915	332	30	28⅔	6⅓	210	70	40	32,875	46,005	464	...	...	...	1902
1901	915	331	26⅞	25⅓	5⅔	204	68	37	30,829	44,143	464	...	...	...	1901
1900	920	323	25	24	5⅓	214	71	34	27,875	39,384	430	...	...	...	1900

capacity of a machine has nearly doubled. The average number of days during the year in which shipping mines are in operation varies between 169 and 222, or between 64 and 74 per cent. of full working time of 300 days. Since 1906 the average number of shipping mines abandoned is 33. This rate of closure indicates a present average length of life of each shipping mine of about 10 years. The average number of new mines annually is between 19 and 20.

The statistics reveal a decided speeding up of production per mine in the last decade. This seems to have been brought about in a number of ways. The most evident source of the increase in production is in the increase in the number of mining machines. It may be noted that about four-fifths of the entire increase in production between 1900 and 1917 can be assigned to increase in the amount of machine-mined coal. Of the total increase of 54 million tons in those years, 42 million represents the increased tonnage mined by machines. It is also noteworthy that the effectiveness of the mining machine has greatly increased, so that in 1917 each machine produced twice the tonnage of the individual machine in 1900.

With the more widespread use of mining machines has gone the more general introduction of motor haulage, and probably also, though the statistics do not show it, an increase in hoisting efficiency. The increasing efficiency of individual mines during these years is indicated by the increase in the output of a mine near Gillespie, which in 1907 led the state with a production of 699,127 tons, and in the fiscal year 1916-17 had an output of more than one million tons.

A further cause of increasing production probably lies in the increase in the number of large operations. The tendency along this line is indicated by the figures given in the 1917 Coal Report. It is shown that the number of mines annually producing 200,000 tons or over has increased from 27 to 139 since 1900. The five largest mines in the state have each a production of between one million and 1,200,000 tons. Of the new mines being built or completed since June 30, 1917, at least four are planned for an annual production of more than one million tons. In comparison it is of interest to note that the total capacity of the four mines abandoned since June, 1917, was only about 600,000 tons. It is evident that operations of the larger type are meeting with much favor among operators. It should not be inferred, however, that large mines are necessary for efficient operation, for some of the smaller mines are being profitably worked.

The growth in number of the large 5000-ton mines is necessarily slow because of the large investment represented in the development of such properties. The recent more rapid increase in their number has been brought about by the entrance into the mining industry of Illinois of such wealthy coal-consuming companies as the United States Steel Corporation, the Standard Oil Co., the Byproducts Coke Corporation and the Chicago, Burlington & Quincy Railroad.

Increased productivity of Illinois mines besides being in part due to the increase in the number of machines and of large operations, is also due to the more general use of the most modern mechanical devices. Hoisting by skip is being introduced. In one of the large mines now being opened much modern equipment is to be installed, such as an electrically hoisted skip operated from the shaft bottom, a rotary dump, entry-driving machines and loading machines, besides the usual complement of chain cutters and electric locomotives commonly found in machine mines.

The desire to produce the coal with the greatest possible speed has resulted in one of the fields, at least.



SHAFT HEAD AT A FRANKLIN COUNTY MINE

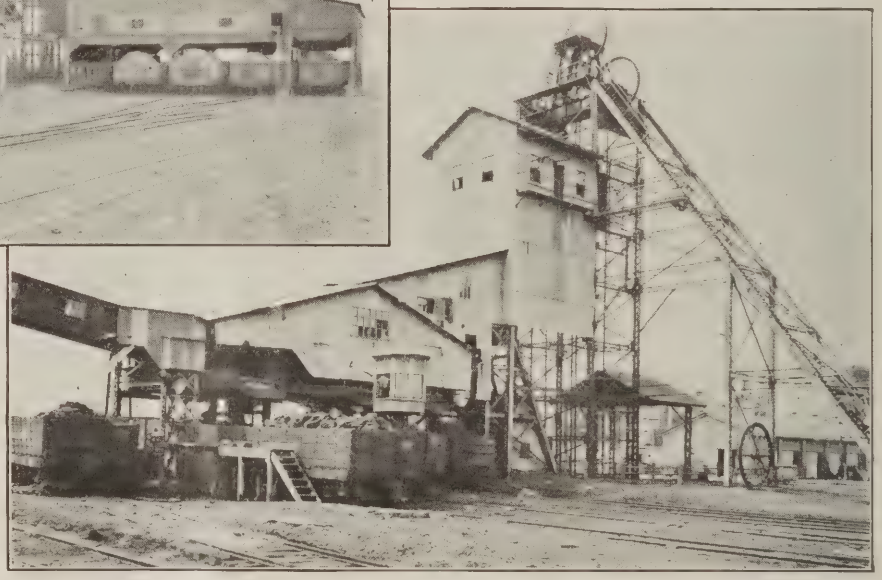
in a decrease in the percentage of recovery. In certain parts of the state, particularly in the Franklin-Williamson Counties field, the percentage of recovery has always been relatively low. Pillars have not been systematically pulled and, furthermore, where the coal is thickest the roof is regarded as poor, so that the top bench, having a thickness of 3 to 5 ft., is commonly left in the mine and is rarely ever recovered.

Recently it is becoming the practice of a greater number of mines in the area of thick coal not only to leave the roof but also to leave from 1½ to 3 ft. of coal in the floor below a persistent thin clay parting known as the "blue band." By so doing the chief source of clay impurity is not disturbed in the mining, and a product somewhat better than the average coal for the region is produced. Such coal has an enhanced reputation at least among domestic consumers, and in addition to its probable trade value the practice results in speeding up production and in decreasing the need of coal-cleaning operations at the shaft head.



Photographs by Prof. C. M. Young

ABOVE—MINE NO. 19, BYPRODUCTS COKE CORPORATION, WEST FRANKFORD, ILL.



BELOW—PEABODY COAL CO. MINE NO. 7 AT KINCAID, ILL.

More especially in the last 18 months than formerly, increasing interest has been manifest among coal operators and consumers concerning the variations in quality of Illinois coal. Probably part of this interest has been created by the large body of analytical data appearing in the publications of the State Geological Survey and the Illinois Coal Mining Investigations.

A working basis for the purchase and sale of Illinois coals on specification has been proposed in one of the publications by Prof. S. W. Parr. This plan recognizes the distinctive variations in the quality of the coals and has tended to establish a reasonable differential between coals of different rank. The purchase and sale of coal on specification is becoming more generally the practice, possibly to a large extent because Federal and state purchases are made on such a basis. One of the probable effects of this growth of the appreciation of the difference among Illinois coals is the decided movement of the center of production of the state toward the southern counties of the coal field.

In addition to the more definite knowledge concerning the chemical difference existing among the coals of the state, there has also come a better knowledge of the adaptability of the coal to specialized uses. Of significance along this line have been the experiments, largely of a private character, toward proving the adaptability of Illinois coal for making metallurgical and other coke. The results of these tests may be judged from the fact that large companies such as the United States Steel Corporation and the Byproducts Coke Corporation have recently made purchases of large properties in the southern Illinois fields, and from the fact that several byproduct coke plants in the Middle West now use Illinois coal for part of their charge. Of interest also is the recently announced plan of certain Chicago coal men to build a large experimental low-temperature coking plant for the manufacture of byproducts and a smokeless fuel.

The adaptability of Illinois coal of various grades to use in gas retorts has been the matter of recent investigations and experiment by the United States Bureau of Mines under the Illinois Coal Mining Investigations Agreement. Because of the increasing difficulty in obtaining supplies of eastern gas coal, many companies have been considering the possibility of using Illinois coals for at least part of their requirements. It has been demonstrated that the substitution can be made, and should the companies become accustomed to the use of Illinois coal at this time a certain percentage of them will doubtless continue its use because it will be relatively cheaper.

The recent agitation to accomplish a greater production of pyrite or coal brasses as a byproduct in coal mining has as yet yielded insignificant results in Illinois. There is a decided tendency on the part of the operators to withhold financial investment in what is regarded as an uncertain industry pending definite assurance of sufficient stability in the market to allow for the re-

covery of the outlay. Investigations by members of the State Geological Survey and the United States Bureau of Mines have substantiated a previous belief that a large supply of pyrite can be obtained from Illinois mines under a guaranteed price of not less than 30c. per unit or about $12 per ton for pyrite containing about 40 per cent. sulphur.

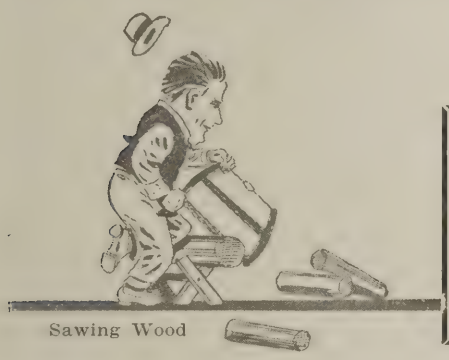
The desire to meet the increasing demands of the trade during the last few months as quickly as possible has resulted in considerable activity in the areas where stripping coal is available. Numerous new operations of this sort have been started along the southern edge of the coal field from the vicinity of Duquoin eastward nearly to Harrisburg along the outcrops of No. 6 and No. 5 coals. The greater number of these operations are between Duquoin and Marion on No. 6 coal. Some new stripping operations have been opened in Vermilion County, and there is considerable interest manifest as to the availability of coal in other localities, especially in St. Clair and Fulton Counties and in the longwall field in the northern part of the state.

Interest in the undeveloped resources of the state is indicated by numerous inquiries which are naturally directed to the Geological Survey. These inquiries have been much more numerous during the last 8 to 12 months than previously. Inquiries concern areas possibly underlain by the thicker coals, that is, coals 5 ft. thick or more, which lie in the southern or central part of the state.

There has been considerable exploration work in Madison and Macoupin Counties incident to the transfer of a large body of coal land near Carlinville. Aside from the drilling in this part of the state no considerable amount of actual exploration work has been done. Certain areas in Washington, Christian, Clark and Crawford Counties seem to be under special consideration by more than one company. The extension of the Indiana field into Clark and Crawford and possibly Lawrence Counties, Illinois, seems to be altogether probable. This would represent, however, an entirely new field in Illinois, and the possibility of its development is therefore of special interest.

British Coal Output

The British Home Office has issued some details of the output of coal in Great Britain for the year 1917. It appears that production, which from 287,411,869 tons in 1913 fell to 265,643,030 tons in 1914 and to 253,179,446 tons in 1915, rose in 1916 to 256,348,351 tons, but in 1917 fell again to 248,473,119 tons, a decrease of 7,875,232 tons from 1916. The number of persons employed at mines under the Coal Mines Act of 1911, which is one of the principal statutes regulating the working of British coal mines, was 1,021,340. This figure shows a decrease of 106,550 persons on the prewar year of 1913, but an increase of 23,277 persons on the figure for the year 1916. The rate of the decrease on the prewar figures in the output of coal is about 13.5 per cent., and in the number of persons employed at mines of about 9.4 per cent. The total number of persons employed will of course be considerably less in the near future, owing to the necessity of meeting military requirements. The release of 100,000 men from the mines as a preliminary step is already in progress.



The Patriot

By RUFUS T. STROHM



Every city, town an' village
  Has a lazy, loafin' bunch,
An' they all allow they can tell just how
  We should land the winnin' punch;
An' they think they're patriotic,
  As they sit an' yap an' yelp,
But the good Lord knows that the talk that flows
  Doesn't do a mite to help.

Now, the real sort of feller
  Is a diff'rent breed of bird,
An' his only creed is the finished deed
  Instid of a shouted word;
For his common sense has told him
  That we're fightin' to the death,
So it's plain as sin, if he wants to win
  He has got to save his breath.

His monniker may be Tony,
  Or it may be Abe or Bert,
But sometimes his name is Marie or Mame
  An' the owner wears a skirt;
Yet you're allus sure to meet him
  Where the nation's pulses throb,
As he pegs away through the livelong day
  At his own pertickler job.

You can find him in the office,
  You can spot him in the shops,
An' he bares his arms on a million farms
  As he gathers in the crops;
But no matter what he's doin',
  He's strong for the common good,
An' there ain't a hint of a pause or stint,
  For he keeps on sawin' wood.

Some Experiences with a Borehole

By A. W. HESSE and K. M. QUICKEL

Heilwood, Penn.

SYNOPSIS—*In a borehole that was to be drilled for the purpose of connecting electrically a surface substation with the mines below, the casing had to be cemented in place with extreme care to prevent the draining of a spring. This article enumerates some of the troubles and difficulties that were encountered before an unobstructed water-tight passage was secured.*

THE drilling of an ordinary borehole and the placing of a casing therein for the purpose of dropping a cable from a substation to the mine below, does not usually cause much disturbance in the daily run of affairs—if all goes well. The experience secured in drilling and cementing a borehole, as here described, however, has some value, because of the conjecture as to what happens when a gas or oil casing is cemented through a coal bed.

To begin with, it is necessary to know just why the method here described was followed. The plot of ground purchased for the substation and borehole site was only a few feet from a spring which supplies the farming community in that section with water most of the year; and before the purchase could be made it was necessary to agree that this water would be prevented from leaking away through this borehole into the mine. Also the mine work was still 300 or 400 ft. away from the borehole.

Trouble Started with the Casing

The contract was let for the drilling, and on Sept. 5 the hole was ready to have the 6-in. casing placed and cemented. The contract called for an 8-in. hole, but when the 6-in. casing reached a depth of about 100 ft. it stuck. A measurement of the collars on the casing showed that the bit must have been allowed to taper down to less than 7⅞ in. By a compromise, it was decided to put in 5-in. casing. This was immediately ordered, and the drill was allowed to go to another job.

When the 5-in. casing came, a three-pole rig was erected and the casing started in; but at 105 ft. it also stuck! Apparently the hole had bridged and there was no alternative except to call back the drill. This was done; but the drill did not get back until the middle of November. The hole was reamed out and drilled 2 ft. deeper, making a total depth of 245 ft. The mine work had not yet reached the hole.

For fear that the cement grout would not get down far enough around the casing to seal off the water, it was decided to drop the cement into the hole before the casing was set on the bottom, then on dropping the casing bail the cement out of the casing and pour it around the top until the annular space around this pipe was completely filled to the top. One of the company's masons was placed on the job to mix the cement and see that the work was properly performed. He reported everything satisfactory.

The place driving to connect with the borehole reached the spot on Jan. 5, but found no borehole. The surveys showed careful work and were properly tied in, or proved. Having by this time lost all faith in the driller's reports, and noticing discrepancies between his data and the surveys, it was decided to sound to the miners by tapping on the pipe. The distance from the pit mouth to the borehole is over 1½ miles and, owing to various conditions, it was not until Jan. 29 that a party could be sent to the hole outside. One person in pounding on the hole with a brick let more than half of it drop into the hole. On Feb. 4 another man in sounding on the bottom of the hole with a puncher pick, found his pick caught when he attempted to pull it out, evidently because of the half brick, and finally broke his rope, leaving the puncher pick in the hole. That day the miners reached the hole and found that the casing was plugged with cement. The driller had failed to get his casing onto the bottom of the hole by about 8 in. and the cement had risen in the pipe about 27 ft., as was proved later. At the immediate bottom of the casing only sand was found. This sand extended about 4 ft. inside the casing and at least 20 ft. up the outside. Above the sand within the pipe came alternate layers of cement, cement grout and sand.

The attempt to force the cement loose in the pipe by means of a screw jack failed. We then tried fishing out the puncher pick so we could drill out the cement from above. This failed because of the overlying brick. We then decided to try driving the cement out by dropping a 5-ft. mine-locomotive axle on top of it. After dropping it from various heights, it was finally dropped 210 ft. and stuck in the cement so tight that the rope (¾-in., new) was broken. The next expedient was to drill the hole out from the bottom. A bit was made, gaged to 4 in., 1½-in. pipe was cut and threaded in joints of 2 ft., a set of iron clamps was made which held an improvised thread box, and a ratchet and threaded bar completed the equipment.

The Cement Had Not Set Hard

The cement was drilled out to a height of 26 ft. in 10 hours, showing that this material had set to a sort of fireclay paste consistency in three months' time. When the bit reached the puncher pick it caught, and no more cement paste could be got out. The next day water was poured in at the top of the hole, and the pick point washed out. We then tried to lift the axle with the drill rods and screw jack without effect. The bit was then put in and more material drilled out up to the axle. On Feb. 27 more water was poured in the hole in hopes of washing out the axle, but finding the water did not escape very rapidly, the pipe was filled to the top and allowed to stand.

The substation equipment not having arrived, it was not until Mar. 5 that we tried dropping a 200-lb. piece of axle on top of the one already in the hole. The 4 ft. of water then in the hole escaped rapidly, and the big axle moved about 8 in. Again, on Mar. 8, the axle was

once more dropped in the hole and, after several hits, the hole was cleared except for a little mud still clinging to the sides. This was easily removed from below.

It was still impossible to see daylight by looking up the hole from inside the mine, so to satisfy ourselves that the surveys were not off 11.8 ft., as shown inside the mine, we decided to determine, if possible, if and how much the hole had drifted. A flashlight was placed in a can and lowered in the casing. At 72 ft. from the top the casing was observed to bend, and at 105 ft. the light was just visible; while at 114 ft. not even a reflection was discernible.

We then took five cans of melted paraffin and lowered them in the fluid state to a depth of 100, 150, 180, 210 and 240 ft. respectively, and allowed the paraffin to harden while suspended at these depths. We then measured the tilt of the cans off the level of the paraffin and found the respective angles of deflection to be 2 deg. 35 min., 5 deg. 56 min., 3 deg. 40 min., 2 deg. 24 min. and 7 deg. 29 min. Upon platting these deflections on paper to a scale of 1 in. = 10 ft. we found that the hole drifted 11.7 ft. in the general course of the error found in the mine.

While the cement did not set to its proper hardness within the casing, its consistency on the outside was such that the hole is perfectly water-tight.

Combined Coal and Gas Firing

By M. Meredith
Liverpool, England

An interesting example of the mechanical firing of boiler furnaces with gas and coal is afforded by an installation in operation at the South Staffordshire Mond Gas Co.'s works, Dudley Port, Tipton, England. The plant comprises eight producers, each capable of gasifying 20 tons of fuel in 24 hours, and generating sufficient gas to drive internal combustion engines of 2000 hp. continuously. The total capacity of the present plant is thus equal to 16,000 horsepower.

The rail or water-borne fuel is loaded by hand into bunkers, and thence fed automatically into two conveyors, each having a capacity of 40 tons per hour. These distribute the fuel into the storage bunkers over each set of producers. Each bunker holds 40 tons—that is, sufficient to keep the producer working for two days. The gas from the producer is thoroughly washed in mechanical washers, passed through ammonia recovery apparatus, also through the scrubbers and the meters, before being compressed and sent through the mains for distribution.

Since for each ton of coal gasified more than two tons of steam has to be supplied with the blast entering the firegrate of the producer, a considerable amount of steam has to be provided. More than half the total required, however, is obtained from the system of recuperation by circulating the water in the Mond producer plant. The steam for this purpose is raised at a pressure of 120 lb. per square inch, and after passing through the various engines and pumps where it does work, the exhaust is collected and mixed with the air supply to the producers.

It being necessary, for equalizing the station load, to fire with gas alone during part of the day, and to employ coal in addition during the time when the demand for gas is high, the Lancashire boilers employed have been fitted with Bennis "sprinkler" stokers. The gas ducts are led into the top flange of the stoker front and secured by means of a gas-tight joint. The baffle plates, which are situated behind the front, are provided with a passage, the outlet being above the grate; the gas thus passes from the ducts to the furnace. There are two ducts to each flue—that is, four to each boiler—each pair containing a breeches pipe placed immediately behind the hopper and passing thence to the gas supply. This constitutes an extremely simple and satisfactory arrangement.

It being essential that air should have access to the gas, a valve with an adjustable cover is placed on the furnace front to regulate the amount of air supply. The air is conveyed into the furnace through a separate air duct and does not mix with the gas until it reaches the inside of the flue, where ignition takes place.

A test lasting 40 hours with gas firing alone has shown an efficiency of boiler and furnace of 79.1 per cent. Other interesting figures from this test are the following: Steam pressure, 84 lb. per square inch; temperature of steam after superheating, 332 deg. Cent. (630 deg. F.); volume of air supplied per 100 cu. ft. of gas burned, 158.6 cu. ft.; losses to chimney (after passing superheaters and economizers), 11.4 per cent.

The steam from the boilers is led to the various parts of the plant by ring mains, so that each steam-driven machine can be supplied through at least two separate lines. The Lancashire boilers, measuring 9 x 30 ft., are fitted with extended flues. They are also fitted with superheaters, the gases discharging into an economizer containing 4000 sq. ft. of heating surface.

A guarantee was given by the stoker makers that the evaporation of each boiler should not be less than 12,000 lb. of water per hour, with an overload evaporation of 15,000 lb. per hour when desired for short periods. An efficiency of 72 per cent. was also conceded. This has not only been borne out in the tests carried on by the staff of the South Staffordshire Mond Gas Co., but also appreciably exceeded. For instance, an overload evaporation of 17,000 lb. of water per hour from each boiler, instead of 15,000 lb. per hour, was obtained.

Prior to the installation, much inconvenience had been experienced owing to the fact that steam was required to be kept both during the night and from midday Saturday until Monday morning, when it was desirable that labor duties should be at a minimum; but since the introduction of the combined system of firing, the desired flexibility has been attained. A thermal efficiency of 73 per cent. has been secured during a six months' run under all conditions and variations of load, including times when parts of the plant were off for cleaning and inspection. The average quantity of water evaporated per boiler per hour for a month's run was 14,880 lb., during which period the boilers were fired with slack during the day and gas during nights and over week-ends.

Remember that National War Savings Day is June 28. Pledge yourself on or before that day to save to the utmost of your ability and to buy War Savings Stamps that there may be more money, labor and materials to back up those who fight and die for you.

You may not be able to fight, but you can save and buy War Savings Stamps.

Coal Mine Photography—III

By H. A. WILLIAMSON
Fairmont, W. Va.

SYNOPSIS—*It makes little difference so far as photographic reproduction is concerned what style of lettering is employed on a map so long as the lines are sharp and distinct. However, plain letters are preferred to more elaborate designs. The conventional signs used by the United States Geological Survey are excellent for mine maps if augmented by suitable symbols for underground work.*

STYLES of lettering and methods of showing specific features by use of conventional signs vary to such an extent that it would be impractical to attempt to illustrate or classify them in anything less than a book on the subject. There are, however, certain letters and signs which can be used to better advantage than others on map work where this map is intended for photographic reproduction.

The accompanying illustration is not an attempt to give all or even most of the signs in use, but it does show some of the most common and most suitable for photographic reproduction.

Lettering for photographic work can be almost any style, so long as it is made with clean clear lines. Ornate types are to be avoided. Simple lettering is easier to produce, looks much better, and is more clearly readable after reduction than such styles as Gothic or other complicated forms. The most important single feature on a map for photographic work is probably the scale. The scale shown in the illustration is the one in almost universal use; it makes no difference how much it is enlarged or reduced it is always correct, while any proportional scale is immediately in error on reduction or enlargement.

Proper Indication of Points of Compass

Another item of importance is the indication of the points of the compass. If coördinate lines can be used, and especially if the top of the map can be made the north, it is a far better way than using a north point and having every map laid out with the north direction different. Further, if the latitude or longitude, or both, can be placed on a map it is an advantage as, for example, it allows the location of large scale, small area maps on small scale, large area maps in order to get location of particular points with relation to railroads or other features.

For photographic map work there are no better signs and letters than the standards of the United States Geological Survey. Sheets of these can be obtained from "The Director," United States Geological Survey, Washington, D. C., at 10c. each. However, they do not show underground features, nor various special features, and it becomes necessary to adopt standards to fit the needs of the particular kind of work carried on.

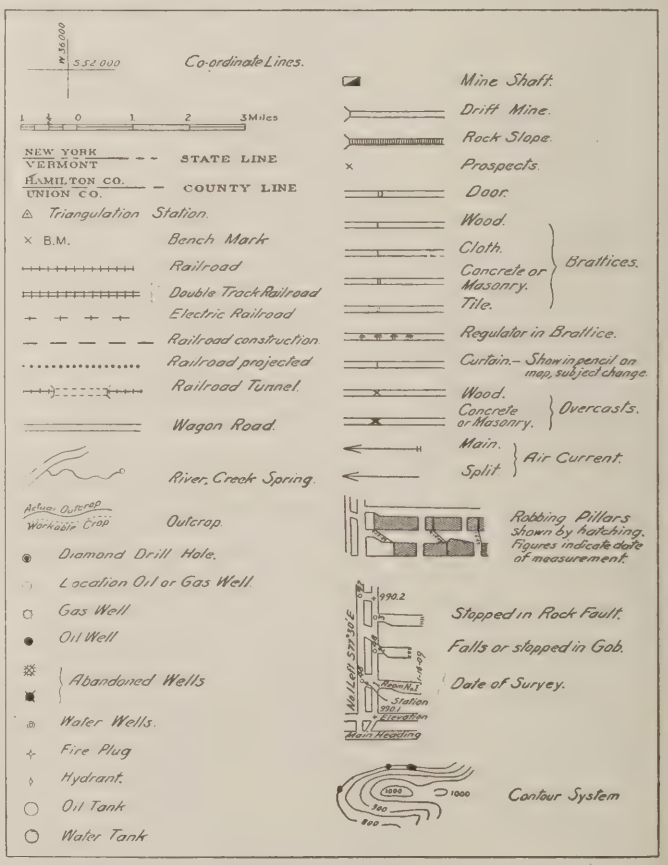
Both in lettering and in signs it is only necessary to remember that simple designs and sharp lines photograph to best advantage, and, as stated in a previous article, a minimum size of letter of $\frac{1}{10}$ in. high is a good standard for five-time reduction.

Where it is necessary to show various features in color, political features are usually black, hypsography brown, hydrography blue, timber areas are tinted over with light, transparent green, triangulation and other surveys either in black or red.

It might be well to mention here the matter of erasures or corrections to maps. It is frequently the case that errors are made or changes desired requiring a large amount of erasing. This is often tiresome and dangerous, particularly on tracing cloth. Much of this work can be avoided by simply leaving the incorrect parts on the map and later opaquing them off the photographic plate.

For the benefit of those draftsmen, with some knowledge of photography, who may desire to carry on photographic map work, I give below a standard method of development, intensification and reduction, and opaquing, together with a note on the rapid drying of glass negatives. (With the exception of the drying process all of this will answer equally as well for the various types of film.)

Presuming that the desired exposure on a suitable plate (with screen if necessary) has been made, we are in a position to start work in the darkroom. Following is the developing formula given in the first article of this series, but here repeated with additional



SCALE IN ALMOST UNIVERSAL USE WHICH MAY BE ENLARGED OR REDUCED WITHOUT ERROR

notes: Water, 15 oz.; sodium carbonate, crystals, ½ oz.; sodium sulphite, crystals, 1 oz.; potassium bromide, crystals, 15 grains. This will keep indefinitely, can be made up in quantities and called a "stock solution."

To develop contrast, or commercial, plates, also tri- or panchromatic plates, for linework: Use the foregoing solution full strength, adding three grains of dry pyrogallic acid for each ounce of solution just when ready to immerse the plate.

To develop out-of-door exposures (or flashlights), roll film and miscellaneous copy work where it is desired to show detail: Use one part of the foregoing solution and two parts water, adding two grains of pyrogallic acid for each ounce of "ready-to-use" solution.

To develop advertising lantern slides: Use one part of stock solution and three parts of water, adding two grains of pyro per ounce of "ready-to-use" solution.

The temperature should be 70 deg. F. Density comes slowly, but the negative should be fully developed in two to five minutes. When developed immerse in: Water, 16 oz.; citric acid, 30 grains, for 30 seconds, and then fix in standard acid fixing bath.

If after fixation and washing the plate should be somewhat under or over exposed, the following method is probably the best now known for reduction or intensification of linework negatives. First be sure the plate is thoroughly washed.

Solution Removes Veiling of Lines

To reduce or remove any veiling of lines use the following solution: One-half dram 10 per cent. solution potassium ferricyanide; 2 oz. hyposulphite soda; 10 oz. water.

This preparation can be used locally or all over the plate. If it is simply desired to reduce an over-exposed plate, the foregoing bath, followed by thorough washing, is all that is necessary.

If the plate is weak, after removing any veiling of lines with the solution given above, wash at least 15 min. in running water and use the following intensifier (Monckhoven's formula). First, bleach through to the back in a solution of mercury chloride, 100 grains; potassium bromide, 100 grains; water 20 oz. When bleached wash 15 min., then darken in the following:

Dissolve 100 grains silver nitrate in 10 oz. distilled water. In another 10 oz. of distilled water dissolve 150 grains potassium cyanide; add silver solution to this in small amounts until the point is reached where the curdy precipitate, which forms as the silver is added and at first disappears completely, does not redissolve. Flow this over the plate, but remove the negative from this solution and wash promptly as soon as the plate is darkened through to the glass side. Too long a time in this will reduce the negative. (The foregoing solutions can be used repeatedly.)

Frequently pinholes or air bells will occur on negatives, and also it is often desirable to cut out some part of a map without actually erasing it from the original. After the negative is thoroughly dry these undesired parts may be blocked out of the negative with opaque. For this work a simple retouching stand may be purchased, or a hole, of suitable size, can be cut in a box, a light placed within the box and the plate placed over the opening. It is a simple matter to block out the undesired parts, using "Alvords" opaque and a medium sized camel's hair color brush. The opaque should be worked as thick as can be conveniently handled and allowed to dry thoroughly before the negative is used.

It is sometimes important to obtain final prints from negatives within a brief time. By having a fresh and strong fixing bath, the negative is fixed in about 3 or 4 min. Remove the plate from the fixing bath and rinse; place the plate in a tray which will just accommodate it, cover with water to half the depth of the tray and add 6 grains of potassium percarbonate for the equivalent of every 4 x 5-in. plate (rock tray)—remove negative when liquid ceases effervescing and wash 3 to 5 min. in running water, then place in bath of wood alcohol for 1 or 2 min.; remove from this and place before an electric fan or in a draft. The plate will dry rapidly by this method. If the fan is just in front of a heater, so that warm air is drawn through onto the plate, the drying will be still more rapid.

Prints can be made with ordinary blueprint paper; or if higher grade work is desired any of the ordinary photographic papers can be used. There is also on the market an excellent photographic cloth which is specially desirable for map work in connection with reports and other data that are desired in lasting form.

Lump Coal for Locomotive Service

Until recently nearly all coal used on locomotives was mine-run—the entire unscreened product of the mines. In the past few years, however, increasing quantities of screened lump coal have been used in locomotive service. This increase in the consumption of lump coal has been due partly to the belief that lump coal, when burned on a locomotive, produces enough more steam than mine-run coal to compensate for its greater cost. Special considerations, such as the desire to lessen the amount of smoke formed, have also led in some instances to the use of lump coal, which is generally believed to require less skill in firing than mine-run coal. The introduction of the mechanical stokers for locomotives has resulted in the use of increasing amounts of various sizes of screenings. Thus far there has been little use of such sizes as egg, egg-run, and nut coal on locomotives, although traffic and market conditions occasionally make it feasible and desirable to use them.

The relative values of several sizes of coal for locomotive use have not been well understood since most laboratory and road tests have been made with mine-run or occasionally with lump coal, and the data are inadequate and conflicting.

A series of tests to determine the value of different sizes of coal has been conducted by the Engineering Experiment Station of the University of Illinois under a coöperative agreement with the International Railway Fuel Association and the United States Bureau of Mines. A Mikado locomotive weighing 142 tons belonging to the Baltimore & Ohio R.R. was used, the tests being made in the locomotive laboratory at Urbana. The results are published in Bulletin No. 101 entitled "Comparative Tests of Six Sizes of Illinois Coal on a Mikado Locomotive," by E. C. Schmidt, J. M. Snodgrass and O. S. Beyer, Jr. Copies may be had without charge by addressing the Engineering Experiment Station, Urbana, Illinois.

Hoisting Coal in Skips*

By JOHN A. GARCIA
Allen & Garcia Co., Engineers, Chicago, Ill.

IT IS somewhat remarkable that with the wonderful progress in mechanical and electrical engineering at coal mines in the last ten years or so, and improvements made in methods of mining, the two main contributing causes for most of the troubles in operation have not only been neglected, but deliberately aggravated—that is, low percentage of extraction and vicious speed in caging and hoisting.

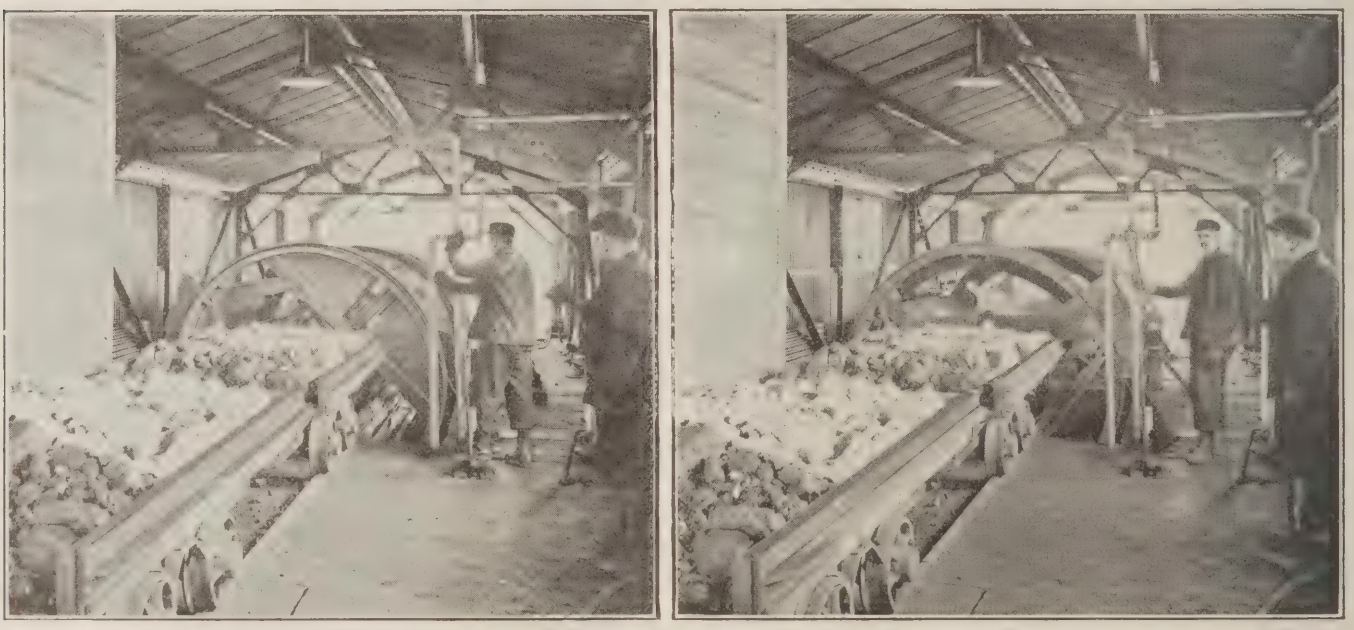
In the Middle Western coal fields, excepting, of course, the longwall mines, the extraction is no better today than it was a generation ago; and in southern Illinois several of the most modern mines were recently found to have made an extraction of only 48 per cent. over a period of about six years. Such extraction leads to sealed-off gas areas, squeezes, short life, long haul and difficulties in operation too numerous to mention; and the solution of the problem is worthy of the best efforts of the best men in the industry. However, this is outside the province of this discussion.

The second major problem—speed reduction—involves, of course, maintenance of existing output or opportunity to increase capacity, as there never was a mine where the output was satisfactory, the boss, like Oliver Twist, always asking for more. However, it is impossible in an existing mine to decrease caging time and rope speed without decreasing output, unless the weight of coal per hoist is increased, which apparently can be done only by enlarging the pit car; and this is often impossible. But even when it can be done, the size of the car cannot be increased enough to materially affect the speed of the hoist, and this fact leads to the question of skip hoisting.

The self-dumping cage has been developed from a crude mechanical freak into a device or machine worthy of admiration, and almost respect. Traveling, in some instances, at the rate of 4800 ft. per minute along vertical slides several hundred feet long, dumping a pit car without manual assistance, reseating and dropping back down the shaft at terrific velocity, to be retarded and reset on the sump logs without breakage, often three to four times a minute, eight hours a day, every working day in the year—these are conditions no engineer or designer could meet. The self-dumping cage of today is therefore the product of hard experience, the result of years of persistent and stubborn effort to perfect, strengthen the weak points as they developed, and to adapt it to the constantly increasing demands.

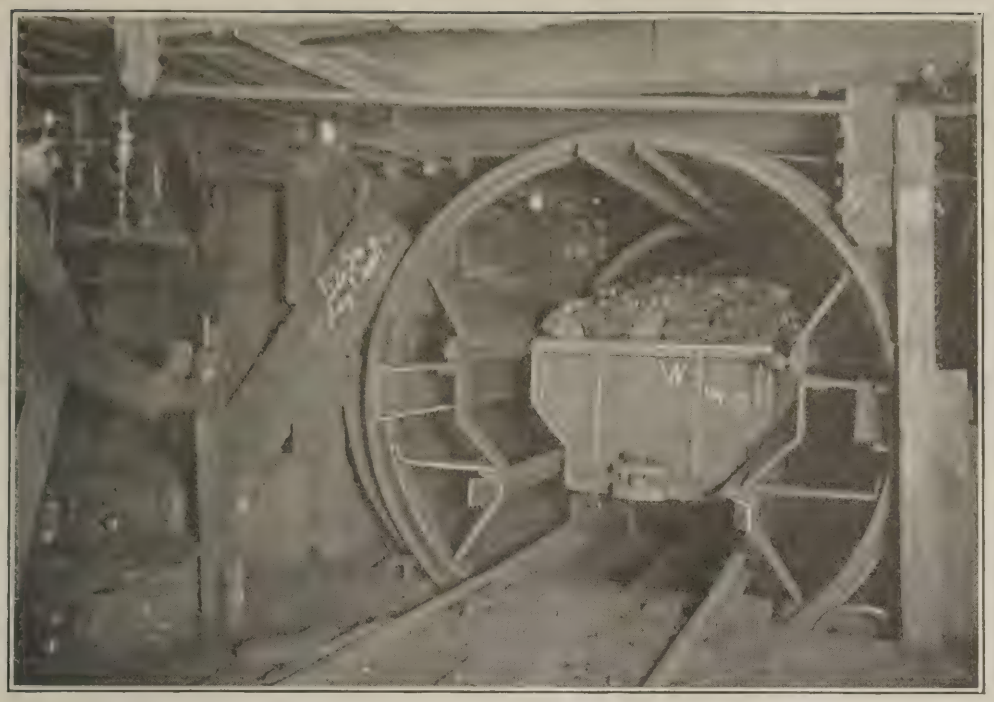
When the cage was first invented, 1000 tons per day was a fair output, and there was every reason for using it as against the stationary platform; but custom and habit in coal mining dies hard, and it was many years after the first self-dumping cages were used before they were in general use. Even today, with our intensive production, we quite often find a mine equipped with a fixed cage, though probably no new mines have been developed in recent years having this type. From 1000 tons we graduated into 2000, and the cage was developed to match the output. Suddenly the capacity of newer mines jumped to 3000 tons, and the hoisting problem became quite serious; the cage began to take on lines of mechanical design, the safety catches offered fair field for the inventors' talent, the automatic stop and caging machine came into service and the construction of mine cars to meet the rough usage and constant dumping shocks became an important feature of mine shopwork.

From 3000 tons the ambitious and progressive operator pushed on to 4000, and the mechanics of hoisting became a science. In the last three years we have



DUMPING CARS AT GRANVILLE TIPPLE WITHOUT UNCOUPLING

*Paper read before the Peoria meeting of the Illinois Mining Institute, May 23, 1918.



ROTARY DUMP WITH CARS IN POSITION FOR DUMPING

come to realize the 5000-ton-per-day mine, and the end is not in sight. Recently the mine of the American Coal Mining Co. at Bicknell, Ind., took the world's hoisting record for a single-car, self-dumping cage, producing 5911 tons in a little less than eight hours, using four-ton pit cars and with a total lift of about 360 ft. That means a rope speed of 3100 ft. per minute, caging cars often at the rate of four per minute and an average of over three per minute all day long.

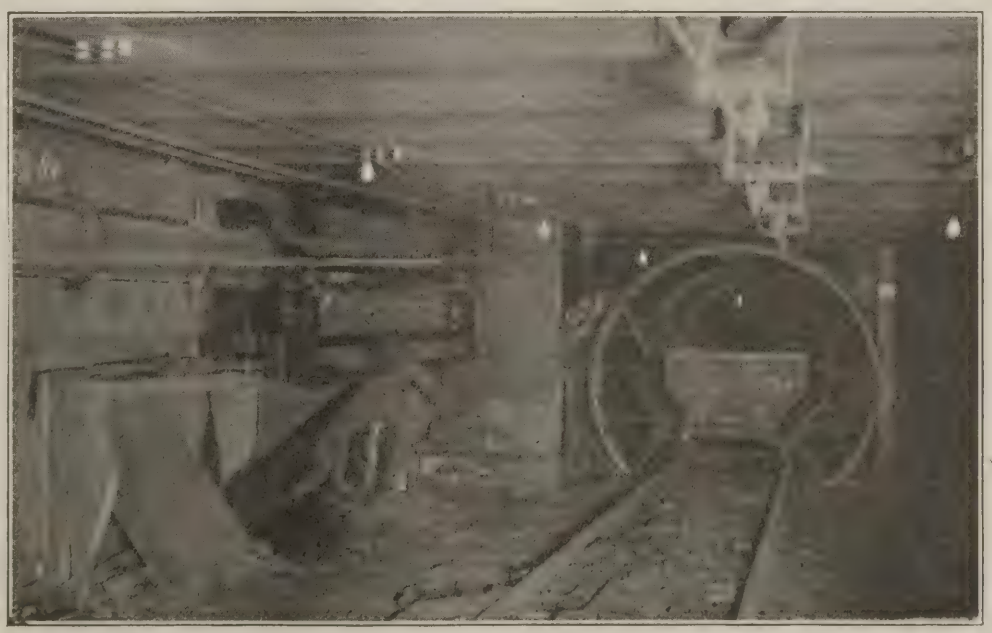
It may be safely assumed that coal mining has not reached such an advanced state of development temporarily, and that the hoisting problem is going to be confined to a few "freak" mines, or to isolated districts.

The march of progress and the keen competition in normal times forces maximum output for minimum investment, and under modern conditions the cost of building and developing a new mine is so high that large capacity is the only way to realize, in a reasonable period of time, on the investment.

However, it is not only dangerous to life and limb and destructive to valuable property to maintain such excessive speeds in production, but it is bad business policy to operate on a schedule that requires every man in the organization to be constantly straining for what is considered a normal output or to put the machinery of a plant constantly and continuously to the breaking test. There surely was some method whereby shaft hoisting could be brought down to the safe and sane plan that well-organized factories with intensive production operate on, and to this end the engineers of the Allen & Garcia Co. began a study of the problem about five years ago.

The first result of this campaign was a self-dumping cage designed to eliminate shock, to prevent overturning in the shaft and to operate at the dumping point without consuming, at that place, 25 per cent. of the total power required for a cycle, as is necessary in the ordinary cage. This result was obtained after four installations had been made, and the mine at Bicknell referred to above was equipped with this type of cage. That mine, however, was built for 3000 tons, and when the development work underground went on beyond the designed capacity of the shaft and hoist, they simply speeded up all along the line until they reached the extreme limit of almost 6000 tons and an average of over 5000. It then became apparent that the engineers must make the hoisting capacity so great that there would be no possibility of mining and hauling a tonnage that would require excessive rope speeds, and the only practical answer was the skip; so a thorough investigation of skip design was made and data accumulated on the few installations made in this country.

The information secured on existing installations in this section was disappointing. None were found that were satisfactory, and mining men everywhere were inclined to condemn the system as impractical. Each case was analyzed and studied carefully, and in the end it was found that there was something radically

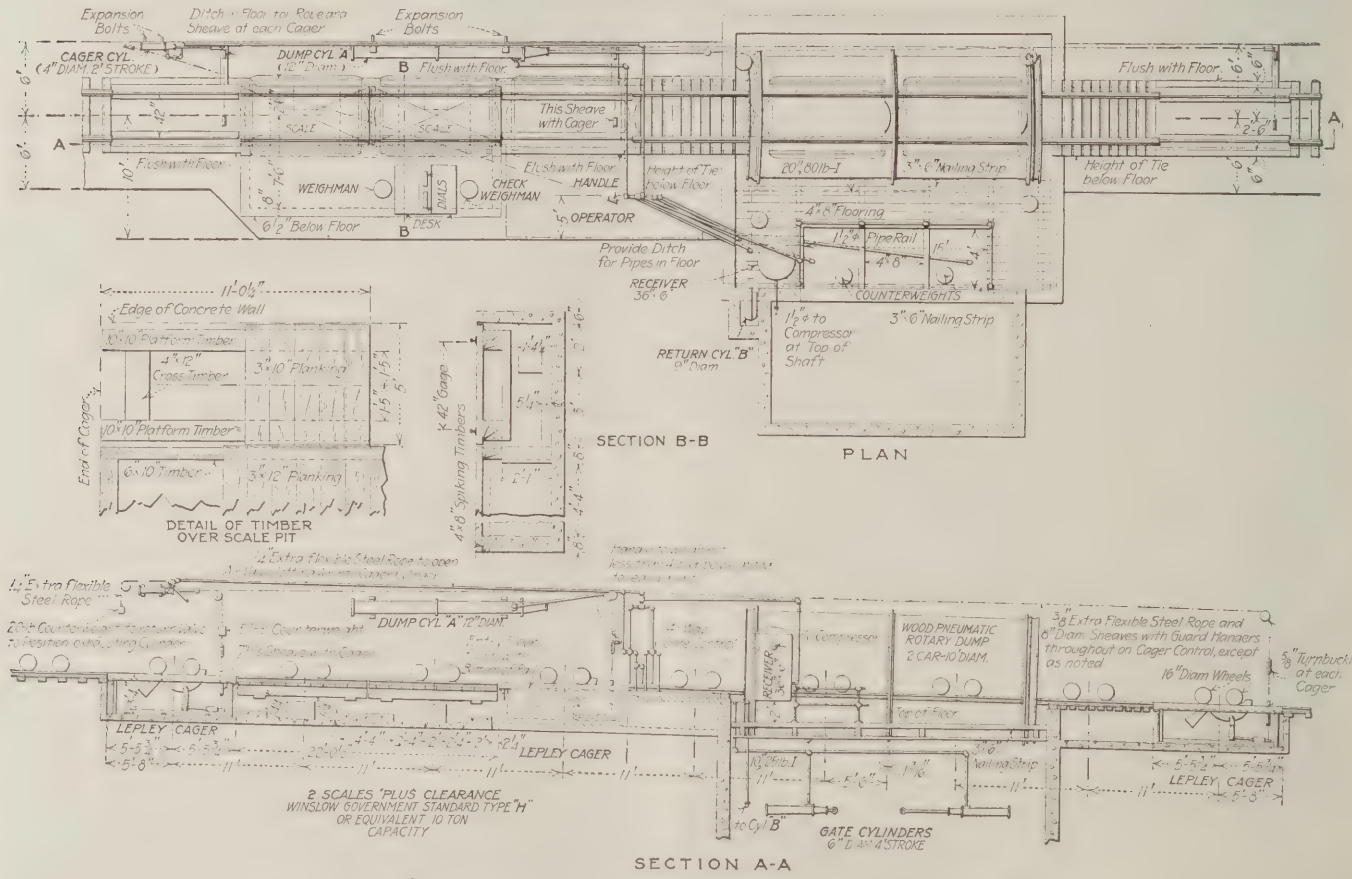


ROTARY DUMP AND FIXTURES AT SHAFT BOTTOM

wrong with each installation in both general design and in details of construction.

The nearest approach to a success was at the eigler mine, and here the hoisting feature of the problem had been solved; but the dumping, both at top and bottom, condemned the whole design. At this mine drop-bottom cars were used, the coal dumped direct into a deep pit holding about 50 tons, and from this pit, or underground bin, the coal flowed through a gate, operated by a compressed-air ram, into the skip, which held approximately eight tons. The drop-bottom cars caused endless trouble, the fall of the coal from cars to bin and bin to skip, together with grinding and crushing in the pit itself, smashed the lumps and greatly increased the percentage of screenings. The outlet gates in the bin were under test, four dumps of two cars each per minute, or 32 tons per minute, which means a theoretical capacity of over 15,000 tons per day. If the mine ever reaches even half that tonnage, there will be no need of "speeding her up" as far as dumping the pit cars is concerned.

In order to eliminate the bin with resultant breakage, the designs for new mines were worked out to place the dump along the side of the shaft, the center line of the dump being parallel with the plane of the two hoisting ropes and far enough back so that the coal could flow to either skip over a steel-lined chute, avoiding all drop excepting the fall from the end of the chute into the skip. The coal is diverted to either skip by means of a movable plate or traveling vane, pivoted at



DETAILS OF UNDERGROUND ROTARY DUMP, SCALES AND OTHER EQUIPMENT

80 to 40 ft. down below the mine rails where the dust and darkness prevented the operator from seeing the skip while loading, with resultant part loads or overloading. The skips discharged in the tipple into a large bin holding about 50 tons, where the breakage was further increased.

In searching for a dump that would meet all the requirements of a coal mine, the pneumatic rotary dump invented by A. H. Wood, and installed at his mine at Kildav, Harlan County, Kentucky, was discovered. After most careful examination and analysis of design by independent engineers, it was pronounced satisfactory, and Mr. Wood was awarded a contract to install a two-car dump in the Zeigler mine. The outfit was put into service in December, 1916, and has been in operation continuously ever since with no troubles of any kind, and is capable of dumping the maximum tonnage the mine can make—in fact, its capacity is, the mid-bunton and pulled by a ⅝-in. cable across the flow chute to either end of the dump carriage. The design provides that the vane will automatically take the proper end of the carriage so that the coal will always flow into a landed skip and not into the sump.

Provision has been made for controlling the dump so that, if desired, the dump cannot rotate unless a skip is in place; on some installations cut-off gates at the end of the chutes are constructed to avoid leakage of small coal into the sump. These gates are opened by the descending skip and closed when the skip is hoisted, by a small counterweight.

The pneumatic rotary dump is a simple affair. The carriage is made of ordinary railroad iron bent to a true circle, and the several circles are fastened together with channels or other standard sections. These circles rest on trunnions similar to ordinary roller-bearing pit-car wheels; common sheet iron forms the shield that

prevents the coal from dropping as it flows over the side of the car as the carriage revolves, and the coal slides along the shield over the flow chute into the skip.

The dump is rotated by steel cables connected direct to the piston rods of two long cylinders over a series of small sheaves and operated by compressed air, so that the shock of the dump is cushioned on air at each revolution.

The power required is small indeed—a 10-hp. motor will furnish ample power for any ordinary two-car dump, but a small receiver should always be used to provide constant pressure and avoid pulsations.

The following is a comparative analysis of the skip and self-dumping cage systems, and demonstrates clearly the fact that an existing output may be maintained with a 40 per cent. reduction in rope speed and a material saving made in power requirements under certain conditions.

The reduction that can be made in the size of the hoisting equipment required for a given depth, tonnage, etc., varies from 10 to 70 per cent., depending largely on the rope speeds required under the two systems.

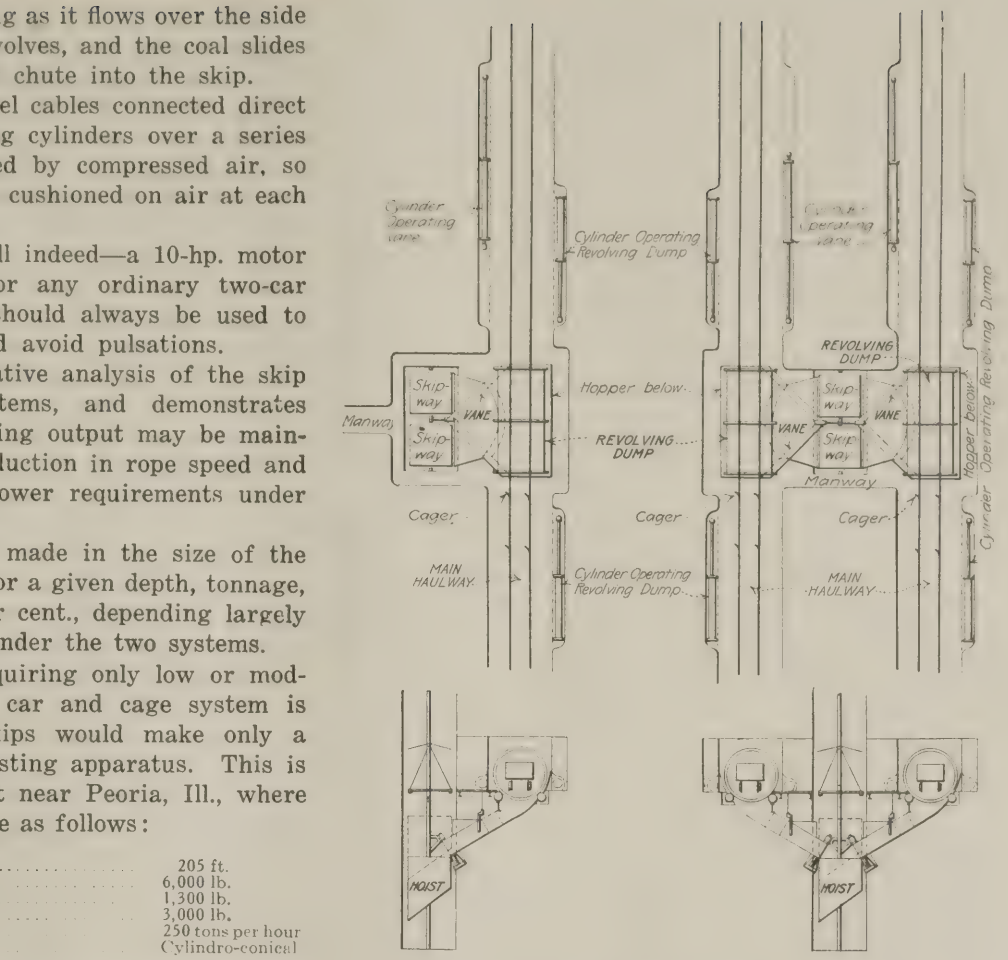
For hoisting conditions requiring only low or moderate rope speeds when the car and cage system is used, the substitution of skips would make only a little difference in size of hoisting apparatus. This is shown by the case of a shaft near Peoria, Ill., where the hoisting requirements were as follows:

Distance rail to dump	205 ft.
Weight of cage	6,000 lb.
Weight of car	1,300 lb.
Weight of coal per car	3,000 lb.
Capacity	250 tons per hour
Drum	Cylindro-conical

On the basis of an electric hoist the root mean square is 166 hp. (R.M.S.[1] = calculation of horsepower on heating basis). On the basis of an electric hoist and skips holding two cars, the R.M.S. is 162 horsepower.

On the basis of an electric hoist and skips holding four cars, the R.M.S. is 148 hp. In this case the average rope speed with the car and cage system is only 800 ft. per minute, and an increase in load carried and a reduction in rope speed makes little difference in either size of equipment or power consumption. In the foregoing case the power consumption is reduced from 0.505 to 0.504 kw.-hr. per ton.

[1]R. M. S. = the square root of the average value squared. Or it is equivalent to the continuous load (in horsepower) that would have the same heating effect on the motor as the fluctuating horsepower under consideration.



SINGLE AND DOUBLE ROTARY DUMPS

On the basis of a mine capacity of 4000 tons in six hours with the following:

Weight of car	3,000 lb.
Weight of cage	8,000 lb.
Weight of coal	8,000 lb.
Distance rail to dump	300 ft.

the R.M.S. is 671 hp., while, by using a skip hoisting eight tons, the horsepower would be reduced to 580. The rope speed is reduced from 24.8 to 15.6 ft. per second.

Recently an operator desired to electrify the hoist



TRACK ARRANGEMENT AT TOP OF GRANVILLE TIPPLE

in connection with a shaft near Springfield, Ill. The duty given was as follows:

Depth of shaft	250 ft.
Weight of cage	5,000 lb.
Weight of car	1,500 lb.
Weight of coal per car	4,000 lb.
Type of drum	Cylindro-conical
Time of cycle	16.5 sec.

This required a maximum rope speed of 35 ft. per sec. and a motor 700 hp. in size. In addition, in order to get safe and economical hoisting, it was deemed necessary to install the Ward Leonard system of electrical control.

By the installation of skips at this mine it would have been possible to secure the tonnage of 432 tons an hour with a 500-hp. motor; an induction-type motor could have been used, which at the present time would mean a reduction in cost of approximately $18,000.

At one of the Franklin County mines now equipped with a 1150-hp. hoist motor, the question of increasing the tonnage by 20 per cent. was recently discussed. To make this increase, retaining the cage and car system, required the installation of a 3000-hp. motor with forced ventilation, which is equivalent to about 4000 hp. with natural ventilation. The duty on which this was based is as follows:

Total hoist	667 ft.
Weight of cage	15,000 lb.
Weight of car	3,300 lb.
Weight of coal	10,000 lb.
Type of drum	Cylindro-conical
Maximum rope speed	4,375 ft. per min.
Number of trips in 7 hours	1,200

This increase in tonnage could be made by the installation of a 10-ton skip with a 1250-hp. motor. It is evident, therefore, that increasing the rope speed in cage hoisting, to obtain a fixed tonnage, means decreased size of hoisting equipment on the basis of skip hoisting for the same tonnage. The preceding examples are given on the basis of actual conditions which have come up in this field.

The actual results as obtained at the Granville colliery near DuBois, Penn., a recent installation, on caging and time of dumping, is given in the following dumping test:

TIME OF DUMPING A TRIP OF 20 LOADED CARS

In the Wood Equipment Co. two-car rotary dump, using swivel hitchings

	Time of Trip Travel, in Seconds	Time of Dumping (Two Cars), in Seconds		Time of Trip Travel, in Seconds	Time of Dumping (Two Cars) in Seconds
1st move	20	7	7th move	15	7
2d move	15	7	8th move	13	7
3d move	15	7	9th move	13	7
4th move	15	7	10th move	17	7
5th move	15	7			
6th move	12	7	Total	148	70

A total of 20 cars was dumped in 218 sec., or an average of one car every 11 sec., which would give 5½ cars per minute.

By using four-ton cars the capacity would be 22 tons per minute, or 1320 tons per hour, or 10,560 tons per day of eight hours. This test was made when the plant had been operating only a few weeks, before the "new" had worn off, and before the men were thoroughly familiar with the operation, but it gives a good idea of capacity.

Another recent installation at the two mines of the Columbus Mining Co., near Hazard, Ky., where the dumps were placed at the tram tracks of drift tipples, verified the tests made at the Granville and Zeigler collieries, so it is safe to say that the dumping part of the skip hoisting problem has been solved.

Placing the loaded cars in the dump is a rather simple matter. They are handled on the mine bottom practically the same as if cages were used, excepting that two, or if desired three, cars at a time are caged instead of one, and the horns of the caging machines are spaced accordingly.

It was found by using swivel hitchings and spacing the track horns properly, that it was not necessary to uncouple the trip when passing the cars through the dump, and the Granville and Hazard mines are so equipped—trips of 25 and 30 cars passing over the scale, through the blocks and dump and out to the empty track—one spragger and one man at the dump handling the entire trip.

In the tipple the coal flows out of the skip as it turns over through the long radius curves and slides



TIPPLE AT ZEIGLER MINE

down a chute to a slow-moving apron feeder, where it is discharged at a uniform rate on the screens. Every effort has been made to avoid all drop or fall to the coal, the only real drop being from the chute into the skip, all other coal movement being slide rather than drop. The fall of the coal from chute to skip compares with the throwing of the coal from the pit car to the weigh basket in the cage system, and it is confidently expected that the total breakage under the new system will be no more than with a cage.

There is another great advantage to the skip hoist that becomes apparent after the system has been in service, and that is the solid-end pit car. Doors on mine cars are a source of continual maintenance expense, they are difficult to keep in good order and there is quite a saving in first cost of cars when doors are eliminated. The solid-end car also makes for cleaner

roads, as most of the coal dust on haulage roads is from leaks between car bottom or sides and the door; the solid car can be built practically dustproof, the only spill being lumps brushed or bumped off the top, and these are comparatively easy to handle.

No data are submitted on comparative first costs of the two systems because none of the installations now under way have been completed, but as near as can be determined from costs to date there will be little saving in first cost of the skip method as against the cage. The cost of the dump itself is probably balanced in saving on pit-car construction, but skips cost more than cages at present prices of plate and the construction of the chutes from dump to skip, with the additional shaft depth required, increases cost of skip installation.

In the tipple structure it is not necessary to build the weigh-house, or that section of the structure carrying the scales, since the coal is all weighed on the bottom before dumping. There is a real saving effected here—probably enough to balance the cost of the extra sump and flow chutes.

The Allen & Garcia Co. is engineering four new skip-installation jobs: The Toluca Coal Co. mine at Toluca, Ill.; the Kathleen mine near Duquoin, Ill., for the Union Colliery Co.; the Valier mine, north of Christopher, Ill., for the Chicago, Burlington & Quincy R.R., and the new mine of the Buckeye Coal Co., at Nemacolin, Penn. At each of these mines, excepting Toluca, the refuse rock, men and material will be handled via a separate compartment at the air shaft; but at Toluca the skip is equipped with an adjustable platform for raising and lowering men. The rock is to be handled in the skips just the same as coal, but diverted by a flop gate in the dump chute in the tipple to the rock bin.

The separate man and material hoist is practically a necessity at large-tonnage mines and is an asset to almost any mine. At the Kathleen and Valier mines practically all the buildings are located with reference to the air and escape shafts, and the only building at the main shaft is the small structure housing the hoisting engines. It is expected to have three shifts of engineers at the man and material hoist and only one at the main engine, since this latter equipment will be in service only during the eight-hour shift when hoisting coal.

For small mines, skip hoisting has the same attractive features as for large producers, where it is or soon will be a necessity, and there are numerous advantages not referred to herein, due to the elimination of the self-dumping cage and open end pit car.

The advocates of skip hoisting at coal mines probably have rough sledding ahead, as the coal man is conservative, to say the least, and skeptical about radical changes in established conditions or customs. Nevertheless, it seems wise that the question be given serious study and consideration. In the last year some of the most competent and thoughtful men in the coal-mining industry have become converts to skip hoisting, and some of them are spending large sums of their own money to demonstrate the courage of their convictions. Let us wish them complete success. If we can help in any way to better the conditions of the industry, make mining safer, or improve our methods, it is not only our duty to do so, but our pleasure as well.

Certificate of Merit for Coal Meter

The Franklin Institute has recently awarded its Certificate of Merit to Oliver D. Havard, of Allentown, Penn., for the Havard coal meter. This is a device which is fixed in the feeding pipe to a furnace, for the purpose of measuring the coal used. The coal is usually crushed to a certain degree of fineness and, in passing through the pipe, rotates a vane connected with a recording device, which is so calibrated that the rotations of the index will indicate the amount of coal passing through the pipe. This is of especial value in connection with automatic devices for feeding furnaces.

April Production in British Columbia

A statement of tonnage of coal mined by the various British Columbia collieries for the month of April, 1918, issued by the Department of Mines, gives a total of 224,992 tons. The tonnages from the different districts follow:

	Tons
Vancouver Island	148,098
Crows Nest Pass	62,641
Nicola-Princeton	14,253
Total	224,992

The total tonnage produced in the Province for the first four months of this year is 898,036 tons. For the same period in 1917 there were 820,864 tons produced, making an increase for the same period this year of 77,272 tons. Coal produced in the coal mines of British Columbia for April follows:

Company	Production, Tons
Crow's Nest Pass Coal Co., Coal Creek	37,975
Crow's Nest Pass Coal Co., Michel, B. C.	17,280
Corbin Coal and Coke Co., Corbin	7,386
Middlesboro Collieries, Ltd., Merritt	8,939
Fleming Coal Co., Merritt	2,806
Princeton Coal and Land Co., Princeton	2,508
Canadian Western Fuel Co., Nanaimo, B. C.	66,025
Canadian Collieries (D), Ltd., Cumberland, B. C.	50,531
Canadian Collieries (D), Ltd., Extension, B. C.	19,971
Pacific Coast Coal Mines, Ltd., South Wellington	9,325
Nanoose Collieries Co., Nanoose Bay, B. C.	2,246
Total production	224,992

It is thus shown that the production continues to climb, and the indications are that it will go much higher before the end of the year. The Granby Consolidated Mining and Smelting Co., having opened up a 14-ft. seam on one of the three slopes being driven on its coal land holdings on Vancouver Island, may be expected to bring to the surface at least 500 tons a day before long. The new No. 5 Mines of the Canadian Collieries (D), Ltd., at South Wellington, which is producing between 20 and 30 tons a day on development, will run between 500 and 600 tons per diem before the end of the year. Incidentally, it may be said that the company is installing a complete plant at this mine. The tipple arrangements now are being completed, screening equipment prepared and yards laid out. The Morden mine of the Pacific Coast Collieries, which was in barren ground recently, has struck an 11-ft. seam and will be doing better from this time forward, while the Harewood Mine, of the Canadian Western Fuel Co., Nanaimo, B. C., is proving one of the most remarkable single mines of the Island. After being abandoned it was reopened last fall, and during the month of April produced at the rate of about 800 tons a day.

Join the army behind the Army—be a war saver.

Blower Fans in Gangway Driving

By WILBUR L. CROSS
Ashland, Penn.

SYNOPSIS—*In certain portions of the anthracite field the use of small blower fans and wooden pipe for the conveyance of air to the face shows many advantages over other methods of driving-gangway ventilation. Supplanting a fanboy with a motor pays for itself in about two months.*

IN THE southern anthracite field where, because of the steep pitching and small beds, penetration of old workings and the frequent impossibility of having other than small airways near some of the working faces the question of auxiliary ventilation becomes a serious problem, every effort has to be made to solve the numerous difficulties presented by different phases of the work. One of these, the ventilation of driving gangways, offers a problem which hitherto has not been satisfactorily solved.

Some of the methods most commonly used to ventilate the driving gangways may be briefly described as follows:

1. By Means of a Door in the Gangway. A temporary door is built in the gangway just outside of the last chute. From this a square wooden box or pipe is extended nearly to the face. This carries the air to the face being driven ahead of the last chute. Under this system the door and the pipe must be moved ahead as the gangway is extended. This is a slow and expensive process especially if a tight door is made.

2. By Means of a Hand Fan Turned by a Fanboy. Under this system a small hand fan is installed connected to a wooden pipe made of 1 x 12-in. plank. A boy by turning the fan by hand keeps the gas away from the face of the gangway and chutes. It is at best a poor method for the force of air is not sufficient to secure good ventilation nor is it possible now to get boys to stay on the job.

3. By Means of a Power-Driven Blower Fan. This system is a development of the fan and fanboy method. The fan most commonly used is a high-speed blower-type fan 12 in. in diameter, direct-connected to a ¼ hp. compound-wound motor, speed 1700 r.p.m. The motor is connected by No. 14 weatherproof copper wire to the nearest trolley feeder and protected by the ordinary type of entrance switch equipped with plug fuses.

The fan is situated outside of the last chute so that fresh air entering the gangway comes to the fan. The air is carried to the face of the gangway and chutes through a 6-in. inside diameter wood pipe. This is the ordinary wood pipe used for water supply. A strong pipe is needed for this service, one which will withstand hard knocks, rough handling, small coal and rock falls from the chutes and cars and pieces blown from the face.

In some places sheet steel or canvas pipe may be used to advantage, but for all-around use in the gangways driven in the steep pitching beds the wood pipe on account of its ability to withstand rough handling and hard service has been found to give the best satisfaction. Wood pipe as ordered from the factory will have mortise and tenon joints. It is well to order the pipe mortised for 6-in. wrought-iron pipe and to cut nipples from scrap pipe which will be found around any colliery for making the joints. The reason for this is that the wooden tenon will not stand up under any but the most careful handling, and if broken renders the pipe practically useless. The fan and pipe must of course be moved ahead as the gangway is driven forward. This is a small job which may be performed by the gangway man in an hour on company time or can be done by the repairman.

The following equipment at the prices noted will be all that will be needed for one gangway: One fan and motor complete, $60; 100 ft. of wood pipe at 34c., $34; one wooden tee, $2.50; one wooden 45-deg. elbow, $2.50; one entrance switch and wire, $5—a total of $104.

The equipment costs about what a fanboy would be paid in two months. In other words, at the end of two months the saving in the fanboy's wages will have paid for the equipment. With ordinary care there need be no repairs for five or six months other than the replacement of the brushes. However, due to various causes both avoidable and unavoidable, armatures and field coils will be burned out. A charge of $4 per month for armatures, coils, broken brush springs, fan-blades, etc., will come close to the average if 10 or 15 fans are in service and care is taken to prevent the avoidable causes of burnouts, which will be enumerated later.

The life of the wood pipe with ordinary wear and tear will be at least six years. The motor and fan if kept in repair will also last the same length of time. The accompanying table may accordingly be made up to show the monthly cost of one fan. No charge for labor is included as it is assumed that there is an electrician already in the employ of the company. This man can take care of the few fans needed at the colliery and still keep up the other equipment. From one point of view this is not an accurate way of figuring costs. It is accurate, however, in that it shows what the extra monthly cost of installing these fans would be over and above the cost previous to their installation.

Depreciation of equipment, 1/72 of $104	$1.45
Repairs	4.00
Interest on investment	.52
Power cost, 1,500 watt-hr. per day—25 days per month, at 2c. per kw.-hr	.75
Total	$6.72

For a total cost, then, of $6.72 per month the driving gangways are kept free from gas and the smoke quickly cleared away after a shot. The cost is so small when the great advantages of the installation are taken into account that it can almost be ignored.

To keep the repair costs down to normal and, what is of more importance than cost, to keep the fans always in working order the avoidable causes of burnouts must be known and remedied. Most of the avoidable troubles experienced are due to one or more of the three following conditions:

1. *Ill Treatment or Neglect.* Bearings not oiled or not replaced until they are worn so that the armature rubs the pole pieces. Fuses are blown out and are re-

placed with copper wire. Brushes are not cared for or the commutator is allowed to get dirty.

Miners Attempting To Do Electrical Work. An instance may be cited of a miner who saw a slight sparking at the brushes and poured water on the commutator to "put out the fire." "Me see him little fire, putten on for water. Zip! Big fireworks. Motor she no go."

2. *Dust Collections.* By far the greatest number of burnouts may be traced to an accumulation of dust in the motor. It is almost impossible to completely protect the motor so that dust will not get into it. This dust, if allowed to accumulate, will absorb surplus oil, ignite from sparks from the commutator and burn the insulation from the coils with disastrous results. If the electrician's assistant, whose duty it is to keep these fan motors in order, carries with him a small hand bellows he can keep the dust from accumulating by blowing it out every time he inspects and oils the motors. This little precaution will prevent about 90 per cent. of the burnouts which would otherwise occur.

3. *Poor Voltage.* In some of the sections of the anthracite collieries the trolley feeders are not large enough to carry the necessary amount of current when the locomotives have a hard pull. The locomotive motors are built to withstand a wide range of voltage, but the small fan motors are not. Consequently, the fan motor should be connected to a feeder where the voltage will be fairly constant, otherwise the excess current due to variation in voltage and consequent loss of speed in the fan will quickly break down the insulation and result in burnt-out armatures.

I have specified in this article and given reasons why wood pipe should be used instead of the other classes of pipe which might be employed. It must not be supposed that I am condemning the use of the canvas pipe which has been widely used in the anthracite as well as the bituminous regions, and in tunnel driving. For the special class of work that I have described and for the reasons given I advocate the use of the wood pipe in the manner set forth above. In work where there is little danger of falls and the pipe can be suspended, the canvas tube will be found to be easier to install and more convenient in every way.

Minecdotes

In Which Poor Judgment Is Shown

Recently a serious accident was avoided at a certain colliery through sheer good luck. It was on one of the numerous holidays observed by foreign-born miners, and some of the men did not report for work. However, the mine was operated for a few hours regardless of the absentees.

When the mine foreman learned of the absence of a certain motorman who usually operated one of the gathering locomotives he promptly lost his good nature —provided he ever had any of the genuine article. After relieving his emotions somewhat through the medium of profanity, he instructed a young fellow who was standing nearby awaiting his day's orders to take charge of and operate the locomotive.

Now, this young fellow knew as much about the proper operation of an electric locomotive as does the average bull terrier about aëronautics. This he tried to explain to the irate foreman. But the latter thought the lad was lying. He considered that the young fellow ought, as a matter of course, to know something, at least, about handling a mine motor. The foreman considered the man's protestations of ignorance a subterfuge whereby he hoped to secure a job more to his liking. He therefore cut the young fellow short with the words: "You will either run that motor or go home. There will be no more sneaking out of jobs that you do not like around here." The lad accordingly promised to do his best.

As has been stated, this motorman *pro tem.* knew next to nothing of mine motors and the ways thereof. When he reached the lift where the locomotive was, being ignorant of the fact that the current-switch had to be closed in order to put "juice" in the trolley wire, he took off his coat and stowed it and his dinner bucket carefully away on the locomotive. He instructed the brakeman (who knew no more about the machine than he did) to go ahead and place all the switches for a straight road.

The young man then took his place and started to open the controller. The motor, however, refused to "mote," no matter how far over he threw the lever. Recalling the brakeman, he asked him if he knew what was wrong. But the latter was as much in the dark as the motorman appointee. They were stuck.

Finally, after exhausting their combined electrical knowledge, they started for the telephone to summon the boss, much though they disliked to do so. About 100 ft. from the locomotive they came upon the open switch that caused their difficulties. They threw it to see if anything would happen—and things happened in a hurry.

The controller had been left in the "full on" position, and in the course of the motor's wild flight along the track it tore down seven doors and finally pulverized a car against the face of the gangway where the gangway miner and his laborer would have been had they not been celebrating.

The rest of the miners on that gangway had to go home on account of deranged ventilation. The motorman *pro tem.* was discharged. He now knows more about switches, motors, controllers, and a few other things, than he did before. The boss—well, perhaps he also is somewhat wiser.

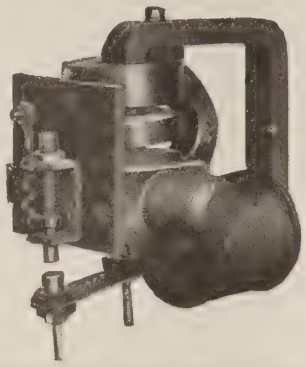


POWER HOUSE AND TIPPLE AT THE WABASH MINE OF THE WESTERN COAL AND MINING CO.

New Apparatus and Equipment

Reverse-Current Relays

A new form of reverse-current relay has been developed and placed on the market by the Automatic Reclosing Circuit Breaker Co. These relays are of the circuit-opening type and are so designed that they will open either upon reversal of current or with zero current at abnormally low voltage. The relay is closed and held closed by a shunt polarizing coil. A high resistance is connected in series with this coil. To close the relay a push-button switch is provided which temporarily short-circuits the high resistance. This high resistance limits the current in the shunt winding to just sufficient value to hold the relay closed. A reversal of current or failure of voltage will thus cause the relay to open.

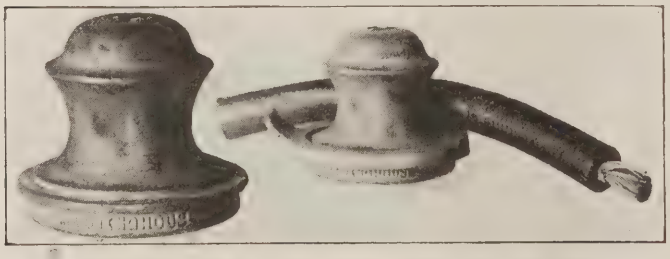


REVERSE-CURRENT RELAY
100 to 800 ampere size

These relays are designed for mounting on the rear of a circuit-breaker panel. The 1200- and 2000-amp. size has a magnetic yoke which surrounds the upper stud of the breaker. The 400- to 800-amp. size relay is provided with a series winding the terminal of which is connected directly to the upper stud on the rear of the panel.

Armored Corner Insulator for Feeder Cables

A new Pittsburgh-type of corner insulator, for securely holding feeder cables on curves, is being marketed by the Westinghouse Electric and Manufacturing Co. This corner insulator is provided with a special collar, or retaining ring, for use where the curve is slight and the cable likely to slip off an ordinary insulator. The collar has an extended lip which curves up around the cable and keeps it in the groove regardless of the angle at which the cable turns. This eliminates the necessity for tie wires and saves time in erection.



CORNER INSULATOR FOR USE ON CURVES

The collar is free to move on the insulator cap, so that after the insulator is screwed to the pin the collar may be turned until the cable seat is in the position best suited to support the cable. For sharp curves the insulator can be used without this collar, as the deep side groove holds the cable firmly in position.

These insulators are made of molded insulation surrounded by a sherardized malleable-iron cap. They are made with a 1-in. pinhole and are furnished in two sizes for feeders of 500,000 and 1,000,000 circular mils respectively.

The Development of "John Crane" Packing

Seldom has an engineering invention or discovery attracted so much attention and created so much interest among operating engineers as has the well-known "John Crane" flexible metallic packing. This packing was invented by an operating engineer named John Crane in the early spring of 1912. Mr. Crane then had charge of a large power plant and was directly responsible for maintenance and repair costs.

His first object was to develop a permanent packing. From actual experience he knew that soft packings ordinarily lasted only a few months, their life depending upon the condition of the plungers or piston rods. Of course, he desired to reduce the bills and if possible to make his packing permanent. He noticed that where metal and fabric were combined in packings the life of such packing was lengthened; also that metals were not affected by heat or water, while the soft packings were. The metal not only lengthened the life of the packing, but it seemed to polish the plunger. Hence the idea came to him of an all-metallic packing.



"JOHN CRANE" COMPRESSIBLE PACKING

After much thought and experimentation, John Crane evolved the idea of taking long, thin continuous strips of metal foil and wrapping this spirally round and round, treating each sheet with a layer of lubricant to permit the sheets to slide on each other and to allow bending about the smallest diameter, also giving the product a compressibility sufficient to compensate for wear and sufficient to control any ordinary pressure. These spirally wrapped sheets, he found, formed perfect barriers against high pressure and made a strong, durable construction.

Mr. Crane had packed many stuffing boxes and knew that a packing to be a success must be simple to instal,

one that could be placed in the same stuffing boxes as soft packings and with equal ease. He therefore used soft metal which could be cut with a knife, took any form or shape under pressure of the gland and bent about the plunger easily.

Reduction of rod friction and elimination of wear were also carefully borne in mind when this packing was developed. That is why the inventor selected an anti-friction metallic-sheet combination containing a babbitt alloy. A mechanical combination of these babbitt sheets spirally wound with lubricant between each sheet naturally was successful in greatly reducing the wear on the rod. To date this saving in wear has amounted to many thousands of dollars that would otherwise have been spent for repairs, replacements and labor charges. It does not require an expert to prove that long-lived packing is highly desirable from the investor's standpoint.

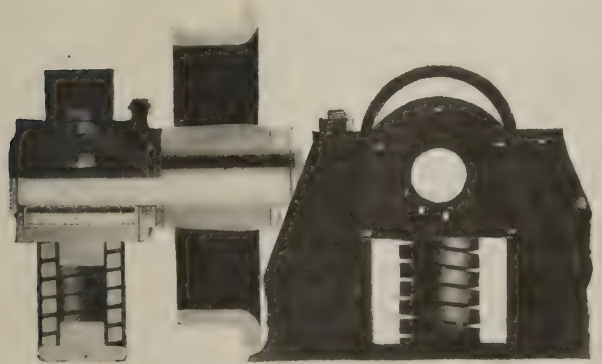
"John Crane" products are now made up in many forms of die-pressed, hand-pressed, straight lengths, rings, coil form and spiralled from 1/32 to 2 in. thick, suitable for steam, air, ammonia, hot or cold water, high, low or hydraulic pressure, oil and acid service. The "John Crane" line has been steadily developed and today any combination of metal alloys for special services can be secured, either in the form of a packing or in a gasket.

As shown in the accompanying illustration, this packing is merely smooth babbitt sheets, thoroughly lubricated, wrapped spirally, forming an all-metallic, flexible, compressible, simple and lasting product for the purpose intended. Rings are generally preferred for large plungers, whereas coils are used in smaller work as in valves, traps and small steam rods.

Improvement in Roller Bearing Journal Boxes

The coal-mining industry has not had a marked change in the method of applying roller bearings to mine cars for a long time. The usual method of application is to install the anti-friction bearings in the hubs of the wheels.

The Fleming self-aligning journal box equipped with



FLEMING JOURNAL BOX WITH HYATT ROLLER BEARINGS.

Hyatt roller bearings, as shown in the accompanying illustration, is a distinct departure from the old method, in that it presents several novel features for the application of this type of bearings to mine cars, especially those carrying from three to five tons of coal. They are furnished with heat-treated axles. This secures a durable equipment, since such axles wear for a long term of years and the danger of their being bent or broken is almost entirely eliminated. Heat-treated axles are coming more and more into use on mine cars and the day is approaching when every modern mine car will operate upon such axles.

The illustration shows a box of the type used with inside wheels, but the boxes are also furnished for use with outside wheels, the fundamental principles remaining the same, a slight change being made in the end plates. These boxes are manufactured by the J. R. Fleming & Son Co., Inc., of Scranton, Penn., and can be applied to both anthracite and bituminous mine cars.

Legal Department

Liability of Mine Operators

By Chesla C. Sherlock,
Attorney at Law, Des Moines, Iowa

The liability of mine operators for the acts of fellow servants has called for no small degree of consideration from the courts. Under the common law, the master was not liable for the negligent acts of a fellow servant. This was a defense recognized by the law and one that mine operators were permitted to use whenever the opportunity presented itself.

The time came, however, when the public saw that the ordinary defenses allowed employers under the common law were not only sadly out of date, but wholly inadequate and unjust to the workmen. Several of the states, moved by this growing popular feeling, passed the so-called mining acts which either abrogated, or modified to a considerable extent, the common law defenses of the employers.

These acts generally provide that mine operators shall not be relieved from liability for injury to a workman on the ground that he was injured by the negligence of a fellow servant. Naturally, the question has come up, What is mining and when will the acts apply?

In a Missouri case, it appeared that the injured workman had been engaged to sink a shaft for the discovery of coal. In the course of his employment he received an injury and brought suit, the employer defending on the ground that his injury was due to the negligence of a fellow servant, and that exploring for coal was not "mining" within the meaning of the Missouri statute.

The court went into the question very thoroughly, but held that "persons employed to sink a prospect hole for the discovery of coal are not within a statute rendering the owners or operators of mines producing coal or other valuable minerals liable for injuries to their employees caused by the negligence of fellow servants."

The Oklahoma constitution expressly abrogates the fellow servant rule in that state in respect to certain specified employments, which includes that of mining operations.

The courts were called upon to determine whether or not drilling a well to search for oil or gas was a mining operation.

A case came up where it appeared that a drill was being operated by two men, one of whom was known as a driller and the other as a tool dresser, the drill being run by an engine. Plaintiff, the tool dresser, while operating the engine, raised the stem into the derrick preparatory to taking it down, a rope having been tied around it by the driller before it was raised, and finding he had not raised the stem high enough to clear the girder, plaintiff went up into the derrick, when the driller called to him to take it out under the girder. Plaintiff then walked out on a walking beam where he could not support himself against the timbers of the derrick, and as he pulled down and outward on the rope, it came untied, and he lost his balance, fell to the ground and was injured. The negligence alleged was that of the driller in tying the rope so that it could come untied. The defense was that plaintiff and driller were fellow servants and defendants were not liable. The plaintiff then claimed that the work he was doing was mining and that the fellow servant rule was abrogated in such work.

However, the court held that "drilling a well in search of oil or gas is not mining within the meaning of the constitution," and that the common law rule of fellow servant governed the case.

The Missouri statute, passed in 1909, reads as follows: "Every person, company or corporation operating a mine or mines in this state producing lead, zinc, coal or other valuable minerals, shall be liable for all damages sustained by any agent or servant thereof while engaged in operating such mine or mines, by reason of the negligence of any other agent or servant thereof: Provided, that it may be shown in defense that the person injured was guilty of negligence contributing as a proximate cause to produce the injury."

In a Missouri case, it appeared that the plaintiff was a driver in a coal mine operated by the defendant. On the occasion of his injury, he had taken empty cars to the end of the track and piled them up on the sides of the track to make way for a loaded train he had to get out. Another driver came along and piled more cars up, but left one in such a way as to project over the track. The plaintiff ran into the obstruction, being unable to see it in the dim light, and crushed his right leg and foot.

The court held that the defendant was liable under the above section of the statute and affirmed the judgment in favor of the plaintiff.

The courts of Missouri have further said that a master is liable to a servant for the negligence of a fellow servant, under the Missouri statute, without any exception save that of contributory negligence.

Under the Montana statute, a mine owner is liable for any damage sustained by an employee, without any fault on the latter's part, where such damage is caused by the negligence of a fellow servant.

In a Montana case, it appeared that plaintiff's intestate was foreman in defendant's mine and while attempting to get off a hoisting apparatus, a skip, as it was lowered in the shaft, was by reason of the alleged negligence of the hoisting engineer in raising the skip without signal, caught between the skip and shaft timbers and sustained injuries resulting in death. The court did not waste any time in affirming the judgment for the plaintiff, it being plain to all that this case came under the statute.

The Alabama code contains a similar statute and the courts of that state have decided cases similar to the one mentioned above.

In a Michigan case, it appeared that the person operating the mining cage was not employed as an engineer but as a fireman, and that his being in charge of the hoisting engine at the time of the accident was in violation of the Michigan statute, which provides "that only a competent and trustworthy engineer shall be permitted to operate the cages and hoisting devices in all coal mines in this state."

The court would not hear the defendant because he had plainly violated the statute in employing an inexperienced man to operate the hoisting cage, and gave judgment for the plaintiff.

In a Wyoming case, it appeared that the plaintiff's injury was due to the incompetency of the engineer causing the cage to fall to the bottom of the shaft.

The court found that there is no statute in Wyoming defining the relation of fellow servants, and that while statutes have been enacted imposing certain duties upon an employer in specified cases and giving the right of action for damages where an injury has occurred as a result of a willful violation of such duties, they are not applicable to the instant case.

The court did, however, find that there was a statute in Wyoming which prohibited mine operators employing any person as engineer who used intoxicating liquor. It was shown that the engineer in question was a user of such intoxicating liquor, and for that reason the court entered judgment in favor of the plaintiff.

In questions of this nature, the answer is naturally found in the state statutes and in the decision of the various courts construing those statutes.

The courts are quite generally of the opinion, however, that the word "mining" as used in those acts is to be taken in a very strict sense, and not applied to prospecting, exploring or shaft sinking where the purpose is merely to discover minerals.

Use of Tar as a Fuel

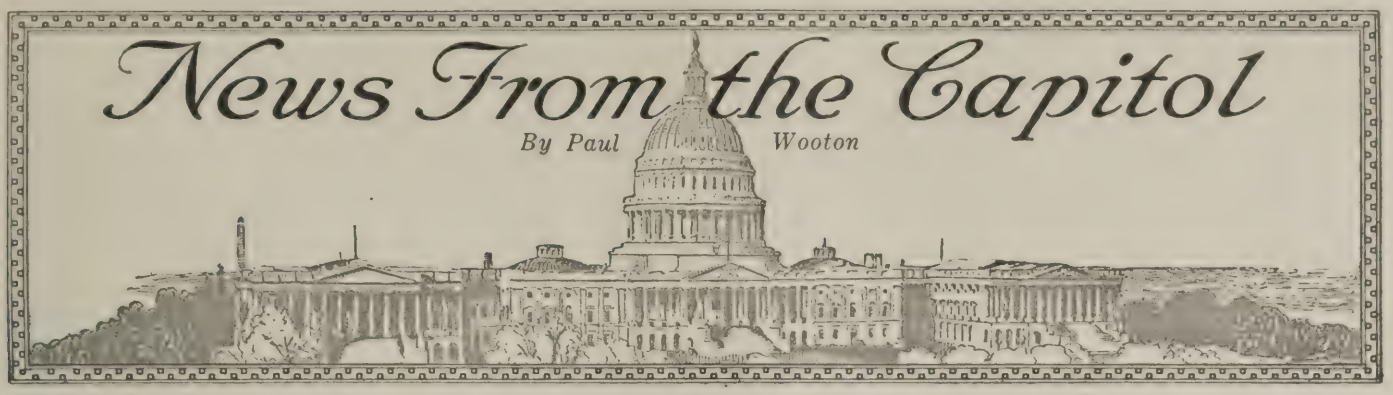
Some tests that indicate in a practical manner the value of tar as a fuel have been carried out in England in connection with oil furnaces and burners, the tar being mixed in certain proportions with creosote. Of two tests made, the first employed a half-and-half mixture—that is, tar 50 per cent. and creosote 50 per cent.

In order to make it flow through the pipes, the mixture was heated in an overhead tank to a temperature of about 100 deg. F., and on its way to the burner it passed through a steam-heated chamber, raising it to 150 deg. F. At this temperature it was easily atomized and, it is said, burned satisfactorily at a low air pressure, namely, 15 in. of water gage.

In the second test a larger proportion—namely, 70 per cent.—of tar was employed, with of course 30 per cent. creosote. The conditions were the same and the result was, it is stated, equally satisfactory. The national importance of the use of tar in such a connection at the present time is self-evident.

Give up your luxuries that the Kaiser may be made to give up his ambitions.

Help your Government and yourself at the same time—buy War Savings Stamps.



Coal Distribution Plan Completed

Intrastate coal distribution plans have been completed by the Fuel Administration. The Fuel Administration describes the procedure in this important regard as follows:

The War Industries Board will decide what consumers shall have preference in securing coal; but the United States Fuel Administration has been asked to assist in the compilation of complete preference lists by obtaining reports and recommendations on individual firms from the state and local fuel administrators.

The crux of the new distribution plan lies in the compilation of these preference lists. All consumers of coal, except domestic consumers, will be recorded under the following classifications:

a. Railroads.

b. Army and Navy, together with other departments of the Federal Government.

c. State and county departments and institutions.

d. Public Utilities.

e. Retail Dealers.

f. Manufacturing plants on War Industries Board's preference list.

g. Manufacturing plants not on War Industries Board's preference list.

The first six classes will be given preference in coal shipments in coöperation with the plants of the War Industries Board.

The distribution of coal to consumers in the first two classes will be handled from Washington. Washington will also supervise shipments to a few vitally important plants.

The list of consumers entitled to preference as established by the War Industries Board will be obtained through a questionnaire sent to every manufacturing plant in the country using more than 500 tons of coal annually. This list, when compiled, will be furnished to each Fuel Administration district representative in the producing field which supplies the various states, and with these lists to guide them, together with weekly reports which will be required from each manufacturing plant, the state and local fuel administrators and district representatives will give their particular attention to building up proper stocks of coal at all essential war plants.

In order to control the distribution of coal to domestic consumers and industrial plants by retail dealers, the dealers will be required to make a special report to the state fuel administrators and from these reports deliveries to manufacturing plants not on preference list can be curtailed when necessary.

Under this plan of distribution each consumer should arrange for shipments from the same source of supply as last year, if possible. If diversion of coal for the war program or the zoning system will not permit this, the consumer should make every effort to form new connections, preferably under a contract arrangement, wherever a supply is available, before calling on the state fuel administrators for assistance.

Weekly reports to the state and United States Fuel Administration will show the actual shipments of coal to the various classifications of industries.

The plan is designed to fix definitely the responsibility and authority of the state fuel administrators. It provides for a complete system of reports for interchange of information between consumers of coal, state fuel administrators, district representatives and the United States Fuel Administration.

Complete lists of the preferred industries in every community in every state will be available as soon as the reports are compiled.

Zoning System Working Well

Operation of the zoning system is exceeding the fondest expectations of its creators. That it is an important factor in making possible a better car supply is asserted at the Railroad Administration. One of the most important changes is that now going into effect in the Kanawha region. This coal is being forced eastward, with the exception of that moving under permit. To make up for the westward movement of that coal, Chesapeake & Ohio, Norfolk & Western and Elkhorn coals have been barred from Indiana. This supplies more coal for Ohio, Michigan and the Lakes. Indiana has a surplus production. Indiana screenings for 60 days are to go all over the lower peninsula of Michigan and into Ohio as far east as Columbus. By keeping Indiana screenings out of Chicago a market is made for Illinois screenings, which have been almost a drug on the market.

Weekly Production Statistics

All records in the production of bituminous coal were exceeded when the output of the country's mines reached the unprecedented total of 12,465,000 tons during the week ended June 8. This exceeds by 17.8 per cent. the production during the corresponding week of 1917. The average daily production went well above 2,000,000 tons, which compares with a daily average of 1,791,000 tons during the week ended June 1.

The remarkable performance of the week and telegraphic advices indicating that the pace had been maintained during the week ended June 15, resulted in a more optimistic view of the situation than yet has been taken by Fuel Administration officials.

Anthracite forwardings came back to normal during the week ended June 8, when 40,754 cars were shipped.

Beehive coke production during the week ended June 8 was 638,000 tons, an increase of 4 per cent. over production during the week preceding. Labor continues to be the chief factor limiting the production of beehive

coke. Byproduct coke production for the week ended June 8 was 480,722 tons. This is a slight increase over production during the preceding week. Just at present the most important factor limiting production of by-product coke is repair of plants.

While car shortage continues to be the most important factor limiting the production of bituminous coal, the car supply is being increased rapidly and there is promise that the more important producing regions soon will have close to 100 per cent. car supply. Each week is showing an increase in the extent to which labor shortage is limiting production, and this factor bids fair to become the chief reason in retarding maximum output.

The figures referred to in the foregoing are estimates made by C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

Domestic Consumers Must Conserve Coal

By seeing to it that coal is not delivered to domestic consumers in a greater quantity than is needed, with careful use, for the winter, the Fuel Administration expects to save for other uses fully 15,000,000 tons of coal. A national work to this end is being set on foot under the direction of T. C. Mahady. The plan has been tried out in Philadelphia during the past six months and is said to be entirely successful. An inspection system is expected to have an important influence in securing compliance by users.

Modifies Freight-Rate Increases

The drastic increase in freight rates made May 25 (General Order 28) is receiving some modification as a result of popular clamor. It was found that some intrastate rates were increased 300 per cent. by the provision made that all intrastate rates be lifted to the same level as the interstate rates prescribed in the order. The rates had thereby a double lift, first to the level of the old interstate rates and then the further 25 per cent. increase that was imposed on the earlier charges. Furthermore, the order changes the regulation in Section 5 entitled "Minimum charges."

"The minimum charge of $15 per car will apply only to line-haul shipments and not to brick, cement, coal, coke, logs, or sand and gravel and stone (broken, crushed or ground) on which the existing rates as increased under Section 2 of the order shall apply."

The Railroad Administration has also postponed until Aug. 1 the requirement that freight transportation shall be settled on a cash basis.

New England To Receive Large Tonnage of Bituminous Coal

New England is to receive 30,000,000 tons of bituminous coal. The Fuel Administration has apportioned this amount to that section after a careful study of its requirements. Steps have been taken to insure the delivery of 60 per cent. of that amount by Oct. 1. As New England forwardings in April and May were below the average which must be maintained, it will be necessary to ship at a higher rate during the next three months. Mines in central Pennsylvania have been ordered to double their New England shippings.

Enforcing Output of Clean Coal

Six mines have been shut down for disregarding the clean coal regulations. Three mines were shut down partially and the operators of 568 mines censured and warned to improved their methods. This report by the Fuel Administration covers the past six weeks during which inspection of output has been in progress. The report shows that 116 mines were preparing their coal properly at the time of the visit of the inspector.

Automobile Industry Receives Drastic Cut in Fuel Supply

Seventy-five per cent. less fuel must be used in the manufacture of pleasure automobiles in the season of 1918-1919 than was used in the fiscal year preceding. This drastic action was taken by Dr. Garfield after he had delayed a decision for some time awaiting action on the part of the War Industries Board as to the amount of steel which could be devoted to pleasure-car industry.

Restricts Industrial Expansion in Certain Area

Further industrial expansion in the East and in New England has been stopped by joint action of the War Industries Board and the Fuel and Railroad Administration. Development has reached the point where it is no longer possible to supply the necessary transportation for fuel, raw materials and the finished products. The order is intended to force new industrial activities in districts where fuel and raw materials can be transported by lines which are less congested. The restricted district consists of New England states; eastern and southern New York; Pennsylvania, as far west as Williamsport and Altoona; all of New Jersey and Delaware and eastern Maryland, not including Baltimore.

Inspire Labor To Do Its Best

Anticipating a more generous supply of coal cars, James B. Neaie, head of the production bureau of the Fuel Administration, is planning a nation-wide campaign to speed up production. As labor soon is expected to become the most important factor limiting production, Mr. Neale is directing his principal effort at this time to the task of inspiring labor to do its best. The campaign will begin in central Pennsylvania. Prominent men will have heart-to-heart talks with the workmen at the mines and operators will be urged to do their part in expediting production by providing every facility and convenience which will aid their employees to mine more coal. John P. White, of the Fuel Administration's staff, is among those who will make speechmaking tours to urge the miners to do all in their power to increase production.

H. F. Byrd has reconsidered his action in resigning as fuel administrator for Virginia. This was done at the urgent request of Dr. Garfield after he had received numerous communications from Virginia asking that Mr. Byrd's resignation should not be accepted.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

The Railroad Administration has increased its car supply so much that the mines in some new quarters are now put to it to hold up their end. It is necessary, somewhat generally throughout the bituminous regions, as it has been all the time in the anthracite and Alabama fields, to use all manner of persuasion and entreaty to get the men to work steadily and for full working hours. Every effort is being made to reduce absenteeism and to increase the ardor of the men.

The railroads' slow turn of cars has driven away the employees. Irregular work has given the men the holiday feeling. Wages have been raised to meet the impoverishment due to shortened hours of work. Consequently, it is now not necessary for a man to work every day to make a living. The wage was raised with that end in view. Now that there is work for every day and wages are so high that steady work is not imperatively required for the securing of a comfortable living, the high wage works continually against the maintenance of maximum output.

MERE SELF-INTEREST WILL NOT STEADY WORKMEN

There is no reason, however, why a patriotic appeal will not undo all that requires to be undone. The mine worker, like other men, is willing to work hard for his country, even if he will not labor diligently to secure a roll of banknotes. More men than ever are prepared to work overtime and are even willing to overexert themselves to help their boys and their neighbors' boys "at the front."

The union in the Shamokin (Penn.) district is making monthly instead of quarterly inspections of buttons, and it hopes by continuous pressure to keep the bulk of the mine workers in the union without the help of button strikes. When membership dues are paid promptly they do not appear so large as if allowed to run a full quarter.

Central Pennsylvania is working steadily, the necessity for a large tonnage being made plain by a number of speakers. In Ohio a strike of 350 mine workers occurred at the Kirk-Dunn mine in Columbiana County on June 13. The men alleged that the draft board granted deferred classification to three miners and denied that status to others. The strikers allege that those thus "deferred" are "just miners" and are not entitled to be singled out for exemption. The operators are charged with having sought favors for the three men and to have been indifferent as to the desires of the rest. The spirit of patriotism in Ohio does not seem as keen as in the anthracite region, where applications for deferred classification should be presented frequently, but are not.

PROSECUTING ATTORNEY SENDS MEN BACK TO WORK

A strike occurred also at the Pursglove-Maher Coal Co.'s Maher mine at Glencoe, in Belmont County, just west of Bellaire, Ohio, early this month, but the men returned to work on receiving orders from the prosecuting attorney, who notified them that the mining of coal was an essential work and must be pursued without any cessation.

In West Virginia a strike of 250 mine workers took place June 10 at the Bertha mine of the Quality Cement Coal Co., a mine on the Monongahela River in the north of Monongalia County, West Virginia, near the Pennsylvania state line. The men claim the weight of their coal is estimated and not weighed, and that the estimate favors the company. They also say that they desire to organize a union and that the company refuses to recognize the organization. The mine is conveniently situated to Point Marion in Pennsylvania, where "wet goods" are dispensed. The dry law of West Virginia is being strictly enforced, and men who, in visiting that pleasant Pennsylvania village, bring back more good cheer than the law allows are being arrested and jailed. As a result, despite the strike, order was maintained. On the evening of June 11 the mine workers announced that they would return to work, orders to that effect having been received from the union officials at Fairmont.

The operators in the Fairmont region are trying to induce men to mine coal who have never mined it before. A. C. Beeson, of the Four States Coal Co.; A. Lesle White and C. J. Ryan, of Clarksburg; F. J. Patton, of the Central West Virginia Coal Operators' Association; E. Drennan, of Elkins, and C. H. Jenkins and John A. Clark, Jr., of Fairmont, went to Washington last week and had a conference with Cyrus Garnsey, Jr., assistant United States Fuel Administrator. The State Fuel Administrator, J. Walter Barnes, accompanied them. The delegation presented to the Fuel Administration a scheme of awarding buttons to the coal miners who work regularly, the buttons to be a badge of recognition of service rendered.

FAIRMONT REGION NO LONGER A NONUNION CENTER

The union is putting its affairs in order in the Fairmont, W. Va., district, President Frank Keeney of District No. 17 having opened an office in the Deveny building, Fairmont. Frank Keeney is directing operations in Marion, Harrison, Barbour, Lewis, Mineral and Tucker counties. This list of counties varies from that designated by the Fuel Administration as the "Fairmont District." Note that Monongalia county is not included, but the action in the strike of the cement company, just referred to, suggests that Monongalia is in Keeney's jurisdiction. "Mother" Jones also addressed a meeting at Star City, near Morgantown, in Monongalia County, Sunday, June 16, as if she had a wider field of operations than the chief. But then who could put bounds to "Mother" Jones' activities?

Governor Cornwell, of West Virginia, is determined that the vagrancy law shall be closely enforced, especially in Mingo county, where he says in a recent letter to the operators there is an excessive amount of absenteeism, some men being absent from their working places two or three times in a week. In the letter he says:

MINGO, W. VA., MEN MUST WORK MORE REGULARLY

"I am advised that the Mingo County Council of Defense is seeking to diligently enforce the vagrancy act against those who do not work. To supplement the efforts of the Mingo Council I ask you to keep an accurate record of the number of hours worked by the men in your employ during the week, forwarding this record to the State Council of Defense each week and posting a copy of the same at the mine where the men are employed. The vagrancy act is a war measure and must be observed during the war."

The attempt of the West Kentucky Coal Co. to make an ancient injunction serve as against persons for whom it was not specifically written has failed. This injunction, dated 1907, restrained certain union officials and others from interfering with the operation of the mines. Sam Tosh and George Overby, officials of the union in western Kentucky, strove to prevent the mine workers from working for the company, and they were arrested for being in contempt of the instrument quoted. The lower court sustained the company, but the United States Circuit Court of Appeals at Louisville, Ky., reversed the decision of that court, declaring that there was nothing in the record to show that the strike of 1917 was a continuation of the strike of 1907 or that the defendants were engaged in the former strike.

Midway between Murphysboro and Sparta, Illinois, lies the town of Willisville, a Perry county mining town. Some few days ago there was funeral at this village and 100 men

quit work to attend it, but according to the company only 12 of these men were interested enough to actually participate in the ceremony. The company fined the men who did not attend the funeral, but quit work nevertheless, $2.50 apiece for unnecessary idleness. The men continued idle for a few days and then concluded that their idleness was a breach of contract. As a result they returned to work.

Operation of many of the mines in the now thriving Belleville, Ill., district was stopped recently by a strike of the employees of the East St. Louis & Suburban Electric Railway Co. for higher wages, and but for a prompt temporary adjustment of the dispute, subject to final decision by the War Board, there would have been a rather serious interference with production. A number of mines are located on or near the interurban divisions of the system, including the big O'Fallon mines near French Village, and miners of Belleville, O'Fallon, Lebanon and other St. Clair County towns are dependent upon the electric line to take them to and from work.

Drivers for Retailers Also Work Short Week

Trouble is being experienced by the St. Louis coal dealers. The drivers and other helpers are making so much money that dealers are having great difficulty in keeping the men at work. E. J. Wallace, secretary of the Missouri Retail Coal Dealers' Association, has called the situation to the attention of William F. Saunders, secretary of the Missouri Council of Defense, and has asked him to take some remedial action. "The drivers and other helpers," he says in his letter, "are making more money now than ever before and find it convenient to lay off a couple of days a week, leaving equipment idle, cars loaded on track and in a general way bring about demoralization in the retail coal trade."

Secret service men of the Government are investigating the discovery of 21 Mauser rifles in the garret of a coal miner's home at Beckemeyer, Ill. The weapons were seen by a child, playing in the garret, and she told Sheriff Welsh. He seized them and took them to Carlyle and turned them over to the Federal authorities. The miner, who was known as a pro-German, left Beckemeyer five months ago, but his wife is still living in the house and gave up the weapons without question. The miner is said to have been a member of the I. W. W.

There is evidence that the mine workers in some places do not understand how important it is to work whenever the Railroad Administration has been able to leave cars in the mine siding. At the Royal Mine at Swansea, near O'Fallon, Ill., in St. Clair County near St. Louis, William Deppe, a miner, refused to contribute to the Red Cross, and 110 mine workers struck and threatened even to riot.

Strike in Illinois About a Single Dollar

The manager followed Deppe into the mine and talked with him. Upon his advice, Deppe gave the manager a dollar for the Red Cross drive. As Deppe was said to be making $66 every two weeks, his fellow miners could not understand why he could not give a small share of it to that work of mercy. Nevertheless a strike or shutdown in a coal mine is an unpardonable offense against the commonwealth at the present time and it should certainly not be instituted for so small a purpose as to raise a dollar for the Red Cross.

The labor situation in the Southwestern district is the most favorable of any time in years. Miners are working well, and there are no strikes. Practically all the fines accruing against miners because of actions contrary to contract have by this time been paid in. A total of $16,000 in fines had so accrued, and the collection made goes into the treasury of the Southwestern association.

There were three strikes in which the contract had been plainly violated. At the Smith, Scott & White mine, 125 men were idle 49 days. In this case, the miners insisted that two men, who were discharged, be returned to work before the matter of such discharge was arbitrated. At the Packard & McWilliams mine, a smaller number of men were out 38 days, demanding that the firemen be promoted to crane jobs. At the Jackson-Walker mines, 1000 men were out 10 days, in an effort to organize the office clerks. In each case, the strikers finally returned to work, and the matters were taken up under the contract. Pressure was brought upon the leaders by the United States Fuel Administration, and by the miners' national organization. The operators plainly saw that these were cases—taken in combination—which would establish dangerous precedents, if the fines were not collected, and this view was taken by the national officials of the Fuel Administration, the miners' officials admitting the violation of contract. As a result, there is among the miners in general a sounder respect for contracts, as well as a more serious purpose to keep industry going.

The convict miners at the Banner Mine of the Pratt Consolidated Coal Co. mutinied on June 11, holding five white men including two fire bosses as hostages. They demanded that the warden of the penitentiary, J. P. Hall, be discharged. By the good offices of Dr. R. A. Smith, the physician convict inspector, the men were induced to return to discipline without the use of firearms or injury to person or property. The convicts at the Banner mine are men of bad records, and more trouble was, for a while, feared. However, the strike was settled and the mine started again at full swing Thursday, June 13.

The Royal Commission which met May 14 at Sydney to inquire into the wage controversy between the Dominion Steel Co. and its employees has rendered a decision which recommends that the company grant its men an increase totalling over $300,000 a year, the advance to be dated back to May 1. The highest rate of increase goes to the lower-paid men.

Labor Shortage in Anthracite Mines

Apart from the draft, even apart from absenteeism, the labor situation in the anthracite region is desperate. The labor force before the war was not adequate. It has been made less adequate since by the drain to the munition factories and the enlistment and draft. For a while some good results have been obtained by drawing on culm banks and by working the easier-won coal, but these resources are narrowing. It is necessary to do something more to relieve the situation than merely provide for exemption from draft.

In bituminous mines most miners want a working place of their own. However, with a little coaxing, or when men are numerous, you can get them to "double up," especially where cars are delivered at the face. Why then must miners in the anthracite region work in pairs—a miner and a laborer? The answer is that the miner prefers that method because in most cases he gets the laborer to do the work while the miner secures the major part of the pay. Let the miner have a place alone and he will have to do all the work. Of course, he will also get all the pay, but in that event he will have to work harder than he would if he had a laborer. The miners desire to maintain the present condition of things. Some of the miners leave their working places and go home quite early in the day, trusting the faithful mine laborer to go on alone with the work of loading the coal. This practice some companies have been trying to change, contending that the trained miner is paid well to look after the greenhorn laborer and should stay in the place and at least attend to that duty if he does nothing else.

The Hudson Coal Co., at the Coalbrook colliery, Carbondale, Penn., has been endeavoring to induce the men to work alone, one man to a place. As a result the 1300 mine workers struck on June 12, tying up the operations at the colliery. The mine workers have 15 grievances and are willing to arbitrate all but this one. They explain that there are a number of the 1300 striking men who are too old to work a chamber alone, and that is the principal reason for demanding a laborer. If that is an honest reason, it will be quite possible for the company to let these old war horses go on working double and let the younger men work alone. Unfortunately, there is reason to fear that the opposition to the rule "One man, one room" arrangement, so popular in the bituminous region, does not arise from any compassion for the old men but from a desire

on the part of the miner to profit from the lower-paid labor of his assistant.

The following letter from a correspondent in the Southern anthracite field is interesting as throwing light on one of the reasons for the shortage of anthracite coal. It shows, what *Coal Age* has frequently contended, that the mine worker has been allowed to visualize a part of his duty as if it were the whole.

"The newspapers and the coal-trade journals have repeatedly told us that there will be a shortage of anthracite, and that if the present output is all that can be obtained there will be a coal famine in the United States next winter that will make the "heatless Mondays," from which the people suffered last year, seem like a Turkish bath.

Miners Must Help or Homes Will Be Cold

"What such a possibility involves we can realize by recalling the suffering that then existed among the poor people in the cities, the long lines of women and children standing with buckets waiting their turn to buy a bucket of coal to keep up the one little fire in their apartments, the riots that took place in Philadelphia where the police were overpowered, bottoms dropped out of coal cars and contents carried away by men, women and children who needed the fuel to keep their homes from freezing.

"The increased consumption of anthracite has been one of the remarkable features of this demand for fuel, and this feature of it can be traced to the doubling and quadrupling of the number of workmen employed in the munition plants, shipyards and other industries that are busied in producing material of war. Most of these are located on the Atlantic coast and so are dependent upon anthracite for fuel. In addition the cantonments, where the men receive their training, require over two million tons of fuel to render them habitable.

"All the coke that the country can produce is needed to supply blast and other furnaces for the production of iron and other metals. Plants that formerly used coke have had to replace that fuel with broken and egg coal, making a still further demand on the anthracite industry.

"What is being done in the hard-coal region to meet these extraordinary war conditions? The reports of shipments show an increase over last year; but is that increase all that it should be, and are the men in the mines doing their share to produce a maximum output of what has proved to be one of the greatest essentials of the war?

Here There Are More Men and Less Coal

"I have been permitted to look through the records of one of our large anthracite corporations, and I have found that the increase in their tonnage is not coming from the mines but from the washeries. One of these was not running at this time last year and another is now running double-shift in place of single-shift.

"I was allowed to look over the daily report of tonnage for the month of May and found that up to May 27 the collieries had worked practically the same time this year as they did in May last year, but that there were 13,103 less mine cars of fresh-mined coal dumped in the breakers. In looking over the records of six different collieries I found that with the same number of hours worked they dumped 13,513 less mine cars.

"As the average amount of coal obtained per mine car is about 2½ tons, the total loss in tonnage amounts to 32,757 tons. On inquiry as to whether in the opinion of the officials of the company the severe falling off in fresh-mined tonnage was due to the loss of miners going into the United States Government service, I was advised that it was not, as in the month of May this year there were 1785 contract miners on the payrolls of the company as against 1665 in May last year. On further inquiry as to what they thought was the reason, my attention was called to the absentee statement which is made out daily. This showed that from 8 to 15 per cent. of the men are absent from their work each day. The falling off in tonnage just stated is almost in proportion to the average absenteeism from these collieries. Clearly the decrease in tonnage arises from the fact that the miners and other employees are not coming to their work regularly and have failed in their duty.

The miners should realize that we cannot prosecute the war successfully unless we have fuel, and that in providing fuel they are providing the munitions which will enable their boys to protect themselves against the enemy. Without these munitions their sturdy defenders will suffer the same fate as the earlier regiments of English and Canadians, who went unprepared to the front and who came back with only 10 per cent. of their men.

"Attention was also called to the fact that every possible excuse is being made for a holiday and that the men are not working effectively or trying to do their best. There seems to be an impression among the miners that by investing in a Liberty Bond and paying out $5 to $10 a month they are doing their full duty toward winning the war. Money is needed, it is true, to buy fuel and other things, but only when the fuel is produced can the money be used; and without fuel the war will be lost."

The remedying of the draft situation is not proving easy. Apparently the draft boards are not the main cause of the trouble. The general sentiment of the anthracite region is that a man who is called by the draft and seeks exemption is a "slacker." Against that sentiment the draft boards must actively oppose themselves if any success is to be obtained in maintaining a force to man the anthracite mines.

It is not enough to accept without question all bona-fide requests for exemption. Such a passive relation to a desperate condition will not save the anthracite supply. The men conscripted are enterprising, daring and patriotic. They refuse to ask or to accept exemption or deferred classification, and they dread criticism and the innuendo more than they do physical dangers.

Production Scores vs. Baseball Scores

However, the union leaders may be able to bring a new sentiment into being, and to this end President Frank J. Hayes has been addressing mass meetings. The operators might well express their opinions in meetings with their men. Most of the men are disposed to listen with approval to suggestions from that source. Operating officials are apt to underrate their influence with their men. With a good cause a competent speaker, who is not merely a fluent talker, but has the correct point of view, will never fail of receiving a proper reception—provided, of course, that a certain degree of rancor does not exist which has to be allayed before the argument is presented.

In order to increase the output of the miners a competitive plan has been proposed calculated to arouse as much interest in output scores as has hitherto been expended on the purposeless scores of baseball and football matches. Competitions for nation-saving are to be the worthy successors of competitions for less noble ends.

Of course, it would not be fair to pit colliery against colliery, for some are large and some are small. The race would be won before it was started, and such an unfair competition would arouse no interest. It is proposed, however, to make the contest one for average tonnage per capita, and so put all the collieries on a more even basis. A conference was held recently at Wilkes-Barre to put this plan in immediate operation, and prizes will be awarded to that miner and his helper who produces the largest weekly tonnage.

Work One Day a Year for Uncle Sam!

The Rev. Oscar Berkley, a "circuit rider" in northern Kentucky, who preaches part time and mines coal part time for the Gravity Coal Co., is endeavoring to start a general movement looking to the donation of one day's work to the Government by every man in the country each year during the war; and is urging that on the same day every merchant donate his profits for that day to the same Government fund.

Berkley claims that this would not work a hardship on anyone, and would make it possible for the Government to secure much additional revenue and do it without increasing taxation materially. He claims that there are thousands of laboring men who would like to assist the Government, but they cannot afford to buy a Liberty Bond. Berkley has apparently overlooked War Savings Stamps.

EDITORIALS

Why Have Two Tons in America?

NO SYSTEM is more provocative of fraud and profiteering than the use of a double standard of weight—the short and the long ton, both tons being known in usual practice by the shorter appellation "ton," as if there were but one standard of weight.

The public does not know which ton is meant when the word is used, the one with 2000 lb. or the one with 2240. As a result, where coal is sold to the retailer by the long ton he can retail it by the short ton and make 12 per cent. of profit. Most retailers are honest, but the temptation is strong and should be removed.

The old English ton, the long ton, used principally in the old coal fields, did have the advantage of being divided up according to the table of weight—14 lb., one stone; two stone, one quarter; four quarters, one hundredweight, and 20 hundredweight, one ton—but, in America, of these divisions one only remains, and that division is misleading in name, for everyone in this country regards a hundredweight as 100 lb., whereas when it is a long hundredweight it has 112 lb. and not an even 100.

The short ton is making its way even in Pennsylvania, the oldest of coal-producing states. But in that commonwealth a state report is made in which the main tabulations are in short tons and the tabulations of the inspectional districts are in long tons. As a result the figures to the layman appear hopelessly discordant, especially as the reports show the long ton as the "ton," though the short ton is specified as a ton of 2000 pounds.

When the long ton disappears we can avoid the use of the adjectives "long" or "gross" and "short" or "net." The use of the word "short" always suggests fraud, and for that reason should be abandoned in all the states. The words "gross" and "net" suggest a different idea from that which we seek to convey. If we speak of the "gross" tonnage of the anthracite region we should mean the whole tonnage, including what is employed in the raising of the steam for the operation of the mines. The "net" tonnage should be that part of the whole tonnage available for public consumption.

Why Should We Reward It for Its Failure?

REPRESENTATIVE CHARLES B. SMITH of Buffalo recently advocated, unsuccessfully, in a letter to President Wilson, that the Treasury Department be put in charge of the work of the Fuel Administration because of the failure of the latter to supply the needs of industry. His suggestion seems to advocate quite a natural evolution, entirely in accord with what has been going on in the past and with what is only too likely to occur in the future.

For example, the Government, by extremely unfair restriction of the railroad business, prevented the development and maintenance of the railroads. They dwindled under the malignant influences of excessive rate regulation till they fell, like a dried apple from the tree, into the lap of the Treasury Department. Since then Mr. McAdoo has been busy doing all those things which the railroads were forbidden to do. We have hope that he will succeed in his administration because he has been suffered to make all those provisions for successful operation that the Interstate Commerce Commission industriously banned.

But the evil that was done to the railroads before Government ownership lives still, though the railroads are now federally owned and allowed to take money from the public with both hands. Not that they are taking a dollar too much, be it understood, not that their traffic regulations are a bit too rigorous, far from it. But it must be conceded they are more severe by far than they ever were under private ownership. We now know, if we could not see it before, why under such ownership the railroads failed to meet the public demand.

The fuel supply may fail to satisfy needs, just as the railroads failed. The trouble is not that the business of producing fuel is conducted with inadequate skill, or that fuel as a whole cannot be produced in adequate quantity, but that the transportation facilities provided are unequal to the work required of them. The coal can be mined, but cannot be brought to market. As the railroads, ruined by the Government, fell into the hands of the Treasury Department, so now the Fuel Administration, handicapped in its efforts by the inefficiency of the Government railroads, is threatened with absorption by the department which controls the railroads.

The railroads have been wholly to blame for the fuel shortage, mainly by reason of their inadequacy of equipment, but partly because of an attempt made by the Railroad Administration to exploit the coal operators. The railroads promised a full stint of cars to those operators who would sell their output to them at a reduced cost. It is even alleged that the railroads turned over some of the coal thus obtained to certain industries that they favored. As a result many mines worked only fitfully and other mines had an excess of cars. This was a waste of equipment when every car was needed, and this, because a mine with cars left over at the end of a day, or one which does not load its cars early in the day, is wasting car service.

But this was not all. The men working at the mines which run only irregularly became dissatisfied and quit for other work. So when the wrong was adjusted by Mr. McAdoo on his return from his Liberty Loan campaign, the evils which followed in its train were not wholly undone. The irregular work has done much to destroy the morale of the mine workers.

It is well known that men get careless and indifferent when work is not steady. You cannot urge them to do their best, for they naturally counter with the answer: "If they want the coal, why don't they give us the cars? They are always calling on us to get out a big

tonnage, but they don't seem anxious to hold up their end; and what is more, they are not giving us a square turn." Because of the discrimination of the Treasury Department, through its branch, the Railroad Administration, it was hard to keep the men keyed up to their work.

Another way in which the Railroad Administration has hampered the Fuel Administration has been by the inadequate purchase of coal for storage. Of course, the effect of this is local, as in most places the public has been willing and more than willing to take what the railroads would not buy, but in such places as it occurs it is most distressing. The Railroad Administration tried also to get an exemption from the zoning rules. It thought it was justified in going beyond the zones laid out for the public. The transportation lines were prepared to haul the fuel that they preferred for long distances, though other parties had to satisfy themselves with coal such as was mined nearby. In this way the roads failed to make the utmost use of their equipment.

And for these inabilities and offences of the Railroad Administration, there are those people who suggest that the Fuel Administration must pay. It is the old story. The man who fails will suffer, and meantime the man who makes him fail enters into his estate. The Railroad Administration may not be blamed for failing to do the impossible. It must be blamed, however, for some things it has deliberately done to prevent the orderly operation of the mines. But alike where blamable and unblamable, the Railroad Administration's failure to supply cars is the cause of the coal shortage. Shall we therefore reward the Railroad Administration by placing it in control of the production of fuel?

Save That "Shovelful"!

WE ARE told (and have no reason to doubt the truth of the assertion) that the country faces a coal shortage amounting to several millions of tons. This is a time of national necessity, a time when every one is anxious to do "his bit"—and without exception every one's bit is his best. Admonitions to economize in the use of food meet the eye at every turn—in the street car, on railway trains, in every post office, courthouse, public library, town hall and schoolhouse. Even the signs along the highway preach the same gospel.

But if food is important as a national resource, as a war munition, so also is fuel. It is highly probable that fuel to comparatively as great an amount and value as food can be saved through care and diligence. It has been repeatedly pointed out that the householder by saving a shovelful of coal a day can in the aggregate save —that is, release—a vast amount of fuel yearly for the production of much needed munitions. The time has now arrived when all users of coal as well as householders must save fuel, must save that "shovelful" per day.

Fuel can be saved in many plants that are already thought to be fairly economical. Not long ago a certain plant in New England that was engaged in the manufacture of wire sought to improve the efficiency of its already efficient power plant. The wisdom of this attempt was doubted by some as the plant was known to be modern and well kept up. After three months of operation, under the supervision of an expert, the efficiency of the boilers and furnaces had been increased 16 per cent., the losses in flue gases had been cut down 13 per cent. and the loss of unburned fuel through the grates had been reduced 2 per cent. When all of these economies were traced back to the coal pile it was found that the savings effected amounted to 1500 tons of coal yearly, or about 30 per cent. of the former fuel consumption.

All this was accomplished without one cent being spent for changes or alterations. The economies effected were secured through careful and skillful firing, strict attention to details and eternal vigilance. The point of maximum efficiency has not yet been reached in this plant. When this point is attained, however, the task of fuel conservation will have only begun, for maximum efficiency must then be maintained.

The foregoing shows what possibilities exist in some plants that are thought to be already fairly efficient. If similar and equal economies were to be made in other plants throughout the country—and this is entirely possible in a great percentage of them—the saving to the nation and to the cause of democracy and humanity would be immense.

Hounding the Devil

OVERWHELMED by our marines at the recent battle in the vicinity of Chateau-Thierry, France, the gasping Huns summarized what they thought of our boys by the ejaculation *"Teufelhunde"!* To the Prussian mind, filled with the intoxicating fumes of conquest and the immoral creed of the Hohenzollerns, there was something devilish, something unearthly in the grim earnestness and strange intensity that characterized the fighting of our lads in khaki. They could not understand it. "Devil-hounds," they called our boys. But though they coined the epithet they did not realize its real meaning, its full significance.

Our marines—the boys who are always the first ones to fight—know what they are doing, however. They are *hounding the devil.* They are exorcising the evil spirit of Prussianism which has taken root in the hearts of the German people—the spirit which has made a shambles of Europe, the spirit which recognizes no sense of decency, no understanding of what civilization means.

Little wonder that the Germans failed to discern the spiritual flame that fed the enthusiasm of our boys and exalted their fighting. "We're here to avenge the women and children of Belgium," was the unuttered cry as our lads pressed forward. "We're here to demand an accounting for the lives of those who went down with the 'Lusitania.' We're here to back up France, bled white, and to fight shoulder to shoulder with our war-weary English brothers. We're here to see that Freedom once more reigns over the earth."

There will be no compromised peace. The determination which marks the faces of "Our Marines," as shown on the colored supplement to this week's *Coal Age,* is full evidence of that.

Don't wait to be urged to join the War Savings Stamps army. What if our men in the trenches waited to be urged?

DISCUSSION BY READERS

Holding Men in the Mine

Letter No. 1.—A short time ago reference was made in *Coal Age* to the difficulty experienced by many mine foremen in holding their men. Various arguments were advanced as to the cause of this difficulty, and suggestions were made of methods of overcoming the trouble; but it appears to me that these did not emphasize sufficiently the chief cause of men constantly wandering from place to place in search of better conditions.

There is no question but what good living conditions, the social atmosphere and steady work at the mine go far toward satisfying men and holding them in their places. Still, where all of these conditions exist, it is frequently observed that the men are restive and the mine cannot be operated to its full capacity, because of an insufficiency of men. In the common vernacular there is "a screw loose somewhere."

Outside of the conditions just mentioned, there are two prime causes to which our troubles may be attributed. The seam of coal worked may be thin, the coal hard to mine, the roof or floor, or both, soft and troublesome; or there may be much gas or water to contend with in the mine. All of these conditions are such as are beyond the control of the management and for which they are not responsible. There is another potent cause, however, that every wise management will strive to eliminate; that is, the disposition of the foreman toward his men.

A Foreman's Chief Asset.

The chief asset of a mine foreman is his reputation. Upon this will depend his success in holding his men. A foreman's reputation is known far and wide and is the chief factor in drawing or repelling men. His reputation will live and follow him wherever he goes. Important as are the many other requirements of a successful foreman, his reputation for square dealing outdoes them all.

It may be asked, What is meant by "square dealing"? In a nutshell, it is the treatment of everyone alike, having no favorites and making no promises that one cannot certainly fulfill. A foreman will sometimes make a promise to a man in good faith and, later, find that he is unable to fulfill it. While his reasons for not keeping his promise are plausible, they are not satisfying. The man concerned is dissatisfied and, for this reason or some other slight cause, he quits and goes elsewhere. The foreman may be resourceful in explaining his conduct satisfactorily to the management and in leaving no room for argument with his men, but this will not keep them satisfied.

Equally efficient with the foreman who is unable to keep his promises is the man who treats his men in a surly, disagreeable manner, snapping them off with "If you don't like that, you know what you can do," or some similar unkind response, generally accompanied with a few cuss words, by way of emphasis.

The all-round successful foreman is the one who is able to win and hold the respect and confidence of both his men and his employers. To do this, he must be honest and sincere in all that relates to the men and the company. He must, of course, be a practical miner and a good judge of men, as to their character, disposition and capability for performing work.

Thomas, W. Va. W. H. NOONE.

After the War, What?

Letter No. 2—There is no question, in my mind, but that there will be a large business done at the close of the war, as remarked by P. H. Kennedy, *Coal Age*, May 25, p. 979. Whatever is the outcome of the war, there will be a great change in the industry both of this country and of Europe. The work of reconstruction that will then have to be performed in Belgium, France, Italy, Russia, Greece, Turkey and Servia will require a large amount of material and of men.

In the early stages of the war when Germany had to maintain the fight on all sides, she reported from 75,000 to 80,000 men killed or wounded a day; but. 75 per cent. of these were later returned to active service. The same is true, but to a somewhat lesser extent, in respect to the armies of France, Great Britain and Italy. Russia had a large percentage of her men slain and the toll of death has been very heavy, also, on the southeastern fronts, among the Turks of Gallipoli and Bagdad.

There will be no immigration, in this country, for a long time following the close of the war. The men who survive the struggle will be needed at home. Workmen in our own land will demand and receive higher pay than what they are getting today. The end of the war will be their opportunity and they will not be slow to seize it, in an effort to secure their share of the increased business.

The demand for coal will be far greater at the close of the war than it is today, because the United States will have to make good the deficiency in other countries, by the export of much-needed fuel. It is now rumored that Canada will have to burn wood, the coming winter, as what coal she can get will be needed by the railroads.

Another great market for coal will be South America, which has been largely supplied, in former years, by Germany and England. It has been stated that it will require five years to repair the coal shafts of France and put those mines in shape to supply that country with coal, which is quoted there, today, at from $30 to $70 a ton. Italy will need coal much more when the war is over than she did in peace times.

In my opinion, when the war ceases, America will be more than 50 million tons short. In view of these facts, it behooves every man to study and plan labor-

saving devices and schemes, to the end that we may be able to produce more coal at a reduced cost and a minimum loss of life. New mines must be opened in the United States and Canada. In this strife for increased production, however, safety first in operation must be the prime consideration. C. McMANIMAN.

Rawdon, Canada.

Practice in Mines in England

Letter No. 2—The letter of Robert Laverick, *Coal Age*, May 11, p. 889, interested me much, as it recalls some of my experiences in the mines in the North of England. I remember that, not long ago, mention was made of the frequent change in mine officials, and the claim was made that men employed a long time, in the same position, fall into ruts and fail to adopt the best up-to-date methods.

With all due respect to the operators in this country, I often think that the methods they employ in the management and operation of the mine do not compare favorably with mining customs in the counties of Northumberland and Durham, where I formerly worked. I have known men to work in those mines and hold practically the same position all their lives, and their sons have taken their places when they were incapacitated by reason of age.

In my opinion, more attention is given by English operators to the care and comfort of their men than is generally practiced in this country. While sinking a shaft that may take one or two years before the coal is reached, the company builds comfortable houses for its men and these are supplied with all the conveniences of life. It was not uncommon for each house to have a large yard or garden and the miner with a family was often supplied with 1500 cwt. of coal free, every two weeks, if desired. Miners living beyond the 3-mi. limit were obliged to pay 50c. for hauling the coal to their homes. A miner living in another than a company house was allowed 12c. per working day.

Welfare Work Years Ago in England.

Social conditions in a village or camp received special attention. Reading rooms, club houses and a large conference hall are provided, where meetings can be held and the miners' brass band can practice, or first-aid teams receive instruction. A small fee is charged to each man's account for the upkeep of these privileges. The company also furnishes a large field for athletic sports, and contests are held annually. There is also an annual flower show. A man who plays an instrument, a good football player, or ambulance man, is given every encouragement to improve himself. Men who hold deputy or examiner's certificates are certain of employment when the first vacancy occurs.

There is a company doctor who instructs the men in first-aid work and attends their families in case of sickness, for which each miner is taxed 18c. every two weeks. A hospital in the nearest town is supported by the miners contributing 25c. each quarter. An up-to-date rubber-tire ambulance and two first-aid men always convey an injured man from the mine to the hospital.

The ambulance, costing from $300 to $500, is generally supplied by the men, while the horse, driver and stable are provided by the company. British mines pay weekly and the drag system of deducting store accounts and other bills from the men's pay is unknown. A police officer is installed in each village, and any abuse of property must be paid for, or the offender is given 14 days to repair the damage.

A good feature of these mining towns is the coöperative stores run by the miners. The men are given no credit at these stores exceeding the amount of their interest. The store is managed by a committee of miners and the company is not concerned. The store pays a dividend every quarter. No junk is handled, but only the best grade of goods is supplied. The scheme of the coöperative stores frees the company of any suspicion or charge of unfairness in dealing with their men. Such are the practices in the mining towns in the North of England. T. GOLDON.

Clinton, Ind.

Loading and Shipping Clean Coal

Letter No. 10—In connection with the question of producing clean coal, which has been under discussion in *Coal Age*, permit me to describe briefly a practice in France, in 1896, which had for its object the loading of clean coal by the miners. I do not claim that the same practice could be applied now in this country; but it is interesting as showing what care was taken, at that time, to secure the shipment of coal of good quality.

It was my first experience in coal mining, and I was given a job of collecting samples of coal from the cars sent out of the mine and preparing them for analysis. In performing this work, I was stationed at the top-landing of a shaft, having a daily capacity of 1600 tons. The shaft penetrated 16 different seams of coal ranging in thickness from 14 in. up, the average being about 3 ft. Several of the seams worked produced very dirty coal, owing to the presence of partings of gray slate and bituminous shale, varying from a half-inch to several inches in thickness. Other seams produced coal of the best quality.

In the working of the poorer seams, it was necessary to mine the coal in benches, in order to separate the impurities from the good coal. Many of the miners would mix the black partings with the coal they were loading, whenever they thought that the foreman would not be around. This practice, however, was held in check by a fine that was imposed upon a miner when his coal showed an increased percentage of ash above the standard fixed by the mining engineer.

Preparing the Coal in the Breaker

The breaker was divided into two parts, one for the loading of the coal coming from the best seams, while the other received the coal of poorer quality. The cars containing the good coal were conspicuously marked to avoid the mistake of sending them to the wrong side of the breaker. Coal of the poorer quality underwent a process of washing, which was not necessary in the case of the good coal.

The samples collected each day were submitted to a careful analysis to determine the contract price to be paid the miners. These prices were continually changed to conform to the changing quality of the coal. It was

my duty to collect these samples of coal each day, and for that purpose I was given a slip bearing the numbers of certain working places from which samples of coal were wanted that day. I had willow baskets each numbered to correspond to the numbers on the day's slips. As the cars came out of the mine, I was instructed to take a few pounds of coal from each car bearing a number on my slip, and to put it in the basket marked with the same number.

I continued to do this during the entire shift, after which the coal in each sample basket was powdered, ground and divided so as to reduce the size of the sample to about 1 lb. This was placed in a small sack, which was labeled with the name of the seam and the number of the room where the coal was mined. It was my duty to deliver these sacks to an office where they were sealed by another person and sent to the company's laboratories for analysis.

The plan that I have described may seem very elaborate; but, since the miners never knew the day when their numbers would be chosen and samples of their coal taken, it had the effect of making them very much more careful to load only clean coal that would stand the test of the analysis made by the company. It is true that a few miners would run the risk and load some dirty coal at times; but the practice frequently brought them to grief when payday showed deductions made for impure coal. It was only later, when working at the face, that I came to understand the purpose of the sampling of the coal at the top of the shaft.

Peru, Ill. GASTON LIBIEZ.

Interpreting Mining Laws

Letter No. 3—The inquiry of Chas. Martin, *Coal Age*, June 8, p. 1080, springs a live topic in respect to the varied interpretation of our mining laws. Reference was made to this in the discussion of several points of the anthracite law some time since (*Coal Age*, Vol. 12, pp. 294, 463).

The two questions now raised by Mr. Martin relate to ventilation, and it must be admitted that the reading of the Pennsylvania bituminous law lacks clearness in respect to the matters mentioned. When attempting to interpret the meaning of a law, it is necessary to ascertain, if possible, the intention of the law makers, which will generally throw light on the meaning of the words used. It is not always an easy task to do this. Such is particularly the case in respect to mining law, where the law makers have undertaken to frame a law in accordance with the information gleaned of matters regarding which they themselves are wholly ignorant.

Referring to the first question of Mr. Martin, we note that the law specifies clearly the limits of the distances apart of crosscuts in room pillars, but gives only the maximum distance apart of crosscuts in entry pillars. The fact that the law permits crosscuts in entry pillars to be spaced 200 ft. apart, while those in room pillars are limited to 105 ft., has raised the question in some minds as to the reason for this.

A little reflection will enable most mining men of practical experience to realize that there are two conditions affecting the distance apart crosscuts should be made: (1) Driving crosscuts too close together increases the expense for yardage, weakens the pillars, and necessitates the building of more stoppings, requiring extra labor and material and affording greater opportunity for the leakage of air and impairing the efficient ventilation of the mine. (2) Driving crosscuts too far apart increases the danger of the accumulation of gas at the working face and necessitates the erection of long lines of brattice to conduct the air forward.

Keeping these conditions in mind, let us suppose that a pair of headings have been driven, say 75 or 100 ft. beyond the last crosscut, when the increase of gas feeders in the coal makes it advisable to drive another crosscut to keep the face clear of gas. There is nothing in the law to prevent this being done, and the foreman is free to use his own judgment. It is hardly to be supposed that anyone will deny that it is possible, with safety, to drive crosscuts farther apart in headings than in rooms, because the erection of a good brattice will keep the face of a heading clear, which is not always possible in a room.

What is a "Return Airway" in the Meaning of the Bituminous Mine Law?

Regarding the second question that Mr. Martin asks, it does not occur to me that there is so much difficulty in interpreting the meaning of the law, which states plainly, in Art. 10, that locked safety lamps must be used where gas is generated in quantities sufficient to be detected by an approved safety lamp.

In my opinion, it will make no difference whether gas is found in the first or the last room on a split of air; but the entire air split must then be worked with safety lamps. It would seem absurd to allow an air current to pass through a gob section and then permit it to ventilate live workings.

My understanding of a return airway is that it refers to a passage conducting the current from the last crosscut inby, back to the main return airway. The wording of the law quoted by Mr. Martin makes it unlawful to use the return air from a section employing from 70 to 90 men, for the ventilation of any other place or places. It must be conducted at once out of the mine.

Perryopolis, Tenn. R. W. LIGHTBURN.

Nature of Mine Explosions

Letter No. 1—I note with some satisfaction that the editorial synopsis to the article entitled "Nature of Mine Explosions," by H. E. Gray, *Coal Age*, May 18, p. 930, speaks of "air waves," "trill of the air," and "detonation" as being phenomena of an explosion in a mine. From the illustrations given as Fig. 1 and Fig. 2 in that article, it would appear that the wave motion produced by a blast was very similar whether the blast was projected into the free atmosphere or into the confined mine air, which I am inclined to think is not the case.

However this may be, I am pleased to note that there are some others who believe in the possibility of detonation taking place in the roadways of a coal mine when an explosion therein has been once initiated. I am a strong believer, myself, in the theory that *detonation* of a modified form takes place in many destructive mine explosions, although the real signifi-

cance of this term is not strictly the same as when it is applied to an explosive fired by a detonating cap.

To my mind, assuming explosive conditions exist in the mine air where a heavy blast is fired, there appears to be no reason why the same vibratory wave set up in the detonator should not be communicated alike to the explosive atmosphere about it, as to the charge of powder in the hole, and thus produce the so-called "trill" terminating in the peak of the vibratory flame.

The Development of a Mine Explosion

Mr. Gray has mentioned the well-known fact, which has been so often observed in the days of the extensive use of black powder for blasting in mines, that a space of 200 ft. or more intervenes between the point where the shot was fired and that where the destructive violence of the blast is first manifest. In this intervening space, little damage appears to have been done. Beyond this space, Mr. Gray states that the mine air trills or explodes, though he does not go on to explain what would be most interesting, the development of the process.

In the hope of provoking some valuable discussion on this point, permit me to restate a theory that I worked out some years ago; namely, that where a blow-out shot occurs, resulting in much of the force of the explosion being exerted on the mine air, a second explosion will result from the ignition of the heated gases and fine dust projected into the air. I claim, further, that it is this second explosion that is responsible for the wrecking of the mine which follows.

One noticeable fact worthy of consideration in this connection is the finding of the men killed by the blast, lying a short distance from the manhole where they had taken refuge when they fired the shot. To my mind, this circumstance proves that they were warned of the danger by the undue force of the exploding charge and had fled but a short distance when they were thrown down and killed by the second explosion, which wrecked the mine.

Incubatory of an Explosion

The notable mine explosions, at Altofts and Blackwell, furnish good illustrations of my claim that the 200 ft., more or less, of space from the point where the shot was fired represents the size of what may be styled the "cartridge" of explosive gases and dust that wrecks the mine. I may be permitted to style this development as the "incubatory" of a coal mine explosion.

Some years ago I observed, at an ironworks, what may serve as a practical demonstration of the explosion of a mixed gas-and-dust cloud, when coming in contact with fresh air or oxygen at a sufficient temperature. I was watching the workmen cleaning the dust out of the flues that carried the gases from the top of the blast furnaces to the boilers. As the dust was scraped from the flues, it fell a distance of 15 ft. carrying with it much of the absorbed flue gases. In falling through the air the dust cloud took fire and passed away in smoke. This was a frequent occurrence at the ironworks.

Although Mr. Gray has not described what he calls the "trill" of the mine air as a *detonating wave*, I believe that such is his meaning and that the two are, in effect, identical; because he says that "the climax is reached by a fine vibratory trill movement, and the real detonation of the mass immediately follows."

Without doubt, it is the earnest desire of each one to do everything possible to prevent the occurrence of mine explosions. But, since these explosions most usually originate in the improper use of explosives, more attention should be given to the charge limit, the use of permissible explosives instead of black powder, and the abolishment of shotfiring by miners or other unauthorized persons. Also, experience has proved that the safest policy is to treat permissible explosives with the same care that is customary in the use of black powder, which is seldom the case.

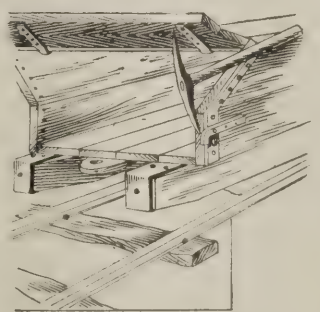
James Ashworth,
Vancouver, B. C., Canada. Mining Engineer.

Mine-Car Door

Letter No. 3—Referring to the inquiry of V. C. Robbins, *Coal Age*, June 1, p. 1031, relative to a suitable mine-car door for use in a 38-in. seam of coal, I assume that the car is so nearly the height of the seam that the coal cannot be loaded over the side but must be put into the car at the end. Although I have never seen a car equipped for that purpose, a few suggestions may prove of service.

While it is possible to design a car with the door swung from the bottom so that it can be laid down flat while loading, it does not appear to me that this suggestion of Mr. Robbins is an essential requirement. The usual arrangement is to swing the door from the top of the car and this, to my mind, is less cumbersome and better adapted for use in a shaft equipped with a self-dumping cage. At a mine employing a good blacksmith, it will not be difficult to equip the mine cars in use with doors swung from the tops of the cars.

It is a common practice among miners, when the end gate is swung from the top of the car, to prop up the gate with a pick, in the manner shown in the accompanying sketch. This is done whenever it is necessary to load the coal through the end of the car. The sharp points of the pick are forced into the ends of the boards forming the sides of the car and into the door, the weight of the door holding the pick in place while the loading of the car is in progress. The scheme is a very simple and practical one and is used by miners throughout the country wherever this type of car is employed in low seams.



A MINERS' TRICK

If desired, instead of depending on the use of a pick to support the door, in the manner I have mentioned, some may prefer to equip the door with a short iron rod attached to it by an eye-bolt. The end of the rod must be pointed like the sharp point of a pick, so that when the door is raised the pointed end will rest against the ends of the side boards of the car and be forced into it by the weight of the door, in the same manner as was the pick. If desired, two of these iron rods can be supplied, one on each side to better support the door.

When a car has been nearly loaded and the end gate is dropped into place and fastened it will not be possible to finish the loading, unless the clearance between the top of the car and the roof of the mine is sufficient to permit the coal to be shoveled over the sides of the car, or the end gate is hung lower than the sides for the same purpose. MINER.

Thomas, W. Va.

Transportation of Coal by Canal

Letter No. 3—I have read with interest W. W. Wotherspoon's reply to my recent letter regarding the cost of transportation on the New York Barge Canal, *Coal Age*, June 8, p. 1075, and am pleased to note that he admits that "if the canal system was constructed, owned and operated by a private corporation, undoubtedly, in computing the ton-mile transportation cost, all of the elements mentioned by Mr. Wilkins would be included."

Mr. Wotherspoon then goes on to explain that, under a provision in the constitution of the State of New York, no tolls can be collected on the canal and also that "as to the canals, their mere existence tends to hold in check and maintain a uniformity of rail rates in the territory between Chicago and New York City," and that "but for the existence of the canals, the rail rates between Chicago and New York and the rates made with relation to the Chicago-New York route would be materially higher."

Why Not a Government Railroad Instead of a Canal

The logical conclusion to the last statement would seem to me that, as a purely economic proposition, Mr. Wotherspoon should admit that it would have justified either the National or the New York State Government to build and maintain a railroad, including its terminals, between Buffalo and Albany, instead of the canal; and allow the shipper to own his own locomotives and freight cars, and run them over the government or state owned tracks, free of charge, in order to produce the result that he says the canal can accomplish, namely: "To hold in check and maintain a uniformity of rail rates in the territory between Chicago and New York City."

It would also seem that, as another economic proposition, the United States Government has no more or better ground for improving navigation by building and maintaining locks and dams on inland rivers and charging no tolls to the boat owners; nor the State of New York any greater facilities to build the Barge Canal and operate it free of all tolls, than for the National or State Government to build a railroad as suggested above and bear all the transportation costs, other than the cost of operating the trains.

In connection with the suggestion of the building of a railroad, instead of a canal between Albany and Buffalo, it may be stated that in 1905, the year construction work was started on the canal, Poor's Railroad Manual gives the cost per mile of the New York Central, including equipment, as $240,859, which for 296.52 miles, the distance from Albany to Buffalo, would amount to a total of $71,419,510, and for 438.72 miles, the distance from New York to Buffalo, the amount would be $105,669,660.

Mr. Travis, the New York State Controller, gives the cost of the Barge Canal to date as $233,695,351. It will thus be seen that the canal has already cost over three times what the New York Central Railroad between Albany and Buffalo had cost in 1905, and over twice the cost from New York to Buffalo, including equipment in both cases.

In view of these figures, does it not seem a rather peculiar solution of an economic problem, in order to maintain uniformity of rail rates, to construct a canal that has cost, including equipment, over three times the cost of a parallel railroad, including its equipment, and over twice that of the railroad from New York to Chicago?

The Question of Transportation Cost

Mr. Wotherspoon says in the last paragraph of his letter: "Since it is impossible to reduce to actual figures, the state-wide benefits received from the canal, I am not of the opinion that the construction, maintenance or interest charges should be considered in the computation of ten-mile transportation cost, but the actual boat operating cost alone should form the basis."

If this conclusion is economically sound, may I ask, Why not go a step further and say that in consideration of these state-wide benefits, the state should also own the boats and operate them free of any charges for carrying their freight, as well as to operate the canal and locks free of toll charges?

As an indication of what it has cost the State of New York during the construction of the Barge Canal, over and above the actual construction cost, the following statement by Eugene M. Travis, state controller, is interesting. He said in an article in the *New York Times*, May 12, 1918, "The total contribution to the canal debt sinking fund amounted to $62,896,702.66 from May, 1897, to May 1, 1918," which is a pretty large part of the state taxes to be set aside for the payment of canal bonds, before the canal is actually in operation, and for which the United States Government is going to provide the barges, because private capital has failed to build them.

Difficult to Estimate Cost of Operation

I am glad to note that Mr. Wotherspoon says with regard to the transportation cost per ton-mile on the New York Canal, "There is no accurate basis that could be employed in obtaining such cost. This is because no one has as yet had experience in navigating the new canal. * * * The actual cost may not be correctly ascertained until the transportation business has been developed."

In discussing the proposed Lake Erie and Ohio River Canal before the Engineers' Society of Western Pennsylvania, I said, "It is impossible for anyone to predict, before the canal is in operation, for what part of its round trip a boat will have a load of either coal or ore; or for what part of the trip the boat will have no cargo at all."

These two statements mean that, Mr. Wotherspoon and I agree that any estimates of unit-transportation costs on either the New York Barge Canal or the proposed Lake Erie and Ohio River Canal are at best only wild guesses and based on no reliable data.

Pittsburgh, Penn. W. G. WILKINS.

INQUIRIES OF GENERAL INTEREST

Sealing Off Fire on Intake

Kindly present the following question for discussion, in *Coal Age*, regarding the best method of extinguishing a fire that has gained so much headway on the intake of a pair of entries driven in solid coal, that it is thought best to seal off the fire by building an air-tight stoppings in each entry.

As shown in the accompanying sketch, the fire when discovered was located in the timbers and coal, about 30 or 40 yd. from the face of the intake heading. It may be assumed that both of these headings are generating



SHOWING LOCATION OF FIRE ON HEADING

but a small quantity of gas, so that it has not been necessary to use safety lamps in driving them. The size of the headings is 6 x 10 ft., and a good air current of 30,000 cu.ft. per min. is passing.

I want to ask three questions. Assuming that this fire is to be sealed off by building air-tight stoppings on both the intake and return airways, as stated: (1) How should this work be performed; or, in other words, in what order should the stoppings be built and the entries closed to the passage of air, to insure the greatest safety and avoid the danger of an explosion? (2) What would be the condition of the air on the inby end should the intake stopping be built and closed first? (3) What would be the condition of the air on the intake should the return airway be closed first.

I know that this question of the order of sealing off a mine fire has been frequently discussed in *Coal Age*, but I do not think that a fully satisfactory solution has been offered, and I believe nothing will be lost by a further discussion that may develop good practical ideas. It is not to be supposed that the same order of building the stoppings will apply in every case; but the conditions I have assumed are simple and should admit of but one solution and I hope there will be a good response from our experienced readers. ANCORA.

Edmonton, Alta., Canada.

It is the opinion of *Coal Age* that this correspondent is quite right in asking for a good discussion of the simple case he has assumed, and we agree with him that there is one way that will afford the greatest safety in the performance of the work. As we have frequently expressed our opinion on similar questions before, we leave the discussion of this question wholly to our practical readers, hoping that it may bring out, as our correspondent has stated, some valuable suggestions. It is one of the important questions in coal-mining practice on which opinions have always differed, chiefly because of the unfailing prejudices of mining men.

Auxiliary Power to Drive Fan

We have a 3 x 5-ft. Jeffrey fan, which is running continuously, 24 hr. a day. The fan is driven by a 75-hp. electric motor, running nearly under full load. It has frequently happened that we have been obliged to shut down the mine owing to a temporary failure in the power line. As this means a large loss in output and is extremely annoying, besides increasing the cost of operation, since the overhead charges and other unavoidable expenses continue unabated during the shutdown, it has been decided to install an auxiliary engine that can be used temporarily when the electric power fails.

Three types of engine have been submitted to us for our consideration; namely, engines operated by crude oil, gasoline and kerosene. As we are at a loss to decide which of these types is best adapted to our use and would prove most economical, we shall appreciate the suggestions of *Coal Age* and any of its readers who may have had a similar experience and can advise us as to what is the best means to adopt and where a suitable engine or motor can be secured. The engine must be capable of continuous service during the period when the supply of electrical power is cut off. It is only intended for use during such periods and the service is therefore intermittent, though liable to be required suddenly, at any moment of the day or night. The matter has been of such great importance to us, that I believe the subject is well worthy of discussion and hope to hear of the experiences of others along the same line.

Peoria, Ill. MINING ENGINEER.

The problem presented by this correspondent is a common one in coal-mining practice, and is, as has been stated, well worthy of discussion by those whose experiences have compelled them to adopt suitable remedies to protect themselves against loss arising from the failure of power lines.

In the opinion of *Coal Age*, the gasoline engine is the type of engine best adapted for use under the conditions named. Generally speaking, its construction is simpler and the engine more easily operated, requiring less skill and giving less trouble. All that is necessary is to keep the engine clean and in good condition and maintain a plentiful supply of gasoline ready for instant use when the emergency arises.

There are a number of manufacturers of good gas engines, among which we would recommend the Fairbanks, Morse & Co., Chicago, Ill.; Foss Gas Engine Co., Springfield, Ohio; Bessemer Gas Engine Co., Grove City, Penn. We shall be glad to have the suggestions and experiences of readers, who we hope will discuss the situation broadly as their practice may dictate.

EXAMINATION QUESTIONS

Tennessee Mine Foremen's Examination, 1918

(Selected Questions)

Ques.—How would you proceed with a mine fire in or near a heading, to insure the safety of employees?

Ans.—Without further information in regard to the arrangement of the mine, it is impossible to answer this question except in a general way. It is assumed that men are working in the heading and are in danger of being trapped by the fire. The first duty is to warn and withdraw these men by any way that is practicable. At the same time steps must be taken to get water to the fire. If the fire is on the intake, the men will be quickly warned of their danger by the smoke carried in on the air current, and they must be given every assistance possible to escape by a safe way. At the same time, an effort must be made to prevent the smoke and gases from the fire passing into the heading, if this is possible. The work of fighting the fire must be conducted on the intake side and performed only by experienced men.

Ques.—What is meant by a fault? Describe one you have seen.

Ans.—Correctly speaking, a fault is a dislocation of the strata caused by a slip of the formation along a line of fracture. In coal-mining practice, miners are apt to speak of any interruption in the continuity of a coal seam as a "fault," whether this occurs as a roll, a pinchout, or results from the erosion of a portion of the seam, by some agency, after its formation. Such interruptions in a coal seam are not, however, true faults, as there is no slip, resulting in an upward or downward throw of the strata along a line of fracture. The candidate must describe a fault he has seen, in his own words.

Ques.—An entry is driven S 60° E, while the rooms are driven N 85° E. The width of the rooms being 30 ft., find the distance on the entry, center to center of rooms.

Ans.—The question is incomplete, as the width of the pillar is not given. Assuming a 20-ft. pillar, the width of a room being 30 ft., the total distance between room centers measured across the rooms is 50 ft. In this case, the rooms make an angle with the entry of $180 - (60 + 85) = 35$ deg. The distance between room centers measured on the entry is, therefore, $50 \div \sin 35$ deg. $= 50 \div 0.57358 = 87.17$ ft.

Ques.—Explain the general arrangements of the ventilation of a mine, in the blowing- and exhaust-fan systems, and show how these differ from each other.

Ans.—In the blowing system, the ventilating fan is located at the mouth of the intake opening of the mine. The operation of a centrifugal fan draws the air in at its center and discharges it, at the circumference of the fan wheel, into a spiral casing by which it is conducted through the fan drift to the downcast shaft or intake opening of the mine. The pressure established by the action of the fan forces the air through the mine to the return opening where it is discharged into the atmosphere. In this system the mine is ventilated under a pressure greater than that of the atmosphere.

In the exhaust system of ventilation, the fan is located at the mouth of the return airway. The action of the fan, in this case, is the same as that in the blowing system, the air being drawn in at at its center and expelled at the circumference of the fan wheel. In the exhaust system, however, the fan drift, leading from the mine, is connected with the center openings of the fan and the spiral casing surrounding the fan wheel terminates in a chimney, by which the air is expelled into the atmosphere after passing through the fan.

In the exhaust system, the mine is ventilated under a pressure less than that of the atmosphere and the latter forces the air into and through the mine until it reaches the fan by which it is expelled into the atmosphere. It will be observed that the action of the fan, in both cases, is to create a depression at its center and a compression at its circumference, and the manner of its connection with the mine determines whether the fan is blowing air into or exhausting it from the mine.

Ques.—Give your opinion as to the advantage, if any, of a forcing fan over an exhaust fan, each working under the same conditions.

Ans.—These two types of fans are adapted to different gaseous conditions in the mine. An exhaust fan is generally preferred in the ventilation of a gassy mine, for the reason that this fan is located at the mouth of the return airway and does not interfere with the hoisting arrangements in the downcast shaft.

The haulage road of a gassy mine should be made the main intake airway, in order to avoid the danger of the ignition of the gas by the open lights of the drivers or motormen who cannot use safety lamps to advantage. The use of a force fan in ventilating a gassy mine, where haulage is performed on the intake, would necessitate doors being placed on the haulage road at the shaft bottom, which would impede the work of hauling the coal.

The use of a force or blowing fan is generally preferable in the ventilation of a nongassy mine, where it has been found of advantage to make the main haulage road the return airway of the mine. By doing this, the hoisting shaft becomes the upcast; and, not only is the formation of ice in the shaft, in winter, prevented by the warm return air current, but the dust of the haulage road is carried out of the mine and does not contaminate the intake air.

In blowing, the action of the fan is usually somewhat greater than when exhausting. In the former case, the fan is filled with the generally cooler outside air, which means a greater weight of air in revolution and a greater power developed.

COAL AND COKE NEWS

Harrisburg, Penn.

Despite extra efforts exerted by employers to safeguard employees, there is a steadily increasing number of fatalities in and about the coal mines, industrial plants and on public service lines of the State of Pennsylvania. From Jan. 1 to June 1, 1918, there were a total of 1245 fatal accidents in the three classifications, as against 1115 for the same period in 1917 and 946 in 1916. These were divided as follows: Mines, 461; industrials, 563; public service lines, 132. In 1916 fatalities were reported as follows: Mines, 437; industrials, 386; public service lines 123.

Deaths in and about the coal mines show an increase of 41 over 1917, while in industrials 45 less persons were killed this year than the year previous. Luzerne County leads the state in mine fatalities for the first five months of this year, with 100. Schuylkill and Fayette County are tied with 51, and Lackawanna had forty-six.

The state draft board authorities and officials of the coal companies face a perplexing question regarding the classification of men of draft age employed in and about the coal mines.

Coal companies also are experiencing difficulty in securing supplies. Quotations on mine supplies are next to impossible to get. It is also hard to secure cutting machines and other machinery needed in and about the mines. About the only way operators are able to secure equipment in a reasonable length of time is to obtain a priority order from the Government.

Every prospective purchaser of steam-generating equipment will be required to file with William Potter, Federal fuel administrator for Pennsylvania, a complete description of the machinery, together with the estimated daily fuel consumption, specifying whether anthracite, bituminous or oil will be used. This announcement was made during the week and is effective at once.

The fuel administration will take under consideration the probable effect of the proposed installation on the prosecution of the war and its relation to the available fuel supply. At the same time the estimated efficiency of such plants will be judged by the state advisory engineer before permission is given for installation to proceed.

J. J. Storrow, fuel administrator for New England, according to information reaching here, has won permission from Dr. Garfield to ship to New England 900 cars of bituminous daily from the coal fields of central Pennsylvania. This is a total of 45,000 tons a day, or almost 20 per cent. of the entire production of the soft coal fields in this state. Meanwhile, industries in the munition belt between this city and the Atlantic seaboard are clamoring for coal.

Charleston, W. Va.

The transportation situation in the Kanawha and Coal River districts in so far as it affected the coal industry last week was deplorable. Conditions were almost as bad as two months ago, when a number of mines were forced to shut down because of inadequate loading facilities. In fact, they were so bad last week that on Friday, for example, 33 mines were shut down, 20 of the mines unable to operate being the mines of the Cabin Creek Consolidated Collieries Co. The other mines were those of the Winifrede Coal Co., Carbon Fuel Co., Spruce River Coal Co., Ivy Branch Coal Co. and the East Bank Coal Co.

At a conservative estimate 80 per cent. of the mines were closed down last Friday, as well as on other days of the week, owing to an insufficient car supply throwing two or three thousand men out of work. Even at the beginning of last week conditions so clearly indicated what might be expected during the remainder of the week that Secretary Toomb, of the Kanawha Coal Shippers Association, sent a telegram to both Director Garfield and Director McAdoo in which he said: "Shortage last month from connecting railroads 2993 cars; shortage this month to date, 2174 cars, or 108,200 tons of equipment. Operators cannot hold men at this rate. Only 40 per cent, supply this month in Kanawha district, served by Chesapeake and Ohio Ry."

The Fuel Administration at Washington replied that the situation had been taken up vigorously with the Railroad Administration at Washington, but up to the end of the week, as already indicated, no relief from the shortage was given.

Discouraging conditions are also reflected in the production figures for the Kanawha district for the week ending June 8, only 144,646 tons being produced in that period. The total hours lost during the same period on account of car shortage was 2094, and because of labor shortage only 191, 2598 hours in all being lost. The labor situation in this district and in other districts of the state has been bad enough, but the absence of cars has made it infinitely worse. If no relief is afforded, coal miners will begin to leave the state in large numbers.

Aside from the territory in the Kanawha district served by the Chesapeake & Ohio Ry., the remainder of the Kanawha district served by the Kanawha & Michigan, and the Norfolk & Western field, the Guyan field, the Raleigh and New River fields appear to have been well supplied with cars this week. A strike in the Charleston yards of the Kanawha & Michigan Ry., Saturday morning, as a protest against the general yardmaster in charge there threatened, however, to tie up traffic on the Kanawha & Michigan and also to affect the interchange of cars to and from the Chesapeake & Ohio and the Coal & Coke railroads,, as well as to affect Government business, since the connecting roads mentioned have much freight for the Government powder plant at Nitro.

Conditions in the New River field, which have been so bad for the last fortnight, owing to an inadequate power supply, were much improved this week, the most gratifying feature of the situation there being a 100 per cent. car supply. This was directed by the Government authorities in order to meet the demand for navy and bunker coal. With cars available the mines in the New River district were able to materially increase their output.

Fairmont, W. Va.

The car supply in the Fairmont district (the Monongah division of the Baltimore & Ohio) has greatly overshadowed the labor supply recently, and with the scarcity of mine workers it has been found out of question to load all the cars coming into the region. D. R. Lawson, district representative of the Fuel Administration, who has his office at Fairmont, attributes the falling off of the car supply on Friday and Saturday of last week (the only light days in some time) to the submarine raiders. Boats did not make Curtis Bay or St. George on time, owing to the scare, which held up the loading of coal. Dumping started in earnest again Thursday of last week and the work has caught up Monday morning according to advices. All existing records for rapid loading were broken recently at Curtis Bay.

The car supply in the Fairmont district was good for the 19 working days from May 27 to June 17, averaging 1337 cars a day, which is in great contrast to the car supply from December to April when the average was 500 cars a day.

The 1769 cars in the Fairmont-Clarksburg region Monday were divided as follows: Coal 1769, coke 64, extra privately owned cars 55. A wreck on the Baltimore & Ohio near Clarksburg interfered with the Elliott mine getting its supply of cars Monday, the road being blocked.

Birmingham, Ala.

The Alabama mining district is in the grasp of a patriotic movement, and Sunday, at the principal mining centers, various speakers sought to impress on the workers the need of full coöperation in the Government program to increase the production of coal as a means toward winning the war. Meetings were held at Sayre, in the western part of Jefferson County, at Littleton and at Jones. Organizers Harrison, Prentice, Foster and Jones, of the United Mine Workers of America, and George Bondurant and P. H. Woodall, of the Four Minute Men, addressed the meetings. The miners were urged to work to their fullest ability and assist in the largest production throughout the coal district.

Increased output at mines is reported this week throughout the entire mining district of Alabama. There has been some sagging, but as a rule labor is putting forward its best effort and results show up most favorably as compared with the mine production 15 days ago. Production is 15 per cent. less than it could be if there was more effort given. Some of the mine employees charge the loss of production to the condition of mine and railroad facilities. However, the hope is expressed that before the end of the month the coal production will have taken on a big increase.

Toronto, Canada

Secretary W. M. Neal, of the Canadian Railway War Board, in a recent interview stated that it was impossible to exaggerate the gravity of the Western fuel situation. The movement of coal from the Western mines must increase at once if the people of the prairies are to have the means of keeping warm next winter. Canada's coal supply from American mines will be curtailed this year, and the West will find itself compelled to use Western coal. This must be ordered now and moved now, as in the fall every eastbound car from the foot of the Rockies to Winnipeg will be required for crop movement. The railways, under the direction of the Canadian Railway War Board, are prepared to move the greater part of next winter's supply before October, but the mines are only loading a fraction of the supply of cars available for them. Good explanations are offered. In one case the mine is unable to load cars on account of labor troubles, in another the mines are not receiving orders from the Western dealers. But whatever the reason may be, a solution must be found promptly. Last winter the railways were able to help out the public by supplying coal from their own reserves. Next winter this will not be possible, the reserves being depleted. Some towns are getting together to finance next winter's fuel bill for their people, and some of the mines are taking special measures to increase production and loading. These examples must be followed and enlarged upon if the West is to be saved from distress if not disaster, next winter.

PENNSYLVANIA

Anthracite

Shamokin—The yards of the Philadelphia & Reading Coal and Iron Co., at Newberry Junction, are choked with shipments of coal, and overhead docks are being built to expedite the work of coal engines engaged in moving the fuel.

Lansford—Three men were killed and two were seriously injured in the Lehigh Coal and Navigation Co.'s No. 4 mine on June 15. The men were engaged in timbering a turnout in the gangway when the top gave away, burying them beneath the mass.

Edwardsville—Charged with uttering disloyal remarks against the United States Government and the American Red Cross, Jacob Stanick, an Austrian, who gave his age as 25, was arrested on June 14 at one of the Delaware & Hudson collieries by special detectives of the company. He is now in the Lackawanna County jail, in default of $1000 bail.

Pittston—The men engaged at the Pickaway colliery of the Quinn Coal Co. held flag-raising exercises on June 14, and with the workmen and residents nearby a large crowd was present. In the various drives for the Third Liberty Loan and the Red Cross all the miners contributed a day's wages, placing the large plant in the 100 per cent. class.

Oneida—Mrs. Apolonia Ambrose has been awarded a total of $1328.50 for the death of her husband, who was employed by the Lehigh Valley Coal Co. He had his foot cut while at work and it caused a pre-existing tubercular condition of the lungs

to be aggravated. This award by the Compensation Board sets a new precedent, as it gives an award in a case where an injury caused an old ailment to be aggravated.

Kingston—Under the direction of F. E. Zerbey, general manager of the Kingston Coal Co., a sawmill was erected some time ago at No. 4 colliery, and systematic collection and cutting of waste wood was instituted. The result was the speedy accumulation of a large wood pile. The miners were quick to take advantage of the company's offer to sell this wood at cost. So far as is known, the Kingston Coal Co. is the first to inaugurate systematic use of waste wood.

Lavelle—An attempt of the Schuykill Coal Co. to obtain a right-of-way through the farm of George Mather met with legal resistance on June 13. The right-of-way extended through a field of oats, and Mather and his friends were guarding it with shotguns when Mather was called away. During his absence workingmen of the coal company entered the land and erected piers for an overhead railway to be used for the transportation of culm. Judge Bechtel granted a preliminary injunction against the company.

Old Forge—Edmund B. Jermyn and Joseph J. Jermyn have secured from the Lehigh Valley Coal Co. the culm pile at the old Sibley mine and will at once begin preparations for washing the coal and putting it on the market. With this end in view an application will be made on July 5 for a charter for the Dennington Coal Co. The bank is estimated to contain about 250,000 tons of coal. Some time ago the Lehigh Valley Coal Co. sold the remaining coal at the Sibley to the Pennsylvania Coal Co., and the coal mined in the Sibley workings is taken underground to the Pennsylvania's Old Forge colliery. After the coal was sold the Sibley washery and breaker was dismantled, and the company now has no means at hand of screening this coal unless a washery is erected. The Jermyns, who have acquired the dump, have a washery at their colliery, which is a few hundred feet from the dump just acquired.

Bituminous

Chambersville—Eliza J. Smith and brothers, operating the Peterman mine here have ten houses under course of construction for the use of their miners. This mine is a new operation, but the production has increased so rapidly that it has been necessary to make further provisions for the workmen.

Lovejoy—The Estep Brothers Coal Mining Co. has installed electrical power in its mine here. Electric locomotives, compressors, pumps, etc., are now in operation and the production has been increased greatly. A new drift mine is being opened near the present mine and the coal will be all loaded over the same tipple.

Butler—The Brewster mines of the Big Creek Coal Mining Co. at Wahlville, near here, are now electrically equipped. The power was turned for the first time one day last week and everything went off without a hitch. Electric mining machines, pumps and motors have been installed. It will increase the production more than four times what it has been in the past.

Johnstown—T. Stanton Davis, representing a syndicate of Cambria County coal operators, has purchased 4200 acres of coal land in the vicinity of Cambria township, the consideration being in the neighborhood of $850,000. The new field is in the vicinity of Ebensburg, the county seat of Cambria County, and a new town is to be developed there and called "Hart-Bee." Branches of the Pennsylvania and New York Central railroads are to be built into the new town.

Locust—The Locust Colliery Co., controlled by James Pierpont & Sons, of Philadelphia, is making many improvements to its new mine here. A new shop and power plant is being erected and machinery installed, the side tracks are being lengthened to provide for the increased tonnage and several houses are being built for the workmen. The new houses are the same type as was erected last year and provide comfortable and improved quarters for the miners, which Mr. Pierpont believes one of the essentials in keeping good men.

Pittsburgh—The Agricultural Department of the State of Pennsylvania, and the same department of the United States, have sent experts to western Pennsylvania to make tests with the lands which are being destroyed for agricultural purposes by the coal-stripping process, with a view of reclaiming the lands and putting them back into a condition which would again permit them to be farmed. The largest stripping operations of this district are in Washington County, and it is here that tests are being made. If successful it will reclaim hundreds of acres that would otherwise be useless after the coal has been excavated.

WEST VIRGINIA

Thurmond—The Clay Coal Co., of Thayer, of which C. M. Holliday is president, is erecting a new bin for smithing coal at its Ridgeview mine.

Harwood—A mine is being opened between Harwood and Shinnston by the New Superior Coal Co., and a new tipple is under construction. The company, which owns about 66 acres of coal land, plans to begin producing coal by July 15.

Huntington—As soon as a sidetrack from the Chesapeake & Ohio is put in, the Weewin Coal Co. on Arbuckle Creek will begin to ship coal, the plant being ready to operate as soon as transportation facilities are provided.

Phil C. Jack and others, of this city, have purchased the plant of the Glen Elk Coal Co. on the Kanawha & West Virginia Railway.

Charleston—The Mordue Collieries Co. expects to be able to begin shipping coal from its mines on Coal River in July.

The Boone County Coal Corporation has purchased from Paul Hardy and associates the Dobra mine on Coal River, from the Coal River Coal and Coke Co., this mine having a drift opening and a 5-ft. seam. With purchases recently made the Boone corporation now owns about 20,000 acres of coal land and is operating 12 mines producing about 40,000 tons of coal a month.

Mabie—Plans are being made by the Randolph Smokeless Coal Co. to build a plant near Mabie, in Randolph County, to cost approximately $100,000, covering electrical equipment, an incline leading to the mine or mines, etc. Engineers are now at work with a view to preparing specifications of what is needed. The coal will be reached by a drift mine. The organization of the company has been perfected by the election of A. F. Bennett as president; W. T. George as vice president; R. E. Talbott as treasurer and H. J. Wilcox as secretary. All the officers reside at Philippi.

NORTH CAROLINA

Cumnock—The Cumnock Coal Co. is building 20 new houses for its employees. The houses will be equipped with water and sewer conveniences, and will be modern in every respect. The company has completed a new tipple and will soon be taking out coal from the old shaft. At present two or three cars a week are coming out from the air shaft. The workings will soon be in shape to begin mining on a commercial scale, although the coal will not go into the market, as it will be used by the engines of the Norfolk Southern road. The Carolina Coal Co. on an adjoining property, is in about 5 ft. of nice, clean coal, and expects to be taking out coal for the local market in a few days. Analyses of these coals show a high volatile content, low sulphur and low ash.

KENTUCKY

Madisonville—The Memphis Coal Co. will shortly erect a steel tipple at Mannington, Ky., where the company has purchased the Lamb and Franklin mines, and plans opening a third mine. It intends to handle the output of the three mines over the one tipple.

OHIO

Zanesville—Fire, thought to have been of incendiary origin, destroyed the Pennsylvania R.R. trestle on the spur to the Monitor mine at Darlington recently. The Monitor mine is operated by the Burton-Townsend Brick Co. The loss from the fire falls on the railroad, which will rush the repair work.

New Lexington—Stripping operations in this vicinity are reaching considerable proportions, one company having just started work on a tract of 250 acres bearing a five-foot vein close to the surface. Stripping is expected to cut a larger figure in the production of coal this year than ever before, on account of the volume which can be produced at small expense and the need for increased production.

INDIANA

Brazil—Coal miners of Brazil, Knightstown and Harmony have called meetings for the purpose of framing a petition to submit to Director-General McAdoo asking that the miners' train on the Pennsylvania be placed back in service in order to transport the miners to and from work. They assert that such a move would increase the output of coal.

Hammond—Fires have been lighted in the first of the new openhearth furnaces of the $25,000,000 steel works of the Mark Manufacturing Co. at Indiana Harbor. Production of steel is expected in two weeks. The company has four rolling mills in operation producing plates. The new openhearth operation will be followed by the blowing in of a blast furnace, the first of several new ones to be built and the largest in the Calumet region of Chicago.

ILLINOIS

Pana—Harry Turner, who recently purchased 83 acres of the Hayward tract of land adjoining Pana, has sold the coal rights for $30 an acre.

Dawson—The Dawson coal mine has been sold by Mr. and Mrs. Edgar H. Buckley, of Bloomington, Ill., to L. E. Fischer, formerly general manager of the Illinois Traction System. The consideration is said to have been $100,000.

Bloomington—An appropriate flag-raising was enjoyed by miners of the McLean County Coal Co. on June 14. Addresses were made by Mayor E. E. Jones and Spencer Ewing, and community singing was a feature of the event. An 8-ft. flag was raised from the top of the shaft.

Hillsboro—The 325 members of Taylor Springs local, United Mine Workers, have voted to give $1 per month from their pay to the Red Cross for the duration of the war. This will amount to more than $4000 for the next year, beginning June 1, and this rate will be maintained as long as the war lasts.

O'Fallon — The following St. Clair County mines have been awarded Liberty Loan flags for going over the top with 100 per cent. of their employees as purchasers of the Third Liberty Bonds: Nigger Hollow No. 1, 301; Nigger Hollow No. 2, 590; Avery, 105; Shiloh, 392; Prairie, 300; Radium, 115; Little Oak, 298; Superior, 137; Muren, 144; Columbia, 114.

Marion—A new town is being built in the eastern portion of the county. It is three miles east of Pittsburgh and will be known as Paulton, on an extension of the Marion & Eastern R. R. A new mine is being sunk there by the Ernest Coal Co., which is controlled by Cosgrove & Co. of Johnstown, Penn. This new mine is going down on the 4500-acre tract and will be one of the largest mines in southern Illinois when finished. It is understood that the new town will be named after Paul Cosgrove, who died a few months ago and who was in charge of Cosgrove & Co.'s interests in the west.

Belleville—The question of whether the exigencies of war justify violation of mining laws is raised in an injunction suit that has been brought in the St. Clair County Circuit Court by the Signal Hill Coal Co. against Thomas C. Wright, state mine inspector, to enjoin him from keeping the company's mine shut down on account of the escapement shaft being less than 250 ft. from the main shaft. The company says in its petition that it operated before the law was enacted, with the shafts nearer than 250 ft. apart, and it is contended that the mine should be permitted to continue operating because of the critical shortage of coal. Arguments will be heard in a few days.

Harrisburg—The Wasson Coal Co., one of the big producers in Saline County, has filed suit against the Central Illinois Public Service Co. for $125,000 and another suit for $175,000 against the Southern Illinois Railroad and Power Co., which is a successor to the first mentioned defendant. The suits are based on the alleged failure on the part of the light companies to carry out the stipulations in a contract for power. During the past winter the mines depended upon the power companies and were shut down many times on account of no electricity. Many other mining companies in the southern Illinois field have contracts which have cost them enormous sums in idle times during the past winter.

Foreign News

Edmonton, Alta.—John T. Stirling, fuel administrator for Alberta, states that fuel orders are coming in satisfactorily from Winnipeg. There were on an average 1200 tons a day being shipped from the Drumheller mines to Manitoba, and the amount was steadily increasing.

Medicine Hat, Alta.—Work on the development of the Ainsley coal mine near Medicine Hat is scheduled to commence at once, and it is reported the daily output will be 1000 tons. The mine will employ

200 men. A spur track is to be built from Medicine Hat to the mine. The Ainsley mine was only a small enterprise before being taken over by an American financier.

Edmonton, Alta.—The provincial government is arranging a system of inspection for all cars of coal shipped out of the province. This is being done to remedy the complaint coming from the Winnipeg market that dirty coal is being shipped out. In order to hold the outside market the best grades of coal only will be shipped to the other provinces, and the softer grades used nearer home.

Winnipeg, Man.—Demonstrations showing how to use western Canadian coal to the best advantage were held for ten days commencing June 6 and were attended by hundreds daily. About a dozen hot-air and hot-water furnaces, ranges and stoves were in operation, with A. E. Wilson of Drumheller, Alta., acting as demonstrator. Printed instructions as to how to burn Alberta coal in the ordinary stoves and furnaces were distributed.

Personals

G. H. Marting, formerly mine manager for the Whitaker-Glessner Co.'s mines, is now managing the Milburn Byproduct Coal Co. at Milburn, W. Va. The company is owned by the Citizens Gas Co., of Indianapolis.

John T. Lewis, of Johnstown, Penn., has been appointed by Seward E. Button, chief of the Department of Mines of Pennsylvania, as inspector in the Twelfth Bituminous District, and will have headquarters at Punxsutawney. He assumed his duties on June 20.

George R. Henderson, of Philadelphia, Penn., has been appointed federal administrative engineer for Pennsylvania. Mr. Henderson has assumed his office and will supervise the inspection, survey and investigation of boiler houses and power houses in all plants in Pennsylvania outside of the Pittsburgh district.

Obituary

W. A. McCloud, one of the first men to develop the Linton, Ind., coal field, died at his home, 918 Fairfield Ave., Indianapolis, Ind., June 12. While superintending a mine in Clay County, Indiana, last July, he fell from a coal car, receiving injuries which had confined him to his room since and which gradually led up to his death. He was 65 years of age.

Industrial News

Hazard, Ky.—The Bewley-Darst Coal Mining Co., Hazard, Ky., has purchased the Coneva plant,, near Hazard, and plans expenditures of several thousand dollars in improvements and equipment.

Louisville, Ky.—According to unconfirmed reports, the Kentucky River Power Co., Hazard, Ky., is planning construction of 25-mile transmission line to furnish power to a number of coal mines operating in the district.

Bee Pee, Ky.—The Williams Byproduct Coal Co., J. W. Williams, president, Fountain City, Tenn., has purchased machinery for developing 1500 acres of land, for daily output of 1500 tons. Will spend about $150,000 on equipment.

Kimbolton, Ohio—The Kimbolton Coal Mining Co. is opening a new slope mine at this place, Willis E. Holloway Co., of Cleveland, Ohio, being the engineers and contractors. The tipple is designed to produce 2000 tons per day of No. 8 Ohio coal.

Reedsville, Ky.—The John Runs Coal Co., S. M. Bradley, of Morehead, president, recently increased its capital from $15,000 to $30,000, and will develop 2000 acres of land, planning an output of two cars at start. The company may later install machinery.

New York, N. Y.—E. Kelly Downey has been elected a director of the Wholesale Coal Trade Association of New York, to fill the vacancy caused by the resignation of W. R. Coyle, who has reëntered the military service as a captain in the Marine Corps.

Wheeling, W. Va.—Contracts have been let by the Bertram Coal Mining Co., of Wheeling, to the Willis E. Holloway Co., of Cleveland, Ohio, for the work in connection with its stripping property at Romaine, Ohio. The property is to produce 3000 tons per day

Star Hill, Ky.—The Star Hill Coal Co., recently organized, plans a small development on 135 acres of coal land, and will install mining machinery. E. W. Roach is president and manager, J. B. Rogers, vice-president and G. W. Nicholson, secretary-treasurer.

Charleston, W. Va.—The Brick Coal Mining Co. has been formed to operate mines in Upshur and Harrison Counties, the authorized capital stock being $100,000. The incorporators are J. Kandt, of Detroit, Mich.; D. J. Carter, Harry W. Sheets, B. B. Jarvis and C. D. Duthie, of Clarksburg, W. Va.

Paducah, Ky.—The Columbia-Panama Coal Co., H. H. Hardringe, Chicago, president; W. A. Calhoun, Paducah, chief engineer, plans development of 2000 acres of coal land on Cumberland & Manchester R. R., at Goose Rock. Has asked for prices on mining equipment, plans mining town, tramway, etc.

Morgantown, W. Va.—H. C. Greer, Albert Shuman, C. E. Watson, J. L. Hatfield, all of Morgantown; and J. P. Burbridge, of Dillslow, W. Va., are the incorporators of the Burbridge Coal Co., which has been incorporated with an authorized capital of $5000 to operate mines in Monongalia County, West Virginia.

Charleston, W. Va.—Among the new coal companies organized last week was the Guy Pocahontas Coal Co. of War, McDowell County, West Virginia, incorporated with a capital stock of $5000, the incorporators being W. M. Guy, S. E. Massey and Eulalia Little Guy, all of Bramwell, W. Va.; J. W. Johnson and V. T. Stricklen, both of War, W. Va.

Morgantown, W. Va.—The application of the Monongahela Railway Co. for permission to build a line along Scott's Run from the Monongahela River to Cassville, in order to accommodate mines at that place, has been denied. The application was opposed by the Morgantown & Wheeling R. R. on the ground that the proposed extension would parallel its own line.

Charleston, W. Va.—H. P. Brydon and brothers have secured a charter for H. P. Brydon & Bro., Inc., the company to operate coal lands and operate a supply depot for miners. The company is capitalized at $50,000 with the following as incorporators: H. P. Brydon and T. F. Shaffer, both of Cumberland; E. R. Brydon and S. B. Brydon, of Bloomington; Ned and Edward James, of Piedmont.

Columbus, Ohio—A flag-raising ceremony was held June 14 at practically every coal mine in the Buckeye State. Arrangements were made by the mine owners, state officials and Secretary W. D. McKinney, of the Southern Ohio Coal Exchange. The ceremonies consisted largely of patriotic songs, speeches, and the raising of the American flag. Practically every available large American flag in Columbus was purchased for the occasion.

Buffalo, N. Y.—W. C. Blodgett, Buffalo representative of Dickson & Eddy, has been appointed collector of statistics of anthracite shipments by lake for the lower lake ports, by the anthracite commission now sitting in Philadelphia. All shipping agents report to him daily the amount of coal loaded, also destination and consignee. He has long been acquainted with this work The former connection will be maintained, with the Buffalo office as headquarters.

Toledo, Ohio—More activity in lake shipments is shown by the reports of loadings at the Toledo & Ohio Central and Hocking Valley docks during the week ending June 15. During the week the Hocking Valley docks loaded 160,713 tons as compared with 11,744 tons the previous week, making a total of 892,293 tons for the season. The Toledo & Ohio Central docks loaded 79,000 tons compared with 7000 tons the previous week, making a total of 484,000 tons for the season.

Columbus, Ohio—Double-tracking, the building of new yards and the enlargement of present ones, the construction of a 15-stall roundhouse at Galion, and other improvements on the Big Four, requiring an expenditure of approximately $10,000,000, for the purpose of bettering and facilitating the movement of troops, munitions and coal for the winning of the war, were announced by Chief Engineer C. A. Paquette. The plans provide for double-tracking 58 miles of the Columbus-Indianapolis division and 38 miles of the Chicago division.

Bradshaw, W. Va.—The Bradshaw Coal Co., Bluefield, W. Va., organized by Edwin Mann, president; George S. Strader, secretary-treasurer, of Bluefield, W. Va.; Robert J. Hancock, Lynchburg, Va., vice-president; C. L. Biddilson, War Eagle, W. Va., engineer, has purchased the holdings of the Bradshaw-Pocahontas Coal Co. in McDowell County and plans improvements costing $75,000. Electricity will be purchased from the Appalachian Power Co., Bluefield, W. Va. The company was recently incorporated with capital of $300,000 at Lynchburg.

Buffalo, N. Y.—The supply of coke is only fair, and consumers are doing all they can to get a regular connection with some byproduct plant building their own where possible, as it appears to be more economical to obtain the coke in that way where all the products are made use of. Development of the byproduct plant projected by the Buffalo Union and Donner companies in Buffalo has not begun yet, as it is hard to get men and material for the work. Beehive coke is bought of producers direct, and no prices are made here. Receipts of iron ore by lake for the week were 248,604 gross tons.

Cleveland, Ohio—Eastern Ohio operators are protesting against the alleged discriminatory distribution of coal cars in the eastern Ohio district as compared with certain parts of West Virginia. A statement issued recently shows that the car supply on the Wheeling division of the Baltimore & Ohio during the month ending June 15 was only 40 per cent of requirements, and that fully one-third was taken for railroad fuel, leaving only a small number of cars for the lake trade and to fill commercial contracts. It is also claimed on the Monongah division that operators are given approximately 100 per cent. car supply. Efforts have been made to call attention to this discrimination to the proper authorities, but without results. In the meantime eastern Ohio operators see their miners leaving for other fields or to enter steel and iron plants because of lack of work.

St. Louis, Mo.—Creation of a new railroad operating region west of the Mississippi River, to include the southwestern lines, with headquarters of the regional director at St. Louis, is the culmination of months of effort directed by the St. Louis Chamber of Commerce, with the purpose of having this district separated from the territory under the jurisdiction of R. H. Aishton, regional director of Chicago. It is the belief here that the action taken by the Government will greatly facilitate transportation matters in this district. Benjamin F. Bush, president of the Missouri Pacific Railroad Co., has been appointed regional director for the southwestern railroad division and has resigned the railroad presidency to take the position. The territory west of the Mississippi River is now divided into three districts, with Aishton directing the Chicago division, Bush the southwestern division and Hale Holden, president of the Burlington R.R., directing the central division.

Newark, N. J.—United States Attorney Lynch ordered a coal company to remove from the summer home of Forrest F. Dryden president of the Prudential Life Insurance Co., at Bernardsville, 56 of the 235 tons of coal it had delivered there. In his application for the coal Mr. Dryden explained that while last winter he had used only 195 tons, new buildings had been completed since then which would require a greater supply of coal next winter. He will have in his bins, when Mr. Lynch's order has been carried out, only two-thirds of the supply that he deemed necessary.

Louisville, Ky.—Coal rates in Kentucky will not be increased 15c. a ton over what they were on June 1, 1917, before adding the increase of 25 per cent. authorized by General Order No. 25, Railroad Administration. This was the contention made by the coal men at a hearing ten days ago, when a protest was launched against a 25 per cent. increase on top of the proposed increase of 15c. a ton, which had been accepted.

St. Louis, Mo.—The Interstate Commerce Commission hearing on the petition of the St. Louis Chamber of Commerce for the abolition of the bridge arbitrary of 20c. per ton on coal, which had been in progress two weeks, adjourned Friday, June 14, to July 9. The petitioners have finished their side of the case and several witnesses have been heard for the defense. The adjournment was necessitated by Commissioner Mackley having to return to Washington. It is expected that several more days will be needed to complete the hearing. The commissioner will then make his report to the commission. Attorneys for the Terminal Railway Association and the railroads will ask the commission to throw the case out on the ground that Director-General McAdoo's order increasing all freight rates directed that all existing differentials be preserved. Attorneys for the petitioners will contend that under the act creating the railroad administration authority to pass upon complaints was reserved to the commission.

MARKET DEPARTMENT

Weekly Review

Record Output of Bituminous Brings Feeling of Optimism—Anthracite Production About Normal—Car Shortage Gives Way to Scarcity of Labor—Bureau of Production to Speed Up Mines—New England Shipments Large—No New Industries for Atlantic Seaboard—Market Conditions Active

A FEELING of optimism is engendered by the record production of bituminous coal during the week ended June 8, when the output of soft coal reached the unprecedented total of 12,465,000 short tons. This exceeds by 1,691,000 short tons the production of the preceding week. The average daily output was well above 2,000,000 short tons, which amount of coal must be shipped every working day for the rest of the coal year if estimated demands are to be met. It must be remembered, also, that to date we are behind considerably more than 26,000,000 short tons of bituminous coal. Shipments of anthracite for the week ended June 8 totalled 40,754 cars, which is about normal output for the hard-coal mines under the existing labor conditions.

Though the shortage of cars continues to act as a bar to the greater production of bituminous coal, particularly in West Virginia, this condition is being alleviated rapidly. There is promise that ere long the most important producing sections will be receiving close to 100 per cent. car allotment. The laying of the car-supply ghost, however, has seen the rise of another to haunt the coal operator. This time it is labor shortage, a factor which bids fair to become the chief deterring reason to maximum output.

Realizing that labor in the coal mines must be inspired to do its best, James B. Neale, who heads the newly formed Production Bureau of the Federal Fuel Administration, is planning a nation-wide campaign to speed up coal production. The workers at the mines are to be addressed by well-known men, and the operators will be urged to do their utmost to expedite production by providing every facility and convenience which will aid the employees to mine more coal.

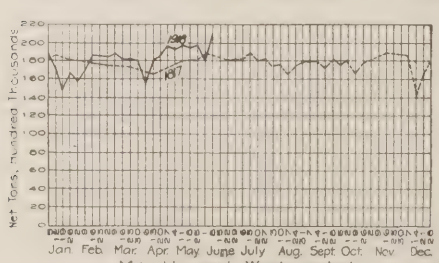
After a careful study of New England's requirements, the Fuel Administration apportioned 30,000,000 short tons of bituminous coal to that section. Steps have been taken to insure the delivery of 60 per cent. of the total amount by Oct. 1. To do this it will be necessary to ship considerable coal to New England during the next three months, as forwardings in April and May were below the average which should have been maintained. Mines in Central Pennsylvania have been ordered to ship to New England 45,000 tons a day, or almost 20 per cent. of the entire production of the soft coal mines of Pennsylvania.

Industrial development in the East and in New England having reached the point where it is no longer feasible to permit the erection of new plants and factories, further industrial expansion in these sections has been prohibited by joint action of the War Industries Board and the Fuel Administration. The order is intended to force new industrial activities in districts where fuel and raw materials can be transported over lines that are not congested. The restricted area consists of the New England States; eastern and southern New York; Pennsylvania, as far west as Williamsport and Altoona; all of New Jersey, and Delaware and eastern Maryland, not including Baltimore.

Market conditions are quite active. The sharp demand for domestic and steam grades continues, and the storing of domestic coal is going on at a good rate. However, receipts by dealers are not half the tonnage desired.

COAL PRODUCTION

Bituminous coal production during the week ended June 8 was the largest in history. The soft coal produced (including lignite and that made into coke) is estimated at 12,465,000 net tons, an increase over the week of June 1 of approximately 1,900,000 net tons, or 17.8 per cent., and the same increase over the week of June 8, 1917. The average daily production is estimated at 2,077,000 net tons, considerably in excess of the 1,791,000 net tons during the week



preceding and 1,789,000 net tons during the same week of the preceding year. Anthracite shipments during the week ended June 8 were 40,754 cars, an increase of approximately 9000 carloads, or 28.3 per cent., over June 1.

Beehive Coke—Production of beehive coke in the United States during the week ended June 8 is estimated at 638,000 net tons, an increase over the week preceding of 26,000 net tons, or 4 per cent. The average production per working day amounted to 106,000 net tons as compared with 102,000 net tons during the week of June 1. The principal operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania produced 362,075 net tons of coke during the week ended June 8, or 77.2 per cent. of their present capacity compared with 75.6 per cent. during the week ended June 1. Of the factors limiting production, amounting to 22.8 per cent. of present capacity, 0.5 per cent. is due to shortage of coke cars, 18.3 per cent. is attributed to insufficient yard labor, 0.2 per cent. to plant disability and 3.8 per cent. to all other causes. The same operators produced 161,400 net tons of coal.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended May 18	May 25	June 1	June 8
Bituminous shipments, 123 roads	205,026	207,036	188,318*	220,607†
Anthracite shipments, 9 roads	41,011	40,594	31,762*	40,754†

* Revised from last report. † Subject to revision.

Byproduct Coke—Operating conditions in the byproduct industry improved during the week ended June 8, causing slight increase in production. The plants of the country operated at 88.3 per cent. of their present capacity as compared with 87.7 per cent. the week preceding. Of the total losses of 11.7 per cent., 2.7 per cent. was attributed to lack of coal, 3 per cent. to labor shortage, 5.1 per cent. to repairs to plants, 0.2 per cent. to "no market" and 0.7 per cent. to all other causes. Material improvement was reported by operators in Maryland and Ohio, production by the operators in the former state rising from 98.7 per cent. to 100 per cent., and in the latter state from 94.5 per cent. to 96.7 per cent. Lack of byproduct coal caused the operators in Tennessee to report the ratio of production to present capacity at 62.7 per cent. Labor shortage and plant repairing in Pennsylvania continue to be the factors limiting production, thereby causing Pennsylvania operators to report the lowest ratio of the large producing states—73 per cent. of present capacity. "No market" losses in Minnesota declined sharply during the week ended June 8—from 9.3 per cent. to 5.4 per cent.

BUSINESS OPINIONS

Dry Goods Economist—Early this week the announcement was made that the War Industries Board had determined to stabilize the prices asked for cotton fabrics and had called upon leading cotton goods manufacturers and distributors to name the prices that should be asked for various grades of cotton goods and to explain the basis on which the prices suggested had been determined. Manufacturers, converters, wholesalers, retailers and even consumers are affected by this action of the War Industries Board, since in the future all will be called upon to pay for cotton goods on the basis of the prices to be determined by the Board. Even contracts already entered into will be subject to revision if the goods they call for are delivered later than certain specified dates.

Bradstreet's—In its broadest respect, business in general eclipses that of this time last year, but of course the largest single disburser is the government, its daily expenditures now averaging about $57,000,000. In ordinary channels business is getting closer to a cash basis, and naturally so, for such sellers as have goods available are in a position to make terms as well as to select customers. Jewelry, liquors, beer, ordinary building and other so-called less essentials are in the doldrums, as it were, and liquor dealers are going out of business.

Marshall Field & Co.—Current wholesale distribution of dry goods has been very

much in excess of the large shipments during the corresponding period a year ago. Road sales for the week for immediate and future delivery show a splendid increase over those of the same week in 1917. Customers have not been in to market in such large numbers as last year. Collections show a good increase over those of the corresponding week a year ago. The cotton goods market is firm.

Atlantic Seaboard

BOSTON

More hopeful outlook for New England due to Mr. Storrow's success at Washington. New plan now assumed to be in operation, but it will be some weeks before anything like maximum movement is realized. Query whether present plan will increase number of contracts with operators for consignment to this territory. Opinion is that producers will continue shy of commitments. Great interest in actual working out of distribution program. Multiplicity of reports, etc., is to its disadvantage, but local policing is the more sensible method. The main thing is for this territory to get its quota now when the railroads can haul the coal. Slow movement coastwise means a considerable loss in receipts. Hampton Roads dumpings decrease due to fewer arrivals of tonnage and the consequent diversion of shipments from tidewater to line and connecting railroad points.

Bituminous—June 10 was a favorable day for New England. The fuel authorities at Washington ordered certain district representatives to make up the quota for this territory all-rail by instructing operators to consign 100 per cent. on such contracts or orders as were on hand, and in addition to that volume of coal to send forward to the New England gateways enough more each week to bring consignments all-rail up to the full New England ratable proportion. In central Pennsylvania this would amount to 4500 cars weekly, based on current output. At the conference in Boston on June 4 on the "zoning" problem, it was shown by representatives of the New England railroads that the latter could easily handle 450 carloads more per day. This was brought to the attention of Mr. Garfield and the Railroad Administration with such force by Mr. Storrow and others interested in the New England situation that the whole New England program has been rearranged, so far as concerns all-rail deliveries. It has been understood that during May, for instance, all-rail consignments into New England from central Pennsylvania amount to only about 1700 cars weekly. The new order therefore calls for 2800 cars more from that one district, but this does not look so heavy as it might for the reason that the same readjustment of program provides that coal which formerly moved into New England from the Somerset, upper Potomac and Fairmont districts, which moved into New England all-rail, has been shut off upon the understanding that such coal will reach Providence or Boston via Curtis Bay or Port Covington piers at Baltimore.

The result of these broad instructions has been the cancellation of all directions to district representatives to ship only to preferred requirements. It is an important part of the plan that the policing is to be done by state administrators, and it will be the function of Mr. Storrow's office not only to regulate the flow of coal to all grades and kinds of consumers, but through the district representatives to put each buyer who has no contract in touch with an operator who will be in position to supply him, always bearing in mind that when production falls off then New England's volume of coal likewise drops down.

There are going to be enough problems involved in the operation of this plan, but obvious though some of them are, and large as the job is, it is much more feasible for an office like Mr. Storrow's, with representatives in every part of New England, to control it either at the gateways or at destination than to have the same thing attempted from Washington or by the district representatives. Any sag between the volume of coal covered by contracts in hand and the 4500 cars weekly is to be destined according to orders from Mr. Storrow, and to this end a considerable number of destinations have been furnished the Altoona office. The 4500 cars are to include railroad fuel as well, and it is expected a real effort will be made to build up stocks of locomotive coal. The whole program is subject to orders from Washington, and any day there may be heavy inroads on the New England quota to make up deficiencies from other districts. However, it is a real move in favor of coal for New England and comes as a decided relief after the alarming slump in receipts all-rail that was disclosed during May.

The fact that from Washington it is insisted that requirements be classified and tabulated in such way as to show in detail the course of each requirement only adds to the machinery of operation, but those who formulated the system have good courage and everybody wishes them well. The big thing is to get coal forward in due proportion during the months when the railroads are in position to handle it. Losses in movement during favorable weather are never made up later in the season.

While traffic is relatively light on the New England lines the question of car-miles is not so important, and for that reason any "zoning" of consuming territory is likely to be postponed. Without doubt it will come up prominently when there is any sign of congestion, and at that time the plan outlined at the June 4 conference will probably be carried out. It was agreed there should be a 30-day notice in order to give consumers a chance to adjust their contracts. As it is, the embargo of all-rail coal via Shippensburg is causing uneasiness to a good many consumers who for years have drawn their supply from territory tributary to the Baltimore & Ohio.

An important conference in Mr. Storrow's office on June 18 was attended by state fuel administrators and representative shippers, called there to discuss what compensation the state administrators should fix for "wholesalers" who handle coal only through barges or steamers which they charter from trip to trip. Application was made by one or two interests to have the charge extend to 5 per cent. of the delivered price, the argument being that the overhead, the capital involved, etc., were so large that 15c. per net ton was entirely inadequate. The subject was thoroughly gone into and all the points of view examined, but clearly the consensus of opinion was that any increase in compensation in view of approaching freight increases would be such an additional burden on the consumer as would not be warranted; that to allow a larger commission would only make it easy for some shippers to divide with "scalpers" nearer the mines; and that the net result would not be more coal for New England but would be merely taking away from the established agencies a certain tonnage that would normally come forward through the regular channels. A feature of the meeting was a clear statement by Thomas F. Farrell, vice president of the Pocahontas Fuel Co., representing the Pocahontas operators. He called attention to the price differential as between the smokeless coals and showed the complications that grew out of it. Mr. Farrell made a further impressive statement with regard to the draft and its effect upon labor supply for the mines.

Later the same day the state administrators gave attention to matters of policy with regard to the new distribution program. It was agreed that in all respects the six New England states should be handled as a unit and the amount of stock that should be supplied preferred requirements and other needs not preferred was discussed in detail.

The movement coastwise has not yet quite recovered from U-boat activity, but a considerable gain was made this week. There has been no day recently when the volume of coal was not largely in excess of the tonnage waiting at the piers. It was only natural that as dumpings decreased last week coal should be diverted to line points and to connecting roads.

Anthracite—Unhappily, there is no increase in the volume of domestic sizes that can be pointed to so far as this territory is concerned. For the first 16 days in June the average daily movement was but 524 cars, still well below the program. The percentage of steam sizes still hovers about 30 per cent.

NEW YORK

The trade urges appointment of state fuel administrator. It sees coal slipping to other markets. Anthracite retail dealers' receipts continue light. Shortage of coal feared by civic organizations. One company advances mine prices of buckwheat and smaller sizes. Bituminous continues short for commercial uses, but bunker coal is in good supply.

Anthracite—The appointment of a state fuel administrator to succeed Albert H. Wiggin, who resigned several weeks ago, would be welcome news to the trade here. Letters have been written to Dr. Garfield urging him to announce Mr. Wiggin's successor, and conferences have been held by representatives of various civic organizations in sections of Greater New York with the local fuel administrator urging such appointment.

Requirements in the Greater City are steadily increasing, and although the allotment made by the anthracite committee of the fuel administration of the entire state represents an increase of 12 per cent., that tonnage could practically be absorbed by local consumers. The trade points out that while the state is without a state fuel administrator to urge its needs this market is not reaping any benefit from the cutting down of Western shipments or of shipments to the 29 counties in western Pennsylvania as ordered by State Fuel Administrator Potter of that state.

The Bronx County Board of Trade is fearful that there will be a decided shortage of coal in that county next winter and has started out to find the reason for delayed shipments. It is claimed that the 21 retail dealers in that county have orders on their books for more than 400,000 tons, while the requirements for the county are placed at 1,344,000 tons.

Although it has been announced that the city authorities have options on 300,000 tons of coal to be sold to the needy next winter, the trade is still in the dark as to where this tonnage is to be obtained.

There has been no change in the situation regarding the sizes larger than and including pea, although some dealers did receive slightly increased shipments over the previous week because of the shortage of boats to carry coal to New England. Some of the largest yards in this city are reported to have contained less than 100 tons of coal at times during the week.

The steam coal situation has gained some strength, and one of the large producing companies has advanced its mine prices for buckwheat, rice and barley 25c. per ton. It has not yet been learned if any of the other companies will do likewise. The demand is spotted, and while some shippers have plenty of barley on hand others have none. Culm is plentiful with some of the shippers.

Current quotations, per gross tons, f. o. b., tidewater, at the lower ports of the follows:

	Circular	Individual		Circular	Individual
Broken	$6.50	$7.25	Pea	$4.90	$5.65
Egg	6.10	6.85	Buck	4.85	5.60
Stove	6.35	7.10	Rice	4.35	4.80
Chestnut	6.45	7.20	Barley	3.85	4.00

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice and barley are not fixed by the Government.

Bituminous—The record production as recorded by Government statistics for the week ended June 8, when there was an increase of 1,900,000 tons over the previous week, made practically no change in the local situation. Coal was decidedly short for the spot buyers, while regular customers did not obtain any more than they could conveniently use. There has been no let up in the demand.

Producers and shippers were somewhat surprised by the announcement from Philadelphia on Monday that J. J. Storrow, fuel administrator for New England, had obtained permission from the Fuel Administration at Washington to ship to New England 900 cars of bituminous daily from the central Pennsylvania coal fields. Meanwhile it was pointed out that industries engaged in war production along the Atlantic seaboard are clamoring for coal. If this order is allowed to remain in force it will no doubt result in the New York market losing a portion of its already too meager supply.

Public utilities and their customers are again being urged to exercise the utmost caution in using electricity for advertising purposes and other display illumination. Should this alleged waste continue the suspension of the so-called "lightless night" order may be recalled.

PHILADELPHIA

Anthracite deliveries short. Retail labor troubles serious. New allotment not yet fixed. Production good, as well as car supply, with New England still preferred. Non-war plants denied buckwheat exemption. No coal in company storage yards. Steam prices advanced 25c. Government may act. Culm demand grows. Bituminous trade upset. Heavy rail shipments due to submarines. Car supply sharply cut in favor of southern shippers.

Anthracite—From the point of receipts the local situation continues unsatisfactory. The yards are bare, as coal is delivered as promptly as received. Despite real summer

weather consumers do not let up in their efforts to have deliveries made. As a consequence the dealers increase their pressure on the shipping agencies. During the past week the number of dealers calling on the sales agents has increased. That the dealers are losing no opportunity to get every ton of coal possible is shown by the number who in looking up their records have come across single cars of coal which they purchased in the 1916 period and are coming in to be assured that they will receive this car of coal.

The labor question is becoming more acute with the retailers each day, and they find it extremely difficult to keep enough men on hand to deliver what coal is received.

There has not as yet been any decision as to what part of the 18 per cent. increase of anthracite allotted to this state will be received by local dealers. It is understood that the decision in this matter hinges on the matter of how much coal the various operators have been shipping into the various territories which have now been prohibited from using anthracite.

From the production standpoint it can be said that the tonnage is almost up to the record of last year. The reason that it is not more is only because the men are not in the region, and while the reduction of labor from month to month is not heavy, yet in the aggregate it is bound to make itself felt. Unlike the bituminous region, however, there is hardly any trouble with the car supply, as during the past year or more there have been only a few occasions when any operation was idle for the lack of cars. Following out the request of the fuel administration all operations are now making daily reports of the car supply, and the authorities intend to keep the closest watch possible on this phase of the situation.

Practically all the local manufacturing plants have now had replies from Washington in reference to their applications for exemptions for the use of buckwheat coal. Of course, those concerns on war work found this application to be merely a matter of form. However, those engaged on non-war lines are finding themselves in trouble. Their use of the No. 1 buckwheat has been denied, and they are advised to go on either No. 2 or No. 3 buckwheat coal. Even this does not let them out of their difficulties, for most of them find themselves unable to procure any No. 2 or No. 3 buckwheat, as even these grades are closely sold. As a consequence of these refusals of exemptions a few of the smaller operators have had a few cars of buckwheat coal for sale, which generally have been sold around $4.50 for single cars. In this connection retailers who are selling anthracite for steam use are being closely pressed by the authorities to be careful that all such sales are covered by the exemptions necessary. With the big companies it is at times possible to get small quantities of barley or No. 3 buckwheat, as at times their production of this size is a little in excess of their current needs; but even they are not willing to take on new customers for any definite periods.

It is also well to note in connection with the general anthracite situation that the storage yards of the big companies, which in ordinary years begin about this time to fill up with all sizes of coal, from the domestic to the steam grades, are completely bare and do not hold a pound of coal. There is little likelihood, too, that they will receive any coal, except for a light tonnage of barley as midsummer approaches.

The trade was somewhat surprised when on the 12th inst. the Philadelphia & Reading Coal and Iron Co., from its general offices here, announced an increase of 25c. per ton on all steam sizes from buckwheat No. 1 down. There was nothing to indicate that such a plan was in contemplation, and the increase means quite an item to manufacturers, as in addition to this on the 25th inst. the new freight rates with advances approximating 25 per cent. go into effect. The big companies have little of their steam sizes under contract and this means that they will get the new price on fully 75 per cent. of their production. A feature of the present increase is that the price of Lykens Valley No. 1 buckwheat is higher than the same grade of pea coal, and this has caused quite a little comment. It would not surprise any one to see this price adjusted, for some months back individual shippers were selling their buckwheat to steam users at a higher price than they were getting for their pea coal. The Fuel Administration in this instance simply called their attention to the inconsistency, without requesting any action; but that was sufficient, and the prices were adjusted to a more equitable basis. It is possible that the Government might take the opportunity now that the question is opened to set the prices for steam grades the same as they have for domestic fuel and also for bituminous coal.

While the market locally is not active on culm, it is known that heavy shipments of this material are being made to eastern points. In New England the demand for this coal is increasing and heavy tonnages are going there. While heretofore the independent operators have had the bulk of this trade, having practically blazed the way for it, the larger companies have now gone into the market and are selling a fair tonnage. Most of their trade as yet is through middle houses, who have developed a market for it and called on the big companies for supplies.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$4.90	$6.25	Buckwheat	$3.40	$4.40
Egg	4.50	5.85	Rice	2.90	3.80
Stove	4.75	6.10	Boiler	2.70	3.70
Nut	4.85	6.20	Barley	2.40	3.30
Pea	3.45	4.70	Culm	1.25	2.15

Bituminous—Late in the week the bituminous operators received quite a jolt. Due to the good car supply which they suddenly began to enjoy a few weeks since, they were feeling comparatively comfortable as to the immediate future. Then came a drastic ruling that on account of the submarine activity off the coast a greater tonnage of coal must go via all-rail from southern points into New England. This order of the fuel administration simply laid on their backs the central Pennsylvania operators, who had begun to ship heavy tonnages into this market. While recognizing the fact that New England is entitled to a fair proportion of coal, they cannot see why the entire market should suffer so drastically. Prior to this latest edict, on the 14th inst., the tonnages of soft coal coming into this market were quite sizable and consumers were storing for future use. The changed conditions in the car supply up to the 14th inst. were particularly noticeable among the jobbing houses, who after just about existing for months past were again receiving a fair volume of coal, with every prospect of doing some good business for the rest of the year. Even at that no one is without hope that the situation may change as quickly as the unfortunate circumstances arose which made the new ruling on cars necessary.

BALTIMORE

Application of the Maryland compulsory work law comes to aid of coal business. Soft coal supplies fairly liberal, but poor as to grade. Anthracite situation still troublesome.

Bituminous—The iron hand of the law is being extended by the Compulsory Work Bureau of the State of Maryland, of which George A. Mahone is director. In Baltimore the coal yards have been placarded with signs which tell all workers, of whatever degree, that the law of Maryland requires every man between the ages of 18 and 50 inclusive to be continuously employed. Notice is given that three or four days does not constitute a week's work, and prosecution followed by fines and imprisonment, or both, will be inflicted on work slackers. The distribution of coal in the city will be greatly aided by the move. There is now a plan being worked out which will probably extend the same law over every branch of the coal business in Maryland, and mine work should be greatly speeded thereby. Meanwhile the diversion of coal to this city continues comparatively heavy, and there is not much talk now that this or that industry is near the danger line as to supply. There has been some kicking by customers, however, as to the grade of some of this coal. As a matter of fact some of the coal coming here is very poor, and there have been continued heavy rejections by the fuel administrator at the tidewater pool.

Anthracite—The hard-coal situation, with receipts still comparatively light at a time when the big inrush should be taking place, still troubles the retailers and the local fuel administration. Little satisfaction has been gained by either as to the source from which Baltimore is finally to get its coal, if at all, in the proportion needed. The general statement is made that a plan is still being evolved to eliminate long and cross-hauls, and the coal will come through finally—when, no one can say. Meanwhile the trade, despite the protest sent from here to Washington against a freight rate increase before Sept. 1, is prepared to see the raise go into effect before the end of the month. Just how the increase will be apportioned is a matter worrying the trade, but the dealers cannot see how their profit margin can be reduced any in view of the steadily mounting costs of materials and general overhead charges. Receipts here the past week were light, with the exception of pea coal, which is coming through freely.

Lake Markets

PITTSBURGH

Production somewhat improved. Moderate amount of stocking. Car shortage chief limiting factor. Occasional slight price shading.

Production in the Pittsburgh district has been improving slightly, along with the rest of the country. The excellent report made public at the beginning of this week, showing for the whole country 12,465,000 tons of bituminous coal mined in the week ended June 8, is believed to have been helped by the Pittsburgh district as much as by other districts, and production was fully as large last week. Curtailment in this district is still due almost wholly to car shortage, according to operators' reports, little loss of production being ascribed to labor shortage; whereas there is the curious contrast that in the Connellsville region car shortage is about past, and labor shortage is the restrictive influence. With a full-car supply in the Pittsburgh coal district, however, a labor shortage might be uncovered.

There is a trifle more stocking of coal, but on the whole not as much as there should be, to insure an absence of trouble next winter. Retail dealers are well supplied and by reason of the propaganda householders are laying in their stocks early in many cases.

On the whole the market is holding up to the set maximum prices, and brokers are occasionally able to secure a commission from the consumer in addition. There are, however, occasional instances of large consumers buying at a trifle under the set maximum, say 10c., particularly for screened coal. This still nets the operator a shade more than mine-run, as there is no difficulty in securing the full price for slack. The general market remains quotable at the set prices: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district, jobbers being permitted to charge 15c. brokerage in addition.

BUFFALO

Bituminous trade dull. Jobbers looking to Pittsburgh for relief, but not getting much. Some stocking up now. Anthracite scarce. Lake shipments good.

Bituminous—The trade continues unsatisfactory to the jobbers, who are wondering when the better showing is to take place. They recall that the authorities who talked to them at the jobbers' national convention were all sure of a better arrangement, so that they could handle the coal that goes out, but they do not see any change for the better yet.

Last week a large number of Buffalo jobbers were in Pittsburgh looking for coal, but it does not appear that much was obtained. The fact is that demand is not what it ought to be from a jobber's point of view. The consumption is good and there are more reports of consumers stocking up, but the coal appears to slip by without coming into the hands of dealers here.

The supply conditions are much the same as before. Canada has a surplus westward and is gaining on the shortage in the St. Lawrence district. New York state is pretty well provided for but New England is short. It is learned that the authorities are working on a plan to carry coal on the canal, which ought to help solve the transportation problem eastward. One difficulty is that the supply of canal boats is small.

The latest rulings of bituminous prices make them as follows for Buffalo: $4.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh lump; $4.20 for Pittsburgh mine-run and $3.95 for slack, all per net ton, f.o.b.

Anthracite—The demand locally much exceeds the supply, which has run down lately to about half the former amount. The claim is that the Government is taking it. A light supply once or twice a week is all that can be depended upon. Dealers are complaining of a note put in the local papers by the county fuel administrator urging people to lay in their coal now, when the present supply is so light that consumers are raising a big din about it.

The amount of anthracite loaded in the lake trade for the week was 109,000 net tons, of which 49,200 tons cleared for Duluth or Superior, consignee's option, 16,900 tons for Milwaukee, 15,800 tons for Sheboygan, 14,900 tons for Chicago and 12,200 tons for Fort William. Freight rates continue easy at 48c. to Duluth and Fort William, 50c. to Sheboygan, 55c. to Milwaukee and 60 to 65c. to Chicago.

DETROIT

Deficiency in receipts of anthracite and bituminous continues. James Couzens is

named chairman Wayne County fuel committee. Lake movement drags.

Bituminous—Jobbers and consumers alike are inclined to regard the present conditions as lending a far from reassuring outlook to the future. The volume of bituminous coal shipments arriving in Detroit shows no material increase. Receipts range around 400 cars a day and below, when current requirements and the necessity for accumulating reserves should be supplied with from 700 to 800 cars daily. Mine-run is constituting the larger proportion of the incoming shipments. Slack, domestic lump and other sizes are not plentiful.

Despite the fact that Edgar B. Whitcomb has disregarded the demand of W. K. Prudden, Michigan fuel administrator, and continues to decline to turn in his resignation as chairman of the Wayne County fuel committee, the state fuel administrator has proceeded to announce the appointment of James Couzens as Mr. Whitcomb's successor. Mr. Couzens is the multi-millionaire police commissioner of Detroit, former vice president of the Ford Motor Co. In earlier life he was a clerk in the coal office of Alexander Y. Malcomson. He was a member of the Wayne County fuel committee, of which Charles A. Dean was the third member. Mr. Prudden has not indicated whether Mr. Dean is to continue on the committee with Mr. Couzens. Meantime petitions have been circulated in Detroit and are to be sent to the Federal Fuel Administrator and Governor Sleeper, of Michigan, asking for the removal of Mr. Prudden as state fuel administrator or the creation of a new district including Detroit and Wayne County, independent of the remainder of the state.

Anthracite—There is no improvement in the matter of anthracite supply. The daily receipts in June have averaged little more than 30 cars a day. Household consumers are vainly striving to get their winter supply. Retailers are unable to fill orders and some of them are declining to book orders.

Lake Trade—Shipments of coal over the lake routes are falling short of the expectations of shippers and vessel owners. During the early part of last week average daily loading of vessels was about 100,000 tons. Toward the end of the week the movement eased off. To supply needs of the Northwest, it is calculated that weekly shipments should amount to about 1,000,000 tons until the coming of cold weather.

COLUMBUS

Labor shortage as well as shortage of cars is cutting production in Ohio mining districts. Demand for all grades continues active in every locality.

The coal trade in Ohio has been rather slow during the week. This was due largely to a reduction in production, which was reported from all of the mining districts of the state. With the demand for steam, domestic and lake tonnage as insistent as ever, the curtailment of output had a serious effect on the trade in general. The tone of the market is generally satisfactory and prospects are for a strong demand during the remainder of the year.

Domestic trade is still one of the strongest features of the market. With the campaign to "buy now" progressing satisfactorily, dealers report a better demand from all sections. In most cases retailers have orders booked ahead for several weeks, and many cannot possibly be filled until August. Surplus stocks have been depleted and all efforts to accumulate stocks have failed. Available trucks and wagons are kept busy making deliveries. The private consumers who have been waiting for Pocahontas and other fancy grades are now satisfied to take Ohio-mined varieties. Retail prices are firm at the levels which have prevailed since the last change at the mines. Pocahontas is quite scarce. Considerable splint from certain fields of West Virginia is on the market. Jackson lump is not selling actively because of the higher Government prices.

The steam trade is active in all directions. Buying for future needs is now the ruling motive among the larger users. Some of the larger consumers have succeeded in laying in a surplus which is to guard against an emergency. The smaller users are trying to follow the example of the larger consumers. Railroads are taking a large tonnage, as their freight movement is increasing. Taking it all in all, the steam business is gaining in volume.

Lake trade is active, although the tonnage going to the Northwest is not so large as the program provides. This is caused mainly by the shortage in cars in the sections producing lake tonnage. The vessel movement is good, and in some instances boats have been compelled to go up the upper lake ports light in order to keep the ore trade moving. New dock prices recently announced are at lower levels than those prevailing earlier in the year. There is no congestion on the upper lake docks as the interior movement is brisk.

Production has been decreased in practically every section of the Buckeye State. This is especially true of eastern Ohio, Pomeroy and the Hocking Valley. It is estimated that the output in eastern Ohio is about 60 per cent. of normal and in the Hocking Valley and Pomeroy bend about 75 per cent.

CINCINNATI

Heavy demand from all quarters continues to run ahead of available supplies. The Lake movement is up to a large volume.

So far there is no indication of the slightest change in the volume of demand for coal, and unless the deliveries within the next month or so become so large as to take care of the winter's requirements for many consumers, this demand will apparently continue right into the winter season. The ability of dealers to secure and deliver coal to take care of orders on their books is of course limited by their receipts, and these have not been of such proportions as to speed up the storage demand very much. However, as far as domestic consumers are concerned, it is worth remembering that already there has been more coal placed in bins for next winter's consumption than is usually the case by September, and that this will be an important factor in next winter's demand from this class of consumers. It is the large industrial consumers that worry the trade most, as it is virtually impossible for them to store enough coal to make more than a slight reserve against their daily requirements. The business of getting much of the domestic demand out of the way will help materially in handling this problem next winter, however. The Lake movement through Cincinnati is now of considerable proportions, as it normally is during the entire summer season, and the usual large volume of coal from fields supplying this market is therefore going to the Lake ports.

LOUISVILLE

Domestic demand keen, with result that deliveries are so heavy that little surplus stock is being laid up by local yards. Steam demand steady and good. Shortage of eastern Kentucky coal, with improvement of western Kentucky deliveries.

Louisville jobbers and retailers are experiencing considerable trouble in securing eastern Kentucky coal, which is in considerable demand, as such grades are going to the coal byproducts plants and also being shipped to the Southern cotton mills, which are on the exempted list. Some little Hazard coal is coming in, but little of the more preferred Harlan, while Blue Gem is hardly known on the local market.

The situation in western Kentucky has eased up somewhat in the past ten days or two weeks, and the mines are securing a far better car supply, many foreign cars now coming in under the new regulations of the Railroad Administration. This has enabled the mine operators to hold labor, and as a fact they are now obtaining slightly better forces. The situation in that section is more hopeful, and production has shown an increase.

All western Kentucky coal moving into the Louisville district is being unloaded and delivered rapidly on stocking orders, little stock being accumulated on local yards, and retail yards generally near empty. However, with the stocking orders well in hand the retailers expect to accumulate some yard stocks shortly and be in position to take better care of steam inquiries.

Eastern Kentucky is still suffering from shortage of labor, although there is no kick coming just now on the car supply which is equal to all demands. However, labor is not to be had, and nearly all mines are working with small forces; on the other hand, new development concerns are going in so rapidly that it is a question as to where labor will come from for the greatly increased operations.

Due to the embargo against anthracite moving into Kentucky some 48-hour coke is now coming on the market and is meeting with ready demand. The St. Bernard Mining Co., which has large coke ovens at Earlington, Ky., is shipping coke into Louisville. This concern is also getting along nicely with a new power plant at Earlington, which will supply power to a number of mines.

BIRMINGHAM

Market conditions active. Sharp demand for domestic and steam grades continues. Improvement in production as a whole is slight. Much idleness of mine workers, and shortage of labor holds down production 20 to 25 per cent. below normal.

The scarcity of coal is still the dominant feature in the Alabama field, though much effort is being expended by mine owners to stimulate the output by appealing to the patriotism of the miners and other classes of labor around the operations, which is expected to bear some fruit in the way of a better production. There is no hope entertained of bettering the labor supply, hence the stimulation to greater effort on the part of the present organizations must be attempted as the only measure of relief.

Many industrial plants are suffering for an adequate supply of fuel—particularly brick manufacturers, some of which have large contracts for brick to be used in the construction of Government buildings and industrial plants being erected at the behest of the Federal authorities. Coal men point to the fact that there could be no more vital or important step taken by the Fuel Administration than the appointment of a committee on production. A representative in the field to look after this phase of the industry could be of untold assistance in increasing the production.

The storing of domestic coal is going on at a good rate, though receipts by dealers are not half the tonnage desired. Car-load lots are being ordered in increased numbers, the fuel committee issuing 144 permits during May. Figures compiled by the secretary of the commission show approximately 20,000 tons of domestic coal provided for in May.

It is understood that the fuel administrator is now engaged in compiling figures on cost of production of coal in Alabama with a view to formulating a new schedule of mine prices.

Coke

CONNELLSVILLE

No material change in coke production. Slight increase in byproduct coal production. Shortage in labor performance. Furnaces working fairly well.

Coke production in the region continues to hang around the average of 340,000 to 345,000 tons a week. Only in rare instances is car shortage now reported, but there is much said of labor shortage, particularly in the yards. Production of coal in the region, for shipment to byproduct plants, continues to increase somewhat, but on the whole there is inadequate labor performance. Representatives of the Fuel Administration are investigating matters and hope to induce the men to work more regularly.

The blast furnaces in operation have practically a full supply of coke, but few of them have been able to accumulate any surplus. A furnace here and there is out of blast through not being able to secure a regular supply. The Carnegie Steel Co. blew in an additional stack at the end of last week, now having 56 of its 59 furnaces in operation, a remarkably high proportion. Two are out for relining and one is too small to operate when labor is so scarce.

There has been practically no contracting for coke for the period beginning July 1, except for the renewal of a few furnace coke contracts that run on a monthly adjustment basis. Many foundries have been in the market for contracts, but operators prefer to sell from time to time rather than make contracts. The market remains quotable at the set limits: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1-in., $7.30, per net ton at ovens. Coke screenings from old dumps are bringing up to $6.50, according to the care exercised in preparation.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended June 8 at 341,020 tons, a decrease of 2000 tons.

Middle Western

GENERAL REVIEW

Labor shortage cuts down production. Car supply better than for months.

The shortage of labor continues to be a serious problem with all coal-producing companies in the Middle Western territory. The loss of men is felt more plainly in sections where the railroads have been able to provide a full car supply. Operators who have been making careful checks report that the miners as a class are not availing themselves of the opportunity to get more coal to the surface. Then, too, since the beginning of the war operators have been asking Government officials either to exempt or put the miners in a deferred class.

Production during the past week reached approximately 80 per cent., which seems to be about the limit, unless more miners are available.

H. K. Mack, formerly commercial agent for the Burlington R. R., Paducah, Ky., has been selected by the railroads entering Williamson and Franklin Counties as central car distributor, with headquarters at Herrin, Ill. It is understood that this central distributing office will have telephone connections with all the various yardmasters, and with all coal mines, thereby permitting the distributing office to know early each day the number of cars to be had for the next day's loading. Mr. Mack will also have full details as to what was done, how many cars left over, etc., at all mines under his jurisdiction. If this newly created office meets with the expectation, the same arrangement will be adopted in other large producing centers.

CHICAGO

Heavy buying continues. Large stocks desired before freight rate advance. June 25.

The fact that there becomes effective June 25 a substantial increase in the present freight rate on coal has caused some buying that might have been delayed to a later date. It is not uncommon, however, to hear sales managers say they have more orders on their books for size coal than they can fill for the next 60 or 90 days, unless they can get more coal out of their mines. This condition does not exist on fine coal, although quite a number report they are comfortably ahead with screening orders.

Quotations in the Chicago market are as follows, per net ton f. o. b. cars at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La Salle, Bureau and Will.
Steam lump	$2.55@2.70	$2.55@2.70	$2.95@3.10	$2.55@2.70	$2.55@2.70	$3.25@3.40
Domestic lump	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut	2.55@2.70	2.55@2.70	.....	2.55@2.70	2.55@2.70	3.25@3.40
Pea	2.55@2.70	2.55@2.70	.....	2.55@2.70	2.55@2.70	.....
Washed egg	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack	2.05@2.20	.....	.....	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

Fuel administrator orders anthracite deliveries to begin, leaving prices to be adjusted later. Soft coal schedule fixed. A fair supply of hard coal thus far.

The coal situation at Milwaukee has loosened up to the extent that anthracite is now being delivered from all the docks which handle this grade of coal. Dockmen were holding their stocks until such time as the Government price schedule was announced, but retailers and consumers were so clamorous that State Fuel Administrator Fitzgerald directed that deliveries be made without further delay, leaving the matter of price open to Federal regulation. Because of the temporary check in output there is a goodly accumulation of anthracite to be distributed. From the opening of navigation up to and including June 17, 101,150 tons went over the docks here. In addition, some has come by rail. The sum total is somewhat more than was received last year during the same period.

The schedule of prices for anthracite will be fixed when the cost of handling coal over the docks has been determined. The inquiry as to this is still on. The margin between dock prices and the figures charged the consumer is put at $2.25 per ton with an extra charge of 50c. per ton when fuel is carried in to bins. This includes the retailer's overhead expense and also his loss due to shrinkage. Only six Milwaukee firms receive anthracite, but there is an army of middlemen.

Soft coal is moving out freely. Receipts are falling behind those of last year and it is thought there will be a shortage of steam coal when the season ends. Manufacturers are being urged to economize in every way possible. For the present dealers are allowed to charge as follows for soft coal, delivered: Pittsburgh, Youghiogheny and Hocking—Lump, $6.80; pile run, $6.55; screenings, $6.30. West Virginia Splint—Lump, $7.30; pile run, $7.05; screenings, $6.80. Kanawha Gas—Lump and egg, $8.05; pile run, $7.05; screenings, $6.80. An extra charge of 50c. per ton is made when fuel is carried in.

Coke is selling at $10.75 with the sanction of the fuel administration. This is somewhat higher than usual and presages a stiffening in hard coal prices in order to maintain a proper margin between the two grades of fuel. Thousands of tons of coke are being delivered by the local producers.

Dealers are adhering strictly to the rules laid down by the Federal Fuel Administrator. Users of anthracite are allowed only two-thirds of their normal supply, leaving the other third subject to circumstances later. Manufacturers are being refused anthracite, unless they have special permission, nor can anthracite be furnished to consumers who can use bituminous. Chestnut anthracite is being reserved for consumers having self-feeding magazine stoves. Dealers have orders to report sales at regular intervals.

KANSAS CITY

Plenty of slack going in storage. Dealers accepting orders only for mine-run. Some dealers allowing their stocks to dwindle.

A gratifying volume of slack is going into storage at Kansas City, industrial plant managers going as far as they can in providing against the expected shortage of next winter, and patriotically doing their part in helping the movement this summer. It is said that more than 100 cars of Arkansas semi-anthracite slack has been taken by industrial plants, and much even by office buildings. Many former users of Cherokee and other Kansas slack are storing the semi-anthracite. The latter has a freight rate of $1.60 and mine price of $2.75, against the 90c. freight rate and $2.80 mine price of Cherokee; but the Kansas softer coal will not store. The reduction in price of the Arkansas coal June 1, from $2.85, has had less effect on promoting the movement of Arkansas slack than has the coming advanced freight rate.

The demand for slack from Arkansas is exceedingly strong over a considerable part of the district, and consequently the production can be maintained at a high level. Previously to June, the mines were handicapped by inability to move slack in cars and by lack of equipment and labor to store the slack at the mines. Now that the slack is moving freely, the lump coal is also going rapidly over the district.

ST. LOUIS

An unusual condition, with practically a full car supply on all roads. Transportation improved and all coal easier. Railroad buying still light. Steam market gone to pieces, while domestic demand continues good. Country business improved. Labor shortage greatest handicap.

The St. Louis market enjoys at the present time practically a full car supply on all roads. Transportation has improved, and there is a better movement of loads and empties. In the Carterville field the mines are working steadily, but the labor shortage continues and the tonnages fall slightly week after week at most mines. There has been, during the past week, a heavier tonnage of this coal moving into the St. Louis market than for many weeks previous, but not near as much as the market could absorb. The railroads seem to be buying heavily in this field in preference to other fields. The same conditions prevail in the Duquoin district.

The Mt. Olive mines are working steadily, producing just about enough coal to take care of the demand, with an exceptionally good car supply and with less labor difficulty than in any other field. Throughout all the fields there has been an exceptionally hard time moving steam sizes of coal, and some mines have been idle on account of their inability to move screenings.

In the Standard field the conditions are unusually bad. There is an overproduction, and several mines are having a hard time working on account of the surplus of steam coal. The railroads are not buying the tonnage in this field that they were a year ago, or that they should be buying now. The car supply is full and transportation is much improved, but there is going to be a labor shortage here that is going to grow worse than in other fields, for the reason that the mines are not working steadily and the miners are going to other places where they can secure steady work.

Standard screenings got down to $1.25 and 2-in. lump to $2.15 during the past week, and many mines had a surplus tonnage left over with no place to ship it. In the face of these conditions the brick plants have been shut down because they have used the coal allotted to them for the present year. There is an unusual demand for brick, and there is an over-supply of coal.

The demand for coal from the country is fairly good. Especially now, in view of the fact that on the 25th freight rates increase 25 per cent.

The prevailing circular at St. Louis is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.90	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.90	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.90	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.90	2.55@2.70	.....
No. 3 nut	2.55@2.90	2.55@2.70	.....
No. 4 nut	2.55@2.90	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. scrgs	2.05@2.20	2.05@2.20	1.25@1.50
2-in. lump	.....	.....	2.25@2.40
3-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson & Franklin Co. rate is 87½c. Other fields, 72½c.

Ocean Shipping

OCEAN FREIGHTS

W. W. Battie & Co.'s Coal Trade Freight Report

June 17—The steamers available for Cuban and West Indian coal orders have decreased materially, a few having been sunk by submarines and a large number diverted to other trades, this causing an actual shortage, particularly of prompt boats. The Chartering Committee has named rates for Bermuda and Curacao, as noted below. To other destinations, little business is being completed, owing to the tonnage scarcity. Rates are as follows:

STEAM

	Tons Discharge
Havana, $6	1,000
West Indies, $7.50	600
Cardenas or Sagua, $9	300
Cienfuegos, $9	500
Port of Spain, Trinidad, $11	500
St. Lucia, $11	500
St. Thomas, $10	500
Barbados, $11	500
Kingston, $9.50 and p.c.	400
Santiago, $8.50	500
Santiago, 9.00	400
Guantanamo, $8.50	500
Guantanamo, 9.00	400
Bermuda, $9.50 and p.c., and discharged free	300

SAIL

Rio	$19.50 net	Montevideo	$19.50 net
Santos	19.50 net	Pernambuco	18.50 net
Buenos Aires	18.50 net	Bahia	18.50 net
La Plata	18.50 net	Para	15.50 net

Gross rates $1.50 per ton in excess of net rates.

On all above rates charterers pay vessels' towage to coal port.

To nitrate range about $16.50 gross prepaid.

The Chartering Committee's rate by steam is $18 net to the Plate and $19 net to Rio or Santos, but at the moment there are no steamers offered for this business.

General Statistics

BALTIMORE & OHIO

The following is statement of coal and coke tonnage moved over the Baltimore & Ohio system and affiliated lines during the month of March, 1918, as compared with the corresponding month of the previous year:

	1918 Tons	1917 Tons
Coal	3,644,103	2,999,163
Coke	272,725	318,194
Total	3,916,828	3,308,357

COAL AGE

Volume 13 NEW YORK, JUNE 29, 1918 Number 26

Without Women or Culm Piles

By R. Dawson Hall

OF ALL the national problems in Great Britain during the war, none has been more difficult than that of recruiting the labor forces of the war industries. The problem would never have been solved with any degree of success had women not been available to do much of the work.

It may safely be said that there is less danger in depleting the forces of our machine shops and the clerical and road-maintenance forces on our railroads than in reducing the forces in our mines. Women can run the lighter kinds of machines. They can operate, and have for years operated, telephones and telegraphs as successfully as men. They can handle express and even light freight and are doing so extensively in Great Britain and France. Already they are tamping ties in some states of this Union. But they cannot by any possibility, without a grievous shock to all our innate impulses, work in the mines. By stringent laws they are excluded even from working around such places.

Hence many lines of machine and railroad work and, be it added, farm work can be supplied with labor as soon as the labor forces are depleted, but mine work cannot be so supplied. For this reason, if for no other, mine labor, and especially anthracite mine labor, should be zealously guarded. The supply should never be allowed to dwindle. The draft should not for an instant be allowed to curtail the power of production of the industry.

Once crippled, it is hurt beyond recovery. There is no substitute labor force available. Only young men would have spirit enough to try the hazards of this new trade, and all such men have been drained away by the war. To older men living in cities or farming districts, the mines seem vested with a horror all their own. Thus the enterprising males are gone, and the women who are willing to undertake any kind of honest labor for the national advantage or for a generous wage are unavailable, because the industry is not permitted to accept their services.

It looks, therefore, as if accretions to the mining forces are unlikely. For this reason it is necessary to guard against depletions, certainly against further reduction in the working force. When the war broke out in Europe the anthracite region was quite short of men. New men ceased to come in. Many went to Europe to fight, and others went to the munition factories. The enlistment of men was followed by the draft, and now there is only 82 per cent. of the former scant force.

Up to the present time, the culm piles have made up the deficit. But this easy source of supply, afforded us by the labor of past generations, is fast being used up. Be it noted that the unsightly, but useful, culm banks hid the true situation from the public. We may yet for that reason regret that they ever existed. They have innocently disguised from a not too well instructed people the fact that the mine workers were being spirited away in numbers and were thus leaving flat on their back all the industries dependent on the coal that those mine workers were wont to produce.

Let us wake up to the situation and deduct the culm-pile product from the total and thus determine where the industry will be. Present coal production is not sufficient to meet requirements; it will be still less when the washeries have prepared the last pound of culm. Is it wise, therefore, to draft or enlist any more anthracite miners in the national forces? Anthracite production is slim to famine now; it will unquestionably be slimmer yet if remedial measures are not taken.

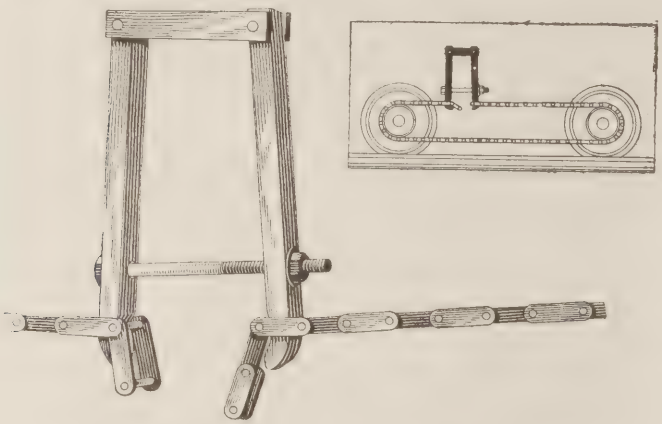
IDEAS AND SUGGESTIONS

Traction Chain Splicer

BY FRED W. SAKON
Johnstown, Penn.

On ordinary mining machines the propelling chains after they have been used for some time develop a certain amount of slack. If this is not taken up it will cause trouble through the chain slipping over the sprocket teeth. In other words, the chain slips a tooth.

A simple device for taking up slack and pulling the chain together in case it is broken can be made by a



SIMPLE DEVICE FOR TAKING UP SLACK

blacksmith in a short time. This requires two pieces of steel 1½ in. square by 12 in. long. One end is forged to pass through the chain and is notched to fit the bushing so as to prevent slipping out when pulling. Drill a $\frac{11}{16}$-in. hole in the opposite end of both pieces, also in each end of two pieces of $\frac{3}{8}$ x 1½ x 5-in. strap iron. These straps are bolted at the top end of the main hooked bars so as to form a hinge joint. Another $\frac{11}{16}$-in. hole is drilled about two-thirds of the way from the hinge to the hook. This is to take a ½-in. bolt 9 in. long threaded 6 in. of its length, which acts as a drawbolt.

To use this device simply insert the chain puller in the chain and tighten up the nut. This draws the chain tight and a link may be removed or the chain spliced. The device eliminates the tiresome job of trying to pull the chain together by hand or with bars that may slip and possibly injure the man doing the work.

Combined Feed Cable and Trolley Wire Hanger

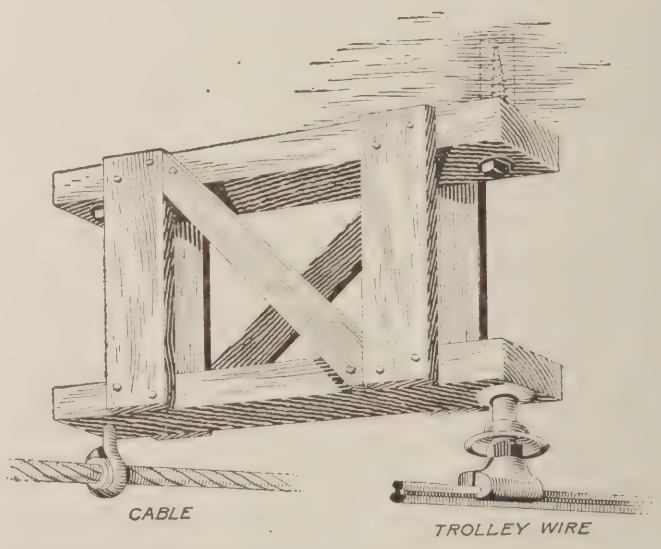
BY R. W. MAYER
Connellsville, Penn.

The United States Coal and Coke Co., of Gary, W. Va., uses one hanger to support both the trolley wire and the feed cable which supplies it with current. Two pieces of hard wood, about 3 ft. long, 3 in. thick and 6 in. wide, are used in making the hanger. One of these is fastened to the roof crosswise of the entry, by means of four lag screws. Two are sufficient when the load is not heavy.

Holes 1½ in. in diameter are drilled into the roof to a depth of 8 in. and wooden plugs driven tightly into them. The ends of these plugs are then cut off even with the roof. The holes for the successive hangers are kept in line by sights or by plumbing up from the rail.

By means of a templet the holes in the roof for each individual hanger are drilled the correct distance apart for the lag screws. Then, through the holes in the timber placed against the roof, the lag screws are driven into the wooden plugs already referred to. Lag screws ½ in. in diameter and 10 in. long are used. These hold the timber rigidly in position, the latter forming the support upon which the balance of the hanger is built. All the lag-screw holes and bolt holes are bored through the timber outside the mine. Templets are employed to get the holes in the correct position.

A second piece, the same dimensions as the roof timber, is supported by means of 1 x 6-in. lumber. Four of these pieces are used as upright supports, two being fastened on each side of the timbers about 8 in. from their ends. Each pair of uprights is placed on directly opposite sides of the timbers. The upper or top end of the upright is fastened to the roof timber and the lower or bottom end supports the lower timber by being



HANGER SUPPORTS BOTH TROLLEY WIRE AND FEED CABLE

fastened to its side. The height of the lower timber is maintained a uniform distance above the top of the rail throughout the entry. This is accomplished by varying the length of the 1 x 6-in. pieces. The trolley and feed wire are fastened to the lower cross-timber.

Cross-braces of 1 x 6-in. lumber are fastened X-wise between the uprights and connect the two cross-timbers. One piece fastened to the edge of both cross-timbers

on each side is usually sufficient. The ends of these braces are cut beveled, so that they will rest against the edges of the upright supports.

The ends of the hangers are placed as close to the rib of the entry as practicable. The trolley wire is fastened to the wooden crosspiece by the usual insulated metal hangers. The feed cable is supported by a metal hanger fastened to the lower timber near the end next the rib.

To Speed Up Development Work

By Harry Goodman
Duquoin, Illinois

In order to obtain the full benefits under the now commonly used panel system it is necessary to work out quickly the panel when once it is started. That this may be done, as much entry driving or development work as possible must be completed so that the panel entry will be driven to its boundary before commencing on the room.

Thus when all these rooms start to work together so much coal comes from this limited area that it pays to keep a motor parting or branch on the main entries between each (or every second) pair of panels. This means grading and laying a motor road. which necessitates a simple system of keeping such work up close to the face without stopping the entries during construction.

To begin with, the location of such partings should be determined in advance so that the main entry can be widened out to hold the parting while it is being driven. Secondly, where it is customary to keep the track only in the haulage entry, except for a turn through every second or third cross-cut to get the coal out from the back entry, exactly the opposite should be done so that the track will be kept up in the back entry from the end of the motor road. As soon as the main entry is up to where new panels are to be turned off construction work may be started in the now vacant haulage entry. This work can be completed easily, before the main entry has again advanced to another parting, and an hour's work will suffice to cut in the temporary track, over which the entry coal has come uninterruptedly, to the main line.

As there can be only six places (the main and right and left panel entries) ahead of such work the slight disarrangement of air should not be dangerous except in an extremely gassy mine. Anyhow, the great advantage is secured of doing the track and wiring when convenient while the development work continues all the time.

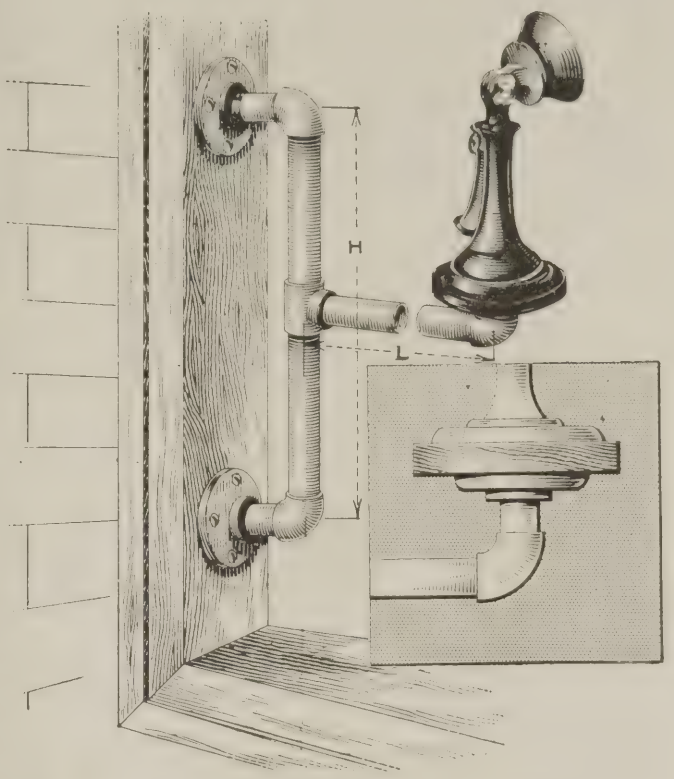
Light for the Drafting Room

It often occurs that a room not originally intended for drafting purposes is used as such and it is also frequently situated on the wrong side of a building, causing annoyance and inconvenience on account of the direct rays of the afternoon sun falling upon the drafting table. This condition may be eliminated, without sacrificing any of the light, by tacking or pasting a single thickness of tracing paper over the offending window. The paper diffuses the light without detracting from its usefulness, and is easily and quickly applied.—*Engineering and Mining Journal.*

Swinging Telephone Bracket Made From Pipe Fittings

By A. L. Renard

In a certain power plant the engineer's office was a small room in one corner of the building. A window in this office opened into the engine room. The engineer's telephone normally reposed on his desk in the office. But when he was in the engine room and a

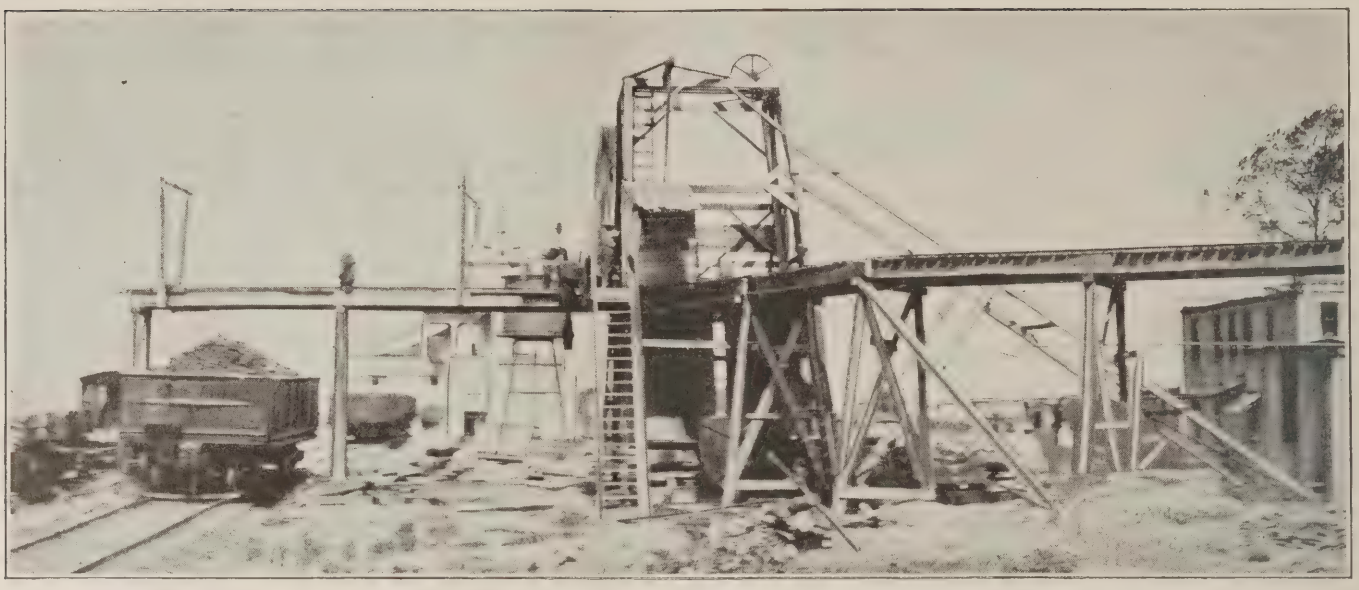


FIGS. 1 AND 2. SWINGING BRACKET AND DETAILS OF ARRANGEMENT

call came, it was his practice to reach through the window and pick up the desk set so that he could use it without having to go around through the door into the office.

The dangling telephone cord gave some trouble by catching on ink bottles and on papers, and finally became a real nuisance. Fig. 1 shows how the difficulty was eliminated by the application of a swinging bracket, which was, in odd times, made up of old pipe fittings, which were picked up around the plant. Fig. 2 indicates the details of the arrangement.

This drawing is almost self-explanatory. The distance *H* should, for satisfactory operation, be about 3 ft. The length of the arm *L* will vary according to conditions. For the bracket which is being described, this length *L* was such that when the telephone was swung into the office it assumed a position directly over the center of the flat-top desk. The base of the telephone was held to the $\frac{3}{4}$-in. wooden disk with straps of $\frac{1}{16}$ x $\frac{1}{2}$-in. sheet brass which are not shown in the illustration. The cord of the telephone was carried through a leather loop on the window frame in such a way that it swung with the arm and did not catch on things when the arm was moved. The idea may be adapted for use in many other instances.



TEMPORARY SINKING HEADFRAME AND TRESTLES AT SITE OF PROSPECTIVE MAIN KATHLEEN TIPPLE

Kathleen Mine of the Union Colliery Company at Dowell, Illinois

ON A tract of over 3000 acres about 5 miles south of Duquoin, Ill., development is well under way for a big 1000-ton-per-hour coal plant. There is no bigger operation contemplated or under construction in the state. Eugene McAuliffe, of St. Louis, Mo., is the president and general manager of the Union Colliery Co., the owner and operator of this new plant—the Kathleen mine.

The improvements already made give abundant evidence of the character of the new operation. Substantial up-to-date buildings are equipped with the most modern devices for handling coal efficiently and economically. Possibly the most striking object at the mine today is the reinforced-concrete tipple at the air shaft, the only structure of its kind in the Illinois-Indiana field. The main tipple will be of structural steel and will occupy the site of the temporary sinking outfit, which is south of the concrete tipple. Both air and hoisting shafts are through the coal, and the two shafts were connected up on June 8, 1918. Coal is now being hoisted to the surface through both shafts and loaded on railroad cars for shipment.

The concrete tipple was built to handle coal until the steel tipple could be constructed. Steel in large quantity for quick delivery is practically out of the question for most industrial requirements. In view of this the Union Colliery Co. used cement in the structure in question. This tipple will be available at any time later to handle 2000 tons of coal per day if need be, in the event of a temporary failure of hoist motors at the main shaft or stoppage of operations at the large tipple from any cause. The main shaft tipple is equipped with a one-car rotary dump and screens for making several sizes of coal. The mine cars have solid ends, roller bearings and a capacity of five tons.

In the face of most trying circumstances and during a winter of most unusual severity, work was prosecuted and the tipple built. Concrete was run with the thermometer at 24 deg. below zero without freezing. This was accomplished by housing-in the tipple with lumber and brattice cloth and using salamanders to keep up the inside temperature. In addition the water used in the concrete was heated (as were also the other component materials) by means of steam coils.

Men and materials will be hoisted through the shaft at the concrete tipple. This shaft also will be used for ventilation. It will be equipped with one double-deck cage for handling coal and materials on the lower deck, or 50 men on the combined decks at one time. This cage is counterbalanced with a steel frame filled with a concrete of cement and scrap-iron aggregate. The hoisting equipment consists of a Wellman-Seaver-Morgan outfit, with an 8-ft. cylindrical drum operated by a three-phase, 60-cycle, 2300-volt, alternating-current, 250-hp. motor. The motor is connected to the hoist by a Francke flexible coupling and Fawcus herring-bone gear. This hoist is air-controlled and is provided with overwind and maximum speed-control devices.

In the power end of the room is a 200-kw. motor-generator set transforming 2300 volts alternating current to 250 volts direct current. This electrical outfit is to operate six-ton Goodman locomotives. With the development of the mine the motor-generator sets will be carried below, having one set on either side of the mine. The engine and power house has concrete foundations, vitrified brick walls and steel roof trusses. Near the engine and power house is a 20,000-gal. water tank with concrete foundations and steel supports. This will supply water to the washhouse.

Near the power house is the outdoor substation constructed by the Delta-Star Electrical Co., of Chicago, Ill. The concrete brick building contains the oil switch equipment. The outdoor substation transforms a line voltage of 33,000 alternating current to 2300 volts. The inside substation eventually will contain switch boards and transformers for changing 2300-volt alter-

nating current to 220-volt current. During development 220 volts alternating current will be carried to the bottom through the air shaft on the high-voltage cables. Later 2300-volt current will be carried to the bottom, thence to a transformer located as close as practicable to the machinery, where it will be reduced to 220 volts. An extension of the air-shaft power house will be used as a boiler room and contain two 50-hp. tubular boilers. One boiler is to be maintained for heating water for the miners' washhouse and for heating the office and engine room in winter. The second boiler will be kept as a reserve.

A Jeffrey fan (5 x 12 ft.) is being installed close to the air shaft. The fan will be of steel, of reversible type and be housed in a concrete, vitrified paving brick building. The fan motive power will be a 200-hp. alternating-current motor. An emergency fan drive will consist of an 80-hp. steam engine.

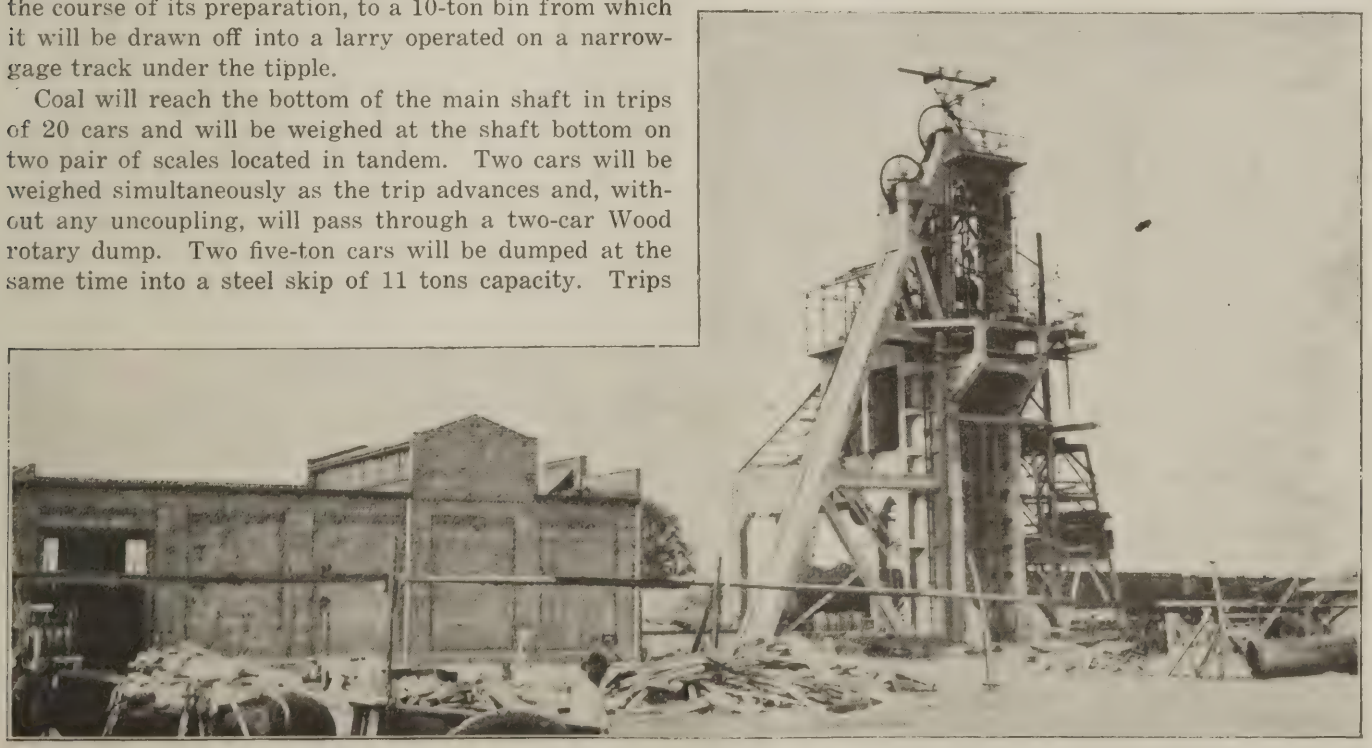
The air shaft is 12 ft. by 26 ft. 4 in. inside dimensions. This shaft is lined to the rock with 2½ ft. reinforced concrete, which serves as a foundation for the tipple. Below the rock the concrete lining is from 6 to 18 in. thick, depending on the strata. Steel H-beam buntons are embedded in the concrete. The air shaft has an air compartment 8 ft. by 8 ft. 6 in. and a hoist compartment 8 ft. by 12 ft. 6 in.; the remaining space contains a stairway and a compartment for the counterweight, electric cables and pipe lines.

The main shaft is 11 ft. by 19 ft. 1½ in. inside dimensions. It is 250 ft. from the surface to the bottom of the coal seam at this shaft. The thickness of concrete lining and its construction is the same as in the air shaft, and the steel buntons are bedded in the concrete the same as in the other shaft. The steel tipple will rest on the heavy concrete lining, extend over four railroad tracks and make the several grades of coal generally made in Illinois. The tipple will be equipped with shaker screens and three picking tables. Conveyors will carry refuse, separated from the coal in the course of its preparation, to a 10-ton bin from which it will be drawn off into a larry operated on a narrow-gage track under the tipple.

Coal will reach the bottom of the main shaft in trips of 20 cars and will be weighed at the shaft bottom on two pair of scales located in tandem. Two cars will be weighed simultaneously as the trip advances and, without any uncoupling, will pass through a two-car Wood rotary dump. Two five-ton cars will be dumped at the same time into a steel skip of 11 tons capacity. Trips after dumping, and without the necessity of recoupling, will be pulled from the empty car tracks to the working places by motors. The labor and delay of coupling and uncoupling cars is thus eliminated. The loaded trip will pass through the dump under the control of three sets of Lepley cagers.

There is under construction, for hoisting at the main shaft, a Wellman-Seaver-Morgan, cylindro-conical drum hoist. The small end of the drum will be 8 ft. and the large end 11 ft. in diameter with a face of 5 ft. 3 in. The diameter of the brake ring will be 10 ft. This hoist is to be operated by a flywheel (Ilgner) set made by the General Electric Co. This electrical hoist is a 600-kw., 500-volt set with a 20,000-lb. flywheel. Underground the main haulage motors will be 18- to 20-ton machines with six-ton Goodman locomotives for gathering. Goodman alternating-current shortwall mining machines with 7-ft. 6-in. cutter bar will be used. The mine track will have 40-lb. rail on the main lines and 20-lb. rail in rooms. It is also interesting to note that steel ties will be used on mine tracks. The No. 6 seam averages 8 ft. 3 in. in thickness at this mine, and 1 ft. to 1½ ft. of top coal will be left up to protect the top in entries and rooms to be recovered on retreating. The mine will be developed on the panel system, and where conditions are favorable the pillars will be recovered.

The track construction at this new plant is somewhat unique for this flat country. The track is 5 ft. above the flood line in the creek bottom. As the expense of a gravity grade was considered prohibitive, the track was planned without a grade with the exception of 800 ft. of track extending from above the air shaft to 100 ft. below the track scales. Cars will be moved by gravity on this grade. Empty and loaded cars in yards above and below the tipple will be moved by a narrow-gage steam locomotive operating between storage tracks. A suitable device on the locomotive engages



KATHLEEN CONCRETE TIPPLE WITH HOIST AND BOILER HOUSE ON THE LEFT



SOUTHWEST VIEW OF KATHLEEN CONCRETE TIPPLE

the end sills of cars, moving ten empties at a time to a point where they are handled by gravity. Subsequently the loaded cars are moved back five at a time, thus making car control independent of load, bad brakes, freezing weather and other adverse conditions.

A shop and store room 40 x 120 ft. at the first story has been constructed of concrete vitrified paving brick and steel roof trusses. The shop is covered with a tile roof and is equipped with a 30-hp., alternating-current motor operating a power hammer, lathe, drill press, planer, iron and wood saws, blowers, emery wheel, etc. At one end of this building is a second story with 40 x 40-ft. floor space, containing mine offices with separate fireproof vaults for engineer's and office records. Below one end of this second story and next to the supply room are the offices of the storekeeper and time clerks.

Two 150-ton railroad track scales—50 ft. long, of concrete and steel—to weigh coal are installed; these scales are on parallel tracks below the tipples. The Central Illinois Service Co. will furnish power, having built a 33,000-volt line from Royalton. A town site of 360 acres has been purchased and laid out in building lots. Part of this tract is covered with a fine growth of timber, six acres of which are to be improved for park purposes and provided with recreation equipment for the children. This new town is to be called "Dowell" and has under construction at present a hotel, brick store building and 25 houses.

The public utilities connected with this company will furnish a market for the entire output of the mine. The main office of the concern is at St. Louis, Mo., with branch offices at Milwaukee, Racine and Kenosha, Wis., and Detroit, Mich. This company also owns the Western Kentucky Coal Co., which operates nine mines in western Kentucky, with the largest fleet (300 barges) of barges on the Ohio and Mississippi Rivers. It is about the only river company left. The local officials of this company at the Kathleen mine are Edward Bottomly, general superintendent; Charles Gottschalk, chief engineer; Robert England, top foreman, and James Wilson, mine manager.

Test on a Jeffrey Fan

By W. D. Owens
West Pittston, Penn.

The Lehigh Valley Coal Co. recently erected a ventilating fan of the Jeffrey type at its No. 10 tunnel, Campbells Ledge Mines, on which I had the privilege of making a test on July 1, 1917. I found conditions as follows: Diameter of fan, 7 ft. 11 in.; width of fan, 4 ft. 1½ in.; including the rims to which the blades are attached at the outer end and also the center plate.

The test was made in vacuum; that is, the mine was walled off so that no air could enter the fan. The fan then ran at 136⅔ r.p.m. The theoretical depression produced by such peripheral speed per minute, according to Daniel Murgue's theory, equals $\frac{V^2}{G}$ found as follows: The peripheral speed was $\frac{7 \text{ ft. } 11 \text{ in.} \times 3.1416 \times 136.66}{60} = 56.64_3$ ft. per sec. The barometer reading during the test was 29.60 in., and temperature equaled 76 deg. The weight of the air per cubic foot was consequently $\frac{1.3253 \times 29.60}{460 + 76} = 0.07318$ lb. Hence $\frac{56.643^2 \times 0.07318}{32.16 \times 5.2}$ 1.40 in. of theoretical pressure or water gage.

Two water gages were used, and each agreed with the other, both showing 1.18 in. of pressure. The fan thus developed an actual pressure equal to $\frac{1.18}{1.40} = 84$ per cent. of its theoretical capacity. This is the best

result I have ever obtained from many experiments. The fan was then tested while ventilating the mine. It then ran at 132 r.p.m. and produced a mine depression or water gage of just 1 in. The theoretical depression at this speed is found as follows:

$$\frac{132 \times 3.1416 \times 7.916}{60} = 54.71\ ft.$$

and

$$\frac{54.71^2 \times 0.07318}{32.16 \times 5.2} = 1.309\ in.$$

Therefore the fan produced a water gage of $\frac{1}{1.309} = 76$ per cent. of the theoretical depression. This was a splendid result, particularly so considering the great volume of air the fan produced. Several tests showed this quantity to be not less than 110,000 cu.ft. per minute.

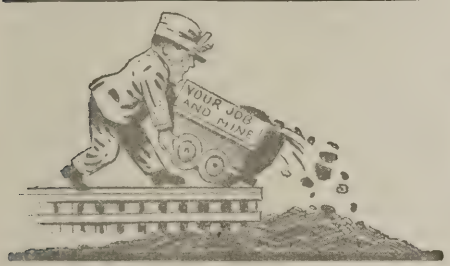
The fan is driven by electric power, and during the test when the fan was running in vacuum it required 8 hp. to operate it; but when ventilating the mines, running at 132 r.p.m., it consumed 33 hp. Now the horsepower in the air circulated was as follows:

$$\frac{110{,}000 \times 5.2}{33{,}000} = 17.3\ hp.$$

And this proves, as might be expected, that there is no definite relation between the horsepower circulating the air through the mines and the horsepower required to operate the fan. It is true that the horsepower developed in the air by a fan of the Guibal type is relatively nearer to the engine power, simply because of the inability of this type of fan to produce a large volume of air and at the same time to produce a high percentage of mine depression compared with the theoretical depression. The Guibal types of fans in general are only able to produce their own cubical contents, even when operating in the open atmosphere, and much less when applied to actual ventilating of the mines. But the Jeffrey fan, as shown by this test, produces considerably more.

The total width of this fan was given heretofore as 4 ft. 1½ in. This dimension includes the circular rim on each side of the fan to which the blades are fastened, also a plate in the center of the fan. This leaves the actual unobstructed width of the fan, which forces the air out, as 3.56 ft. The diameter of the fan as previously stated is 7 ft. 11 in.; therefore, the cubical contents of the fan space is 175.9196 cu.ft., and this multiplied by 132 revolutions equals 23,221.389 cu.ft. The quantity of air produced by this fan was previously stated as being 110,000 cu.ft.; therefore, the fan produced 4.73 times its own cubical contents; and even if the "rims" and center "plate" are calculated into the volume of this fan, taking the width as 4 ft. 1½ in. its volume would be 203.81 cu.ft. and this times the revolutions per minute or 132 = 26,900 cu.ft. Thus this fan produces $\frac{110{,}000}{26{,}900} = 4.08$ times its own cubical contents of air.

This fan has quite a number of blades, some short and some long. I do not know whether there is any advantage in the principle of long and short blades; but I am sure there is considerable benefit in putting in a great number of blades. D. W. Evans of Pittston, Penn., has constructed a fan with numerous blades, their depth being only 5 per cent. of the diameter of the fan. These blades are attached to a rim and central plate, at an angle of about 30 deg. This fan also produces about four times its own cubical contents per revolution, and should be put on the market.

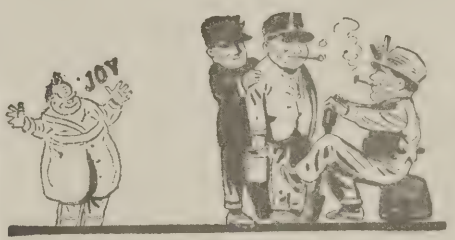


Out on the dump will go your job and mine

How About It?

Written Expressly For "Coal Age"

By BERTON BRALEY



Joy in Berlin

Your job and my job—how much do they mean?
What is our place in the wartime machine?
Are we essential, and do we produce?
For, if we don't, we are simply no use;
Worse, we are brakes that impair and impede,
Hampering progress and vigor and speed.
If we don't fit in the mighty design,
Out on the dump will go your job and mine!

Your job and my job—how well are we placed?
What do we represent, Service or Waste?
Miner and manager, checker and clerk,
How are we handling our share of the work?
Slackers aren't lasting long, over the foam,
This is no time to have slackers at home,
We must be faithful as soldiers in line
Else there's a finish for your job and mine.

Your job and my job—the Nation demands
All we can do with our heads and our hands.
Don't think this war is for others to win,
You and I, brother, have got to fit in;
Each hour we loaf and each task that we slack
Weakens the force of our country's attack,
There is rejoicing far over the Rhine
When we let up upon your job and mine!

Your job and my job—they're worthless and vain
Save as we labor with muscle and brain,
Striving to serve at the top of the breast,
Each of us toiling his hardest and best.
Let us be part of the great honor roll,
Soldiers who fight with the Army of Coal,
Giving our all with a zeal that is fine,
Your job and my job for your land and mine!

The Cost of Coal

SYNOPSIS—*Many factors enter into the expense of producing coal. Some of these are capable of decided reduction from present averages. Others, such as the cost for labor, may be reduced through stabilization. Intensive mining would result advantageously to all concerned.*

FOR analysis, the cost of coal may be divided into promotion, royalty, equipment, labor, distribution and profits. Promotion comes too cheaply, general opinion to the contrary notwithstanding; but the service rendered is small. While, if properly performed, the direct charge for promotion would be increased, thousands of dollars paid in litigation now charged to "cost," and many more thousands considered a legitimate hazard of mining, would be cut off the price of fuel.

To make this economy it is necessary to employ an attorney of recognized standing, an experienced operating official, and a competent engineer. These three should be given definite instruction to include in all deeds, specifically, all rights necessary to mining and prospecting, including release from all damages resulting, so written as to be legally defensible. At no later time can these rights be so cheaply acquired, and if they can be had in no other way the property should be purchased in fee simple.

During the term of the option the mineral should be thoroughly prospected. My experience would dictate a prospect to each 100 acres. This provision alone would have saved in the past millions invested in comparatively worthless lands. A property survey (if extensive, on a triangulated base) should be made, the field locations compared with title plots and all reservations definitely described and located. Property which has been surveyed in recent years should be purchased by the acre, according to the company's location, while parcels which have not been measured within a half century should be purchased in the lump. The cost of all this will be recovered in the royalty.

Preliminary Knowledge Is Important

Before any attempt is made to develop, a topographic survey should be imposed on the property map, showing all buildings, streams, highways and surface contours less than 100 ft. above the topmost bed of coal. The entire field should be projected for mining so as to determine where and how many openings shall be made. This will save thousands of dollars frequently wasted by haphazard location of mines and improper projections.

From the data collected there can be determined the probable life of the field and the net acreage, after deducting barren, unmerchantable and unrecoverable coal. By use of these two factors the amortized royalty per ton can be calculated.

By recognition that fuel is one form of wealth which can never be replaced, and that rather than force its exploitation the process should be discouraged, society can do its bit by exempting all undeveloped coal from taxation. On the other hand, developed coal should be taxed enough to stimulate its prompt recovery, and a surtax should be charged against lost coal in exhausted areas, to force thorough mining.

Before striking a pick the last detail of a proposed mine should be determined and the work should be developed in logical order. First comes the railroad, then the village with water-works, store, etc., then the mine and so on. A modern power plant designed to utilize the lowest grades of near-fuel is required. A mine too small for a power plant of advanced design should purchase its power, and a power plant with antiquated equipment should be scrapped. Electric distribution should by all means be employed.

Delays for Supplies Are Expensive

Where a well-stocked supply house is not maintained, much money is lost in waiting. On the other hand, where one is handy it is apt to be wasteful. A careful check on all supplies and small tools will well repay the expense; every old machine part should be exchanged for a new one, and the worn part should then be examined by a responsible man and refitted, or put in the junk shed. Please note the shed; the tons of junk lost or stolen, if known, would be staggering.

Mine tracks are too light, too poorly graded and aligned, and the bonding is "rotten." Heavier rail and the same track maintenance that a railroad receives would pay big dividends. A pit for annealing old rail would help cut expenses. Why the rail on main hauls is not welded for bonding is a mystery; there are no temperature changes for which to allow.

Mine repair shops as a rule depend too much on hand labor, and I believe large companies lose by not doing more rebuilding for themselves. Large companies should produce their own timber, sand and crushed stone. Possibly a brick kiln would pay.

Small mine cars and few of them (to say nothing of obsolete trucks) is the rule, I believe, because the miners' time seems to cost nothing to the operator. Cars should be plentiful and placed promptly by locomotive. Without wearisome listing, I know of few mines that use enough machinery or have enough of the kinds they do use. An extra machine, as well as repair parts, is always an economy.

The tracks under the tipple should be graded so as to get a free movement of cars in the winter. In cold climates fills rather than cuts on all outside grading will save much labor. I must confess a leaning toward the rotary dump of full trip capacity.

Insurance can be saved by fireproof construction. This need not necessarily be expensive. To get a 100 per cent. return on the investment, all equipment should be operated as nearly 24 hours a day as necessary repairs and overhauling will permit. I know how hard it is to operate a night shift. But why a night shift at all? Take a hint from those industries which must operate continuously and have an early morning and a late afternoon shift; then change shifts each week. Don't forget depreciation and obsolescence and charge enough therefor.

Insufficient equipment and inadequate supervision are responsible for many inefficiencies in coal mines, rather

than the basis of payment. Intermittent operation has been caused by an insufficient car supply and an excessive number of mines. The present high earnings of coal miners are due to the establishment of rates which would give an average miner a living under spasmodic working conditions. In order to correct these it will be necessary to insure full-time work. I expect our Uncle Sam will take care of the car supply; and if the Fuel Administration takes full advantage of its powers before normal industrial conditions are resumed, the superfluous mines will have been wiped out.

In order to radically reduce the cost of digging coal, the change will probably have to be "camouflaged" to avoid serious disturbances. I would suggest a task and bonus system. All men on a day basis and many "company" men can be cut off and the work done on idle days, thus steadying the employment, if necessary. A wage must always be sufficient to keep an adequate working force. For mine work, I imagine we must pay average wages for the class of men desired, plus something to overcome living conditions.

Welfare Work Is Important

Assuming that most of the work about the mines can be done by unskilled labor, it is necessary to gather statistics to show what common labor actually gets in other industries. To this wage should be added the same percentage figured against mining by insurance companies. Man is a pleasure-loving animal, and the less his culture the more he depends on outside sources for his amusement. This is the reason why the average laborer prefers city employment. To overcome this prejudice another allowance is required. If he is to be held any length of time, so-called "welfare" work must be instituted.

By welfare work I don't refer to the maudlin stuff which now passes muster. Everything attempted by a company should be on a strictly business basis definitely understood by all. The reason the company does thus and so—is because it pays.

I would recommend that the housing (in style and type) be the equal of any found in any "open" town of similar size. The streets should be kept up similarly, and sanitation should be pushed to an extreme. All this can be collected in rent.

Public amusements will pay their own way and should be fostered for men, women and children. Education should be encouraged, especially for adults; this may cost the operator some money, but it will be returned a thousandfold in the increased efficiency and number available of petty officials.

I would caution against trying to get wage increases back in company store profit. A company store operated on a narrow margin, managed by a "merchant," and served by real salespeople, would become one of the greatest assets for goodwill an operator can possibly obtain. I have yet to see that kind of store.

One of the gravest wastes in the coal mines is the use of skilled miners to shovel coal. A real miner is as highly skilled as any kind of mechanic. The normal wage he gets is probably not excessive in comparison with other skilled labor. Instead of spending three fourths of his time at work that any navvy can do, he should act as squad leader to several. On the average, in machine mines, one miner to eight navvies would be about the right proportion. This squad, provided with a mining machine, a gathering locomotive and plenty of cars, would revolutionize the output.

A foreman should be provided for as many men as he can conveniently visit constantly, not once or twice a day. He should be paid more than he can earn as a miner. The general foreman and assistants should confine their attention principally to transportation and supplies, and their duties should be restricted to the inside of the mine. Adequate supervision today is a hard problem, mostly because of the ridiculously low salaries paid, but partly because most practical miners rarely have any education. This takes us back to the school problem.

It would pay any coal company to make a special effort to train officials. An apprentice system, made the avenue to promotion, wherein each candidate would serve about a year in each department, whose activities he will touch in later work, is a necessary innovation.

To be eligible to promotion a certain minimum of schooling, or its equivalent, should be required. For instance, a mine foreman should be able to pass an examination in common school branches; a superintendent should have the equivalent of a high school training; an engineer should at least be able to pass the examination for engineer in the Government service.

The functions of officials above pit boss should be specialized. The system of mining should be left entirely to the engineer and safety to the mine inspector. The superintendent being the instrument through whom they work, both should be superior to the superintendent, and of course more highly paid.

Mining ought to be limited to the highest grade of fuel which is of sufficient quantity to fill the demand. This could be accomplished by requiring the operator to pay the freight on the ash content, plus a graduated penalty on all impurities above a fixed maximum. An operator who could not compete on this basis, if he found it impossible to prepare his product profitably and make it come within the specifications, would have to shut down until exhaustion of better fuels brought his up to grade.

Delivery Expenses Are Heavy

Cross-hauling is a waste recently brought to public attention, but I venture to say that the loss through freight cross-hauls is only a fraction of the loss from competitive retail delivery. Probably the use of waterways would cut the freight charges on coal. Domestic consumers who persist in ordering their fuel during the winter months ought to be penalized.

Sales agents should be abolished. There is no reason why the large consumer and the retailer can not deal directly with the mine operator. A fuel engineer who would be able to specify the kind of fuel best suited to individual conditions and name the producers capable of supplying that grade could be jointly supported by the operators logically contributing to a consuming center.

Finally there must be a profit. Capitol is unconsumed wealth. Without capital our present civilization—well, there would be "no sich animile." Unless we offer an inducement, no one will lay aside any of his production. Not being an economist, I will leave the wages of capital for someone else to settle, and will content myself by saying that it must be enough and should not be more.

To treat so vast a subject requires many volumes and many brains. I have condensed this contribution almost to extinction, and it sounds much more dogmatic than I feel. The points I wish to emphasize are:

Mines are generally opened with insufficient data for an engineer to work intelligently. Lack of surface rights adds an enormous burden to the industry, as it is forced to pay damages on valuations that the operations themselves have largely created. This should be remedied in operating properties as soon as possible and new developments should avoid such errors. Coal mining is not carried on as intensively as it should be. In brief we should adopt modern factory methods. More supervision is urgently needed, and a higher standard should be set. Living conditions must be made to compare with those available in other industries.

How Far Does a Belt Slip?

By W. F. Schaphorst
New York, N. Y.

Not long ago I read the following statement in a technical publication, "It is obvious that the chief wear on belts is occasioned by their swift curling and uncurling motion around the pulleys." It is true that this is possible in belts that contain no internal lubricant. If the belt is dry, the fibers rub against one another with considerable friction, and consequently the wear will be great for the same reason that an unlubricated bearing will wear more rapidly than will a lubricated one. This holds true even with ball bearings. But if the belt is properly treated with a preserving lubricant similar to the natural lubricant that is in the hide while on the animal, the internal wear is small indeed. Experience with dry and treated belts bears out these statements, and I believe the author of the quotation given above will agree with me.

While thinking this over, however, the fact developed that there has been given no formula, in textbooks or elsewhere, for computing the distance a belt slips or creeps in a given time—a year, for example. I thought it might be because the total slip for a year is a small amount—not worthy of much thought—but after doing a little rough figuring my eyes opened to the astounding figures that resulted.

Let us take an example. A 4-ft. pulley rotates at the rate of 250 r.p.m. Its belt does not slip, but the creep is 2 per cent. It is used 10 hours per day during 300 working days in the year. How far does it creep per year?

Multiply the 4 by 3.1416 and then by 250 and we find the pulley travels 3141.6 ft. per minute. Multiply this by 2 per cent. and we find that the belt creeps (this is sometimes erroneously termed "slip") about 63 ft. per minute. That immediately looks like an almost impossible amount, but it is true nevertheless. This is equal to 3780 ft. per hour, 37,800 ft. per 10-hour day, or 11,300,000 ft. per year of 300 working days—a total of 2140 miles.

Does it seem strange now that belts wear out? Isn't it remarkable that belts last as long as they do? And isn't it plain that pulleys should be smooth in order that the wear may be reduced to the minimum? Two thousand, one hundred and forty miles of rubbing even on a smooth pulley is considerable. And if there is any slip on the pulley in addition to the creep the matter is all the more serious.

It must be remembered, however, that a given point on the contact side of a belt is not in contact with the pulleys all the time. During each complete trip of the belt around the pulleys the given point is in contact with one pulley for a short time during which there is a rubbing action to some extent, then the given point is not in contact with anything until it reaches the next pulley, when it again rubs. The greater the distance between shafts, then, the less the yearly slip or creep of the given point. Thus if we could connect a driving pulley on the earth with a driven pulley on a distant star a given point on the contact side might not touch a pulley for several years, even when running at the speed of the belt cited in the example above. Such a belt should last millions of years, were the length of life dependent solely on friction. A short belt, on the other hand, is subject to greater punishment because the given point comes in contact with the pulleys frequently.

To aid in computing the slip plus the creep of a point, taking into account the radii of the pulleys and the distance between shaft centers, I have developed the following rule:

Multiply the "total yearly slip of the belt" as obtained above by 3.1416, and then by the sum of the radii of the pulleys in feet. We will call this amount "A." Now multiply the distance between shaft centers in feet by 2, and to it add the product of 3.1416 multiplied by the sum of the pulley radii in feet. Divide "A" by this sum, and the quotient is the total number of feet a given point slips and creeps in a year's time.

For example, let us assume that in the problem above the distance between shaft centers is 30 ft. and the pulley radii are 1.5 ft. and 2 ft. respectively. What is the total creep of a given point on the contact side of the belt in a year's time?

Adding the radii we get 3.5 ft. Multiplying by 3.1416 we get 11. Multiplying that by 2140 miles we get 23,540 miles, which we call "A." Now multiplying 30 by 2 we get 60, and multiplying 3.5 by 3.1416 we again get 11. Adding 11 and 60 we get 71. Lastly, dividing 71 into 23,540 miles we get 332 miles as the total slip of a given point per year.

For the convenience of those who prefer rules of this kind in the form of an algebraic equation, we have the following:

Yearly slip plus creep of a given point on a belt =

$$\frac{3.1416DNSM(R+r)3.1416}{[(R+r)3.1416+2L]5280}$$

where

D = Diameter of the driving pulley in feet;

N = R.p.m. of the driving pulley;

S = Slip plus creep of the belt;

M = Number of minutes belt is operated per year;

R = Radius of driving pulley in feet;

r = Radius of driven pulley in feet;

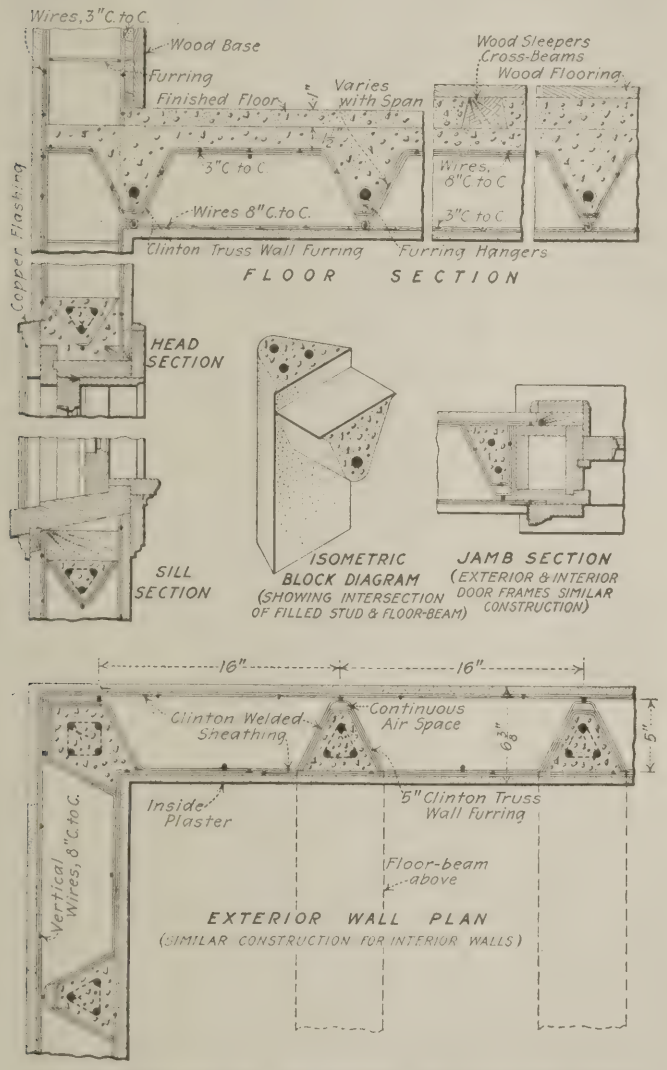
L = Distance between shaft centers in feet.

This, then, explains why belts wear out. It can well be imagined that if a belt is dragged along on even a smooth surface such as found on pulleys for a distance of 332 miles there is bound to be some wear and this would be equal to the yearly wear on the belt.

Two All-Concrete House Designs*

SYNOPSIS—*Forms made of wire cloth, an ingenious way of keeping water from the inside of a concrete house and a system of incorporating precast beams integrally into the house structure are here described.*

THE great need for houses throughout the industrial and shipbuilding centers of the country has led to the preparation of a number of designs providing safe and comfortable homes at reasonable cost and lending themselves, at the same time, to quantity construction. Among these are two embodying somewhat similar details. Both of them plan to use



STUDS AND BEAMS OF FRAME ARE OF CONCRETE POURED INTO SHEATHED WIRE-CLOTH FORMS

concrete or concrete and plaster throughout. They have reinforced-concrete frames with double walls of stucco and plaster, all erected with a minimum use of forms or stages.

Two experimental houses are now being built, in accordance with one of these designs, near a mill of the Pennsylvania Cement Co., at Bath, Penn. Sheathed wire cloth is used to construct the forms into which to pour the concrete units making up the house frame. The type of construction has been named the "Alcho System" and is being developed by Albert Oliver, of the Clinton Wire Cloth Co., New York.

One of the fundamental elements in the design of the house is its triangular reinforced-concrete studs. These studs support on the inside a plaster wall and on the outside a concrete-stucco facing, an insulating air space being left between them. Each stud carries floor and roof beams of similar triangular design, and integral with these beams is a reinforced-concrete floor or roof.

The studs are erected on the concrete walls of the cellar or basement, the forms for the studs being continuous sheets of Clinton welded sheathing, which is a building paper woven into a wire cloth. This is bent to the shape of the studs to be formed, and the concrete is poured inside.

Outside the sheathing are rows of furring rods which project beyond the apex of the stud triangle and to which are fastened the sheathing, making the inside form for the outer wall. This leaves a small air space at each stud, preventing water even at these points from permeating into the wall. The base of the stud also has sheathing against which the inner wall is plastered.

The beams are varied in depth according to the span required. They, too, are cast within sheathing forms, the sheathing being supported on struts during construction. Hangers left in the beams carry furring on which the ceiling is plastered. The floor itself is poured so as to be integral with the beams and can be finished as desired.

The wood-frame doors and windows are detailed as shown in the drawings. The stairs are of concrete, and the partitions are of concrete or plaster applied on wire cloth. The roofing, where the roof is flat, will be of fire-resistant material placed on a concrete slab. It will probably be placed on timber framing where the roof is sloping.

It is intended that the houses now being built at Bath, in accordance with these designs, shall be of poured concrete with hand-plastered walls and partitions. Provision is made, however, for the use of the cement gun in placing the concrete, in which case the studs are turned with the base of the triangle outward to facilitate placing.

In the other type of house, which has been devised by John V. Schaeffer, the president of the Cement Gun Construction Co., Chicago, the studs and walls will be built entirely by the cement gun, while the beams will be precast concrete and the floors will be poured in the usual manner.

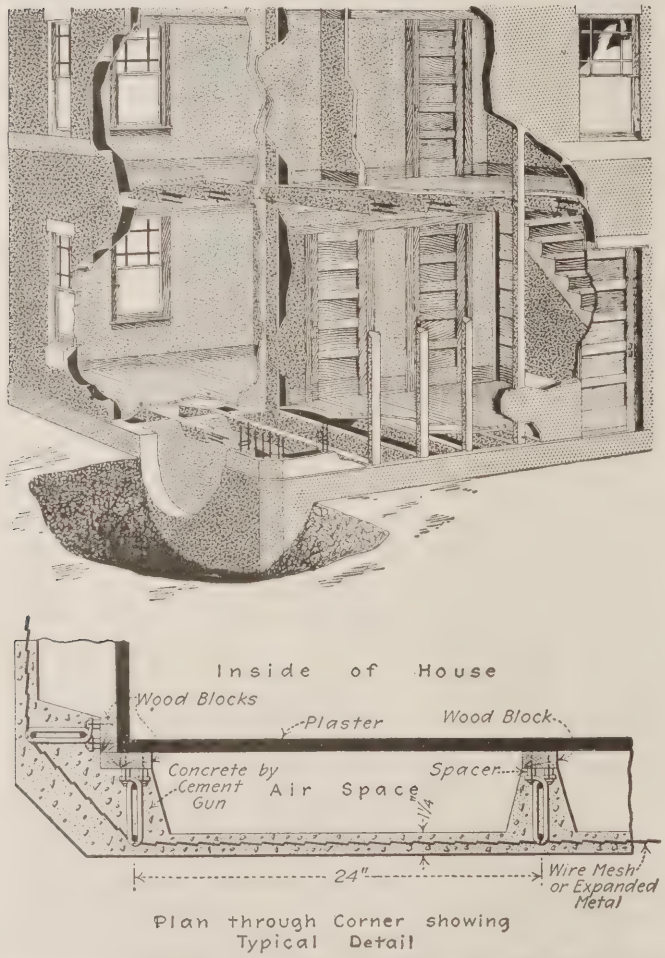
On the page following a sketch is shown of the broken corner of a proposed house of the cement-gun type with all elements of construction in view, and a horizontal section through the wall with the details of a characteristic design. This wall structure comprises studs on 24-in. centers integral with a 1½-in. outer wall

*Article entitled "Two New Designs of Concrete Throughout" appearing in "Engineering News-Record," May 16.

and separated from the inside plaster wall by wood blocks fastened both to the studs and to the wall, leaving an interior air cell for insulation against temperature and moisture.

In building the house a cellar is first excavated, and cellar walls are built in the usual manner except that recesses are left in which are set the precast joists for the first floor, spaced on 24-in. centers to match the studs. On this frame as a platform subsequent construction is carried on A temporary timber framework is then erected on the platform, and the wood blocks of the studs are then set up. The reinforcement, as shown in the floor section herewith, is attached to these wood blocks before they are erected.

After the reinforcing fabric of the wall is placed, the walls and studs are shot with gunite from cement



WALLS AND STUDS ARE SHOT WITH THE CEMENT GUN AND BEAMS ARE PRECAST

guns. When the upper floor is reached, precast beams are placed with protruding reinforcement which is intertwined with the reinforcement of the studs. Connection is made by the use of the cement gun. Plastering, or wire mesh, is then placed on the inside wall and belt courses are shot around the tops of the studs so that all air spaces are isolated at each floor, and after the plastering is in place each air space or cell is a unit. This is designed to prevent circulation of air or migration of vermin.

To provide the backing, against which the cement-gun concrete is formed, several methods have been proposed such as the use of separate unit forms which can be used over and over and the employment of sheathed wire fabric. In the latter case the fabric, being inside the wall, can be left in place.

The system followed in either scheme of operation can be varied to suit the details of the layout and the architectural treatment. It is stated that reliable contractors have submitted estimates of cost, which though higher than are customary for lumber construction compare favorably with the actual cost of the cheaper type of brick house with wood floors. The method is less costly than that followed in the erection of most fire-resisting buildings.

Shipments of Anthracite for May, 1918

The shipments of anthracite for the month of May, tion at Philadelphia, amounted to 6,887,256 tons against 6,917,525 tons in May, 1917, and 6,368,373 tons in April of this year. The shipments last month, therefore, show 1918, as reported to the Anthracite Bureau of Informa- an increase over April of 518,883 tons, but a decrease as compared with May a year ago of 30,269 tons. This decrease as compared with last May, under ordinary conditions, might be considered insignificant, but a serious aspect is given to it by the fact that the shipments of the domestic sizes decreased 174,896 tons, whereas the shipments of steam sizes increased 144,627 tons, all of which increase and more was recovered from the culm banks, and was not fresh-mined coal. In May, 1917, the shipments of domestic sizes amounted to 4,707,246 tons, or 68.04 per cent. of the total; last month the shipments of domestic sizes amounted to 4,532,350 tons, or 65.8 per cent. of the total. The shipments of steam sizes increased from 2,210,279 tons, or 31.96 per cent. of the total in May, 1917, to 2,354,906 tons, or 34.2 per cent. of the total in May of this year.

Compared with April of this year the shipments of domestic sizes increased 283,787 tons, or 6.7 per cent., while the shipments of steam sizes increased 235,096 tons, or 11.1. The decrease in the shipments of domestic coal, all of which is fresh-mined, as compared with last year, and the relatively smaller increase over April as compared with the increase in steam sizes, are due entirely to the inroads made upon the labor supply in the anthracite region, chiefly by the activities of munition plants and other war industries, several of which are located immediately in or adjacent to the mining districts. Some of these establishments are working on contracts of a "cost-plus" basis in which the cost of labor or of materials is of little importance, as profits on any costs are guaranteed, but their action in taking the labor from the mines is threatening the comfort and safety of the communities dependent upon the anthracite mines for their winter fuel.

Distributed by carrier companies the shipments during May were as follows:

	May, 1918	May, 1917	Coal Year, 1918	Coal Year, 1917
P. & R. Ry.	1,356,878	1,341,587	2,590,390	2,345,615
L. V. R.R.	1,328,464	1,275,513	2,503,491	2,264,386
C. R.R. of N. J.	566,974	735,758	1,216,595	1,362,259
D. L. & W. R.R.	1,037,603	1,090,649	2,045,621	1,984,107
D. & H. Co.	825,990	774,278	1,597,543	1,413,773
Penna. R.R.	493,380	498,052	941,754	931,366
Erie R.R.	761,436	786,995	1,456,622	1,451,604
N. Y. O. & W. Ry.	177,072	179,386	362,722	324,565
L. & N. E. R.R.	339,459	352,920	661,626	651,140
	6,887,256	7,035,138	13,376,364	12,728,815
	*00,000	*117,613	*120,735	*218,991
	6,887,256	6,917,525	13,255,629	12,509,824

* Deduction: Tonnage reported by both C. R.R. of N. J. and L. & N. E. R.R.

Safety, Direction and Warning Signal

By R. H. COULSON
20 Hornby St., Wigan, England

SYNOPSIS—*Most hoisting accidents arise either from a temporary lapse of attention on the part of the engine driver or from a mistaken position of the reverse gear. An apparatus is here described that is simple and positive in operation. Through a display of light signals it tends to lessen the accidents arising from either or both of the causes mentioned above.*

ANY IMPROVEMENT that can be devised for the purpose of preventing winding accidents will meet with the approval and commendation of the mining community. Undoubtedly the last 25 years have witnessed the introduction of great advances in detail in the operation of and accessories for hoisting engines. Nevertheless hoisting accidents continue to be reported, and many of them, no doubt, have occurred because the engineman in charge started with the reverse gear in the wrong position, due to momentary neglect, or having his attention directed elsewhere at the critical moment. The importance of safeguarding the hoist will be realized when it is remembered that in addition to it being employed for the purpose of raising the mineral, at least twice each day the lives of all the men employed underground depend upon the successful working of this equipment.

Successful Apparatus Was Designed

It was to the end that greater safety might be secured that the agent of the Collins Green Collieries, in Lancashire, some time ago suggested to the manager, Thomes D. Watson, that he might go into the matter of attaching some mechanically controlled arrangement to the hoisting engines so that the engineman in charge would know at any time whether his reversing gear, when starting or stopping, was in the right or wrong position. The agent outlined what was really required, and after working some time on the problem Mr. Watson devised a fairly successful apparatus. His agent further suggested that if he could make a warning signal sound an alarm at any predetermined point to warn the engineman that he should shut off steam it would be a still further improvement. This was fairly easy to accomplish on the existing arrangement, and the apparatus ultimately devised will tell the engineman in charge whether he is right or wrong with his reverse gear. The device is called the safety direction and warning signal and is intended for use in connection with hoisting, haulage and other machinery in which movement is to be reversed or stopped at regular intervals.

The apparatus gives a special signal, if needed in addition to any other indication, to warn the person in charge of the machinery that a certain predetermined point has been reached and also to show that the reversing gear is or is not in such a position that the intended depth or distance may be exceeded. The apparatus consists of three screens, rectangular, curved plane, or circular in form, with suitable gearing for altering the relative positions of two of them in relation to each other, and to the third, which is a fixed screen. Each of these screens is perforated in such a manner that at the predetermined point or points the light from a lamp placed behind becomes visible, either clear or through colored glasses, or other media, as may be desired, to the person in charge of the machinery. If desired a bell can be made to ring on approaching visibility. One of the movable screens is operated through suitable connection with the reverse gear; the other movable screen is moved through suitable connections by the drum or machinery shaft.

How the Lights Work

The latter movable screen is provided with red and green glass and is worked by a rack in mesh with a pinion fixed on an extension of the clock-face indicator spindle. Two lights are displayed, "red" and "green," but only one of these is visible at one time, the other being hidden by the screen actuated by the reversing gear. Near the end of the wind, at least two revolutions of the drum before the actual finish, a red light appears and remains visible until the reverse gear is put in the proper position for the next wind, when the red light disappears and the green light appears. This green light gradually disappears on starting the hoist and after the first two revolutions becomes invisible. After three-quarters of the wind has been completed (or any predetermined point reached) a small red light gradually appears, warning the engineman to shut off steam, when the small red light slowly disappears and when within two revolutions of the landing the larger red light appears and is full on at the completion of the wind. This operation is repeated as often as a wind takes place.

The glasses fixed on the movable screen actuated by the drum gear can be adjusted by a thumb screw arrangement to suit any position of the wind that is required and any reasonable number of glasses, if so desired, can be attached to suit any landing arrangement.

A horizontal depth indicator devised by Mr. Watson is placed under the center of the fixed screen. In this depth indicator the figures move and the pointer remains stationary, and on completion of the wind the end of the movable indicator comes to rest under the center of the red light.

Where great depths have to be shown, the indicator can not be easily seen. With this depth indicator the engineman has only to keep his eye fixed on the center of the depth indicator both for warning signal and depth indication.

This warning signal apparatus can be used for main rope and main and tail rope haulage (having fixed points to go to and from) whether worked by steam or electricity. It can be arranged to suit any number of landings, each being denoted by a different colored glass.

The secretary and agent to the Lancashire, Cheshire

and North Wales Enginemen's and Boilermen's Federation (Thomas Watson) who visited and examined a model of the apparatus, in a written communication says:

I have carefully thought over the merits of your invention, and I am fully satisfied it is a decided improvement on all appliances brought out up to the present for making overwinding less frequent. For instance, there are two distinct features associated with your invention not peculiar to others.

It gives visible warning to winders in a most clear, definite manner when engines are exceeding speed at various important points and similar warnings also in the event a winder attempts to start the wrong way; the whole construction being both simple and moderate in cost. Certainly I can honestly say and it can be verified by those having an extensive knowledge of overwinding accidents, that at least 50 per cent. take place through starting the wrong way, which without doubt your contrivance will reduce to a minimum.

If by a stud arrangement a bell is made to ring when the red light was approaching visibility, introducing sound to remind sight, bringing another special sense into operation, it would perhaps add to its utility.

The new device has also been examined by William Forshaw, assistant secretary and agent to the Lancashire, Cheshire and North Wales Engineers' and Boilermen's Federation, and the following is an excerpt from his letter:

From a winding engineman's point of view it (this apparatus) appears to have no objectionable features, while it has distinct advantages. It will, I consider, be helpful to the engineman and will conduce to the safety of life and property by tending to reduce overwinding accidents due to starting the engines in the wrong direction.

In addition to the foregoing and others the apparatus has been examined by the enginemen at the colliery where Mr. Watson is the manager, and all express their appreciation of this apparatus and its simplicity. One person who examined the device has no hesitation in saying it was the "Engineman's Friend."

Referring to the illustrations of the safety, direction and warning signal, Fig. 1 shows the apparatus ready for descent, while Fig. 2 shows it ready for ascent. Fig. 3 shows the rack screen which carries the colored glasses. Fig. 4 shows the movable screen in relation to

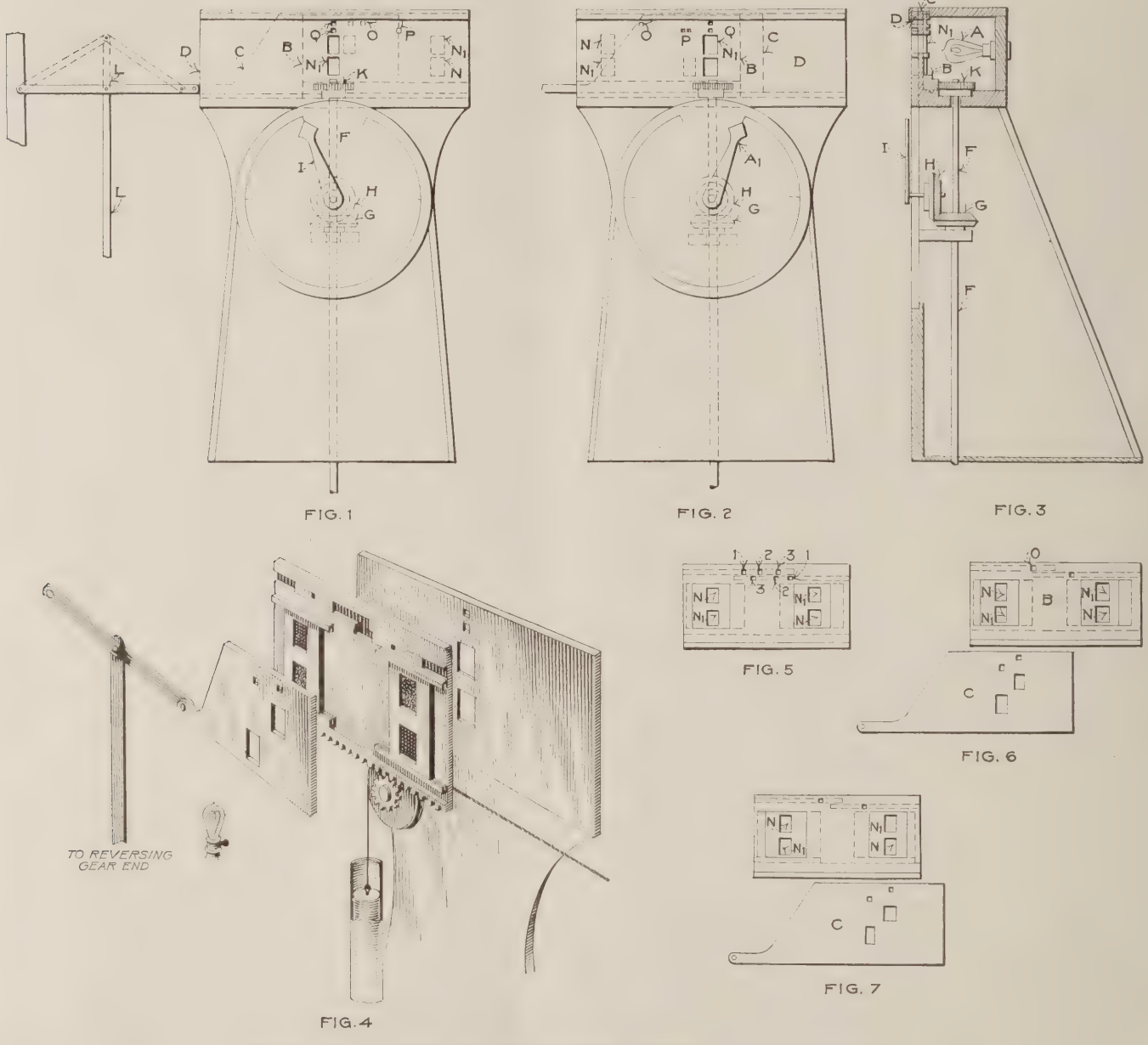


FIG. 1 FIG. 2 FIG. 3

FIG. 4 FIG. 5 FIG. 6 FIG. 7

FIGS. 1 TO 7. DETAILS AND VARIOUS VIEWS OF THE APPARATUS

the reversing gear position. Fig. 5 shows the rack screen with glasses separately. Figs. 6 and 7 show the movable screen in relation to the reversing gear positions. Fig. 3 is a section of the apparatus as shown in Fig. 2. Fig. 5 shows a rack screen for haulage underground with a starting and stopping point with three landings of shunts between them, each shunt being denoted by different colored glasses, and Fig. 4 shows the apparatus fixed to a cord indicator ready for an ascent.

Examining the accompanying figures it will be seen that the device consists of the lamp *A*, the screen *B*, moved by means of the spur gearing *K* meshing with a rack carrying a screen with glasses, and as the cage moves up or down the pointer *I* is actuated by the shaft *F*, through the bevel gears *G* and *H*. *C* is the screen operated by the toggle lever *L* from the reversing gear. *D* is the front screen which is fixed. This, as shown in Figs. 1 and 2, is of such length as to allow the other two movable screens to work behind it. *B* is the rack screen, shown clearly in Figs. 3 and 4. It has guides whereby the openings filled with colored glass can be regulated and adjusted by hand when required. The colored glasses *N and* N_1 are respectively "red" and "green," and appear when the perforations in the screens coincide.

Small Lights Show When Power Can Be Shut Off

The little glasses *P* and *O*, colored red, alternately appear opposite their respective openings and show when the cage has reached such a point that the power can be shut off. This forms a warning signal.

The apparatus is shown ready for descent in Fig. 1. The screen *B*, as shown, has the bottom perforations opposite, and the green glass N_1 shining through shows "right away," the reversing gear being in proper position for descent. On the wind being begun the gearing gradually moves the rack *B* to the left, the green gradually disappearing at the second revolution of the machine, and at three-quarter wind (or any predetermined point) the small red light *P* gradually appears, and then gradually disappears, warning the engineman that a cage is coming up to the top and to shut off power. At the second revolution from the top the red light *N* gradually appears, and when *N* is full on the wind is complete. The rope cage is now at the top. By changing the reverse gear the screen is moved to the position shown in Fig. 6, and the apparatus is ready for another wind, as shown in Fig. 2.

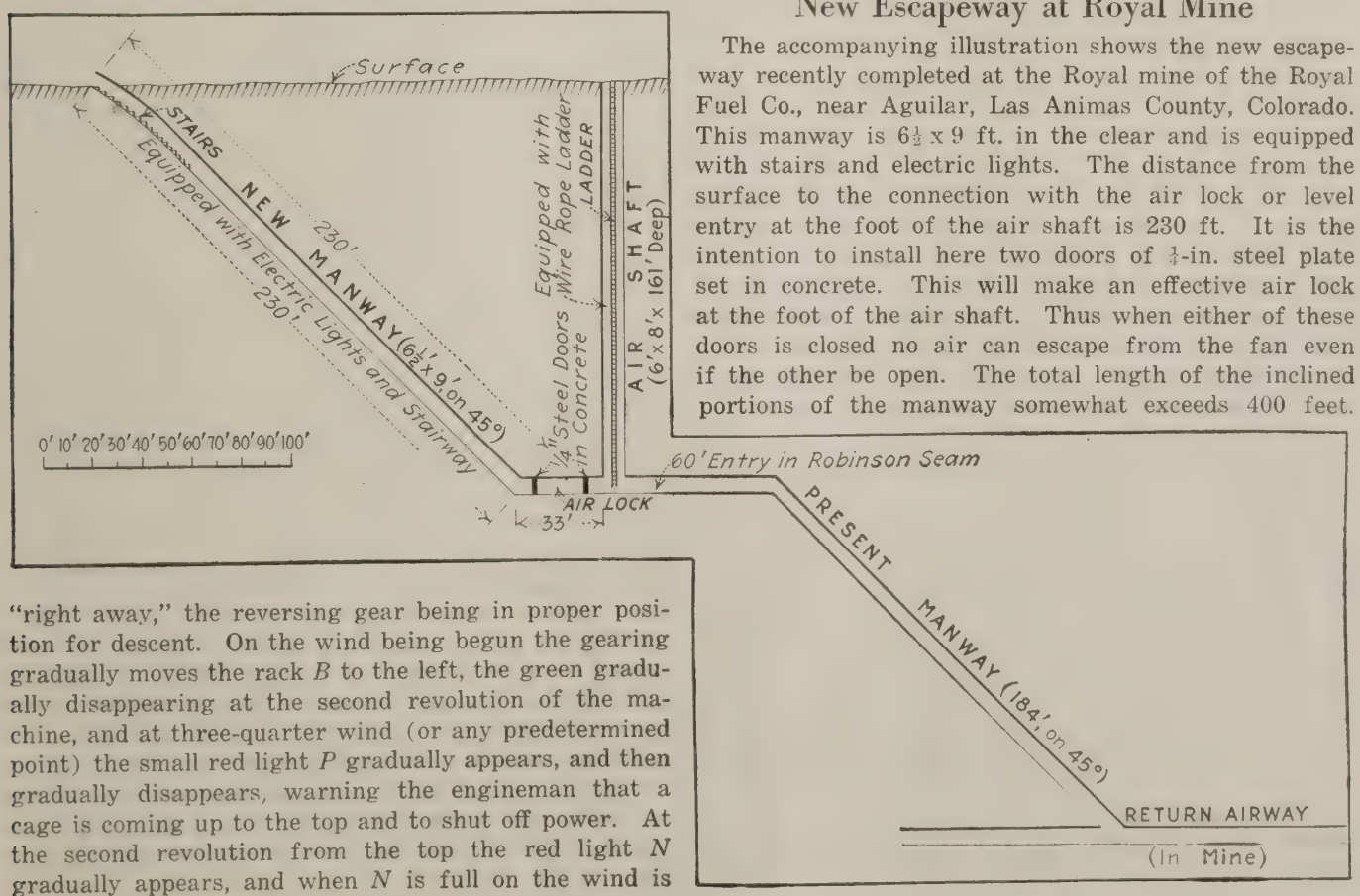
Precisely the same operation takes place in the reverse direction, but instead of the small red light *P* gradually appearing the small light *O* gradually appears, warning that the other cage is coming to the top and it is time to shut off power. If so desired electric contacts at *O* and *P* can be fixed so that when these lights appear sound can be made to remind sight.

The screen *D* can be made of sheet iron $\frac{1}{8}$ in. thick; screen *C* of sheet iron $\frac{1}{16}$ in. thick; screen *B* of the same material $\frac{1}{8}$ in. thick, with shoes for glasses, rack and spur wheel of cast metal. The lamp chamber is preferably enameled white so as to give better results. As to method of lighting, any lamp is suitable for the apparatus.

The following claims of advantage are made for this device: The small red light gradually appearing and disappearing warns the engineman that it is time to shut off steam. The larger red light gradually appearing warns the engineman of nearing completion of wind, and when full on tells him that the hoist is finished. The larger red light warns the engine driver of the danger of restarting his machine until movement of reversing gear obscures the red light and shows the green light. The green light informs the hoistman that the reversing gear is correct for restarting the machine when the signal is given. The whole arrangement is simple, compact, inexpensive and has few parts to get out of order. The inventor acknowledges his indebtedness to his fellow officials and workmen for criticisms and suggestions.

New Escapeway at Royal Mine

The accompanying illustration shows the new escapeway recently completed at the Royal mine of the Royal Fuel Co., near Aguilar, Las Animas County, Colorado. This manway is $6\frac{1}{2}$ x 9 ft. in the clear and is equipped with stairs and electric lights. The distance from the surface to the connection with the air lock or level entry at the foot of the air shaft is 230 ft. It is the intention to install here two doors of $\frac{1}{4}$-in. steel plate set in concrete. This will make an effective air lock at the foot of the air shaft. Thus when either of these doors is closed no air can escape from the fan even if the other be open. The total length of the inclined portions of the manway somewhat exceeds 400 feet.



SNAPSHOTS IN COAL MINING



MINERS AT WORK IN A THICK SEAM OF ANTHRACITE



COAL-LOADING PIER AT NORFOLK, VA.



GENERAL VIEW OF DORRANCE COLLIERY, LEHIGH VALLEY COAL CO., WILKES-BARRE, PENN.



NO. 3 TIPPLE OF NEW RIVER COLLIERIES CO., ECCLES, W. VA.

READERS are invited to submit photographs suitable for reproduction in the pages of COAL AGE. Views of surface plants, scenes underground and snapshots of coal-cutting and conveying machinery are especially desirable. Good photographs will be paid for liberally, and whenever requested will be returned after they have been used. If you are proud of your company buildings, surroundings and equipment, send in some photographs so that COAL AGE readers may see why.



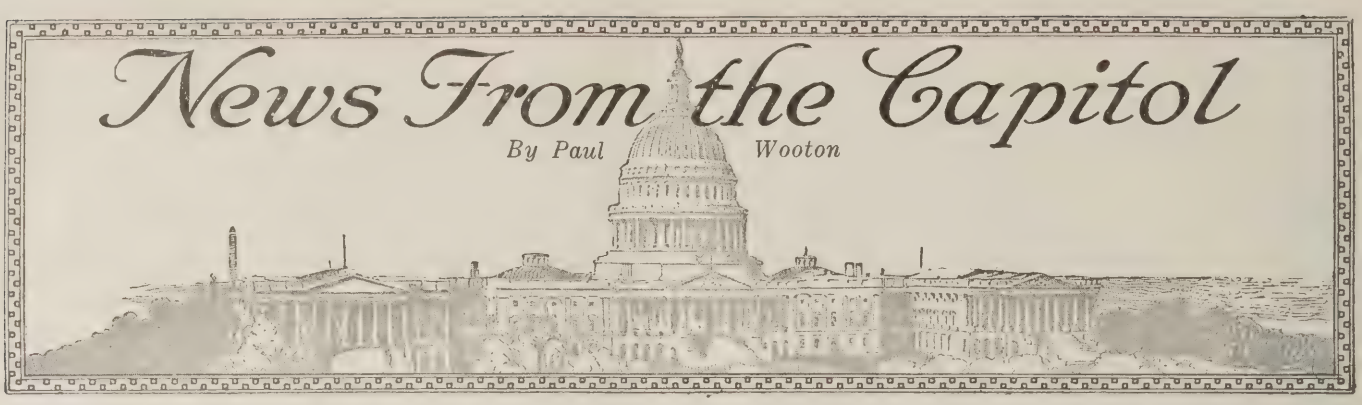
GERMAN PRISONERS AT WORK IN ENGLISH COAL YARDS



MAIN ENTRANCE OF J. W. DWYER COAL MINE IN RALEIGH COUNTY, WEST VIRGINIA



PARTIAL VIEW OF TIPPLE AND WORKS AT THE MINES OF THE VICTOR-AMERICAN FUEL CO., DELAGUA, COLO.



To Classify Industrial Users of Coal

All industrial concerns using 500 tons or more of coal annually are to be classified on the so-called preference list of the War Industries Board. In order that no hardships may result all concerns are urged to return at the earliest possible moment the questionnaire which has been sent to them by the Fuel Administration. Dealers are not to be allowed to add increased freight charges to coal transported prior to the increase in rate. The Fuel Administration expects to penalize severely any dealer who adds the freight rate increase to coal on which this increase was not actually paid.

Explains Order Regarding Railroad Fuel

"The Government prices for coal are maximum prices, and it follows as a matter of course that any consumer including the railroads may purchase for less than the Government price provided it is mutually agreeable. The preferential car supply has been discontinued and will not be a consideration of any contract or understanding." Dr. Garfield made this statement in clarifying the intent of the order covering railroad fuel.

Large Tonnage to Northwest and Canada

A total of 28,000,000 tons of bituminous coal will be handled through Lake Erie ports to the Northwestern States and to Canada, it has been announced at the Fuel Administration. Of the total, 24,000,000 tons will go to the Northwestern States. Every effort will be made to expedite the movement of the Northwest supply so that early diversion of coal may be made to Ohio and Michigan. This will obviate the difficulties of last year when the supplies for the last-mentioned states did not become available until late in the fall.

Shipping Board Proud of "Tuckahoe"

The Shipping Board is proud of the performance of the "Tuckahoe," one of its new colliers. The ship was built in 37 days. During the first month that it was in service, ending June 21, it took four cargoes of coal from Norfolk and Baltimore to Boston. The four cargoes aggregated 19,000 tons. Two round trips a month have been the average performances of steam vessels engaged in the New England coal-carrying trade. One of the round trips of the "Tuckahoe" was made in seven days.

Tidewater Coal Must Be Dumped Immediately

Coal for tidewater must be dumped immediately, the Fuel Administration has ordered. Some shippers have delayed dumping in order to hold the coal for bunkering, thereby allowing them to take advantage of the higher price.

Priority in Labor Supply

Priority in labor supply soon is to take definite form. Labor probably will be supplied in the following order: Shipbuilding activities; operation of railroads; production of coal, coke, oil and essential minerals; munition manufacture and other supplies for Army and Navy use. This classification will be extended at length, but some time probably will be required.

To Restrict Coal for Use of Breweries

Coal for breweries probably will be reduced to 50 per cent. of the consumption during a normal year. Conferences to this end are in progress. Pooling of the manufacture of beer is meeting with favor. It is believed that several hundred breweries located at a distance from a coal supply could be closed, thereby confining the making of beer to plants which could be operated more economically so far as fuel is concerned.

Weekly Production Statistics

Previous performance in the entire history of coal mining in the United States was exceeded again during the week ended June 15, when production reached 12,571,000 short tons. This compares with a production of 11,434,000 short tons in the corresponding week of last year, which in itself was a record at that time. The daily average production for the week ended June 15 was 2,095,000 net tons. This is regarded as a truly wonderful accomplishment when it is considered that serious car shortage still exists; that thousands of the most productive operatives have been taken by the draft and that labor conditions generally are in a demoralized state.

Anthracite production for the week under review showed an increase of 3 per cent. Shipments aggregated 41,960 cars. This is the best showing that has been made in many weeks.

Beehive coke production for the week ended June 15 was 658,000 tons. This is an increase of 3.5 per cent. over the week preceding. Byproduct coke production

continues to hit its stride around 89 per cent. of full-time capacity. Production for the week under review was 484,290 tons. Extensive repairs to plants continue as the principal limiting factor.

The percentage of full-time output during the week ended June 8 was the highest ever recorded. During that week, the mines of the country were operated at 82.3 per cent. of their full-time capacity.

Telegraphic advices to the Fuel Administration covering output during the week ended June 22 show a slight decrease. It is believed that the remarkable performance of the week ended June 15 will be the peak of production for some weeks to come.

The figures referred to in the foregoing are estimates made by C. E. Lesher, the geologist in charge of coal statistics for the United States Geological Survey.

Rates Equalized on Bunker and Cargo Coal

Railroad rates equalizing charges on bunker and cargo coal to all ports have been issued by the Interstate Commerce Commission. The commission sees no justification during the present emergency for lower rates on bunker coal than on cargo coal originating at the same point and delivered to the same vessel.

Coal Prices Changed in Texas

Prices for bituminous coal and lignite mined in Texas are as follows: All bituminous coal, except that produced in Erath, Palo Pinto and Young Counties, run-of-mine, $4.25; prepared sizes, $5.05; slack or screenings, $2.25.

Erath, Palo Pinto and Young Counties, run-of-mine, $3.40; prepared sizes, $4.20; slack or screenings, $2.25.

All lignite, run-of-mine, $1.55; prepared sizes, $1.75; slack or screenings, $1.

The regular allowance for wage increase may be added. In the case of bituminous operations, summer discounts must be made.

Rigid Inspection Leads to Cleaner Coal

Out of 621 inspections made at the instance of the Fuel Administration during the week ending June 22, 390 showed that coal was being prepared improperly. No case was sufficiently flagrant to cause the closing of the mine. The Fuel Administration finds, however, that "the rigid inspection is having constructive results in securing cleaner coal and thus conserving transportation and time."

To Discontinue Preferential Car Supply

Discontinuance of a preferential car supply for railroad fuel, effective June 24, has been ordered on the Pennsylvania lines and on the Baltimore & Ohio. The principal is to be extended to other roads as rapidly as possible, in accordance with a recent agreement.

New Coke Prices Announced

Additional coke prices have been announced as follows: Beehive ovens, in Cumberland County, Tennessee —Blast furnace, $7.25; 72-hour selected foundry, $8.25. Beehive ovens at Ansted, West Virginia—Blast furnace, $7; 72-hour selected foundry, $8.

To Bring Mexican Labor Into United States

Immigration regulations have been suspended so that Mexican labor may be contracted and brought into the United States for specified occupations, which includes lignite coal mining.

Fuel Oil Users Urged to Buy Early

The Oil Division of the Fuel Administration is urging plants which operate on fuel oil to fill their available storage now and, if possible, to create a reserve which could be used next winter. Only in this way will plants be protected from emergencies that may arise next winter. The heaviest demands will be made on petroleum products and the greatest difficults are likely to be experienced as regards railroad congestion.

At the present time, it is pointed out, the oil industry is getting exceptionally good service out of the oil transportation equipment. Tank cars are moving as high as 300 miles a day now, as compared with the general average of under 30 miles per day last winter. This means that an immense amount of fuel oil can be delivered now, as compared with what can be handled under the handicaps of next winter's weather conditions.

New Prices for Anthracite at Lake Docks

To provide for the increase in freight rates and the cost of handling at the docks, new prices on anthracite at Lake Superior and Lake Michigan docks have been ordered as follows: Broken, $10.20; egg, $10.10; stove, $10.35; nut, $10.45; pea, $8.80. The prices are subject to the summer reduction of 30 cents.

Brief Washington Notes

Martin Gerry has been appointed fuel administrator for Montana. Mr. Gerry is a civil engineer and resides at Helena.

T. B. Davis, president of the Island Creek Coal Co., has been made chairman of the National Coal Association's committee on mine supplies and priorities.

Cement plants have been assured of a sufficient fuel supply to handle all production needed for war requirements and for other demands of exceptional importance.

W. W. Miller has been appointed fuel administrator for the State of Washington. He succeeds David Whitcomb, whose appointment as executive secretary to Dr. Garfield is announced.

For violating the regulation with regard to bunker coal, the Penn Fuel Co., of New York, has been deprived of its license by the Fuel Administration. Further action is to be taken by the Department of Justice.

Purchase of 125,000 acres of coal land by the Government and the purchase of the Virginian Ry. are provided in a bill introduced by Senator Lewis of Illinois. The field would be operated by the Government with the idea of supplying the coal needs for the Navy and the Army.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

There is a growing sentiment in favor of a distinction being made between essential and less essential industries in the operation of the draft. It is stated by the National Coal Association, which has just completed a survey of the situation, that by Sept. 1, when the second draft calls will be completed, more than 2,000,000 men will have been drawn from the ranks of labor in the coal-producing states for service in the United States Army. It is becoming increasingly hard for those who are carrying the industrial burden of the war to do so in the face of the depletion of the working forces. Meanwhile the less essential industries are continuing to operate under as many privileges as to draft and labor as the essential industries, under few or no restrictions as to production and under absolutely no restrictions as regards price of product.

Anthracite operators unable to meet the requirements of the coal market by getting new men, by hiring women or boys below the age limit, or by a suspension of the Gallagher bill, are trying to increase their tonnage by decreasing absenteeism and inducing miners to put in a full day.

The Susquehanna Collieries Co. in the Mt. Carmel-Shamokin district called together 20 to 50 of its best miners in every colliery and presented the coal situation to them in all its perplexities. The Susquehanna officials requested the men to work a full eight-hour day. The company's officers declared that they wished to see the miners making big wages and would do all they could to aid them in that endeavor.

PROMISE TO WORK STEADILY AND WITH ENERGY

Nearly all the men pledged themselves to work a full eight-hour day in the cutting of coal. They were assured that the company would not fail to supply cars as fast as they were needed. The conference also took up the question of the slow-work days following every pay-day. The company expects shortly to announce a system of bonuses to be paid to the men who do most toward increasing coal production.

Pledge cards, which earnest mine workers started ten days ago to circulate among their fellows, are already showing their value. At every mine where they have been used, it is noted that the average of absenteeism has appreciably decreased, with the result that the men, as a body, are working much more nearly 100 per cent. time. There is still a wide gap, however, between the nominal 48 hours per week per man and the actual time made.

Statistics go to show that the war calls upon the anthracite army of workers have had the effect of bringing down the average effectiveness of the whole body of labor engaged in the anthracite industry. This is partly because a large number of men, new to the work, have come in, partly because there is an abnormally large turnover in the labor force, but chiefly owing to the fact that the largest drain has been from men between 20 and 31 years who, in the natural order of things, are more capable than others of the steady performance of exacting toil.

Labor statistics for April have just become available today. They show that for that month the anthracite workers numbered 153,092. That is a decrease of 2888 men from the number employed the month before. The loss included 644 certificate-holding miners, men whose places, under the law, it is impossible to fill in less than two years. The average output of anthracite by a single miner is 165 to 170 tons per month. Of course, the miner only dislodges that much coal; he has a laborer to load it; motormen and drivers haul it; a host of men keep the mine in order and another host prepare the coal. But all these stand idle if the essential miner does not do his bit. The loss to the industry of 644 miners means therefore a loss of about 1¼ million tons per year and that at a time when the demand greatly exceeds the supply.

Since April the draft has taken several hundred mine workers, and other causes have drawn away from the anthracite industry an even larger number of men, so that the total available force in the anthracite mine workers' army today, as closely estimated, does not exceed 145,000, which compares with the 177,000 mine workers employed in the anthracite region before the war. The only way now possible to keep production up to anywhere near a maximum point is by better average working time and by increased accomplishment of the mine workers in working hours, greatly aided as these are, by the developments in machinery and mining equipment of recent years.

	Men Employed, March, 1918	Men Employed, April, 1918	Increase or Decrease
Miners	42,830	42,186	D. 644
Miner's laborers	21,990	20,768	D. 1,222
Company men (inside)	42,763	42,143	D. 620
Company men (outside)	42,949	42,515	D. 434
All other employees at collieries.	5,448	5,480	I. 32
	155,980	153,092	D. 2,888

The attention of the Secretary of War, N. D. Baker, has been called to the recruiting going on among mine workers in the Shamokin district. He promised to have it stopped. The draft will take enough men without adding to the depletion by enlistment. Provost Marshal Crowder is said to have taken the position that neither miners nor other mine workers shall be exempted or placed in the deferred class. The tonnage last month despite all the efforts of loyal mine workers and operators fell to a level 30,000 tons lower than in the same month last year, the year of the coal famine.

Reports from the Lehigh field show that the mine workers there are somewhat generally opposed to the suggested extension of the working day to nine hours, claiming that longer hours would not cause the production of any more coal. The strike at the Coal Brook colliery of the Delaware & Hudson Co., recorded at length in our issue of June 22, came to an end June 20. An order of John P. White, former president of the United Mine Workers and now a member of the United States Fuel Administration, dated June 15, was, at first, disregarded by the mine workers. A meeting was held on the evening of June 19, the men being addressed by the officers of the local and by W. H. Connell, of Scranton, the president of the Anthracite Conciliation Board. The latter pledged his word that the Board would make a careful inquiry and reach a decision as soon as possible. The vote showed 248 in favor of resumption and 114 in favor of continuing the strike. The dispute is about the placing of laborers in rooms of their own, and the alleged non-payment of the scheduled rate for the regular mining and for the removal of "shelf-rock."

On June 17 Charles P. Neil, the umpire of the conciliation board, decided in favor of the men at the Clinton colliery of the Delaware & Hudson Co., to which reference has just been made. He declared in his decision that they were entitled to an increase of 7 per cent. instead of the 3 per cent. that had been paid them under the company's interpretation of the last contract. The footmen at the Packer No. 3 colliery of the Lehigh Valley Coal Co., near Shenandoah, also received a favorable verdict, men receiving 27c. per hour being awarded 32c. by the umpire.

The principal recent feature in central Pennsylvania has been the propaganda in behalf of increased production. Successful meetings have been held at Barnesboro, Johnstown, Indiana, Kittanning, Dubois, Punxsutawney and Philipsburg, about 45,000 persons being present. The producers and mine workers of the district declare that production can be kept up to the level provided by railroad trans-

portation facilities without any necessity for lengthening the hours of labor or resorting to the conscription of working men. Pledge cards, the signers of which agree to increase their production to the limit of their power, have been freely circulated and 40,000 of them have been signed.

The foreigners in Ohio bitterly resent the action of the union in refusing work to all unnaturalized aliens and are displaying revolvers in support of their demand that they be not removed from their union affiliation. At Shadyside Belmont County, Ohio, near Bellaire, it is said that 16 revolvers were shown during a meeting of the local where a motion further supporting the expulsion of aliens was presented. At the Big Run mine of the Rail and River Coal Co. 40 or 50 Austrians and Russians hooted a man who proposed the exclusion of foreigners. At Pulteney two men who opposed the expelling of aliens presented revolvers in defense of their contention.

In the Fairmont region of West Virginia the work of unionizing continues. A single evening saw 500 members enter the union at the largest mine in West Virginia. This mine belongs to the New England Fuel and Transportation Co. The same night 245 members joined the union at Baxter, where the Monongahela Valley Traction Co. has a mine. Both these plants are on the Big-Paw-Paw Creek in Marion County. At a point remote from these, namely Masontown, Preston County, a village on Decker Creek above Morgantown, much union activity is being exhibited. Between 700 and 800 new members are joining the union.

The union in the Georges Creek region of Maryland loses its president, William Diamond, the aforetime international statistician. He had intended to go back to work in Michigan as a mine worker, but he will ply that occupation near Altoona, Penn., because of the difficulty in getting his household goods transported. Francis J. Drum has succeeded him as president of the district, No. 16, and will reside at Cumberland, the terminus of the one and only railroad which serves the Georges Creek coal mines.

"Mine the Tons That Beat the Huns"

The crowd of mine workers shown assembled in the streets of Indiana, Penn., in the illustration herewith, probably did not put their thoughts into the slogan "Mine the Tons That Make the Guns To Beat the Huns," but the idea was there and animated the meeting. It was one of a series of gatherings held throughout central Pennsylvania under the auspices of the Central Pennsylvania Coal Producers Association, for the purpose of increasing the production of coal.

John P. White, of the United States Fuel Administration, former International President of the United Mine Workers of America, was the leading speaker. Capt. Frank Schwab represented the British Army and Lieut. Robert J. Bagnes the army of heroic France. Joseph Poggiani, also of the Central Pennsylvania Coal Producers Association, spoke to his fellow countrymen in their own language. Gazy Carol addressed the Slavs in their tongue, and John Brophy, of Clearfield, president of District No. 2, pleaded with all who could understand English for a big output of gun-making coal, without which no success against the enemy of our people could possibly be secured. It is estimated that 6000 men attended the meeting.

It would be impossible to record all the rallies held in central Pennsylvania. A notable one was held the day before at Johnstown in the Cambria Theater, the presiding officer being the Hon. Francis J. O'Connor. Some of the speakers have been referred to already as being present also at Indiana. They were John P. White, Captain Schwab, Lieutenant Bagnes and Joseph Poggiani. To these were added Lieutenant Clark of the United States Army, who was in charge of an alien squad of 17 men of different nationalities, Charles O'Neil, Secretary of the Central Pennsylvania Coal Operators Association, and Father John Martvon, of Johnstown. At the back of the program was printed a pledge which every man was asked to sign. Every mine with 100 per cent. of signatures will get a National Service Flag. The pledge runs:

"I pledge allegiance to my flag and to the republic for which it stands—one nation indivisible, with liberty and justice for all. And I do sincerely believe in the proposition that coal will win the war, and therefore promise to do everything in my power to improve and increase the production of coal by every means at my command, doing so in firm belief that in this way I will contribute to the success of my country in her struggle with the Imperial Government of Germany."

The words "I pledge allegiance to my flag" are now usually written, "I pledge allegiance to the United States flag," and with this change all ambiguity is removed.



INDIANA, PENN., MINE WORKERS PROMISE THAT THEIR WORK SHALL ATTEST THEIR PATRIOTISM

Means for Increasing Hard Coal Output

"Anti-slacker" committees are to be formed at every colliery, and men who do not work steadily, or who do not aim continually to maintain a maximum tonnage, will hear from their fellows. Perhaps longer hours will be worked. The union leaders have been asked to sound the men on that proposition. No one can fail to regret the necessity for this, but after all it is by no means as grievous and unkindly a necessity as that which already takes the best young men of our nation to the field of slaughter.

And now comes a novel proposal: to reduce the consumption of coal at the mines, replacing coal, even there, by the use of wood. The Kingston Coal Co. purposes to saw wood at a mill just erected at its No. 4 colliery, at Edwardsville. To this mill waste wood of every sort will be brought. Around every mine is a lot of old timber—crosspieces, posts, ties and discarded building material. The Edwardsville mill of the Kingston Coal Co. will get busy on this waste lumber. It will be sold at cost, and it is hoped that the housewives will use it to the exclusion of wood, at least during the summer and early fall seasons, when fuel is used solely for cooking and water heating. C. F. Huber, the general manager of the Lehigh & Wilkes-Barre Coal Co., believes that a material saving of anthracite will result from the wood-burning plan, if the mine workers take to the idea patriotically.

A Patriotic Straw-Boss

The illustration herewith shows a view in the stable of the Claridge mine of the Westmoreland Coal Co., Claridge, Penn. The stableman, Robert Lisinger, painted on the brick



PAINTS BIG FLAG IN UNDERGROUND FEED ROOM

wall of the feedroom the large United States flag shown, which teaches its silent lesson of patriotism to the drivers and others having occasion to enter the stable. This stable is entirely below ground. The picture was taken by the mine foreman, Robert Ridley.

Hecla Urges Patriotism and Production

The Hecla Coal and Coke Co. in an effort to secure the coöperation of all its employees in an 100 per cent. output during the war, has inserted the following notice in all its pay envelopes, in English, Italian, Slovak, Hungarian and Russian.

"To the Employees of the Hecla Coal and Coke Co.: Over 1,000,000 Americans, including many of your friends and relatives, have given up good jobs and are now fighting in France to keep the Germans out of America. They cannot win the war without guns, ships and other supplies, in the manufacture of which coal and coke are used.

"It is your duty to support these men and to protect yourselves and your families by working every day and by producing every ton of coal and coke that you possibly can. The soldiers are working day and night at very small pay. We are asking you to work six days a week at the highest rates of pay ever earned by coal and coke workers.

"Don't be a slacker! Do your share! Don't have your friends come back crippled and blame you for failing to support them. Don't lay off and drink while they are dying for you and your families. Each day you loaf adds one day to the length of the war."

The same notice, enlarged, has also been posted on the bulletin boards at all the mines and coke plants of the company. In addition, every employee is given an opportunity to sign the "Industrial Soldier Pledge" card shown above, and each signer is given an industrial soldier's button.

HECLA COAL & COKE CO.

.....PLANT

INDUSTRIAL SOLDIER PLEDGE

Realizing that the greatest possible amount of Coal and Coke must be produced to win the war, I hereby promise to work six days a week and do my best to increase the production of Coal and Coke.

.....

PLEDGE TO FIGHT THE WAR IN THE MINE TRENCH

According to General Manager W. L. Affelder, the men are responding to an even greater extent than had been anticipated.

The enlisted or conscripted soldier works whenever there is work to do and at whatever work needs to be done. The industrial soldier whose work is in the mine works whenever there are cars and does his best to put out a record tonnage in whatever capacity he is employed. Both work for their country rather than for pay. The industrial soldier goes on working till he has made all he needs for the family, and then starts in afresh to secure the money to buy Liberty Bonds and War Savings Stamps, that he may thereby support the Government.

Labor Difficulties in Upper Lehigh Region

A correspondent, writing from the upper Lehigh region, finds the draft is affecting mostly the day hands, who, in general, are younger than the miners:

"The war has caused a most serious shortage of labor, not among the actual miners at the face, but in the men engaged in haulage and preparation. The young men who have been drafted and the fellows who are enlisting in greater numbers each day are skilled breaker hands, drivers, steam engineers and all around colliery mechanics. The men who mine coal are, in greater part, above the present draft age and, in a large percentage, are men of foreign birth. They have in many cases a boy or more already in the army. One miner in Beaver Brook has sent three boys away already and another is in the next call.

"The Beaver Brook colliery has been hard hit by the war. From the little town of about 500 people 45 employees have gone into the army. Many of the employees at the mines, knowing that there is a great shortage in labor, are taking liberties and neglecting their work. Such a nonperformance of their duties a year ago would have caused their dismissal. The young fellows below the draft age are out for the biggest possible rewards and go from one colliery to another looking for the biggest pay. In Hazleton the mines are competing with a big munition plant which has the backing of the Chamber of Commerce in its drive for employees, as if that industry was more important to the city than the mines by which the major portion of its people have for years been supported."

The Lehigh Valley Coal Co. will use school teachers in its offices during the summer vacation of the schools.

EDITORIALS

Congress Should Eliminate Long Tons

ONE of the primary Government conditions our forefathers required was that of uniform standards of weights and measures. They considered these so important that they provided for them in the Constitution. They well knew that in every country there had been a multiplicity of standards, and that this fact had made the conduct of business difficult and uncertain and had opened up the way for all manner of trickery, uncertainty and dishonesty. Fully abreast with the needs of the times, they went to much expense to secure unit standards that would agree with those in general use in the country.

To quote the Constitution, Section VIII says among other matters, that "the Congress shall have power . . . (5) to coin money, regulate the value thereof and of foreign coins and fix the standard of weights and measures." Consequently, there is no reason why Congress—or perhaps the persons deputed now to act in its name—should not establish a standard ton. There would be no opposition to such a change. Some suspicious persons might think that there was an attempt to rob the public by a shortening of the ton, but if the price were reduced accordingly, as it would and should be, there might be even a disposition to feel that an actual gain had been made by the consumer.

In the few cases in which the miner is paid by the long ton and not by measure, he might feel aggrieved by the new rate resulting from the reduced size of the ton, but the union should be ready to back up a correct readjustment with its approval and influence. In fact, the union is now so solidly on the side of a proper adjustment of matters where such an adjustment is needed that its assistance would probably be no sooner asked than given. The officials of the union are so generally behind the scenes that they know all the *dramatis personae* intimately and so can readily size up the situation.

The English ton should be as dead here as as the Imperial gallon; not that either are in themselves objectionable, but because neither can exist side by side with our weights and measures. Some day we shall have so far forgotten the long ton that we shall wonder that the English have any other, and we shall say with native simplicity: "Funny people, the English! You know I never could understand how they have 2240 lb. in their ton." The same remark has often been heard about the Imperial gallon.

It is a bad business, breaking away from British standards of weight and measure, and as much to be regretted as the fact that we are getting an entirely different technical language to that which they employ. But in this case we have no choice. We cannot change to the long ton. The short ton has shown itself preferable. We may as well hasten what is so much needed and what seems to be so inevitable.

Thus May We "Unalienate" the Alien

THE FOREIGNERS at our mines are our good friends or our sullen and indifferent neutrals, to a large extent according to the way in which they have been treated. If the alien has received the "glad hand" —that hand that America so freely extends to those it would please—then, if worthy of citizenship, he is already on his way toward a full participation in our endeavors.

The foreigner in America knows little of the United States. For the most part all he knows of the country is the *rôle* that is played by his different employers. If that *rôle* is a helpful, friendly one, the foreigner is soon inducted into our national life. Where foreign-born workmen—naturalized and unnaturalized—have unburdened themselves of their money to buy Liberty Bonds, it usually has not been because they trusted the country as a whole, a country they cannot know, but because they had faith and confidence in the managers, superintendents and foremen of the company for which they worked.

If they gave their money to the Red Cross, it was as a return for the kindness and regard they had received, the ready word of friendship and the sympathy extended to them. If they are striving now more than ever to provide coal that propels our war vessels and makes guns, ships and war material, it is because they visualize in those around them, especially in those employing them, those with whom they are daily working, a people worthy of comradeship, a people they desire to see succeed in all their endeavors.

The people who complain most about the foreigner's lack of Americanism are those who sin most against him, who treat him with studied contempt. Fortunately they are few. Ignore the barrier between native born and foreigner and the barrier will fall. It is even now falling.

Wonderful indeed are the foreign-born in America. Centuries of propinquity, ages of propaganda, persecution and purchase all have failed in parts of Europe to make a homogeneous people. Here the work is done in a generation, in less than a generation, almost without any effort. The foreigner is perhaps not entirely made over. His enunciation, his strange groupings of words, his peculiarities of deportment still remain to interest us, but he becomes an American in his preferences and an American in his willingness to make sacrifices and give service.

Even the American Germans have only been about a half of one per cent. disloyal. The Liberty Loan sales have perhaps been larger among them than among our own people, for they have a thrift to which our people are strangers. Our generosity to them has, in but few cases, been a mistake. The American German has, in most cases, responded to our good will.

A stranger comes to your home from California, let

us say, and you gather round him. His differences please and interest you, and you delight to show courtesies to this visitor from a distant state. How your courtesy to him puts his own kindliness of heart in action! What a wonderful host are you and what a gentle guest is he! It will not be otherwise if we treat with kindness those of another tongue, another country and perhaps another creed. Their very "otherness" is a bond of union of great worth to those who thus recognize it. It gives them a chance to show again the things that they most prize and which they know the stranger will enjoy with them.

Look Around for a Speaker

UNFORTUNATE indeed just now is the mining village where, for lack of an adequate speaker, the war and all that it means has not come home vividly to everyone, especially every English-speaking mine worker. It is necessary that someone should be found at every plant who can declare how intimate is the relation between guns and coal, and do it so clearly that the man who labors at mining cannot fail to realize the matter. Someone is needed who will show how the mine worker contributes to the waging of the war.

The man who makes luxury goods may work negligently if he pleases. His product may be inferior in quality or quantity; the war will be finished just as soon. But the man who mines coal mines it to back up the Army and Navy. He must not falter or fail. Whatever the work others may be doing, his work is one which directly contributes to victory. Happy indeed should he be that he finds himself where he can render his country such a great service. The man in a luxury trade uses excellent raw material for a useless purpose. He destroys the labor of others, adding to it other labor, only to waste that also.

But the man who mines coal is doing useful work. His is the work of honor at this time. Every little mining town should have a forceful orator who will proclaim this fact, so that it will not be a single moment overlooked.

Some will speak lightly of his story, for there never was a story yet, however true it might be, that did not find its derider; never a bulletin or picture that some one did not find fault with it. But there are always some who will accept the story, bulletin or picture on its full face value; some who will accept at least a part of it and perhaps none who fail to retain some fragment of the thought expressed.

Where there are unions the work of speeding production may well be done through them. The union leaders have long ago seen that the mine worker is the backer of both Army and Navy in the present war. The mine worker's son and brother in uniform are required to give untiringly of their efforts, and he himself can give no less; for his work is necessary for the support of these men at the front and will in large measure reduce the loss in life and shorten the duration of the battle.

We say again, "Look around for the speaker." If you can, get him from the ranks, get a man who can speak as brother to brother. Every mine village should have its spieler to give purpose to its efforts and to bear the message of the Nation to the mine worker.

Do All Your Employees Really Know?

TOO often the officials of a company who have been reading diligently about the war in every spare moment assume that all the employees have been doing the same, and they feel it a waste of time to repeat to the mine workers what might seem obvious truths; but just lately several cases have occurred that show that there are a number of people with wholly erroneous ideas, implanted doubtless by persons having an active alien or private interest to advance.

In Hoboken, N. J., a manufacturer induced a number of his employees to buy War Savings Stamps. Probably he laid all the stress on the patriotic duty of buying them, which, of course, is an excellent form of argument for their purchase. As a result of this appeal and the pressure of fellow subscribers, they agreed to buy stamps. The propagandist or profiteer then came along with the story that the stamps were of no value, and one particularly vicious person went around buying them at a considerable margin below their cost to sell them in New York City. It took only a word to make the women, who were parting with these stamps so readily, decide henceforth to keep them. They were easily brought in line by a suggestion from someone they did not know. A difficulty, so easily removed, should never have been allowed to make any headway.

Another example: A long line of people at a dime saving bank were talking about Liberty Bonds. One man in the row declared that he would much like to buy the bonds, but he needed the interest, and he could not afford to withdraw his time deposit from the bank where he got his percentage regularly. Another even wanted to know how often he would have to pay interest on his bond after he had bought it.

Perhaps there are no men around the mines, native or foreign, who are quite as ill-instructed as these men and women, but there may be other difficulties that keep them from doing their duty, and every mine official should make it his business to learn the nature of these problems and should study how he may correct them. It does not do to take knowledge of anything for granted in these days of propaganda, especially in sections where many people cannot speak the English language.

After all, banking and investment are not easy things for a man to understand. It takes time to learn how to avail oneself of the Government's offers. The language of banking in which many of the notices are couched is more exact than clear. Where the work of acquainting men with the Government offerings has been well explained, the people are eager to buy and ready to retain the securities and stamps almost indefinitely. No one holds so tenaciously to the purchased bond as does the small bondholder. What he buys he keeps until a rainy day. He is not an uneasy speculator but a satisfied investor.

The people will be more likely to feel aggrieved at the insistence of the Government on the paying off of the bonds when they fall due than upon any of the other provisions. We wager that the man who has received 4½ per cent. from the Government for many years without a hitch will feel quite grievously dispossessed should he, when the bond expires, have to accept payment and put the money in the bank at 4 per cent. or less.

The Army Behind the Lines



Uncle Sam might have drafted any one of us. Because he did not do so is a good reason why we should do our whole duty in the industrial army and all in step march ahead whenever Uncle Sam cries—"Forward! March! A little more pep, please. This is no route-step or go-as-you-please."

DISCUSSION BY READERS

The Mining Situation

Letter No. 1—While statistics show that the production of coal in our mines has greatly increased, it is still far below the present demand, and the question is constantly asked, "What is it possible to do to increase the production?" Public meetings have been called to discuss the question; large coal companies have held conferences with their officials; and both the Government and mining companies are giving every encouragement to miners to induce them to increase their efforts to mine coal.

At a recent meeting of the superintendents of a large coal company, the general manager, in the course of his remarks, stated that because of labor and other conditions, the company had contracted to supply considerably less coal than last year and, notwithstanding this fact, they were much behind on their contracts.

The seriousness of the coal situation is not realized by the general public. Several causes are responsible for the condition. The draft has called many men from the mines and others have left to seek work where they are offered higher pay; but, aside from all this, the miners themselves are not working as they should. The truth is, the miners are making big money and, as a rule, have an overpowering desire to spend what they make, some in drink, some in pleasure and luxury, but comparatively few in investments in Government bonds and war-savings stamps.

Instances are numerous that show the restive disposition of many miners who are making good money, but who yet are dissatisfied. One of my men who drew $70 for two weeks' pay came to me with the claim that he was "not making enough money." He named a man in an adjoining town who drew $96 for only eight day's work. Had the man worked the 13 days of that pay he would have had $156 in his envelope; but he laid idle the remaining five days, or over a third of his time, which is no exceptional case.

Pleasure vs. Work

While a year or two ago autos were owned only by the higher mine officials, today it is hardly an exaggeration to say that nine out of ten autos seen speeding from one mining town to another are owned and driven by foreign-speaking miners. Now, while no one would begrudge their amusement and pleasure, the fact is that the habit of a good proportion of our miners to visit their friends in adjoining towns is responsible for the loss to the country of a third of the possible production or capacity of the mines.

Few miners realize what this means to our country in the present crisis. Ninety per cent. of these men are foreign born; many of them cannot read and all they know is what they hear. The suggestion has been made that wounded soldiers who can speak their language be sent among them to inform them of the real conditions and the great need that they should work their full time in the mines. While this would do some good, my opinion is that it would not accomplish the desired result.

The Soldier and the Miner

The question to be decided is, What is the cure for these conditions? In attempting to answer this question, it is well to remember that the Government makes the service of the boys drafted for the army compulsory. They are obliged to do every class of work required to make them hardened soldiers, and are paid $30 a month for their services, and many of them have left good positions that afforded them four or five times that amount.

If a drafted man grumbles, he is called a "slacker." But, the great army of workers at home are paid increased wages and permitted to work where they please and as they please, although their services are as essential to the success of the war as that of the fighters at the front.

Let me suggest, in closing, that the seriousness of the present situation demands that the Government should take more drastic means to keep the miner at work. If it is asked "How can this be done?" my answer is, place a Government inspector in each mining district who will act in the capacity of a truant officer. Given a list of the men absent from a mine without excuse from the foreman, the inspector would investigate at once, ascertain the circumstances and impose such a fine as may seem fit. It will do no good to send the man to prison, but a fine would send him back to the mine and make him less willing to absent himself for pleasure or other needless cause.

McIntyre, Penn. THOMAS HOGARTH.

Private Business and the War

Letter No. 1—At the present time, we hear much talk of the need of private business giving way to the Nation's interests, for the winning of the war. I was pleased with the timely verses of Berton Braley, which appeared as a Foreword in *Coal Age*, May 18, and were designed to teach the lesson of one's private interests being subserved to the necessities of the great struggle in which we are engaged.

It strikes me that this is a lesson that every miner must learn as well as men who are conducting public affairs and interests of various kinds. In every case the business of the individual must be regarded as second to his duty as a citizen and one of a great army of industrial workers.

Only recently I have been led to apply this reasoning to the case of the skilled and unskilled miners who work side by side in our mines. Take, for example, a machine mine where safety requires that the most skilled miners should be employed on pillar work and in other danger-

ous places where their work will not permit them to earn the same amount that they could if employed in easier tasks.

On the other hand, the unskilled laborer is frequently put to work on loading coal where he is practically safe and free from injury. It has happened that, in the performance of this work, he is enabled to earn comparatively larger wages than his skill and acquaintance with mining work would warrant. As a result, the skilled miner is apt to feel that there is an unjust discrimination in the choice of work, although he recognizes that it would not be right to place the unskilled man where he would be liable to injury because of his inexperience in the mine.

The mine foreman recognizes the appeal made to him and replies, "Yes, James, I am going to give you a machine-cut right handy to the stump you took out yesterday, and you and that new man whom I will send with you can load it out. When that is done you can both start mining the remainder of the stump; but you will have to watch your man and see that posts are set to keep him safe."

Suppose, now, the miner should reply that it was not his business to look after the other fellow; he must learn to do that himself. How would such a reply be regarded if made by a soldier at the front who refused to look after the safety of a comrade. He would be sent at once to the rear and be court-martialed for his disloyal attitude.

Permit me to ask, In fairness to his fellow miners and loyalty to the cause, should not every miner preserve the same attitude toward his fellow worker as is demanded of the soldier toward his comrades? Are they not all working under the same banner, and does not the same responsibility rest on the miner as on the soldier at the front? R. W. LIGHTBURN.

Perryopolis, Penn.

Shortage of Mine Labor

Letter No. 1—An item that appeared recently in *Coal Age*, May 25, p. 986, drew attention to the protest made by mine operators against the draft being made on competent and experienced miners who are daily being taken from their work in the mines and sent to war-training camps.

A short time ago a committee of coal operators made a special trip to Harrisburg for the purpose of conferring with Major Murdock. They explained to him that the draft for the army was reducing the employees in and around the coal mines to an extent that threatened to greatly interfere with the production of coal in the anthracite district. They urged that competent experienced miners employed underground should be exempted from military duty and claimed that the coal industry was being hit harder than any other necessary industry.

To the unprejudiced mind, there would appear to be some camouflage in the action taken by these operators. If it is a fact that coal companies are being crippled by the shortage of labor growing out of the necessities of war, as this committee claimed, it would seem that they should be compelled to show figures giving a correct account of how many men they have lost through the draft and how many men have left the mine to seek other work where they could get more wages. It is my belief that such figures would show that the shipyards and railroads in the country have taken more men from the mine than have been called by the draft.

In districts Nos. 1, 2 and 3, in the city of Wilkes-Barre, the records show the following number of men drafted from different coal companies in that vicinity: Lehigh & Wilkes-Barre Coal Co., 17; Lehigh Valley Coal Co., 3; Pennsylvania Coal Co., 1; and the Delaware & Hudson Co., 3, making a total of 25 men who will leave these mines, on June 24, for training camps.

It would naturally be supposed that coal companies, fearing the loss of their more experienced and competent men, would submit a list of such men and claim for them industrial exemption from the draft. On the other hand, there are numerous instances where discrimination has been shown to favorites, and where sons of bosses have received special mention. I am proud to say, here, that the feeling of loyalty to one's country has triumphed over these efforts, which have, in most cases, been spurned by the boys themselves.

Efforts of Companies To Have Men Exempted

In one instance, a large coal company left no stone unturned to have a certain young man exempted, who stated, when the report reached him, that he was "no slacker" and promptly enlisted. It is not surprising that a large number of the younger men working in the mine have recently been aroused by the situation. These let it be known, yesterday, that they would take their regular place in the draft, regardless of their work in the mine. The probability is that they were forced to take this action because men for whom exemption had been asked had been commonly termed "slackers" by their comrades.

Let me suggest that coal companies face a peculiar situation. From my observation, the shortage of men in the mines is due largely to the inducements of the larger pay offered for work in other industries. To overcome this effectively and hold their men it would be necessary for coal companies to increase wages correspondingly; but this cannot be done without increasing the cost of production of coal.

Disproportion in Pay for Mine Work

An instance came to my knowledge, a few days since, of a young man who had been employed running an air compressor, two turbines, and an electric dynamo, all housed under the same roof. He served a 12-hr. shift for a measly $3.50 a day. The man was a good engineer, but he had no regrets when giving up his job at the call of the draft. There is little wonder that the place is still vacant, and no one appears to be anxious to assume the responsibility at the small pay offered.

Comparison shows that the miner is the poorest paid workman in any industry, at the present time, and yet the product of his labor underlies production in practically all of the industries. Today, any able-bodied man can earn $3.50 for common labor, in other work than mining, and it is not strange that they are leaving the mines to seek such work.

I want to say, in closing, that the claim for exemption from draft cannot be urged with any more reason

for the miner than for the farmer, or men working on Government work in the shops and the shipyards. If these classes of workers are to be exempted, then, who will be left to do the fighting? Were miners to be exempted by a ruling of the War Department, there would be a host of men seeking employment in the mines who are not competent for that work.

Wilkes-Barre, Penn. JUSTICE.

Letter No. 2—The frequent references both in *Coal Age* and the daily papers, regarding the shortage of labor throughout the anthracite district, leads one to believe that there will inevitably result a big shortage of anthracite next winter.

The reasons for men leaving the mines in such large numbers are numerous. Some are called away by the draft, many are seeking jobs in other industries or volunteering for service in the army and other causes besides are depleting the ranks of the mine workers. Several hundred men have already left the Wyoming Valley and the same is true throughout the region.

Considerable alarm is felt among anthracite operators regarding the effect of the recent draft call, which requires Pennsylvania to furnish 3750 men for the army. Both the operators and the United Mine Workers organization are attempting to estimate what proportion of this number of men will be taken from the mines. If the present call affects the miners to the same degree as did the last call it is generally conceded that many of the mines will be forced to close down.

WHAT DRAFT OF MINERS MEANS TO THE MINES

Every miner taken away for military duty means the training of a new man to take his place, and the Anthracite Mine Law requires that a man work underground, in the mines of Pennsylvania, for two years before he can secure a certificate permitting him to mine coal or work as a miner. It is quite evident, therefore, that every experienced miner called by the draft will curtail the production of coal, which is already restricted by the lack of men.

With the hope of relieving the labor-shortage situation, a committee of four, composed of members of the Luzerne County Exemption Board, was appointed to go to Washington, in company with a committee of mine operators, to confer with the proper authorities in an effort to obtain a ruling that would exempt coal miners and skilled mine laborers from military service. I understand that similar committees have been selected from other mining counties, for the same purpose.

The problem, however, has another aspect that is equally serious. Most young mine workers balk at these exemption plans. Unwilling to assume the role of "slackers," many of them have been aroused by the deferred classifications, which have been accorded some of their number in a wholesale manner by district exemption boards. It is feared that they may take the stand of refusing to accept such deferred classifiation arising from the nature of their work in the mines. An official of the United Mine Workers organization is authority for this statement.

While it is true that this stand of young workers reveals a super kind of patriotism, there is another phase of the situation. A growing feeling of discontent, because of what is termed "unjust discrimination," results from men being moved forward on the draft list by reason of the wholesale exemptions secured by the coal companies for favorites in their employ.

In the opinion of some operators, the situation demands a change in the anthracite mine law, which requires two years of labor underground, in the mines of Pennsylvania, before a man can receive a miner's certificate. Many operators say that six months is sufficient to give a man the required training for the work of mining coal. Personally, I believe this would be a grave mistake and is not required by reason of the scarcity of miners in the anthracite field.

Kingston, Penn. FRED B. HICKS.

Detecting Marsh Gas by Smell

Letter No. 1—Reading the inquiry in regard to carbon monoxide being a "supporter of combustion," *Coal Age*, June 15, p. 1128, shows that one cannot rely wholly on what the textbooks say. In the minds of many, there is some question in regard to marsh gas having no smell.

Methane or marsh gas is described as a "colorless, odorless and tasteless gas"; yet many men declare that they can smell it. In the hope of clearing up this point and throwing some light on the subject, allow me to submit the following:

When going my rounds as an examiner I have frequently suspected the presence of gas and rarely failed afterwards to find it in sufficient quantities to give a flame cap in the lamp. Perhaps, however, the perception was not wholly by smell, though mainly so as I believe.

An Alberta mine inspector tells me he has often had the same experience. Once, while I was accompanied by another examiner, we entered a room and he exclaimed, "There is gas in here, I can smell it." We found no gas, however, and as we came out he said, "I guess it was the timber I smelled."

I am inclined to think it was the timber, in that case. All the timber used around here is conifers from the eastern slope of the Rocky Mountains. It is highly resinous and gives off a pleasing odor for several months after it is cut. It is usually where the odor of the timber is noticeable that I have suspected gas. As a rule the odor of the timber is stronger where much gas is present. It is only when the timber is old and has lost its odor that the presence of the gas makes no difference.

My explanation is that the methane acts as a solvent upon the more volatile portion of the resins of the timber and renders them more active, in much the same manner that kerosene acts upon pitch. It may intensify whatever action the odor has on the sense of smell.

Coalhurst, Alta., Canada. T. EDWIN SMITH.

First Aid to the Uninjured

Letter No. 7—The writers on this subject have drawn attention to a most important feature of the safety-first movement. More than anything else in coal mining is the necessity of aiding men to recognize the dangers with which they are surrounded and take precautions to avoid possible accidents. This aid must be given

to the man before he is injured. What most of us need, however, is a good supply of common horse sense.

When a man has been injured seriously, perhaps through carelessness of his own, or when a man has been arrested for a violation of mining law, he is in a position to appreciate more fully the foreman's solicitation on his behalf. But, it is important to bring men to the same state of appreciation before their neglect has resulted in serious injury to themselves and perhaps to others. It may be necessary to punish a man for carelessness, in order to bring him to appreciate means taken for his safety.

Chances Taken by the Average Miner

Nobody will deliberately pull a ton of rock or coal down upon himself; but scores of miners will continue to load a car, under a roof that they know is not safe, intending to secure the loose top as quickly as they have loaded out the coal beneath it. Men take these chances continually, and it is for the foreman to use radical means, if necessary, to cure them of the habit. No man should take chances on his life and health.

Many mine foremen are bewildered at the prospect of impressing on their men the need of taking greater care in their work and many hesitate to enforce strictly the safety rules of the mine. The task will be made easier if such men will classify the accidents that commonly happen in mines, owing to men's neglect and carelessness. It will enable them to apply the right remedy in each case, and better results will follow.

Cause of Greatest Number of Accidents

By far the greatest number of accidents in mines occur through falls of rock or coal at the working face. Nine out of ten of the accidents of this class can be avoided by the exercise of due care and caution on the part of the miner and a close supervision of his work by the mine foreman and his assistants. Because the miner is prone to ignore the laws and safety rules made for his own protection is no excuse for a mine officials' laxity in enforcing them.

Let every mine foreman place accidents of this kind in a class by themselves and study the best means to avoid them. He will soon discover that a large portion of the responsibility rests upon himself. He will find it necessary to enforce a rigid discipline in respect to the timbering of working places, and to supply and keep on hand in each place a sufficient amount of timber of the right size and kind. He will see that these provisions must be accompanied with a close supervision of each miner's place and work. He will permit no one to load a car before he has secured roof reported as unsafe. Dangerous rock on haulage roads and travelingways must have an equal share of the mine foreman's attention.

Accidents Due to Blasting

A second class of accidents embraces those due to the blasting of coal and rock. There is less excuse for accidents from this cause than those in timbering. No unseen hand threatens the miner in preparing a blast, as in loading a car under a roof judged to be solid and safe when, in reality, a hidden slip or a "pot" formation renders it insecure. There are but few legitimate excuses for accidents due to blasting coal. Nearly every box of powder contains printed instructions regarding the safe handling of the explosive and the precautions that must be taken in its use.

The accidents from blasting are not so many, however, and usually arise from careless practices, such as using a short fuse, crimping a cap with one's teeth, smoking a pipe or cigarette, or approaching a light too close to the powder when preparing a charge. A miner will sometimes be found riding a motor trip with explosives on his person; he may carelessly carry a few caps with his powder; or he may allow the explosive in his charge to come in contact with a live wire and, in many other ways, do things that he knows he should avoid.

Accidents from the Movement of Cars

I will refer to one more class of accidents, namely, accidents due to the movement of cars. These are largely the result of bad management in the mine, or disobedience to rules by the miner. Where mechanical haulage is performed, men should not be permitted to travel the haulage roads, but a separate travelingway should be provided whenever practicable. Refuge holes should be cut in the ribs and a suitable clearance at the side of the track be maintained wherever it is necessary for men to travel a haulage road.

Strict rules should be enforced in regard to men riding motor trips and violations of such rules should be suitably punished. All tracks should be maintained in good condition and protection should be afforded against live wires, wherever men or animals may come in contact with the same. If sufficient attention is given to these and other provisions for the safety of men, there will be a noticeable decline in the number of accidents occurring in the mine.

Thomas, W. Va. W. H. Noone.

Strong vs. Weak Stoppings

Letter No. 2—Previous to the mine enactment of 1893, in Pennsylvania, there were many extensive mines in which the stoppings were built of wood. Sometimes these were of the most flimsy character, the material used being often procured from old store boxes. Fortunately, no great explosions occurred which would, undoubtedly, have blown out every stopping on the entry, from the face to the shaft bottom, and made the work of rescue very slow and tedious, because of the necessity of rebuilding all the stoppings.

Such flimsy stoppings may be rightly described as being very flexible. At times, a heavy shot would move them so that they required to be repaired before rescue work could proceed. Indeed, stoppings of that kind were short-lived and had to be constantly renewed. In my opinion, any form of light stopping that is easily blown out is dangerous, and the same is true of a collapsible stopping. A light stopping soon begins to leak air and makes it impossible to conduct the air current, in sufficient quantity, forward to the working face.

The suggestion made by E. P. Brennan, in his letter, *Coal Age*, June 8, p. 1077, that a modified system of mining be used so as to form an explosion barrier at the mouth of each pair of cross-entries could only be employed in the laying out of a new mine. It

has made me think, however, that some systems of mining are more favorable to the development of an explosion than others. I am inclined to believe that the longwall system advancing has the cleanest record in this respect. In that system, there are practically no stoppings other than the packwalls.

My experience has taught me that the best form of mine stopping is one consisting of a good solid packwall faced with 18 in. of brick on each side. The brick should be laid in cement. This form of stopping should be built on all main and cross-headings. A 50-ft. pillar should have a 12-ft. packwall for a stopping, and all stoppings should be set into the ribs a depth of 12 in. The pack should be well rammed as it is brought up to the roof so as to form an air-tight joint at the roof.

My preference is for explosion-proof stoppings, in any system of mining. I believe that, while such stoppings will not prevent the occurrence of explosions, they will greatly expedite the work of rescue, which would then only be delayed by the entries being blocked by possible roof falls. In a mine with strong stoppings, it seems to me that there would be less wrecking of the passageways, as the explosive blast would have a straight course and quickly spend itself.

Perryopolis, Penn. LUMEN.

Letter No. 3—A common mining practice has been to use two kinds of stoppings, designated as temporary and permanent. The temporary stoppings are usually built by using 1-in. boards, slabs or refuse lumber of some sort daubed with clay or cement to prevent leakage of air. This form of stopping is simple and may be built by any one understanding the use of saw, hatchet and nails. When built of rough boards of single thickness it will stop about 50 to 75 per cent. of the air traveling from passing immediately back into the returns. The permanent stopping is a more elaborate affair and has, no doubt, received much more attention in the selection of materials and methods of construction. The state law makes it compulsory to build the permanent stopping of incombustible material and of ample strength. No stipulations are made concerning the thickness.

In a mine entirely free from combustible gas, having no large accumulations of fine coal dust, any available material such as top rock or slate will make a satisfactory stopping if the work is done in a skillful manner. When a mine is gaseous, with coal-cutting machinery producing large quantities of finely divided coal dust, the permanent stopping becomes a matter for careful consideration. Before deciding on the kind of materials most suitable for the work, it will be well to understand the double purpose of a mine stopping.

First, it must be air-tight to insure the complete distribution of the entire ventilating current. Second, it should afford quick release when the mine resistance or pressure—due to accident—is above normal and to provide a short circuit for air and rescue work in the event of a serious disaster.

The stopping built of slate or rock, having double walls with a pack of dirt, clay or other material between them, is much in favor with a large majority of mine officials. When this is made thick and strong, it is said to be proof against shock arising from an explosion. The explosion-proof stopping is the outcome of an idea advanced by certain authorities in support of their belief that its indestructibility tends to throttle the explosion in its incipiency, by increasing the mine resistance. In support of this idea one writer says: "It has been found that old mines, where the mine resistance is great, are practically immune from dust explosions; they occur most frequently in new mines where the mine resistance is comparatively small."

Resistance to Development of an Explosion

In this instance there seems to be some confusion with regard to the term "mine resistance" in its relation to an explosion. What is commonly known as frictional resistance or total ventilating pressure is of small moment in accelerating or retarding the development of an explosive wave. What does count is the difference in resistance between a narrow working place with four solid walls, including indestructible stoppings, and another place where the stoppings are arranged to afford a quick release of high resistance brought about by abnormal conditions. It will be found that where old mines are free from explosions the condition of the ventilation is the most potent factor.

The writer referred to, in a further effort to strengthen his claim, says: "It is well known that the easy removal of insufficient tamping increases the danger from a blownout shot, and an increase in the length of the hole and a corresponding increase in the length of the tamping reduces the danger." This is very true. Now let us assume that we withdraw the tamping—affording a complete release of all resistance—then what will happen? There will be flame and smoke unaccompanied by an explosion.

Again, assume that we stem and tamp the hole solidly, its entire length, using the same amount of explosive and making the resistance complete and effective; what will be the result? A rending, smashing, shattering explosion of full destructive strength and power will be developed. The indestructible stopping would be the ideal of perfection if we could be absolutely certain of the future conduct of a mine.

Mine Stoppings in the Future

It is a safe prediction to make that the mine manager in the future will arrange his stoppings for ventilation on a much different plan from that of the present or past. Permanent stoppings will be constructed with a view to their flexibility and thickness. All stoppings within 300 ft. of the working faces will probably be built in keeping with the advancement made in the science of mining.

These temporary stoppings will be a portable arrangement, set in a frame after the fashion of a trapdoor, and held firmly in position by springs adjusted to withstand the normal resistance of the mine and made to release or collapse when the resistance becomes abnormal. The quick release of all resistance will effectually prevent the development and continuity of an explosive wave, if applied near the point of origin.

Much can be accomplished that is thought to be impossible in respect to the prevention of mine explosions, and I shall be glad to learn the views of others.

Confluence, Penn. H. E. GRAY.

INQUIRIES OF GENERAL INTEREST

Designing a Mine Siphon

Kindly explain what conditions are required for the successful operation of a siphon in a mine; or, in other words, what elements enter into the design of a mine siphon. INSIDE FOREMAN.

Pittston, Penn.

The essential requirements for the successful operation of a mine siphon are the following:

1. The pipe line must run full; that is to say, the size (diameter) of the pipe must be such that it will conduct the required flow of water, under a velocity determined by the effective head and the frictional resistance of the pipe. This is necessary in order that the water flowing through the pipe shall sweep away any air that might otherwise separate from the water and accumulate at the crown of the siphon.

2. In order that the siphon shall run full continuously, the diameter, length and effective head must bear a fixed relation, in both branches of the pipe. For example, the ratio of the fifth power of the diameter, in inches, to the length of the pipe, in feet, multiplied by the effective head, in feet, must be the same for both the intake and discharge ends of the siphon. The *effective head* at the intake is the atmospheric pressure minus the vertical lift from the level of the water in the supply basin to the crown of the siphon. The *effective head* in the discharge end is equal to the vertical height of the crown of the siphon above the point of discharge minus the atmospheric pressure.

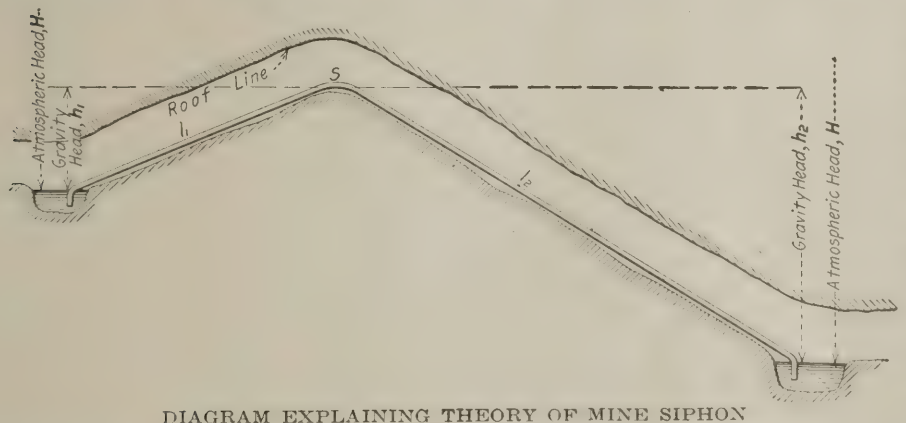


DIAGRAM EXPLAINING THEORY OF MINE SIPHON

3. There must be no leaky joints in the pipe, and all unnecessary obstructions, in the form of sharp bends in the pipe, valves, and other hindrances must be avoided as far as practicable. The mouth of the pipe must be kept sufficiently submerged beneath the surface of the water in the supply basin to permit no air to enter the pipe at that end.

A siphon that fulfills these requirements will run continuously. In order to start the siphon, it is necessary to fill the two branches of the pipe through an opening at the crown, which must then be tightly closed by a good valve. During the filling of the pipe, both the intake and discharge ends must be tightly plugged or suitable gate valves must be provided at these points and closed until the pipe is full. Sometimes a small pump is used to fill the siphon instead of pouring the water into the pipe at the crown.

When a siphon line is not properly proportioned, as here explained, it will empty itself in a short time or the accumulation of air at the crown will prevent its operation. To avoid the first of these conditions it is common to use throttling valves to control the flow of the water at the discharge end, and to escape the second condition an air trap must be provided at the crown, through which the accumulated air can be withdrawn from time to time as necessary.

Referring to the accompanying figure and calling the atmospheric head, H, expressed in feet of water column, the gravity head, in feet, length of pipe, in feet, diameter, in inches, on the intake end, h_1, l_1, d_1; and, on the discharge end, h_2, l_2, d_2, respectively; the effective intake head is $H-h_1$, and the effective discharge head h_2-H. The relation of these elements, as stated in the foregoing rule is then expressed by the formulas

$$(H - h_1)\frac{d_1^5}{l_1} = (h_2 - H)\frac{d_2^5}{l_2}; \text{ and } d_1 = d_2\sqrt[5]{\frac{(h_2 - H)l_1}{(H - h_1)l_2}}$$

These formulas are practical and should always be used to determine the sizes of pipe best adapted to different conditions regarding the length and vertical lift, or rise and fall, in each branch of the siphon. Also, it is well to remember that the atmospheric head H will depend on the depth of the mine and the system of ventilation employed. In practice, a good aneroid should be first compared with a standard mercurial barometer on the surface, and then taken into the mine where the increase in the reading is noted. The increase, if any, is added to the reading of the barometer on the surface and the result multiplied by 13.6, the specific gravity of mercury, and divided by 12 to reduce inches to feet, will give the atmospheric head H, expressed in feet of water column.

Straightening Brittle Rails

Kindly explain how brittle iron rails can be straightened without first heating them, as claimed by a correspondent, *Coal Age*, May 4, p. 847, without breaking the rails or taking them out of the mine. DOUBTFUL.

Scranton, Penn.

We understood that our correspondent would tell us his method later and hope that he will do so soon. We have never heard of brittle iron rails being straightened without first being annealed by applying heat.

EXAMINATION QUESTIONS

British Columbia Examination, First Class. May 14, 1918

(Selected Questions)

Ques.—How many cubic feet of marsh gas will be required to be generated in a mine each minute to render dangerous a current of 30,000 cu.ft. of air per minute?

Ans.—The percentage of marsh gas required to render mine air dangerous will depend on the character of the coal mined and the method of working. In the mining of a soft, inflammable bituminous coal, especially with machines, the danger point may be reached when somewhat less than 1 per cent. of gas is present in the air. Much will depend on the inflammability of the coal and its suspension in the air.

On the other hand, in the mining of a harder and less inflammable coal, 2 per cent. of gas in the air may mark the danger line. In the mining of anthracite, 2½ per cent. of gas will generally indicate the approach to danger. Taking 1 per cent. of gas in the return current as indicating the danger line, the air will form 100 — 1 = 99 per cent., and the total volume of the return current is then 30,000 ÷ 0.99 = 30,303 cu.ft. The volume of gas that must be generated to produce this condition is therefore 30,303 — 30,000 = 303 cu.ft. of gas per minute.

When 2 per cent. of gas marks the danger line, the total volume of the return current is 30,000 ÷ 0.98 = 30,610 cu.ft., and the volume of gas generated, in that case, is 30,610 — 30,000 = 610 cu.ft. per minute.

Ques.—Explain the law of diffusion of gases and its effect on their behavior in mines. Give rule and example showing how to find the comparative velocity of diffusion of the different gases.

Ans.—The law of diffusion states that gases of different density diffuse into each other in the inverse ratio of the square roots of their densities. The effect of diffusion is to cause a rapid and intimate mixture of the gases in contact with each other, and the density of the mixture will depend on the proportions and densities of the two gases.

The relative velocity of diffusion of a gas into air is equal to the reciprocal of the square root of its density referred to air. For example, the relative velocity of diffusion of marsh gas into air is $1 \div \sqrt{0.559} = 1.337$. The relative velocity of diffusion of carbon dioxide into air is $1 \div \sqrt{1.529} = 0.808$. In each case, the relative velocity of the diffusion of air into the gas is 1 or unity.

Ques.—What effect has a blownout, windy or a tight shot in the presence of firedamp?

Ans.—In the explosion of any of these shots, more or less flame is produced and projected into the surrounding air at a high temperature. If firedamp is present, it will be ignited by the projected flame and a gas explosion will follow, which may or may not be propagated throughout the mine, depending on the gaseous and dusty condition of the mine air.

Ques.—If a volume of 1200 cu.ft. of marsh gas is mixed with pure air in such proportion that when exploded all the carbon in the marsh gas combines with the oxygen in the air what volume of carbon dioxide will result, measured at the same pressure and temperature?

Ans.—In the complete combustion of marsh gas (CH_4) where all of the carbon of the marsh gas unites with the oxygen of the air to form carbon dioxide, the volume of the latter gas produced is equal to that of the marsh gas burned. In this case, there will be produced 1200 cu.ft. of carbon dioxide, measured at the same pressure and temperature.

Ques.—How would you remove firedamp from a section of a mine, after an explosion? What dangers would you expect to meet and how would you overcome them?

Ans.—Much will depend on the conditions existing in the mine and the arrangement of the workings; but, in general, it may be stated that only experienced miners must be employed in the work, and these must be equipped with safety lamps of an approved type and in good condition. No advance must be made ahead of the air current, which must be conducted forward by repairing stoppings that have been injured and erecting lines of brattice where this is necessary to carry the air forward. When the brattice is extended, sufficient time must be given for the current to sweep away the gas and make further advance possible and safe.

When entering a mine after an explosion there is danger of men being overcome with the afterdamp of the explosion. There is also danger of igniting a fresh body of firedamp that may have accumulated since the explosion occurred. To avoid being overcome in the afterdamp, exploring parties should advance slowly and with caution, making frequent tests to ascertain the condition of the air. Caged mice or birds should be carried and closely watched to observe any symptoms that would indicate the presence of poisonous gas. These little animals are prostrated much more quickly than persons and their presence is a safeguard against the presence of carbon monoxide which will not be indicated on the flame of the safety lamp. No advance must be made ahead of the air without the use of breathing apparatus.

Ques.—Find the weight of 1 cu.ft. of marsh gas, at a temperature of 70 deg. F., when the barometer is 29.5 in.

Ans.—The weight of 1 cu.ft. of air at the given temperature and barometer is

$$w = \frac{1.3273 \times 29.5}{460 + 70} = 0.07387 \text{ lb.}$$

Its specific gravity being 0.559, the weight of a cubic foot of marsh gas is $0.559 \times 0.07387 = 0.0413$ lb.

COAL AND COKE NEWS

Harrisburg, Penn.

Prominent coal operators declare that they will appeal from Provost Marshal Crowder's refusal to grant deferred classification to men employed in and about the mines, and that if necessary they will carry it up to President Wilson. Pointing out that the tonnage of anthracite mines decreased over 100,000 tons last month over the same month last year, they say that unless some action is taken at once that each month will show a greater decrease and that the country will face a greater fuel shortage next winter than it experienced last year. The draft increments of June 24 and 27 will take about 5000 men away from the mines, and as the working force is 32,000 short at present, they point out that the situation at present is extremely critical.

Thousands of dollars in compensation will be received by dependents of mine workers killed at work on company property as a result of a final decision by the Supreme Court in the compensation case brought by Mrs. Julia Gurski, of Nanticoke, against the Susquehanna Collieries Co. in which the Supreme Court upholds the award of the Referee. The decision is one of the most important to mine workers that has resulted since the passage of the Workmen's Compensation Act.

Charleston, W. Va.

Despite power shortage and car shortage, the mines in the Kanawha district succeeded during the week ended June 15, in increasing the total production in the field from 144,000 tons to 170,000 tons—an increase of over 25,000 tons—this being the largest production recorded in the Kanawha district for several months. With practically a full supply of cars in the field Monday the mines were at a standstill in many places with the power off, a number of the larger companies, such as the Cabin Creek Consolidated Coal Co., being compelled to shut down.

It was not through any assistance from the railroads that the mines in this district were enabled to increase their production, but because of the fact that the coal was moved out on barges. The inadequacy of the car supply is shown in the fact that 2037 hours were lost during the week ended June 15 through car shortage alone, labor shortage being responsible for the loss of only 151 hours. Operators claim that with anything like a fair car supply they will be able to materially increase production. The supply of cars for the present week has been much better than during last week, averaging about 70 per cent.

Mines reached by the Kanawha & Michigan Ry. received almost as many cars as they can load during last week.

Definite control of the Kanawha & Michigan and the Coal & Coke railroads, both of which are coal-carrying roads, seem certain in view of the visit here last week of C. H. Markham, regional director of the Allegheny regional district under the National railroad administration. If such does prove to be the case, it will work an improvement in the interchange of cars between the Kanawha & Michigan and the Coal & Coke railroads.

Fairmont, W. Va.

As long as transportation facilities in the Fairmont field are kept up to the mark at which they have been for the last few weeks, the production in that field will be most gratifying. Last week the supply of cars was sufficient to keep coal moving, there having been 1769 cars in the field Monday, 1561 Tuesday, when every mine was working, and an equally good supply Wednesday. Operators in the Fairmont district, as well as in other fields, believe, however, that the maximum supply will not be reached nor will it be possible to reach it until coal cars doing general duty on miscellaneous freight roads are ordered back to coal roads and used exclusively for the transportation of coal.

The car supply in the New River field during the week has fluctuated considerably, being good one day and bad the next. Furthermore, the operators are still bothered by the fact that they cannot depend on regular power supply. Of course, this does not apply to all the mines in the district, because there are several of the larger operations in the New River section which depend on their own power plants. Operators in New River territory have not so far given any attention to the question of greater efficiency in the mines, having been able to load all the cars they receive, but it is predicted by some of the operators in that district that when there is a full car supply operators will be hard put to load all cars. The same coal men say that there is little doubt of there being a coal famine this winter, and that the fact might as well be faced now.

Huntington, W. Va.

Twelve of the fourteen districts composing the West Virginia Coal Association were represented at the meeting of the executive committee at the Frederick Hotel, this city, on June 21. This was the first session of the committee since the reorganization a short time ago, and it was an eminently satisfactory one throughout. Discussion and action were all grounded on the proposition that the maximum production of coal is one of the most essential factors in warfare, and there was unanimity of sentiment that the fullest coöperation should be given the Government. This sentiment was put in concrete form by resolutions.

The association now represents the entire coal tonnage of the state, steam and gas. The two districts that were not represented at the meeting are likely to join within a short time, it was stated. Information given at the meeting leads to this belief, and there is no tenable cause for their remaining outside the fold.

The following officers were elected to serve for the ensuing year: J. G. Bradley, chairman, Dundon, W. Va.; G. H. Caperton, vice chairman, Charleston, W. Va.; A. H. Land, treasurer, Logan, W. Va.; W. H. Cunningham, secretary, Huntington, W. Va.

Marion, Ill.

A meeting was recently held here between the operators of Williamson, Franklin and Saline Counties and the district officials of the United Mine Workers from the same counties, and also the officials of the Central Illinois Public Service Co., together with its attorneys and Special Agent Horton, of the United States Fuel Administration, with a view to straightening out the difficulties encountered by the operators in the three counties in contending with the extremely poor service furnished by the Public Service Bureau.

The Government agent was evidently not so well informed about Illinois coal-mining conditions as he might have been, and the result was that the meeting was anything but harmonious. The operators and miners were opposing the Public Service Company and the Government official.

It developed that the Government plans had been approved of by the Public Service Company, who had seen them previously to the meeting. The plan proposed was that the mines curtail the power requirements in their contracts and take not to exceed 70 per cent. of same. It also developed that the Government wanted one mine to work one day and alternate in idleness with another mine the next day.

The operators and miners proposed that the power be cut off from all other industries in the field and give the mines the preference.

Another proposition was that the Interurban line between Eldorado and Carrier Mills be shut down during the day while the mines needed the power. The Public Service representatives stated that it would be impossible, for while the power company and the railroad were conducted by the same company, the bondholders of each were different and that the bondholders of the railroad would not permit the shutting down of their operations.

Another proposition was that the mines could get more power if they worked during the night hours instead of the day hours, and there were some extremely heated arguments, over which the Government agent got somewhat uneasy.

The meeting, after two or three hours of this kind of wrangling, broke up about as informally as it had convened, with nothing accomplished, only perhaps that some harder feelings existed between the Service company on one side and the operators and miners on the other.

Dallas, Tex.

Owing to a slacking up in orders for mine-run coal and the hearty response on the part of people of Oklahoma, Texas and other states to the appeal of the Federal Fuel Administration for the householders to purchase and store coal for winter use, there is now being developed a plan that has for its purpose the abolishment of all prepared sizes of coal and the production of nothing but mine-run. The plan is proposed for the duration of the war, and already has the approval of the Fuel Administration, officials of the United Mine Workers of America and coal operators of Texas and Oklahoma.

According to coal operators of the McAlester-Wilburton (Okla.) coal fields, the manufacturing industries have been slow in making purchases of coal for winter use. The private citizens who depend on coal for heating, it is said, have laid in their winter supply and such purchases are now negligible, but the manufacturing plants and other large industries have no coal on hand for winter.

It is claimed for the plan proposed that with the elimination of other grades and classes of coal except the run-of-mine, all the labor now required to separate the different grades of coal would be eliminated and the plan would make for continuous operation of the mines. The matter of loading coal on cars at the mine would also be simplified, as the mines would produce but one grade of coal and there need be but one loading system.

Victoria, B. C.

The Canadian Collieries (Dunsmuir) Ltd. has practically completed development work in connection with the opening of a new coal mine at South Wellington. The Douglas seam has been struck with a thickness of between 10 and 12 ft. at the face. On Monday, June 17, the new tipple, screening plant, etc., were in operation for the first time, and within a short time the output will be maintained, if expectations are realized, at between 750 and 1000 tons a day. The product of this company at both its Extension and Comox collieries, Vancouver Island, runs to about 70,000 tons a month.

The Canadian Western Fuel Co., of Nanaimo, B. C., has commenced operations on the sinking of a pair of shafts for the opening of a new mine on the company's farm near Nanaimo. These shafts are of ample dimensions, and are situated 150 ft. apart. They are being sunk to tap the Wellington seam and will mean the area southeast of Jinglepot mine. Extensive drilling operations have been under way for some time to prove the measures and locate the best position to place the shafts. Excavating of the surface subsoil to bed rock has been completed and concrete collars placed around the mouth of the shafts. Work on the hard stratified bed rock commenced on Monday, June 17. The seam will be uncovered at about 350 ft. depth, and if conditions are normal coal should be reached in about four months. The cost of opening and equipping will involve an expenditure of about $300,000. The company is producing upward of 70,000 tons a month from its mines now in operation and looks forward to a considerable augmentation of this total. This will make the third new mine opened in the vicinity of Nanaimo, Vancouver Island, during the past year, the other two being now in coal. One was developed by the Canadian Collieries (D) Ltd. and the other by the Granby Consolidated Mining and Smelting Company.

PENNSYLVANIA

Anthracite

Browntown—Several families have been notified by officials of the Pennsylvania Coal Co. to vacate their homes, as further caving is expected. During the past year a number of homes have been badly damaged in Browntown as a result of mine settlings.

Plains—Thirty-three full-fledged certified miners were among the 109 men from the 30 county exemption districts, with headquarters here, who left for Camp Lee, Petersburg, Va., on June 27. The list also contains numbers of men employed in and about the mines in the transportation and preparation of coal. Steps had been taken to obtain exemption for the miners called in this quota, but through a recent order of the provost marshal the board was instructed to include the men in this call.

Georgetown—For the second time within a week a large section of the surface of Northampton St., in front of the property of the Settlement Association, caved in on June 20. Traffic on the trolley line was stopped when the cave became serious. The cave caused the water mains to burst. The escaping water tended to hold up the side of the cavity, but after the water had been shut off from the mains the surface depressions extended over a considerable area. The cave is over old workings of the Empire No. 4 colliery of the Lehigh & Wilkes-Barre Coal Co.

Bituminous

Waynesburg—The Crucible Fuel Co. has purchased 52 acres of coal land in Cumberland township, Greene County, from J. Calvin Gwynn, for a consideration of $27,578.25.

Blairsville—The Davis Coal Co., operating several mines around Blairsville, is opening a new mine about two miles from town near Smith Station. The coal is the Pittsburgh vein and is 7 ft. thick at the new operation. Frank G. Davis is general manager of the company.

Coral—The Potter Coal and Coke Co. has started the construction of 12 additional houses at its plant here to care for the additional workmen which they are employing. These houses are of the bungalow type, similar to the ones erected by this company last year, when it took the Coral mines over from the Wharton Coal and Coke Company.

Harrisburg—According to a report issued by the Chief of the Department of Mines, Seward E. Button, there were 368 fatalities in the bituminous coal mines for the first five months of 1918, a decrease of 11 over the same period last year. There was an increase in the fatal accidents on the outside of the mines, however, over the same period last year. In 1918 there were 71 fatal as compared with 52 in 1917. Most of the outside fatalities were due to accidents by cars.

Indiana—One of the largest crowds ever present at an affair in Indiana gathered the other night in a patriotic celebration and "Clean Coal" campaign. Special trains and street cars were run on all the railroads to carry the miners from every mine in Indiana County to this city that evening. The chief speaker was John P. White, of the United States Fuel Administration, and former president of the United Mine Workers. Other speakers included wounded British and French soldiers who are in this country on leave. The miners pledged 100 per cent. efficiency and to load clear coal.

Uniontown—Disposition of $3,797,472.45 is shown in the schedule filed with the referee in bankruptcy of the sale of 1100 acres of Greene County coal land by the trustees in bankruptcy of J. V. Thompson, former coal baron and banker, to the H. C. Frick Coke Co. The schedule of distribution will be presented shortly to the United States District Court at Pittsburgh for approval. The court has already confirmed the sale and directed the transfer of the title. The magnitude of the sale is revealed by some of the minor items appearing upon the schedule. It takes $3678 in revenue stamps alone to convey the deeds to the property. The trustees of the estate will receive a commission of 1 per cent.

WEST VIRGINIA

Crumpler—United Pocahontas Coal Co. is installing a complete water-works system for its tenants.

Powhatan—The Pocahontas Coal and Coke Co. is installing a filtering system in connection with its water-supply line.

Coopers—The Mill Creek Coal Co. contemplates building new houses to take care of miners and increased production.

McComas—The American Coal Co. is installing sanitary septic tanks at each of its operations—Crane Creek, Pinnacle and Piedmont.

McDowell—The McDowell Coal and Coke Co. will build additional houses, preparing to take care of new miners and to increase their production.

Landgraff—Responding to the request of the Government for more coke, the Empire Coal and Coke Co. is rebuilding and firing up all ovens possible.

Thurmond—Picking tables are being installed at the mines of the Alpha-Pocahontas Coal Co. at Alpoca, the object being to insure cleaner coal.

Yolyn—The Paragon Coal Co. has recently completed the construction of a new tipple at its No. 2 mine here, costing $6000. Fifteen new houses are being built by the Paragon company at a cost of $15,000.

Fairmont—New officers have been elected by the Fairmont Coal Club for the period of six months. They are Brooks Fleming, president; Clarence D. Robinson, vice president, and Brooks S. Hutchinson, secretary.

Accoville—New shaker screens and a new loading boom costing $8000 have been added to the tipple of the Deegans Eagle Coal Co. of this place. The same company has also let the contract for ten houses to cost $10,000.

Ceredo—The Coal Branch Coal Co. of this place began operations last week according to an announcement made by Harry S. Stout, general manager. The equipment for the operation consists of a tipple and other mining machinery. Coal from the mines is to be conveyed by trucks.

Elkins—From being the smallest, the Grassy Run mine of the West Virginia Coal & Coke Co., at Roaring Creek Junction, has now become its largest operation, 25 cars of coal a day being shipped from this mine. A large number of houses of modern construction for the miners at this point have also been built recently.

Fairmont—The Trainor Coal Co. has sold its property on Coon's Run to J. W. Preston and associates of Johnstown, Penn., who took control June 18.

The Helen's Run and Bingamon branches of the Western Maryland R. R. are now supplied with cars from the Monongah division of the Baltimore & Ohio, and the reports of these mines are handled the same as other mines in the Fairmont district. Heretofore the Western Maryland has had specially assigned cars sent here by that line of railroad.

Grafton—The Hope Natural Gas Co., which has a byproduct plant at Downs and one at Hastings, in Wetzel County, is to erect another such operation near Moatsville in Barbour County. This announcement would indicate that the venture at Downs is meeting with the success anticipated. For several weeks past agents of the Pittsburgh concern (or men believed to act in such capacity) have been taking options on farms from the mouth of Raccoon creek where it empties into Teter's creek to a point two miles above Moatsville. More than a thousand acres of land has already been optioned, it is reported, at an average of $85 an acre. The rumor is that a $4,000,000 plant is to be erected on the J. O. Freeman farm two miles east of Moatsville, but the amount to be expended is probably a high estimate.

Huntington—The mining and shipment of coal from the mines of the Peter Cave Coal Co., on Coal River, will be begun early next month. D. J. Pancake is general manager of the company and Frank Kerns is superintendent, with headquarters at Alkol, W. Va.

D. C. Hewitt, his son, A. M. Hewitt, and R. A. Morris, who has been general superintendent of the Hewitt timber operations, were the principal figures in a coal deal consummated at Welch this week under the terms of which the producing mines of the Buck Creek Coal Co. and the Warfield Coal Co. were sold to the Easton Coal Co., and coal lands recently acquired by D. C. Hewitt were leased to the Easton company at a minimum royalty of $12,000, the coal lands being located just across the river from Kermit, W. Va. The purchasing company plans to invest $300,000 in additional equipment with the result that the development is expected to make it possible to produce 35 cars of coal daily.

Charleston—The West Virginia Coal and Coke Co., with general offices at Elkins, will in the near future open another mine in the Copen field, on the Coal & Coke Ry., near Bower, in the Pittsburgh seam, to be known as No. 12 mine. The plant to be erected will include a wooden tipple and other mine accessories.

The Royal Block Coal Co. at Dotson, on Coal River, is not only preparing to open up their No. 2 mine there at a cost of $20,000, but is also expending $10,000 on erection of a new tipple there.

The Carbon Coal Co., at its No. 2 mine, contemplates the construction of a coal-storage bin in which to store coal produced at times when cars are not received for loading. By doing this the company hopes to enable the miners to work every day. The same company has purchased and will install a box-car loader at its No. 3 mine within the next 60 days, and also in order to secure the highest quality of coal is building at its No. 6 mine a tipple with automatic scales, picking table, etc. The tipple is nearing completion.

INDIANA

Brazil—The Indiana Industrial Board has awarded judgment to Walter Griffith, of Coalmont, for $4,500, and he will draw $9.08 a week for 500 weeks. The judgment is to be paid by the Vigo Mining Co., for which he was working when injured by a fall of slate in a coal mine.

ILLINOIS

Pana—Coal rights under 33 acres of land purchased two weeks ago by Harry Tanner from the Hayward estate were sold a few days ago to the Smith-Lohr Coal Co. The coal rights were sold at $30 per acre. Besides the coal rights Mr. Tanner sold the coal company 15 acres of land adjoining the mine company on the west.

Decatur—This city has been much concerned over the order that coal can be shipped into Macon County. The mines of Macon County will not produce enough coal for the City of Decatur and the county, and much coal must be shipped in from other localities. The mines at Lovington, 20 miles east of Decatur, supply much of the coal which is shipped into Macon County. Decatur people have invested about $200,000 in the Lovington mines and wish to see the coal mined from Lovington for Decatur consumption. Much of the coal now being mined in Macon County is being stored in Decatur. A number of Decatur manufacturers have gone to Chicago to protest against the order against shipping coal in from other localities.

KENTUCKY

Heiner—The Daniel Boone Coal Co., which has offices in Columbus, Ohio, is activey at work on a new mine in the Hazard field. A modern tipple is being constructed and entries are being driven. It is planned to have an output of 2000 tons daily and the new mine will be opened by the first of the year. With the new mine the company will have three operations on the tract, two at Lennut and one at Heiner.

TEXAS

Santo Tomas—The big tipple of the Santo Tomas coal mines, 23 miles north of Laredo, Texas, was destroyed by fire and an explosion of unknown origin on June 5. The lives of 60 men who were at work in the mine at the time were threatened, but all were saved. The loss will amount to about $75,000, but the damage will be repaired at once and operation of the mine continued with but brief interruption.

Foreign News

Minto, N. B.—A party of American capitalists, including F. S. Peabody and W. H. Leland, representing the Peabody coal interests, recently visited the Minto coal field in company with Fuel Controller Magrath. Mr. Peabody was favorably impressed with the coal areas and expressed his willingness to spend $500,000 under favorable conditions. He subsequently conferred with Premier Foster, of New Brunswick, with a view of securing coal areas.

Personals

A. S. Hamilton has been appointed general mechanical superintendent over all the operations of the Canadian Collieries (Dunsmuir) Ltd.

H. R. Bissell, formerly with the Century Coal Co., of Baltimore, Md., has been made

superintendent of the Cambria Coal Co.'s two mines at Bellaire, Ohio.

John Dando has resigned his position as mine overman at No. 4 Mine, Comox Colliery, Canadian Collieries (D) Ltd., and has been succeeded by **Charles Pharnam.**

Thomas Taylor has resigned his position as mine overman at No. 5 Mine, Comox Colliery, Canadian Collieries (D) Ltd., and has been succeeded by **William Walker.**

P. A. Grant has resigned his position as state mine inspector of the Ninth District of West Virginia to accept the superintendency of the Sunbeam Coal Co., of Logan, W. Va.

William Roper, of the Morden mine, Pacific Coast Coal Mines, Ltd., South Wellington, B. C., has resigned and accepted a position with the Canadian Western Fuel Company.

C. J. Norwood and **F. C. Horton,** of Lexington, Ky., have been reappointed by Governor A. O. Stanley of Kentucky as state mine inspector and assistant mine inspector respectively.

F. E. Harriman, who for many years was coal traffic manager of the New York Central lines east of Buffalo, was last week elected vice president of the Clearfield Bituminous Coal Corporation.

Ralph M. Keeney has been appointed assistant general manager of the Thompson-Connellsville Coke Co. plants at Republic, Penn. He succeeds Andrew Thompson, son of J. V. Thompson, who has retired from the company.

W. Guy Srodes, for several years superintendent of the Cambria Coal Co.'s two mines in Bellaire, Ohio, has been promoted to assistant manager and placed in charge of operation of twelve mines at Athens, two at Zanesville and two at Bellaire.

A. H. Krom, formerly secretary of the American Association of Engineers, has been made director of the Division of Engineering, with headquarters at 29 S. La Salle St., Chicago, Ill. Through this division the Government will supervise the proper distribution and conservation of the technical service of the country.

H. K. Mack, for eight years commercial agent for the Burlington R. R., has been appointed supervisor of coal traffic for Southern Illinois by the Railroad Administration, through R. H. Aishton, divisional fuel administrator of Chicago. Mr. Mack will be located at Herrin, Ill., from which point he will supervise distribution of coal cars and coal traffic in the Southern Illinois district.

Obituary

James Wilson, aged 68 years, one of the best known mining men in northeastern Pennsylvania, died suddenly on June 18 at his home in Ashland, Penn. He was for 20 years superintendent for the Philadelphia & Reading Coal and Iron Co. in the Ashland district.

Dr. James Douglas, for many years president and lately chairman of the board of directors of Phelps-Dodge & Co., copper mine owners, died at his home in New York City on June 25 in his 81st year. Dr. Douglas was rated one of the foremost metal and mining authorities in the world.

Lorenzo D. Devore, chief deputy in the division of mines attached to the Ohio Industrial Commission, died at his home, Columbus, Ohio, June 24, from cancer. He was 55 years of age and had been connected with the Ohio mining department since 1908. He served most of the time as deputy inspector until about 15 months ago, when he was appointed chief deputy. He leaves a widow, four sons and three daughters.

Trade Catalogs

Hazard Wire Rope. Hazard Manufacturing Co., Wilkes-Barre, Penn. Price List No. 18. Pp. 49; 4½ x 7¾ in.; illustrated. Describes the several kinds of wire ropes manufactured by the concern and gives tables of prices, weight per foot in pounds, approximate breaking strain, etc.

Jeffrey Retarding Conveyors. Jeffrey Manufacturing Co., Columbus, Ohio. Catalog No. 232. Pp. 32; 8½ x 11 in.; illustrated. The catalog contains complete information regarding the construction and operation of Jeffrey retarding conveyors, as well as numerous illustrations of successful installations.

Strom Bearings—Data Sheets. U. S. Ball Bearing Mfg. Co., Chicago, Ill. Pp. 68; 4¼ x 7¼ in.; illustrated. The data sheets are so compiled as to furnish in a convenient form essential information regarding the dimensions of all types of Strom bearings. A revised list of prices in effect on and after Apr. 22, 1918, is also included.

Sullivan Rotators. "DP-33," "DR-33." Sullivan Machinery Co., Chicago, Ill. Bulletin 70-F (replacing 70-A). Pp. 28; 6 x 9 in.; illustrated. The rotator described in this bulletin is claimed to be an "all around rock-drilling machine." It is equipped with automatic steel rotation, is built in separate air and steam types, and may be used as a hand tool or on a mounting.

Illustrated Book of Parts and Accessories. Ironton Engine Co., Ironton, Ohio. Illustrated, 9½ x 11 in. The book gives a list of parts for locomotives, storage batteries, motors and accessories for the Ironton storage battery locomotive. Standard parts are shown for both A and D types, while parts used exclusively in either type and parts for motors and controllers are shown in separate sections. The Ironton company evidently went to considerable trouble and expense to prepare this book, a copy of which will doubtless be of considerable worth to users of Ironton equipment.

Industrial News

New York, N. Y.—The Wilputte Coke Oven Corporation has removed its offices and engineering department to the Winfield Building, 469 Fifth Ave., northeast corner of 40th St., New York City.

Orange, N. J.—The Edison Storage Battery Co., manufacturer of storage battery locomotives, etc., has opened a Philadelphia sales office at 740 Land Title Building. J. A. Hurst, sales engineer of the company, is in attendance.

New York, N. Y.—John F. Bermingham, president of the Delaware, Lackawanna & Western Coal Co., who is the representative in Greater New York of the Anthracite Committee of the United States Fuel Administration, has had his jurisdiction extended so as to include all of Long Island.

Kansas City, Mo.—The Southwestern Interstate Coal Operators Association, at its annual meeting recently, elected for continued service the officers who had held the places during the past year. F. W. Lukins was reëlected president. W. P. Hawkins, of St. Louis, was reëlected vice president at large; C. N. Fish, of Leavenworth, Kan., was reëlected secretary, and George Manual assistant secretary and treasurer. W. L. A. Johnson, was reëlected general commissioner.

Louisville, Ky.—According to figures recently compiled by W. B. Bryant and G. H. Sowards, of the Kentucky fuel administration's office, Louisville annually consumes 1,672,052 short tons of coal, of which 1,003,052 short tons represent domestic coal and 660,000 tons represent steam coal. This is taken from the annual receipts by rail and river on an average over a five-year period. The annual coal consumption for the state is given at 5,606,475 net tons.

Columbus, Ohio—A ruling has been announced by the Railroad Administration which effectually puts Ohio wagon mines out of commission. The new ruling supersedes a recent order that wagon mines are to be supplied with open-top cars only after all tipple mines secure 100 per cent. supply. Under the recent ruling no open-top cars are to be given wagon mines under any consideration. Unless they use box-cars the mines will have to suspend operations entirely.

Toledo, Ohio—Activity at the docks for the loading of lake coal kept up fairly well during the past week, although the total loaded by the Hocking Valley and Toledo & Ohio Central docks was not so large as during the previous week. During the week ending June 21 the Toledo & Ohio Central docks loaded 71,000 tons as compared with 79,000 tons the previous week. The total since the opening of navigation is 555,000. The Hocking Valley Docks loaded 144,634 tons as compared with 160,713 tons the previous week, making a total for the season of 1,036,927 tons.

Clarksburg, W. Va.—A. Lisle White discussed a phase of the labor question at a recent meeting of the Clarksburg Coal Club which has been emphasized by developments since that time, not only in coal circles, but in other lines of industrial activity. Mr. White referred to "registration dodgers," whose method of evading military service is to move from one state to another, working in mines, and avoiding registration by frequent changes of names. Since Mr. White's talk there have been developments which indicate that such a course will be almost impossible under regulations now being considered.

Fort Worth, Tex.—The coal operators of Texas met at Fort Worth last week and apportioned among the various Texas mines the amount of coal required by the Government, estimated at 60,000 tons. The agreement among the operators was prompt, and all promised hearty coöperation with the Government in every way possible. Among the Texas operators who attended the meeting were W. H. John, of Bridgeport, assistant district fuel administrator; E. S. Britton, Texas and Pacific Coal Co., Thurber; Judge E. B. Ritchie, Strawn; L. Wueste, of the Olin Coal Co., Eagle Pass, and W. F. Nance, Newcastle.

Christiansburg, Va.—C. C. Mathey, formerly of Galena, Ill., has been elected president of the Anthracite Coal Corporation, recently organized and incorporated here. The company is composed chiefly of men from Illinois and Wisconsin. According to the plans of the company, as outlined by President Mathey, about 3500 acres of coal land are to be thoroughly developed, the machinery for which work has been bought and is now being installed. It is expected to make the output of the mines for this year fully 300 tons per day. This is to be increased in 1919 to 500 tons per day, and after that time to 1000 tons per day.

Cincinnati, Ohio—The E. L. Sternberger Coal Co., of West Virginia, has filed suit in the United States District Court against J. F. Scherer and H. W. Mountain, of Lawrence County, Ohio, for $16,303.30, alleged to be due for breach of contract for the delivery of coal. The Sternberger company alleges that in March, 1917, the defendants agreed to deliver to the company the entire output of their coal mine from May 6, 1916, to May 6, 1918, at the rate of not less than 350 tons a week, but that a shortage of 10,868 tons between the contract and the coal actually delivered occurred, occasioning the claim for damages.

New York, N. Y.—The New York Coal Barge Operators' Association has issued the following demurrage rules for this harbor: "Two days to be given at the loading ports to load the barge and three days at the destination for unloading. At the expiration of the lay days, a charge of 3c. per ton on the full cargo capacity of the boat as per bill of lading to be charged for each and every day, over the lay days, $12 per day minimum. Sundays and holidays to be excluded from the lay days, providing coal piers or consignee are not working, but each day to count after the lay days are up. Twenty-four hours to constitute a day."

Louisville, Ky.—In the case of R. E. Boyd against the Petersburg Coal Mining Co. and J. W. Lam, the court dismissed plaintiff's petition, and gave the defendant judgment on a counterclaim of $763.89. Boyd sued for $45,436.11, alleging breach of contract made Apr. 26, 1916, to sell coal in the Falls Cities for the company, he to sell 300 cars the first six months and 600 cars the latter six months, but after delivering 60 cars the company broke its contract. The counterclaim was made on the grounds that plaintiff failed to pay for coal shipped. He admitted that he had not paid for it, and the court held that he violated the contract thereby.

Cincinnati, Ohio—Through a recent order of the U. S. Circuit Court, John S. Jones, of Columbus, has purchased all the outstanding stock of the Sunday Creek Coal Co., and all the legal complications which have been a source of litigation for more than 10 years are now cleared away. In the order the court approved a contract entered into between John S. Jones and the Hocking Valley Ry. Co. to take over $2,606,000 face value of bonds at 25c. on the dollar. The purchase of these bonds perfects the title to 25,000 acres of coal lands in Athens, Hocking and Perry Counties in the heart of the Hocking Valley producing field. Several years ago when Mr. Jones purchased the property it had $14,000,000 against it in bonds. Among other bondholders were the Kanawha & Hocking Coal Co., the Continental Coal and Coke Co. and the New York Central Railway Co. The bonds of the coal company were redeemed largely by the transfer of property for which the bonds were originally given as payment. Since Mr. Jones has acquired the clear title to the property steps will be taken to reorganize, taking the name of the Sunday Creek Coal Company,

MARKET DEPARTMENT

Weekly Review

Nothing New in Market Conditions—Demand Urgent and Stocks Low—Bituminous Coal Production Exceeds All Previous Figures in Spite of Car Shortage—Anthracite Labor Problem Serious—Coal Shipments to Northwest Behind Schedule

AN ANALYSIS of coal-market conditions the past week discloses nothing of a startling nature. The competitive features which in former years dominated the news and added the spice of variety to the task of the reviewer are lacking in these days of Government regulation and administration. The statement that "Demands for all kinds of coal are urgent with stocks inadequate," though somewhat stereotyped by now, is nevertheless as true this week as it has been for weeks past.

The impetus given to coal production by the pulling together of the railroad and fuel administrations was reflected in the truly wonderful accomplishment of the bituminous coal mines during the week ended June 15, when 12,571,000 short tons of soft coal were mined. This output breaks all previous records and is deserving of more than passing notice when it is considered that a serious car shortage still exists; that thousands of experienced miners have been taken by the draft, and that labor conditions in general are demoralized.

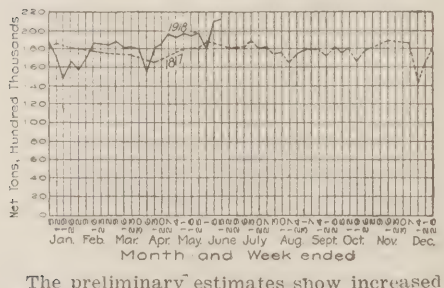
Anthracite production for the week under review totaled 41,960 carloads, the best showing that has been made in many weeks. The labor problem at the hard-coal mines continues to cause much uneasiness, as this branch of the industry is losing men at the rate of 2000 monthly. Steps are being taken to have the Government give relief to a condition which promises to become critical unless the proper remedies are applied speedily.

While the tonnage of anthracite for May was but slightly less than the quantity shipped in May, 1917, yet it must be emphasized that the increase in steam sizes produced from banks—or culm piles—was the only thing that kept the aggregate production near that figure. The output of fresh-mined coal will continue to diminish just as long as labor at the mines diminishes.

Many of the larger operators are now shipping their entire output to the lakes, thus necessarily reducing the stocks available for steam and domestic use. The vessel movement is generally good, and a considerable tonnage is going to the Northwest. On the whole, however, shipments are behind schedule, principally because of the late opening of navigation.

COAL PRODUCTION

Production of bituminous coal during the week ended June 15 equalled and even exceeded the record production of the week preceding. The output of soft coal (including lignite and coal made into coke) is estimated at 12,571,000 net tons, an increase over the week of June 8 of 170,000 net tons, or 1.4 per cent., and over the current week of 1917 of 1,137,000 net tons, or 10 per cent. The average production per working day is estimated at 2,095,000 net tons as against 2,067,000 net tons during the week of June 8 and 1,906,000 net tons during the week ended June 15, 1917.



The preliminary estimates show increased production during the past week in central Pennsylvania, Tennessee and Kentucky, and Alabama. Central Pennsylvania production increased 4 per cent., Tennessee and Kentucky 5 per cent. and Alabama 5 per cent. Material decreases occurred in the Pittsburgh and Panhandle districts and in Ohio. In the former fields 10 per cent. less coal was produced than during the week preceding and in the latter fields 7 per cent. less.

Anthracite shipments totalled 41,960 carloads, an increase of 206 carloads, or 3 per cent., during the week ended June 15.

Beehive Coke—Beehive coke production in the United States for the week ended June 15 is estimated at 658,000 net tons, an increase over the week preceding of 22,000 net tons, or 3.5 per cent. The average per working day reached 110,000 net tons, the highest daily average during the past three weeks. The principal operators in the Connellsville, Greensburg and Latrobe districts of Pennsylvania report production of beehive coke during the week ended June 15 at 391,070 net tons, the plants being operated at 77.2 per cent. of their present capacity, identically the same ratio as the week preceding. During the week slight improvement was reported in labor conditions, but such improvement, however, was offset by slightly greater car shortage. The same operators produced 190,550 net tons of coal.

CARLOADS OF COAL ORIGINATING ON PRINCIPAL COAL-CARRYING ROADS

	Week Ended May 25	June 1	June 8	June 15
Bituminous shipments, 123 roads.	207,036	187,875	219,839*	222,432†
Anthracite shipments, 9 roads.	40,594	31,762	40,754	41,960†

* Revised from last report. † Subject to revision.

Byproduct Coke—During the week ended June 15, little change was exhibited in operating conditions of the byproduct industry. Slight improvement was reported due to repaired plants and to better market conditions, the plants of the country being operated at 88.5 per cent. of their present capacity—the highest point since May 25. Material increases in production are reported by Alabama, New York, Tennessee and New Jersey. The improved production in Alabama and New York is attributed to repaired plants, in Tennessee to better supply of byproduct coal, and in New Jersey to both improved coal supply and repaired plants. Massachusetts was the only state reporting a material decrease in production. The decline is attributed to repairs to plant. Labor conditions in Pennsylvania show no improvement, while slightly better market conditions existed in Minnesota.

BUSINESS OPINIONS

Dry Goods Economist—Strikes of operatives in spinning plants have reduced the week's production of wool and worsted yarns. Production of most lines of dry goods bids fair to be curtailed by the Government plans as to restriction of fuel supply. Transportation delays continue to retard the delivery of goods to merchants and of raw materials to manufacturers. The indications are, however, that transportation westward from territory near the eastern seaboard, where the bulk of the country's manufacturing plants are located, will improve as the Government's plans for relieving freight congestion mature.

Bradstreet's—Potentially, civilian demand is of large volume, but inability to find free merchandise in large quantities naturally lessens the power of sellers to fill orders, and as most markets are dominated by the exigent needs of the Government, trading is being conducted in the confirmed belief that deliveries can only be had when and as the war situation becomes less imperative. On the other hand, movements in such important lines as textiles are somewhat crimped by the uncertainties arising from price stabilization, lack of knowledge as to its final effects rendering it necessary for sellers as well as buyers to temporarily mark time, as it were.

American Wool and Cotton Reporter—As long as importations of wool continue there will probably be a reasonable supply, but if developments make it impossible to keep up importation, or if they become negligible, the situation with regard to even Government production might be affected seriously. The supply of wool is not overlarge for any particular plant, and possibly manufacturers are working on a narrower margin than they are used to; but machinery is being kept in operation up to the limit. In many ways the recent conferences between the representatives of the Government and manufacturers have had a restricting effect upon business. There is every reason for conservative buying because the entire problem has not yet been settled. The sooner the prices are definitely fixed and the sooner the details are established, the better it will be for the market.

The Iron Age—The disappearance of Chicago as a basing point for bars, plates and shapes is an important outcome of the Washington conference. The 25 per cent. freight advance adds to the advantage a sole Pittsburgh basing brings to Central Western and Eastern mills that for nine months have had to absorb freights to Chicago. The change was due in part to the fact that Chicago mills are loaded up, so that 200,000 tons of ship steel for the Pacific coast must be rolled in Youngstown, Pittsburgh and farther eastern mills. With no definite system of pig-iron priorities, furnace companies are making shipments largely to foundries working in essential lines. Contract deliveries are going by the board in many cases and other foundries designated from Washington are get

ting iron. England's order for 180,000 tons of basic iron, to be shipped in September, October and November, is likely to be divided between the North and the South. If silicon tolerance is raised to 1.25 per cent. the South can take more, with the advantage of shipping from Southern ports.

Marshall Field & Co.—Merchandise billed for both current and future delivery shows a large increase over the corresponding week of a year ago. Road sales for both immediate and future delivery are in excess of those of the same week in 1917. Customers have been in the market in fewer numbers. Collections show a satisfactory increase over the corresponding period last year. The domestic cotton market is firm.

Atlantic Seaboard

BOSTON

Clamor from other sections about all the coal going to New England not borne out by the facts. So far movement is but slightly improved over May figures. Continued anxiety over outlook. Railroad stocks diminish instead of increase. Valuable time lost. Grain shipments to start by July 15. Bottoms at Hampton Roads not yet resumed, schedule and dumpings slow. Baltimore & Ohio deliveries cease to come through all-rail and for New England destinations are likely also to be "zoned" via Curtis Bay piers. Lean arrivals by water. Fuel authorities begin wholesale diversions under new distribution plan. New Lake-built steamers appear on coast from week to week. Anthracite steam sizes come forward in good volume. Buying increases to such extent that tonnage available will probably be less and less as season advances. Rail shipments of domestic sizes show fairly well but water receipts are still sluggish.

Bituminous—The order dated June 10 directing the district representative at Altoona to ship to New England on the basis of 4500 cars as a weekly quota has apparently given other sections an attack of heart-burn, although thus far the "order" is going into effect with extreme slowness. If the coal were shipped as provided on paper, the share of this territory for "commercial coal" would be less than 20 per cent. As it is, neither the Shipping Board nor eastern Pennsylvania has occasion for anxiety, considering the very thin yield the order has as yet produced for New England. There seem to be hitches in the program, and while the latter has apparently been approved by the Railroad Administration, there are still some traffic questions to be smoothed out. Meanwhile, this territory drops farther and farther into arrears as compared with a year ago, and the task of equitable distribution becomes increasingly complex. Experts from Washington decided early in the year that 30,000,000 tons should be New England's quota, and it is only our portion of the 30,000,000 that should come to this territory from central Pennsylvania that Mr. Storrow is trying so hard to secure.

As a check on the actual volume moving through the five gateways, it appears that the best recent day was June 20, 661 cars. The average, however, for 21 days was only 490, a matter of but 20 cars daily increase, and this from all the producing districts now open to all rail destinations for New England. The most recent "New England order" was to build up the total movement from central Pennsylvania to 4500 cars weekly, including railroad fuel and every other requirement; in other words, an average movement of 1700 cars weekly from that district was to be raised, 2800 cars or nearly 165 per cent. Conservative opinion does not hold that any such increase is probable, and the 4500 are doubtless destined to be as famous as the order of Jan. 3 for 500 cars daily, which actually yielded in excess of 300 cars on only one day and showed an average for something over 100 days of 100 cars per day. The numerical designations applied to these orders are something for eager consumers in other sections to conjure with.

That buyers here are in a state of genuine alarm over the outlook has become a trite saying, but the days go on and still slim receipts from every quarter. Important activities are operating on very narrow stocks and consumers generally are dazed. There are so few directions toward which they can turn and each source of supply seems a little less dependable than the others. Conservation measures are being well supported and some surprising progress has been made.

The railroad fuel situation is particularly urgent. One of the larger roads is repairing storage plants and is able to run on current receipts, but others, like the Boston & Maine and the Boston & Albany, find daily receipts actively inadequate and are making further and further inroads into storage. If relief is not had within a few days, one of the systems will be obliged to confiscate coal in transit. This only shows the extent to which the New England situation has been allowed to drift. The May average for fuel coal daily through the five gateways was but 98, while the average for 20 days in June was practically 110 cars, a gain of only twelve.

Boat arrivals at Hampton Roads are still irregular. On June 21 the dumping dropped to less than 13,000 tons, the highest day since the 16th having been 35,000 tons on the 19th. Against a normal tonnage of 60,000 tons this seems rather a poor showing. The June total for New England will therefore be considerably less than the May figures, and New England receipts will be that much farther behind. At all times recently there has been a surplus of coal over bottoms, and not yet have the Hampton Roads shippers felt very seriously the shortage of labor.

Loadings at Baltimore, Philadelphia and New York show slight increase over May, the total tidewater tonnage from all ports for New England for the first 21 days in June amounting to more than 900,000 tons. Shipments all-rail from the Boston & Ohio and Western Maryland have practically ceased to New England points and the increased volume over the Baltimore piers is beginning to materialize. From the ships operated by the Shipping Board and subject to allocation by Mr. Storrow's committee of shippers a considerable allotment was made this week for Baltimore loading and it is likely this movement will increase materially as the season advances. Receipts at all the rehandling piers here are light, several of the distributors being hard put to it to meet the current needs of consumers who look to them for supply. One of the results of this scarcity of water coal is the renewed activity on the part of the fuel authorities in diverting coal in transit all-rail. A liberal use of this power is contemplated by the new distribution program and the flow of coal is bound to be closely watched under these circumstances.

Each week more of the new lake-built steamers appear with cargoes of Cape Breton coal, discharge and go to the loading ports to join the coal fleet. That is one of the few encouraging signs in the coastwise trade, and it is quite possible that during August receipts will show a decided increase through this additional cargo space and the increased movement via the Baltimore piers.

Prices at Boston on the smokeless coals are still on a high basis. Recent cargoes of New River have sold all the way from $8.35 @ $9.90 f.o.b. cars Boston for distribution inland, the range varying with demurrage and other contingent charges.

Anthracite—The average movement of steam sizes of anthracite through the five gateways for 21 days in June was 183 cars daily, as compared with a daily average of 558 cars of domestic sizes. The rail movement begins to show the result of instructions a fortnight ago to increase shipments in that direction. Water shipments are still held down by the precautions being taken in the forwarding of tows. It is a great pity that the most favorable weather of the year cannot be used to greater advantage.

NEW YORK

Anthracite shipments short and lack of supplies causes dealers to worry. Consumer with winter coal in bin considered fortunate. Miners continue to leave operations and further appeals are to be made to Washington. Increased freight rates become effective. Dumpings of anthracite and bituminous show increase.

Anthracite—The situation, with receipts of fuel comparatively light, continues to be a source of worry to the trade. At this time of the season, when retail dealers should be filling their yard bins for next winter's drive, they are practically without any coal and the prospects are not encouraging. Fortunate, indeed, the dealers say, is the household consumer who has the whole or any part of his winter's fuel in his cellar bin. With an urgent demand from all sections of the country where anthracite shipments are permissible, this market is not in a position whereby it can expect to obtain more than its allotment of tonnage.

The increase in freight rate of 30c. per ton ordered by Mr. McAdoo, Director General of Railroads, went into effect on June 25. This makes the freight rates to the lower ports $1.85 per ton for the sizes above pea coal and $1.75 per ton for pea coal and the smaller sizes.

The heavy demand for coal is having its effect upon the stock market. A contributing reason for the steady buying of the anthracite coal stocks may be found in the much higher prices some of the smaller sizes of coal now bring.

The report of dumpings at tidewater for the week ended June 24 shows 7245 cars of anthracite dumped as against 7131 cars dumped the week previous, an increase of 294 cars, while there were shipped from the mines during the week ended June 15 41,960 cars, an increase of 1206 cars, or 3 per cent. over the preceding week.

Governor Whitman's attention has been called to the failure of Dr. Garfield to appoint a successor to former State Fuel Administrator Wiggin. The Merchants' Association has interested itself in the matter, while the trade is anxious that the vacancy be filled quickly.

Supplies of the domestic sizes have made no appreciable increase. While statistics show a larger number of cars dumped here, considerable of this coal went to other sections outside of the Metropolitan district.

The buckwheat coals are in good demand, and there is a good supply. Some of the companies are enabled to store small quantities of barley, but this tonnage is not large. Culm is being offered freely, but as a rule is only purchased by those who are able to obtain bituminous.

Current quotations, per gross ton, f.o.b. tidewater, at the lower ports are as follows:

	Circular	Individual		Circular	Individual
Broken	$6.75	$7.50	Buck	$5.15	$5.90
Egg	6.35	7.10	Rice	4.65	5.10
Stove	6.60	7.35	Barley	4.15	4.30
Chestnut	6.70	7.45	Boiler	4.60	..
Pea	5.20	5.95			

Quotations for domestic coals at the upper ports are 5c. higher on account of the difference in freight rates. Prices for buckwheat, rice, barley and boiler are not fixed by the Government.

Bituminous—Conditions are slightly improved, due to a better car supply and transportation facilities. At this market receipts show a slight increase and movement was better, but there are no free coals to be picked up by the spot buyer. Regular customers are obtaining a better supply, but far from what they want.

There were dumped 7239 cars during the seven days ending June 24, as compared with 6630 cars the previous week, an increase of 609 cars. Government statistics show that during the week ended June 15, 222,432 cars of bituminous were shipped as compared with 219,839 cars during the week ended June 8, an increase of 2793 cars. It is also reported that production last week increased in the central Pennsylvania district.

The effect of the increase in freight rates which became operative on June 25 will not be felt immediately in the trade owing to Dr. Garfield's order that the increase shall not be added to any coal now on hand and that it may be included only in prices charged for coal upon which the higher rate actually has been collected by the railroads. The increase will mean an advance of from 40 to 50c. per ton on tidewater coal, depending upon the district from where the coal comes. It is understood that one road has announced that its rate to this tidewater will be $2.15 per ton, an increase of 50c. over the previous rate. Shippers are, however, uncertain as to what the increase is and are awaiting definite information from the proper authorities.

PHILADELPHIA

Anthracite tonnage heavy to New England. Local dealers expect heavy shipments later. New freight rates effective June 25. Unfilled retail orders pay higher prices. Steam trade disturbed. Buckwheat on retail preferred list. Dealers object to stopping bag deliveries. Coal solves rent profiteering problem. Labor supply hinders production. Bituminous trade dissatisfied with New England preference order.

Anthracite—To record local conditions recently is to tell of empty yards, disgruntled dealers and an impatient public. The New England market continues to have the call, and while all houses continue to ship heavily, one of the big companies practically shipped its entire production of prepared sizes there toward the latter part of the month.

We have recently interviewed a number of dealers, who are leaders in the trade, and who profess to believe that after the middle of July shipments to this city will be materially increased. It is becoming quite apparent that some radical move

must soon be made if the dealers are to make any material reduction in the heavy tonnage domestic coal orders which have remained unfilled since early spring. As the receipts of many dealers during June ran behind their allotment it will be necessary to make substantial shipments here during July if next month's quota is to be finished and this month's shortage made up. This is not allowing for any increase, the details of which have not as yet been announced, but for which the dealers are anxiously waiting.

The new freight rates went into effect on the 25th inst., and on domestic coal amounts to an increase of 45c. a gross ton, which makes the rate on the bulk of the coal reaching this market $1.95, although on shipments from some of the other regions it is $2. and $2.11. This increase has placed the dealers in an even more difficult situation as to the deferred orders on their books. It is absolutely certain that hundreds of orders will remain unfilled by Sept. 1, when the fall increase in the price of coal goes into effect to the amount of 30c.; and this with the freight increase of 45c. makes a total increase of 75c., which they will have to explain to innumerable customers. Of course, the dealers are protected as to price, but that does not make their task the less easier in explaining the situation to customers who expected the coal in their cellars months ago at the lowest price in effect.

The steam business is in a state of chaos, and it is understood will be further disturbed. This week the local administrator issued a circular letter addressed to all the Philadelphia dealers, advising them that No. 1 buckwheat had been placed on the preferred list by the U. S. Fuel Administrator and forbidding them to store more than one day's requirements at any plant without a special permit from the local office. In the same letter the dealers were advised to deliver no coal of any size to private garages, whether occupied partially as a dwelling or not, nor to private greenhouses. They are informed that in the autumn it will be determined whether such buildings are to be allowed to receive any coal.

The local trade has also been much upset to learn of the desire of the municipal sealer of weights and measures to prohibit the further delivery of coal for domestic use in bags, which has become quite popular in the residential sections in recent years. The city officer argues that in times of scarcity of coal it makes it too easy for drivers to yield to the temptation of disposing of a bag or so before the coal reaches the cellars of the buyers. A committee composed chiefly of surburban dealers called on the dealer and explained to him if only because of the extremely high cost of bags they would be glad to give up the practice. The difficulty is that in the suburbs a great proportion of the coal cannot be chuted, even if they had the equipment, which at this time they are unable to provide. The wagons now used for this bag business would be useless, and they appealed against any such action being taken at present. The question is still in abeyance.

Chairman Lewis of the local fuel administration has made a ruling that has endeared him to many householders. With the army of new workers now in the city there has been much trouble finding homes to accommodate them. This has led to quite a scandal, as profiteering landlords have been promiscuously raising rents and refusing to give leases for more than a month at a time. Under these conditions most people were afraid to order a winter's supply of coal, for after getting the coal in the rent might be raised to prohibitive figures and they be compelled to vacate. Plans were put in operation to secure national legislation to correct the evil, but the chairman came across with a simple plan that bids fair to effect a cure. Landlords are warned that if they refuse to give a lease until next April to any tenant who fulfills his part of the obligation, no coal will be permitted to go into the house before Apr. 1, 1919. Mr. Lewis made the statement plain when he said the property owner who tried to put the tenant out without cause other than his desire to profiteer will find himself with a property on his hands for which no fuel can be obtained. He is also on record as ruling that any landlord who will not put the heating apparatus of a house in condition to burn coal economically will be compelled to do so.

The labor situation at the mines continues to cause much uneasiness, as there is an average monthly decrease of about 2000 men. Steps are being pressed all the time to have the Government give relief to a situation which will eventually become critical. While the tonnage for May was but slightly less than a year ago, yet it must be recalled that the increase in steam sizes produced from banks was the only thing that kept the aggregate production near that figure. The production of fresh-mined coal will continue to diminish just so long as labor at the mines diminishes.

Bituminous—The shippers continue to remain dissatisfied at the New England preference order. The shipment of 900 cars a day to that region, they claim, badly disrupts their business connections in this vicinity. They stand in the position of being desirous of giving all their trade, wherever located, at least a fair proportion of the output. The car supply has fallen off considerably during the past week, as many shippers report only a 60 per cent. supply, although it is admitted that if the supply were 75 per cent. of rating it would be about all the operators could load on account of the labor shortage. The brokers continue to receive a fair proportion of coal

BALTIMORE

Steady improvement noted in character of bituminous shipments, which, however, are lighter. Anthracite situation far from satisfactory to trade or public.

Bituminous—There are two outstanding features to the soft-coal situation here at present. One is that the shipments to this territory have lightened, principally because there have been less diversions, whether due to improved railroad movement or other causes. The other is that there has been less complaint by far as to the quality of the coal coming through. The Government is growing more and more to regulate the shipment of coal from the mines in regard to quality and not merely to depend upon rejections at tidewater pools. The result has been that the jobbers here have been called upon to dispose of less of the rejected coal; not always an easy matter where customers can see the prospect of getting any better grade coal at the same Government figure. It may be remarked that while the industrial world here absorbed the coal diverted to the section, there was lacking any element of rush that might have been expected. The business world has apparently in many cases failed to take to heart the lessons of short supply of last winter. The Government order that the new increase in freight rates is not to touch coal already shipped or held in stock will not affect any great quantity of fuel here as there is not much of an accumulation at any point.

Anthracite—The order on freight rates applying to hard coal is likewise not destined to hit much tonnage, as the receipts here have been so far behind distribution needs that there is practically no coal in yards in this city. The Baltimore Coal Exchange has held several meetings recently to discuss the proposed freight-rate increase and its application to the public, as well as the railroad administration rule which requires that coal consignments be delivered only on surrender of original bills of lading and payment of charges; with a certified check for 110 per cent. to be filed in case bill of lading is lost or delayed. The Exchange has been bitterly opposed to the application at this time of both the rule which raises freight rates and consequently the cost to the consumer of anthracite, and to the bill of lading restrictions before delivery of coal. The receipts of hard coal here are a great disappointment. For April, May and June the total deliveries here of hard coal will not total much more than 180,000 tons, which is below last year's receipts for the period. This in spite of the fact that the Maryland fuel administration had asked for about a 20 per cent. increase for the year and had been promised an allotment of 10 per cent. increase, is disappointing. With more than 300,000 tons on the books undelivered and with orders still pouring in and which will run to around 600,000 tons before summer is over, there is no chance apparently of giving the public anything like the two-thirds supply which had been planned. Some new method of curtailment in early deliveries may now be worked out.

Lake Markets

PITTSBURGH

More complaint of labor shortage. Expansion of draft age limits may help. Prospective shortage of coal increased.

There is more complaint of labor shortage, which is coming to be recognized as a greater restrictive influence than was estimated recently, the shortage of cars covering up the labor shortage. Scrutiny of conditions indicates that if full car supplies were furnished—miraculously furnished, according to the views of most operators—it would not be possible to produce much more coal.

Considerable interest has been taken in the representations of the Provost Marshal relative to expanding the draft age limits. Hopes are entertained that if there is such expansion the "work or fight" doctrine will be more vigorously carried out and it will of course have a wider scope, as taking in a larger proportion of the coal-mining labor. Much attention also is being directed to the liquor question, and it is held that the Washington authorities should take drastic action in this matter, as they have in so many others.

While coal production is in the main increasing slowly, it is not increasing as the requirements are increasing with the constant speeding up of war work, and serious shortages are now more clearly in prospect than they were a few weeks ago. The coal-mining industry should be seeing the palmy days of the year just at this time as regards production and that is not the case.

Complaint is made by many manufacturing consumers in the immediate Pittsburgh district that on account of their nearness to the mines they are required to take a considerable part of their supplies by truck, paying a trucking charge usually of $1 a ton, when their freight rate would be 40c. or less. Their nearness to coal mines thus operates to their disadvantage, as their cost is increased, while that of consumers with a straight rail shipment is unchanged.

There is only a moderate amount of free coal developing, and only in small lots. Brokers are readily able to collect their 15c. brokerage on such free coal as they can find. Regular prices remain as follows: Slack, $2.10; mine-run, $2.35; screened, $2.60, per net ton at mine, Pittsburgh district.

TORONTO

Coal supply far short of requirements. Dealers refuse to accept orders. Outlook considered serious. Coal dealers' representative trying to receive additional deliveries.

The outlook for next winter's supply of coal is considered serious. Citizens who are in a position to pay for a supply are generally desirous of laying in stocks, not merely for fear of a shortage, but in anticipation of a rise in prices; but most of the dealers continue to refuse all fresh orders. It is estimated that the quantity of coal so far delivered this season is from 30 to 40 per cent. short of that on hand at this time last year. The order of the Fuel Controller limiting each consumer's supply to 70 per cent. of normal is generally well observed. H. A. Harrington, of the Coal Dealers' section of the Retail Merchants' Association, has gone to Pennsylvania to try and arrange for an increased supply for this city.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove nut and grate, $10; pea, $9; bituminous steam, $8.50; slack, $7.50; domestic lump, $10; cannel, $13; wholesale f.o.b. cars at destination, three quarter lump, unprepared, $6.11; prepared, $6.31; slack, $5.18.

BUFFALO

Scarcity of anthracite locally is complaint. Bituminous moving about as usual. Conflicting reports as to miners working. Lake shipments keep up.

Bituminous—The situation does not change materially. Reports come in of cars discovered idle, but the fact seems to be that more coal is moving than ever before. From the Ohio ports come stories of lack of cars and vessels waiting, but this port is getting its fuel pretty promptly, which is all that it has to look after in the bituminous trade. The expectation of an advance in rail freights has increased the demand, but jobbers are not able to get any better supply. A great part of the coal goes from the mines to the consumer direct. While the jobbers are not discouraged, they are aware that they must wait for a change of conditions before they can do much business.

Buffalo appears to be getting an adequate supply of bituminous and more or less stocking up for winter is reported. Canada is still getting an oversupply in certain easily-reached sections and water shipments to the more remote St. Lawrence Valley are good.

The price of bituminous is based as before on the last general order, which makes the Buffalo figures $4.65 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh lump; $4.20 for Pittsburgh mine-

run and $3.95 for Pittsburgh slack, all f.o.b., per net ton here. The advance in freight rates will necessitate a higher schedule as soon as it is in effect.

Anthracite—The local supply is still inadequate and does not increase. It is much smaller than it was early in the season. Nobody quite knows where it goes, but it is supposed to be taken by the Government for war purposes, possibly exported. The city consumers complain that orders given long ago are not filled. The shipping agents are not disturbed, as they find it easy to recall that after April or May it used to be a difficult matter to sell coal in any quantity till fall.

Householders who burn natural gas are pleased to see the order go out cutting off all consumers except families through the winter, though it is not easy to say what the supply will be now. The plan is to supplement the natural gas with artificial in very cold weather.

Lake shipments still run into six figures for the week, being mostly to the heads of the lakes, 50,900 tons to Chicago, 41,900 tons to Duluth or Superior, consignee's option, and 7000 tons each to Fort William and Port Arthur, total, 106,800 tons. Rates of freight are as formerly, with tonnage plenty, 60 and 65c. to Chicago, 48c. to Duluth, Fort William and Port Arthur.

DETROIT

Volume of receipts continues light in both bituminous and anthracite. Lake movement shows good average.

Bituminous—Basing calculations on present receipts, Detroit's winter coal supply is still far from being assured, in the opinion of local jobbers and wholesalers. Though weather conditions are favorable for transportation and nearly three months have elapsed during which coal should have been moving into the city in large volume, shipments much of the time have been disappointingly small and especially so during June, when receipts have scarcely equaled 50 per cent. of what dealers say should be their normal volume. With many of Detroit's great manufacturing establishments working at capacity or striving to increase production of munitions beyond normal capacity, the demand for steam coal continues active and steady, absorbing shipments as speedily as they are available. Free coal on tracks is comparatively unknown in the local market. Efforts of large consumers to put aside a reserve to aid in satisfying winter requirements have been only partly successful, owing to the necessity of satisfying needs for current consumption. Mine-run constitutes the larger part of the bituminous receipts, though slack and other sizes are arriving in small quantities. Domestic bituminous is not plentiful, dealers say.

Anthracite—Uncertainty concerning Detroit's anthracite supply is not yet relieved. The daily shipments received range around 30 or 35 cars, and few of the household consumers who are clamoring for supplies have been able, so far, to obtain hard coal. As there is virtually no coke and the market is denied smokeless coal, anxiety is increasing.

Lake Trade—Shipments of coal over lake routes have shown a moderate degree of improvement during the last week. Daily receipts at loading docks have been heavier. The movement for June is expected to exceed 3,000,000 tons.

COLUMBUS

The coal trade is firm in every particular. Demand for domestic, steam and lake tonnage is strong. The output is curtailed by car shortage in many mining districts.

Some car shortage is reported from certain mining districts, notably from eastern Ohio, which is curtailing the Ohio output. On the Hicken Valley and Toledo & Ohio Central the car supply was fair and consequently good production was reported. On the whole, however, production is falling behind anticipated figures and every effort is being made to speed up. The tone of the trade is generally satisfactory and indications point to a strong demand for the rest of the year.

The domestic trade is probably the strongest feature of the Ohio market. Retailers are anxious to buy both for present and deferred shipment. Consumers are now rushing their orders in order to avoid the higher retail prices which will prevail after the increase in freight rates take effect, June 25. The new rates will mean an advance from 20 to 35c. on the ton. Retail stocks are not large, and many are operating their yards from a hand-to-mouth basis. Pocahontas is quite scarce, as none mined east of Welsh is being shipped in this direction. There is still some West Virginia splints being sold, but the quantity is being reduced. Consumers are compelled to depend on Hocking Valley grades for their supply. Retail prices are firm at the Government levels, but an advance will be announced soon.

The steam business is active in every particular. Buying by both the larger and smaller users is reported, and many of the consumers are anxious to increase their storage stocks. Railroads are buying more than ever before as their freight movement is extra heavy. It is estimated that one-third of the output of certain fields is taken for railroad consumption. Another incentive has been the necessary advances to take care of increased rates, which will especially affect large users.

The lake trade is still active in every way. Many of the larger operations are now using their entire output for lake shipment. This necessarily reduces the available stocks for steam and domestic use. The vessel movement is generally good and a considerable tonnage is going to the Northwest. On the whole, however, shipments are behind the schedule, principally because of the late opening of navigation.

CINCINNATI

Business is settling down to a steady volume of deliveries, both local and for the lakes, limited only by the ability of the railroads to handle the coal.

With the weather definitely settled down to the summer, disposing of domestic consumption for heating purposes, the coal trade is getting into the harness for the delivery of the biggest volume of summer sales in its history. The Northwest movement via the Lake ports promises to assume unprecedented proportions, industrial consumption in that section naturally being on a par with the large consumption elsewhere, which is the outstanding reason for the present enormous demand for fuel. At the same time, enough coal is being delivered to local dealers to enable them to make some deliveries against the orders of their domestic customers, who are endeavoring to store coal for winter consumption. Industries in this section are being well taken care of as to immediate requirements, their chief concern still being the matter of their winter's supply, in view of the difficulty of storing anything like an adequate amount. Both the present limited supply of coal and the fact that a supply for any extended period would require enormous storage facilities or yard space seem to operate against much success in preparing for winter consumption; but every effort is being made in this direction, as both the trade and industrial consumers realize that every ton stored now will to that extent relieve the inevitable emergency of the winter.

LOUISVILLE

Demand considerable in excess of supplies, with no surplus stocks being laid up by jobbers or retailers. Active local demand for eastern Kentucky coal is being filled with western.

Anticipating a sharp advance in coal prices due to increased freight rates, consumers have been placing heavy orders for domestic coal, the demand being so keen that most of the local retail yards are empty, and the dealers are delivering direct from the cars. There is a shortage of teams, drivers and trucks, and this is holding back delivery somewhat.

The local branch of the fuel administration has requested the residents to go ahead and accept western Kentucky coal, instead of awaiting deliveries of eastern Kentucky stock, which is very indefinite. Many consumers are opposed to the lower grade western coal, but as the eastern Kentucky grades are moving to the by-products plants, the cotton mills and into other zones largely, practically no eastern Kentucky coal is to be had on this market. In view of the fact that western can be readily obtained the Fuel Administration is pushing immediate stocking on this grade, at the same time calling attention to the fact that the needs of the Government plant at Nashville this winter will be so heavy that there will be a big increase in the demand for western Kentucky. As a result stocking has received impetus. There has not been any particular change in the production situation in either section of the state. The car supply is holding up much better, but labor continues scarce and hard to secure, and men who went into other lines are drifting back slowly.

Eastern Kentucky mining companies have been endeavoring to buy all of the coal mined in that district that they can secure in order to take care of Louisville consumers, and the local jobbers and retailers are making every effort to obtain supplies, with the result that not even the small mines are having any trouble whatever in disposing of all of the coal they can produce.

BIRMINGHAM

Marked activity in domestic distribution. Steam demand continues at the maximum. Supply of both grades much below requirements. Little improvement noted in production.

The records for the month of June will show an appreciable gain over the month of May in domestic coal stored. The Fuel Administration has issued practically double the number of permits for car-lot shipments as compared with the same period in May. Doubtless the anticipated increase of freight rates was responsible in a measure for the increased orders. Distributors are experiencing a strong demand. Receipts continue light and unsatisfactory, due to the hampered production.

The need for an increased supply of steam coal is imperative in this market. The demand has not slackened in the least while on the other hand production is not up to the output which was being obtained a month or more ago. Industries classified as non-essential are receiving an irregular and inadequate supply. The Southern Ry. is taking 51 per cent. of the output of operations which it serves.

The Gulf States Steel Co. assumed charge of the operations of Sayre mines in the western part of Jefferson County, July 1, having purchased this property several months ago. The mines and coke ovens at this operation have been under lease to the Sloss-Sheffield Steel and Iron Co. for the past several years, the agreement covering the operation of the properties expiring June 30.

Coke

CONNELLSVILLE

Furnace coke contracts renewed. Occasional lots of free coke. No price changes in prospect.

With only one notable exception, such few contracts for blast furnace coke as expire June 30 have been renewed between the same parties. The contracts as a rule were at the Government limit, and all new contracts are of course on that basis. The one important exception was the coke that has been going to the Youngstown Sheet and Tube Co., which is building 102 additional byproduct coke ovens, to be put in operation about Aug. 1, releasing between 15,000 and 20,000 tons a month. This coke, when available, probably about Aug. 1, has been sold to other consumers at the Government limit.

In the case of foundry coke quite a number of contracts expire and quite a number of these have not been renewed, operators seeing a good market from week to week for their foundry coke, and some of them therefore prefer not to tie up with individual foundry interests, whose actual consuming rate, in these times, may prove more or less uncertain.

The business of the coke brokers has practically disappeared, first because nearly all the furnaces that are in need of extra coke keep representatives of their own traveling through the region to pick up coke, so that they get it before brokers have an opportunity to hear of it, and second, because brokers cannot charge a commission unless they secure it from sellers, and sellers have no occasion to offer a commission. There is a fair volume of business done in spot coke from week to week in direct transactions. The market remains quotable as formerly: Furnace, $6; foundry, 72-hour selected, $7; crushed, over 1 in., $7.30 per net ton at ovens. The War Industries Board has fixed iron and steel prices for the third quarter of the year at the schedule expiring June 30, with an advance of 45c. a ton in iron ore, by reason of the freight-rate advance. Coke prices are fixed by the Fuel Administration, but there is no likelihood of any change until fundamental conditions change, and with pig-iron prices set for another three months there is not the least likelihood of any change in coke prices in the near future.

The Connellsville "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended June 15 at 342,970 tons, an increase of 1950 tons. Production has been at substantially the same level for eight weeks.

Buffalo—The demand is about as before, but reports from Canada say that it is not so heavy as formerly. The regulation oven price of $7 for foundry and $6 for fur-

nace holds, with $2 freight added, but next to none sells in the open market. Canada pays no duty, but pays 7½ per cent. of the mine price as Canadian war tax. Iron ore receipts by lake continue, the amount for the week being 262,664 gross tons. Reports from Ohio predict that June will be a record month on this movement. Cars are not plenty enough to move the ore promptly that is consigned to outside points.

Middle Western

GENERAL REVIEW

The supply of cars seems to be sufficient to take care of all the coal that can be produced. Outlook encouraging.

Reports from all the producing centers in the Middle West seem to indicate that the railroads are at last able to furnish a sufficient supply of cars to handle all the coal that can be produced. In fact the Illinois Central is reported to have had far more cars available for loading than were needed the past week. This is unusual. In the preceding several months this line has been charged with being one of the principal offenders. During the past week production reached the highest level heretofore known, a direct result of increased car supply, and if the miners could now be induced to work full time no doubt production would be further increased. Regardless of the fact that more coal was mined and shipped last week than in any previous week, the demand for prompt shipment still is a source of worry to the sales managers throughout the country. The householders are buying as heavily as though it were winter, a direct result of the activities of the Fuel Administration's "Buy Your Coal Now" campaign. Another factor that has caused heavy buying is the putting into effect on the 25th inst. of an advance freight rate, ranging from 15 to 35c. per ton higher than the present rate.

Steam users, including the railroads, have not as yet had an opportunity to store much coal. This has caused more or less worry among some consumers, who fear that they will not be able to get some stock ahead prior to the fall and winter months, and that they will be caught as they were last year, without coal. Operators in a position to know say that with the present flow of coal to the dealers for another month or six weeks domestic users will be fairly taken care of, and they then will be in a position to give steam coal substantially heavier shipments.

CHICAGO

The demand for domestic sizes continues to be in excess of supply.

The response made by the householders to the request that they buy coal early has produced satisfactory results to date. Never before in the memory of the oldest dealer has there been so insistent a clamor for coal as now. The demand is so heavy, in fact, that dealers are far behind and have not been able to accumulate any surplus stock.

The market on screenings is still without any strong indications, and considerable fine coal has been moved through jobbers at 15c. per ton off the Government price; not, however, to the extent that any material reduction resulted to the ultimate user.

There is no change in the hard-coal situation, householders having placed their orders with the dealers, who in turn have placed the orders with shippers. All wait impatiently for some indication that the coal will be forthcoming at a later date. So far the receipts have not met with earlier expectations.

Quotations in the Chicago market are as follows, per net ton f. o. b. at mines:

	Williamson and Franklin	Saline and Harrisburg	Fulton and Peoria	Springfield	Carterville	Grundy, La-Salle, Bureau and Will.
Steam lump	$2.55@2.70	$2.55@2.70	$2.95@3.10	$2.55@2.70	$2.55@2.70	$3.25@3.40
Domestic lump	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Egg or furnace	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Small egg or nut	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Stove	2.55@2.70	2.55@2.70	2.95@3.10	2.55@2.70	2.55@2.70	3.25@3.40
Chestnut	2.55@2.70	2.55@2.70	.....	2.55@2.70	2.55@2.70	3.25@3.40
Pea	2.55@2.70	2.55@2.70	.....	2.55@2.70	2.55@2.70	.....
Washed egg	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed stove	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Washed nut	2.75@2.90	.....	.....	2.75@2.90	2.75@2.90	3.45@3.60
Mine-run	2.35@2.50	2.35@2.50	2.75@2.90	2.35@2.50	2.35@2.50	3.00@3.15
Screenings	2.05@2.20	2.05@2.20	2.35@2.50	2.05@2.20	2.05@2.20	2.75@2.90
Washed slack	2.05@2.20	.....	.....	2.05@2.20	2.05@2.20	2.75@2.90

MILWAUKEE

Anthracite price schedule not yet received. Deliveries now being made by all dock yards and dealers.

The State fuel office is at a loss to understand why dock prices at Milwaukee on anthracite coal have not been formulated. It is understood that they were dispatched from Washington, but thus far they have not shown up. Deliveries of hard coal are in full swing, however, and the situation is more satisfactory in consequence.

Since last week's report an additional cargo of 8500 tons of anthracite has been docked, making the total receipts of hard coal since the opening of navigation 144,735 tons. A great deal of this is now in the bins of consumers. During the same period 736,683 tons of soft coal was received.

Every effort is being made to increase the use of soft coal. Coal dealers throughout the state have been notified that threshers should be supplied with mine-run coal or grades of steam coal other than the domestic sizes of bituminous coal which they have been in the habit of using in the past. Manufacturing concerns which have been restricted to 50 per cent. of their normal supply of coal are endeavoring to secure more by promising to use inferior grades than they formerly used, but thus far have met with refusal. Some firms which have stored more than the regulation amount will also be held to the rule.

ST. LOUIS

Fairly active market on Standard grades the first time in many weeks previous to the 25th. Lagging market follows. Car supply showing up poorly. Screening market rather weak and good demand for domestic sizes from high-grade fields. Local retail buying normal. Labor shortage growing acute. No Eastern coals and light tonnage of Arkansas.

The week previous to June 25 the local market was fairly active. Not only because the freight rate advanced 25 per cent. on the 25th, but for the past week there has been an unusually heavy car shortage. This followed a few weeks of car supply that was normal, and large buyers in an endeavor to force the market laid off buying so that when the car shortage struck them they were caught short. This is especially true of the mine-run and screened sizes. Screenings continue weak from the Standard field, going at about $1.25 to $1.35.

The recent activity did not stimulate the Standard market to any great extent as regards price; 2-in. lump went around $2.20, with mine-run at about $2. In some sections of the Standard field the past week mines have been idle on account of no business, contrary to operating reports. In the high-grade fields there has been a continued effort on the part of the operators to increase production by using car supply, but the labor shortage there continues, and the falling off of the equipment the past week showed a tonnage loss.

In the Mt. Olive field the demand still continues to meet with the production. The mines are working perhaps better than in the other fields, and there is not the decrease in the tonnage noticeable here on account of labor shortage as in other sections.

Following the large amount of coal stored during the low freight rate the expected lull in business in the Standard field was natural and the end of the present week will see some extremely low prices. The only ray of hope for the Standard field was a tip from Washington that the Government had ruled against the railroads having any more Williamson or Franklin County coal for locomotive purposes, with a few modifications. This is going to throw a vast tonnage of high-grade coal into the industrial and domestic market, where it rightfully belongs. It has been almost a crime that the railroads should grab the best coal produced in the State of Illinois while the City of Chicago and other large cities were in dire need of this low-volatile fuel, when the railroads could just as conveniently, and almost as economically, use the high volatile fuels.

This will force the railroads to take a large tonnage of their coal from the Standard and Mt. Olive fields. This will give the men steady work on account of no orders, and it will retain the men in the Standard mines that are now leaving to seek employment in other fields that work steadier, or to go to big industrial plants in the cities. It will strengthen the Standard market and force the Government maximum price on these coals which for several months now have been selling below that price.

The domestic demand locally is light. This is because orders are many weeks behind and retailers are having trouble effecting deliveries. Labor is short and independent, and an effort has been made by the retailers' association to have the Government take some action compelling employees of coal companies to work at least five days a week as against three and four at the present time.

Coke, which will largely supplant anthracite coal in this market, has been selling at 60c. under the Government price, but effective June 25 it went to the Government price, which with the increased freight rate will increase the price of coke to the domestic consumers about 95c. a ton.

The Chamber of Commerce in St. Louis prepared the latter part of the week to put up a vigorous fight at Washington for a specified tonnage of anthracite coal for certain places in St. Louis that must have anthracite coal or suspend operations, and also for a number of homes in the city that are equipped to burn nothing but anthracite and which cannot secure other equipment for many months to come.

Coöperating with the Chamber of Commerce will be the Coal Service Bureau of St. Louis and the Missouri State Retail Coal Merchants' Association, as well as the Manufacturers' Association and other organizations of similar nature.

The prevailing market is, per net ton f.o.b. mines:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.55@2.70	$2.55@2.70	$2.40@2.70
3x6-in. egg	2.55@2.70	2.55@2.70	2.35@2.55
2x3-in. nut	2.55@2.70	2.55@2.70	2.35@2.55
No. 2 nut	2.55@2.70	2.55@2.70	.....
No. 3 nut	2.55@2.70	2.55@2.70	.....
No. 4 nut	2.55@2.70	2.55@2.70	.....
No. 5 nut	2.05@2.20	2.05@2.20	.....
2-in. screens	2.05@2.20	2.05@2.20	1.25@1.50
2-in. lump	.....	.....	2.25@2.40
3-in. lump	.....	.....	2.25@2.40
Steam egg	.....	.....	2.25@2.40
Mine run	2.35@2.50	2.35@2.50	1.85@2.00
Washed:			
No. 1	2.75@2.90	2.75@2.90	.....
No. 2	2.75@2.90	2.75@2.90	.....
No. 3	2.55@2.75	2.55@2.75	.....
No. 4	2.55@2.75	2.55@2.75	.....
No. 5	2.05@2.20	2.05@2.20	.....

Williamson and Franklin County rate is $1.10; Duquoin field, $1; Standard and Mt. Olive fields, 95c.

SEATTLE

Coal situation not promising, public not buying and mines operating only part of time. Mine convention asks national fuel head to investigate matter.

At the twelfth annual meeting of District No. 10 of the United Mine Workers of America, resolutions were passed by the representatives of the 32 state local unions, which have a membership of 5000, asking the national fuel administrator to make a thorough investigation of the coal situation in this state. It is pointed out that in April, when the mines of Washington began to slow down their production, between 800 and 1000 skilled workmen left the mines to obtain steady employment. Many of the mines are still operating only part time. If the coal business should pick up within the next few months the mines could not be worked to full capacity on account of the labor loss. The mines of Issaquah, Newcastle, the Cumberland district, some Pierce County districts and the southwestern Washington district, all of which produce mainly domestic coal, have of recent months been operating only one to three days a week. The public is not buying coal and nothing seems able to stir them to a full realization that early buying is the only way to prevent a fuel famine here, though all hope that there will be enough coal to meet the demand was given up several weeks ago. Coal prices, which recently took another advance in Seattle and resulted in many demands for an investigation, will shortly take another advance, as new freight rates went into effect on June 25 and teamsters are demanding larger wages. There is a railroad car shortage ahead which is going to hamper the delivery of coal this winter in the Northwest still further. The coal situation in Washington is not promising for the coming winter.

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COAL AGE

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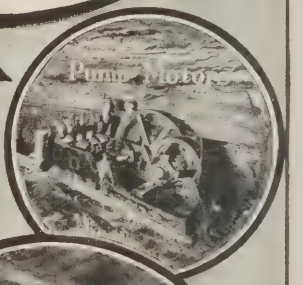
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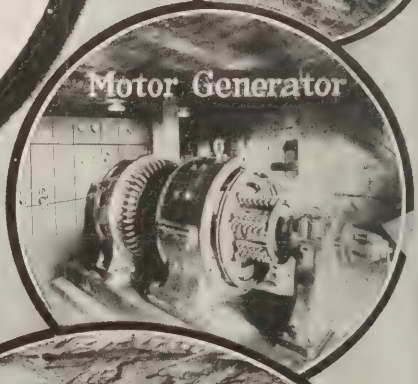
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Volume 13 New York, June 29, 1918 *Number* 26

COAL AGE

WITH WHICH IS CONSOLIDATED THE
COLLIERY ENGINEER

FLOYD W. PARSONS, *Editor*

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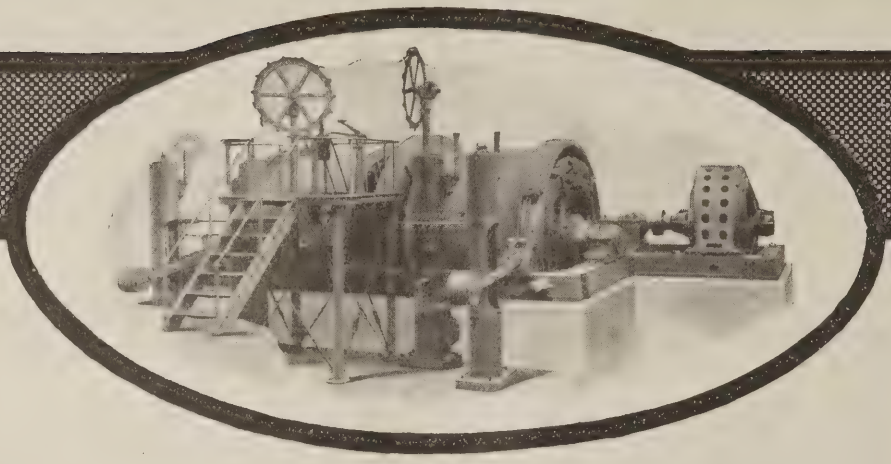
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This standard, double-drum geared hoist has 60 by 42-inch drums, two 60-inch clutches, two 80-inch post brakes, all air-operated; dial indicators, herringbone gears, flexible coupling. We have built this hoist for various mining companies in the United States, Canada and Mexico.

W-S-M
Electric Mine Hoists

The manufacture of hoists has been a specialty of this Company for many years. In our hoist construction there are combined with good and carefully selected materials an engineering and manufacturing excellence, developed under the guidance of high ideals, but tempered and made profitable by long and diversified experience.

A W-S-M Hoist is not the lowest-priced hoist you can buy. In fact it is perhaps the highest-priced hoist built. But superior service, safety, economy of operation, reliability and long life more than offset the additional first cost.

Write for Bulletin C 5, "Electric Mine Hoists."

THE WELLMAN-SEAVER-MORGAN CO.
CLEVELAND, OHIO, U.S.A.
NEW YORK DENVER SEATTLE

W&M

Leaders In Coal Mining Machinery Equipment



"Results exceeded expectations and cost of gathering is much lower"

This is the substance of a report from a leading Coal Company in Indiana regarding their two 5-ton

JEFFREY

Storage Battery Locomotives

These locomotives replaced mules used for gathering. Some of the advantages of Jeffrey Storage Battery Locomotives over mule haulage are:

1. Only one man required to operate the Locomotive and handle the cars.
2. Three-ton to five-ton Locomotives are replacing from 3 to 4 mules, each.
3. Saves the cost of drivers, mule feed, harness, shoeing, etc.
4. Sanitary conditions about the mine are very much improved.

Jeffrey Storage Battery Locomotives are ruggedly built with large, durable wearing surfaces and ample mechanical strength and accessibility. They work wherever tracks are laid—right up to the face of low headings where a mule cannot go.

Write today to Dept. 12—ask for our special bulletins showing actual installations of Jeffrey Storage Battery Locomotives.

The Jeffrey Manufacturing Company

912 North Fourth Street, Columbus, Ohio

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FAIRMONT

CAR RETARDERS

In *Another* Big Tipple

Fairmont Car Retarders are coming to be regarded more and more as a necessary part of every modern tipple. Their accomplishments in improved loading, cheaper and safer operation and in the displacement of labor are making them more essential than ever in these days when the cry is for increased production and the available labor supply is fast dwindling.

Fairmont Retarders will solve *your* loading problems.

FAIRMONT MINING MACHINERY CO.
FAIRMONT, W. VA.

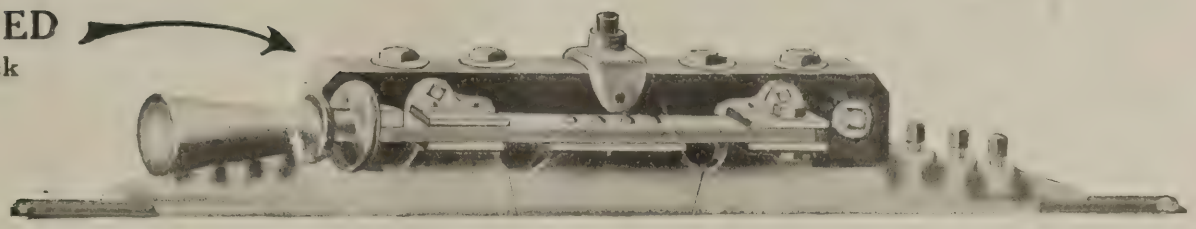
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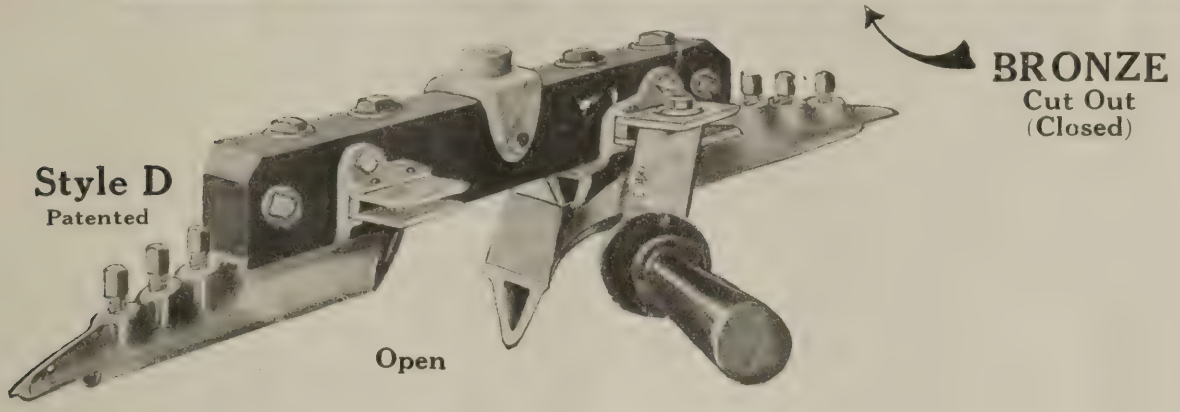
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Write for new Retarder Bulletin CA-10, just off the press.



The Team That Wins





The Ideal Sectional Insulator

Note the insulated wood back. It's waterproof and damp proof. Therefore, it makes it absolutely impossible for current to leak from one section to the other when the cut-out is open.

And the cut-out—that's *bronze*. When closed it forms a *continuous* line. No flashes of sparks as with old-style wooden gaps; no burning out of armatures or blistering of wheels when a trolley wheel passes over it. No, it keeps the voltage the same throughout and thus eliminates voltage strain.

Are you interested? Most certainly you are if you have investigated the cause of excessive maintenance costs when the old-style insulators are used. Let us send you full particulars explaining a simple method to keep these costs down to a minimum and to safeguard the lives of your men in the bargain.

Write us today for full particulars.

Flood City Mfg. Co.
Johnstown, Penna

"The TROLLEY LINE Switch with the BRONZE Cut Out"

FLOOD CITY



The Great Coal Loading Plant of the Baltimore & Ohio at Curtis Bay, Md.

Pure Iron For Railroad Service

The construction here illustrated embodies the last word in appliances for handling coal from cars to vessels. It is a master-work of modern engineering.

Ten thousand lineal feet of belts are employed on this Coal Pier, the largest being sixty inches in width. The decking to protect this belting is of Rust-Resisting Armco Iron.

Armco Iron was also used in a novel method for waterproofing the feeder pits. These pits are approximately forty feet wide and seventy-five feet long and are eleven feet below the tide level. A solid bin was constructed for the bottoms and sides of these pits of Armco Iron, protected on the outside by six inches of concrete. This gives an absolutely water-tight pit of enduring material.

This is the Iron That's Made to Last

The American Rolling Mill Company

MIDDLETOWN, OHIO

AMERICAN ARMCO INGOT IRON

The trade mark ARMCO carries the assurance that iron bearing that mark is manufactured by The American Rolling Mill Company with the skill, intelligence and fidelity associated with its products, and hence can be depended upon to possess in the highest degree the merit claimed for it.

Licensed Manufacturers Under Patents Granted to The International Metal Products Co.

Armco Iron Blue Annealed Sheets, Black, Galvanized, Polished and Special Finish Sheets, Roofing, Pipe and Metal Lath

Branch Offices at New York, Washington, Pittsburgh, Chicago, Cincinnati, Cleveland, Detroit, St. Louis, Atlanta and San Francisco



Vulcan Hoist made for Lehigh Coal and Navigation Company, Lansford, Pa.
(One of several repeat orders)

ACTION

Quick — Sure — Safe

Because a "Vulcan" is fast, it creates action. Men have to hustle to keep up with it.

Yet there is no possible chance for accident. Vulcan safeguards against "overwind" and other dangers. Easily operated. Powerful and with inbuilt endurance.

For the past 65 years Vulcan Hoists have been the best. The best is always the cheapest.

There's one for your particular needs. Get in touch with our engineers. They're ready to help you on your hoisting problems without obligation.

VULCAN IRON WORKS

1730 Main Street

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VULCAN HOISTS

Sterling

This Little Cotter Pin Means a Lot



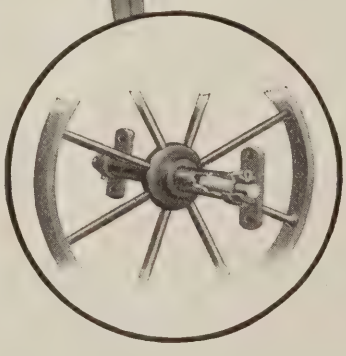
In Sterling Wheelbarrows, just as in everything else, it's the little things that count.

This cotter pin is a small detail. Its value in Sterling construction is great.

It is used at both ends of the axle, passing through the malleable brackets and axle and holding the latter securely in place. It is impossible for a Sterling axle to turn with the hub.

Contrast this with the ordinary bolt axle construction—no nuts to work loose and come off—no tightening up until the frame binds the hub. Just a nice fit—no more, no less.

"Cheap" wheelbarrows are expensive at any price. Buy Sterlings for economy.



Ten Other Sterling Features

Malleable Wheel Guard
Broad, Flat Leg Bearings
Self Lubricating Wheels
Cold Rolled Steel Shafts
Patented Handle Clamps
Malleable Wheel Supports
Tested Clear Maple Handles
Riveted Leg Braces
Balanced Load
All Parts Interchangeable

Sterling Wheelbarrow Company, Milwaukee, Wisconsin

New York, 30 Church St. Chicago, 30 So. Jefferson St. Detroit, 18 Columbia St. Cleveland, 422 Frankfort Ave.

Sales outside of the United States and Canada handled exclusively by ALLIED CONSTRUCTION MACHINERY ALLIED CORPORATION, New York, U.S.A.

PLACE YOUR ORDER *NOW!*



THE MANIERRE BOX CAR LOADER

Shown here is a 24" Portable Belt Loader

that has been in active and successful service for the Ft. William Coal & Dock Company, at Ft. William, Canada, since October, 1913. It is a double acting Loader, mounted on M. B. C. car for standard gauge track. A chute is equipped with balanced gate which we furnish with or without lip screen and hopper.

This type of loader is especially designed for handling "run of pile" Coal or Coke and is for loading coal beyond the reach of the usual reclaiming machinery. This particular machine was designed and mounted for its local duty. We build a standard machine of this type of wide application.

Our strong point is that we can solve problems and meet any sort of unusual conditions with our machine.

We are prepared to do our part in filling orders promptly for any Standard Loader because we have looked ahead and have a stock of electric motors, chutes and loaders ready for immediate shipment.

Don't hold your order. If you want a Manierre Box-Car Loader this season, GET IT NOW.

Box-Cars can be used and great savings realized with a Manierre Box-Car Loader. It pays for itself fast, if kept busy.

The Government gives this machine priority.

REPRESENTED BY The Link-Belt Company, Chicago; Philadelphia; Pittsburgh and Wilkesbarre; Portland, Ore.; Seattle; Lindrooth, Shubart & Co., Denver; The International Engineering & Trading Co., Petrograd, Russia.

MANIERRE
ENGINEERING & MACHINERY CO.
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REPRESENTED BY The Link-Belt Company, Chicago; Philadelphia; Pittsburgh and Wilkesbarre; Portland, Ore.; Seattle; Lindrooth, Shubart & Co., Denver; The International Engineering & Trading Co., Petrograd, Russia.

A Real Service

IT HAS been said that the adaptation of wire rope to coal mining was one of the greatest single improvements in the industry. Without wire rope it would be impossible to raise the great loads of coal to the surface or to lift the huge water buckets with rapidity, steadiness and safety.

We of the Texas Company can say in truth that we have brought something of value to the coal mining industry, by inventing and developing TEXACO CRATER COMPOUND and proving out its service in increasing the useful life of wire rope.

This product has been the means of preserving thousands upon thousands of feet of hoist ropes and other ropes, saving them from wear and from deterioration by chemically contaminated waters. This remarkable lubricant has frequently doubled the life of severely exposed wire rope, not only in coal mines but on ropes used for drilling oil wells, on steam shovels, on dredges and elsewhere.

Thus, we can readily say that we have made an important contribution not only to the coal mining industry but to others as well.

We have written up part of the story of TEXACO CRATER COMPOUND in a 48-page illustrated book which is yours for the asking. Just ask us to send you "Wire Rope Lubrication." A post card will bring it.



THE TEXAS COMPANY
Department "C.A.," 17 Battery Pl., New York City
HOUSTON CHICAGO NEW YORK
There is a Texaco Lubricant for Every Purpose





KEYSTONE GREASE Increases Car Capacity

THERE'S a big difference between *lubricating* mine car wheels —and *lubricating them properly*. Most any lubricant is better than none at all. But a lubricant which enables mine locomotives and mules to pull *more cars* at *less* expense is something worthy of the serious consideration of every mine operator.

When properly packed in mine car wheels of good condition, one application of **Keystone Grease** affords this type of lubrication—without attention—for from three to six months.

KEYSTONE GREASE

is an important factor in increasing mine efficiency and decreasing fire risk in the leading coal fields of America.

It lengthens the life of roller bearings, keeps equipment from the scrap pile—saves time, labor and money. Its density is unaffected by temperature changes, water, or outside chemical attacks. And there is no waste of the lubricant itself as when oil is used.

Keystone Grease No. 119, Medium is scientifically suited for Hyatt Roller Bearing Mine Car Wheels—Keystone Grease No. 2 should be used for Solid Roller Bearing Wheels, and Keystone Grease No. 119 is suitable for all other types.

Let one of our experienced lubrication engineers call and arrange for a trial installation in *your mine* at *our risk*.

KEYSTONE GREASE *for mine car wheels*

THE KEYSTONE LUBRICATING CO.

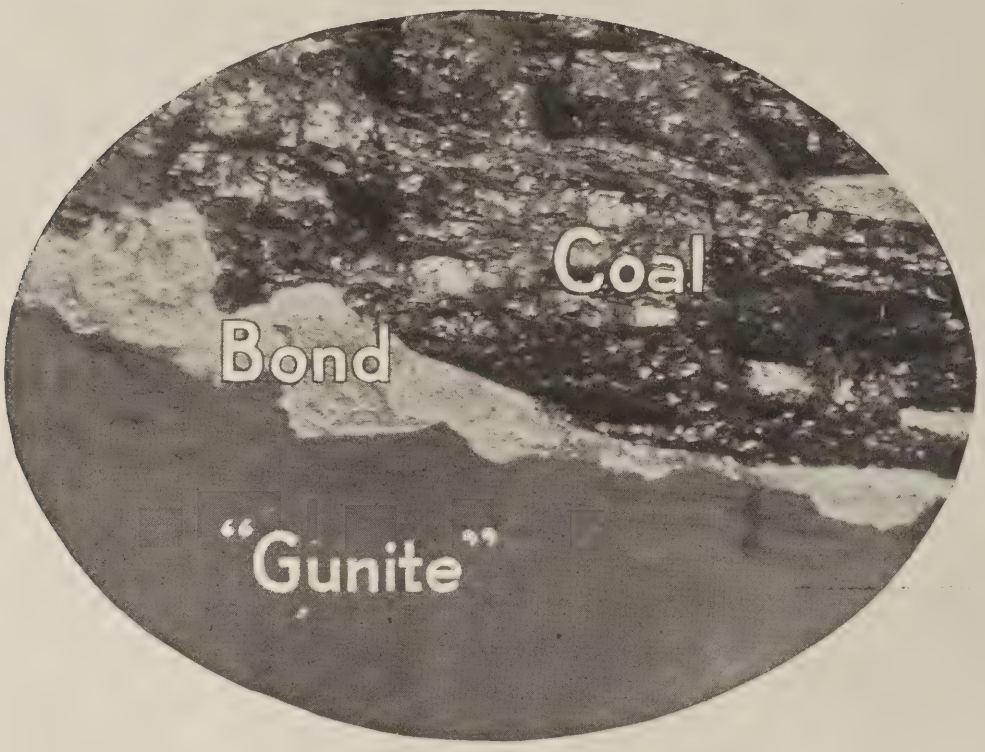
New York
Boston
Pittsburgh
Chicago
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Executive Offices and Works
Philadelphia, Pa.
Established 1884

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Continental European Office, Marseilles, France
West Indian Office, Havana, Cuba
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A Tight Bond with "Gunite"



Showing the "Gunite" Picked Down.

How many mine stoppings are made practically useless because the poisonous gases leak around the stopping? No doubt you have encountered such experience in your own mines.

But with the CEMENT-GUN, this evil is gone forever. Not only does the cement-sand product, **"Gunite,"** make the stopping air-tight, but you can *seal the passage* as far back as necessary *to prevent the gases working around.*

The same use applies in stopping roof slacking. **"Gunite"** keeps out the air and therefore slacking is prevented.

Another use is protection of steelwork and timbering, concrete and masonry. **"Gunite"** builds up a lining that fills every crevice, clings with a bond like steel and places an absolute barrier against weathering.

There are so many practical uses, both in the mine and above ground, that you should read the Book of Bulletins to grasp them all. Regret the time spent? *Never.* **Just drop us a card today.** No obligations.



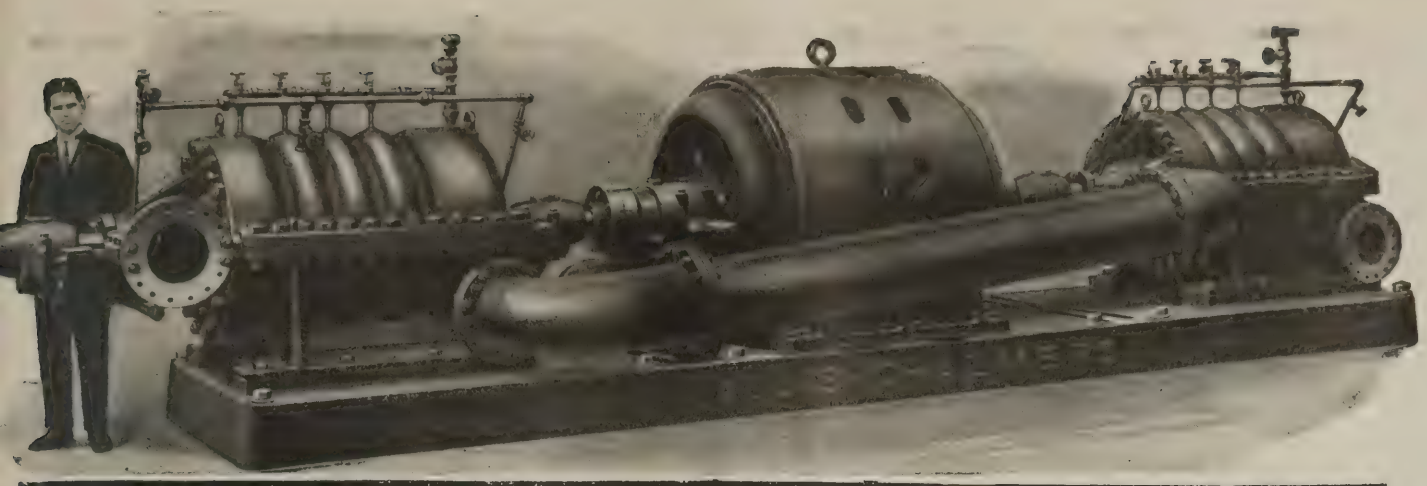
CEMENT-GUN

Mounted on Mine Truck

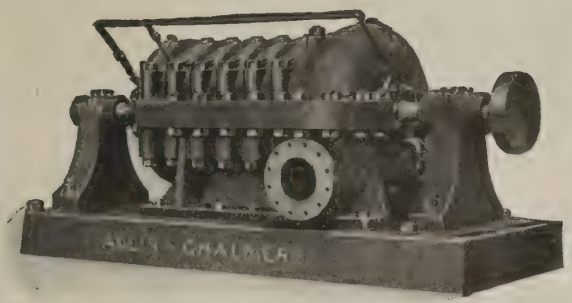
CEMENT-GUN COMPANY, Inc.

Allentown, Pa.

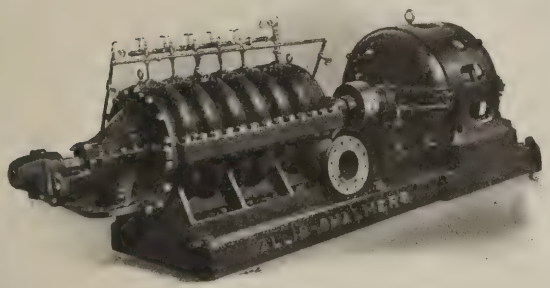
NEW YORK OFFICE, 30 CHURCH STREET
CHICAGO OFFICE, 1414 FISHER BUILDING
John A. Traylor, Newhouse Bldg., Salt Lake City, Utah
Taylor Engineering Co., 538 Central Bldg., Seattle Washington
Taylor Engineering Co., Vancouver, B. C.
R. E. Cleaton & Co., 20 St. Nicholas St., Montreal, Can.
General Supply Co. of Canada, Ltd., Winnipeg, Can.



Centrifugal Pumps for Every Type of Mine Service



High-Lift Multi-Stage Pump
for High Pressure



Motor Driven 8-Inch Six-Stage
Bronze Mine Pump

The Centrifugal Pump is unusually well adapted to the drainage of mines, and in addition to the standard features of design of Allis-Chalmers pumps our multi-stage pumps for mine service are often made of bronze where acid water is to be handled. In this connection we have developed an acid-resisting bronze which is much more durable than ordinary bronze.

Allis-Chalmers Centrifugal Pumps are in operation in many of the largest mines of the world, discharging against heads as high as 1000 feet.

ALLIS-CHALMERS MFG. CO.
MILWAUKEE

Sales Offices in All Principal Cities

Our Name is Your Assurance

ALLIS-CHALMERS

"Equipped throughout with Gurney Ball Bearings"



G. D. Whitcomb Co.
Mine Locomotive

Your Assurance of Satisfactory Service

When a mine locomotive, a conveyor, crusher, motor, fan, hoist or any other unit of mining machinery is "equipped throughout with Gurney Ball Bearings" you have the absolute certainty that such equipment will stand up satisfactorily under heavy loads without frequent lubrication, and with friction losses reduced to the "irreducible minimum."

Gurney Ball Bearing Company

Conrad Patent Licensee

Jamestown, N. Y.

GURNEY

"INDISPENSABLE on Federal Coal Reports"



For compiling information required by the Federal Trade Commission's "Coal Report on Cost, Income and Tonnage," one well-known operator wrote us regarding his

MONROE

Calculating-Adding Machine

"Without doubt your little machine is a valuable asset in any line where accurate figures are required, but on the A-1 sheets direct from the mine, where Tonnage is figured both Gross and Net, from pounds through proper channels to final invoice totals, it is **indispensable.** Especially so since the Government requirements are so strict in regard to commissions and specific prices.

"Again in the cost sheet, * * * its accuracy and rapidity has cut the work more than 50% and pulled the thorn from previously abhorred and ofttimes neglected labor."

In the light of the above statement from a Coal Operator, **can you afford to overlook the merits of the Monroe?**

The Monroe Adds, Subtracts, Multiplies, Divides—in fact is strictly an all-round **Calculating** Machine. The Monroe Visible Check is a **guarantee** of absolute accuracy and top-notch speed. Monroe Simplicity and Directness enables the inexperienced operator to work with speed and accuracy after a brief trial.

Mail the coupon today—without obligating you we'll arrange a demonstration on your own work or send full particulars, as you desire.

These Coal Companies are saving Time and Money with the MONROE

Amherst Fuel Co., Huntington, W. Va.
American Coal Co., Mac Comas, W. Va.
C. L. Amos Coal Co., Syracuse, N. Y.
Black, Sheridan, Wilson Co., Baltimore, Md.
Bay State Fuel Co., Cambridge, Mass.
Boone County Coal Corp., Clothier, W. Va.
Bertha Coal Co., Pittsburgh, Pa.
C. G. Brake Coal & Coke Co., Cincinnati, O.
Consolidation Coal Co., Fairmont, W. Va.
M. S. Converse Co., Springfield, Mass.
Cleveland & Western Coal Co., Cleveland, O.
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Hudson Coal Co., Scranton, Pa.
Island Creek Coal Co., Holden, W. Va.
Keystone Coal & Coke Co., Greensburg, Pa.
Lehigh & Wilkes-Barre Coal Co., Wilkes-Barre, Pa.
Lehigh Coal & Navigation Co., Hazelton, Pa.
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Northern Coal & Dock Co., St. Paul, Minn.
Northwestern Fuel Co., St. Paul, Minn.
Northern New York Coal Co., Watertown, N. Y.
Omar Coal Co., Omar, W. Va.
Pittsburgh Coal Co., Pittsburgh, Pa.
Phila. & Reading Coal & Iron Co., Pottsville, Pa.
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Rochester & Pittsburgh Coal & Iron Co., Rochester, N.Y.
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Scranton & Lehigh Coal Co., Brooklyn, N. Y.
Thompson-Connellsville Coke Co., Republic Station, Pa.
U. S. Coal & Coke Co., Gary, W. Va.
United Coal Corp., Pittsburgh, Pa.
Victor-American Fuel Co., Denver, Colo.
Vandalia Coal Co., Terra Haute, Ind.
West Virginia-Pittsburgh Coal Co., Wellsburg, W. Va.
West End Coal Co., Macanaqua, Pa.
Wayne Coal Co., Steubenville, O.
Washington Coal & Coke Co. Dawson, Pa.

"3c mighty well spent"

COUPON

Monroe Calculating Machine Co., Woolworth Bldg., New York City.

Without obligation to me send details of how I may save Work, Time, Expense and Errors in figuring Cost, Income and Tonnage.

☐ Arrange for Demonstration.

Name .....

Address .....

C. A. 6-29-18

Monroe Calculating Machine Co.

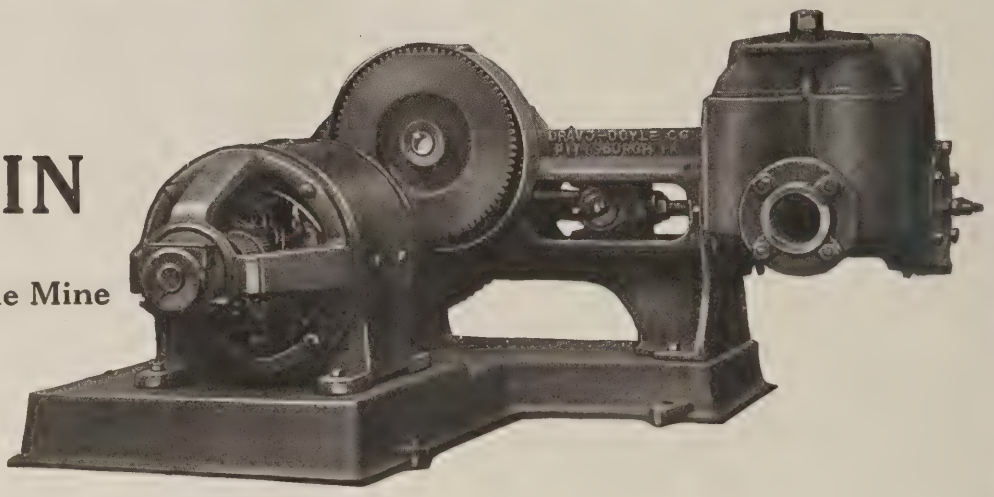
Woolworth Bldg., New York City

Offices in Principal Cities

This Pump "Stays Put"

It's an AUSTIN

"The Pump the Mine Man Needs"



ONCE you put this pump in place in the mine, you don't have to pull it out again to rebabbitt the bearings or to clean the valves.

The bearings are removable—the valves can be reached for cleaning by simply removing one nut—all bearings are adjustable without taking the pump apart.

Water box is of special patented construction and motor spur is of the flywheel type. Thus both the discharge line and the motor are fully protected from shocks.

Capacities

30 to 200 Gallons per minute.
Sizes up to 100 gallons per minute carried in stock.

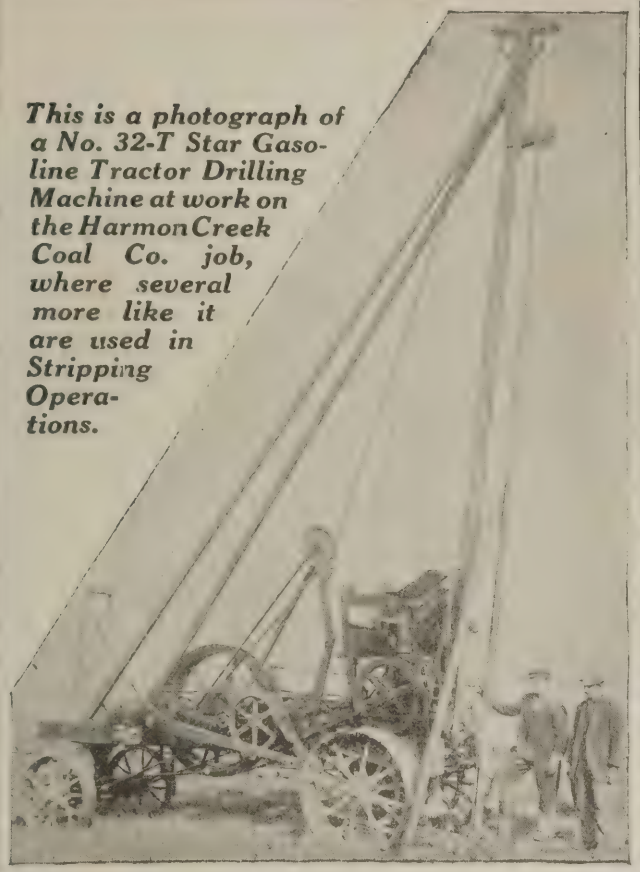
Send for illustrated bulletin.

The Dravo Contracting Company

Engineering Works Department

Diamond Bank Building, Pittsburgh, Pa.

Philadelphia Cleveland Indianapolis



This is a photograph of a No. 32-T Star Gasoline Tractor Drilling Machine at work on the Harmon Creek Coal Co. job, where several more like it are used in Stripping Operations.

Mr. Coal Mine Operator

Do you use a steam shovel for stripping?

Then You Need a Star Drilling Machine for Drilling Blast Holes To Increase the Efficiency of Your Shovel.

Do you want to test out an undeveloped field?

Then Do Your Prospecting with a Star Machine.

Do you require ventilation holes?

Then Drill Them with a Star.

Whatever your drilling problem, through shell rock, trap rock, limestone, there is a Star Machine to handle it.

Made with Gasoline Engine, Steam or Electric Motor power. Tractor or Non-Tractor. Any size hole, any depth.

The constant repeat orders represent our strongest argument for durable construction, efficiency, economy in operation and general satisfaction.

Learn more about the Star Drill.
Catalog sent on request.

The Star Drilling Machine Co.

Dept. 8

Akron, Ohio, U. S. A.

Erie Revolving Shovels



Photo shows one of FIFTEEN ERIE Shovels bought by P. & R. Coal & Iron Co., Pottsville, Pa., after making careful tests of steam shovels.

Do You KNOW Which Steam Shovel to Buy?

Profit by this experience

If you are in doubt as to the right steam shovel to buy, for stripping and loading—here is some experience which may be helpful to you:

Tested one Erie—bought 15!

The Philadelphia & Reading Coal & Iron Co. are experienced users of steam shovels. They owned about 20 shovels of different makes, when they bought their first ERIE, late in 1916.

Since that first ERIE, they have added 14 *more* ERIE Shovels to their equipment.

Bigger output

They have found that the quick movements of the ERIE, and the simple control by three levers, result in more output than they had been accustomed to from steam shovels of equa size.

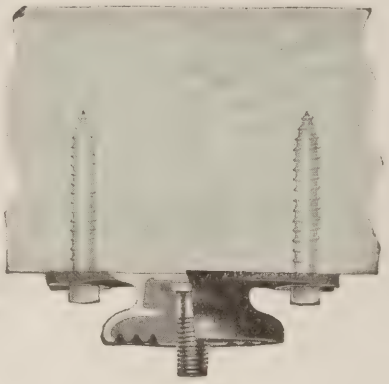
Reliable service

They have found that the ERIE Shovel works steadily in the hardest digging, because it is built far stronger than the usual standard of steam shovel construction.

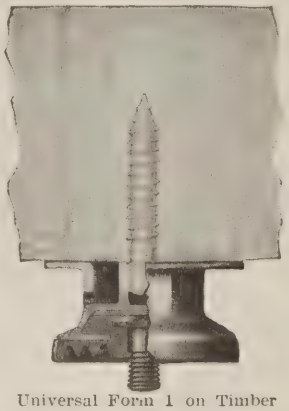
We will be glad to send you our Bulletin "A." It tells you what the ERIE Shovel can do on your work. Write for a copy.

Ball Engine Co., Erie, Pa.

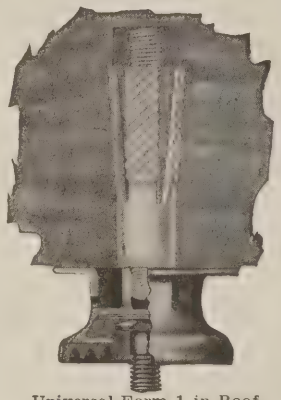
O-B PRODUCTS



Type H-3 on Timber



Universal Form 1 on Timber



Universal Form 1 in Roof

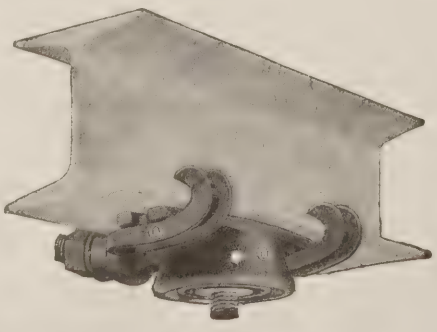
O-B TROLLEY HANGERS SUIT EVERY MINE

Perhaps you have noticed—most mining men have—how O-B Hangers "fit" in the mine in every sense of the word. It is the logical result of applied experience and knowledge.

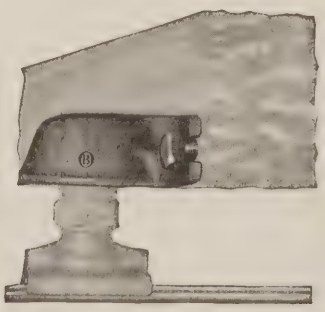
See Catalog No. 16 *and Supplement No.* 1 *for complete listing of the many different types. One of them is the right one for your mine.*

The Ohio Brass Company, Mansfield, Ohio

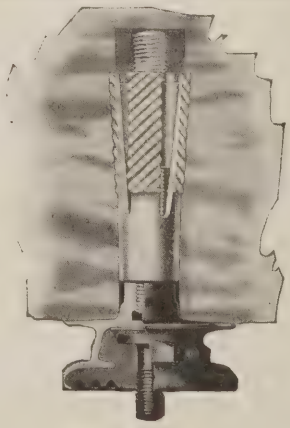
New York Philadelphia Pittsburgh Charleston, W. Va. Chicago San Francisco Los Angeles



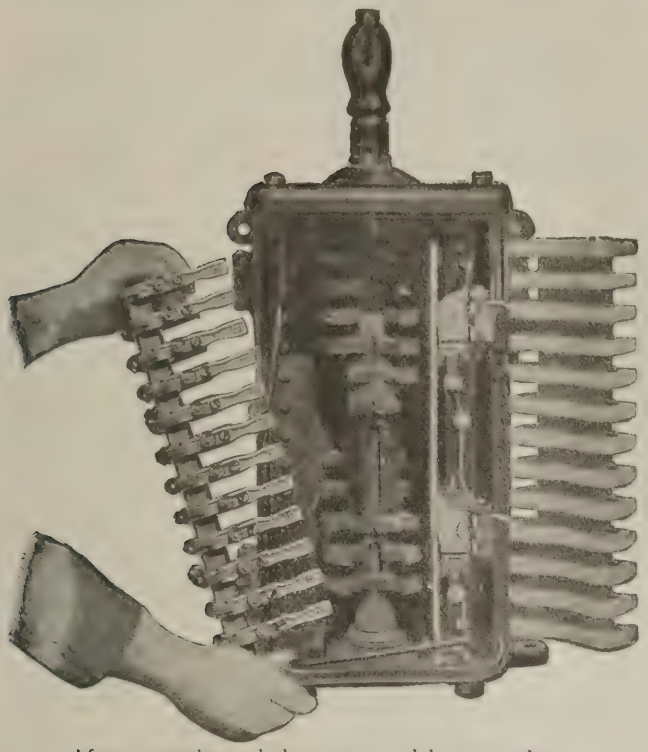
Type H-2 installed on steel beam with O-B I-Beam Clamp



Type P on side of Timber



Type K-3 in Roof



After removing a bolt at top and bottom, the contact fingers may be removed.

Easy to Get At

Just Remove Two Bolts

and you can lift out the contact fingers as shown in the illustration. This is a C-H feature that those experienced in crane and hoist work consider of great importance.

DRUM CONTROLLERS

For Crane and Hoist Service

because of their superior rugged construction provide the most precise operation. Each speed point can be distinctly felt by the operator—yet the operation is smooth. They are made in D.C. and A.C. types.

The straight line non-stubbing fingers, first employed on Cutler-Hammer Controllers, are mounted on a square metal shaft. This can be removed in one piece as shown above.

Ask for Booklet containing Drum Controller Bulletins. The office nearest you has a stock of these Booklets as well as Booklets describing C-H Battery Charging Apparatus.



Exterior View of C-H Drum Controller.

The Cutler-Hammer Mfg. Co., Milwaukee

Largest Manufacturers of Electric Control Apparatus in the World

NEW YORK—Hudson Terminal Bldg. CHICAGO—People's Gas Bldg. BOSTON—77 Franklin St. PITTSBURGH—Farmers' Bank Bldg. PHILADELPHIA—Commonwealth Bldg. CLEVELAND—Guardian Bldg. CINCINNATI—Gwynne Bldg. SAN FRANCISCO—583 Howard St. LOS ANGELES—San Fernando Bldg. SEATTLE—522 First Avenue, So. BIRMINGHAM, ALA.—General Machinery Co. KANSAS CITY, MO., and TOPEKA, KANS.—Empire Electric Mfg. Co.

Back of this man and his motor lies your mine and all its equipment Don't let a faulty Bearing hold up your mining operations



SKF
BALL BEARINGS

The mine owner is being pressed by the need for greater fuel production.

The dependability of mining machinery, next to the operators, is the controlling factor of output.

Mining machinery SKF equipped has the staying quality needed for unusual service.

SKF BALL BEARING CO.

Hartford 416 Conn.



HERE IS THE REASON WHY *This Construction*

Why over 120,000 Edison Electric Safety Mine Lamps are in use today.

Why over 1000 Mines are using Edison Mine Lamps almost exclusively.

Why every Edison Mine Lamp is still in service, giving good service.

Why Edison Mine Lamps have never been replaced by any other electric mine lamp.

Why its record is one of unqualified success.

is found only in the Edison Electric Safety Mine Lamp.

This is the steel and iron construction of the famous Edison Nickel-Iron-Alkaline Storage Battery.

This shows the steel positive tube, banded with steel rings; the steel negative pocket, the steel connectors and poles; and the steel container of the cell itself, as well as the steel carrying case.

Another distinctive feature, found only in Edison Batteries, is that steel parts are submerged in an alkaline solution, which is a **preservative** of the steel.

The Edison is the only storage battery with any iron or steel in its construction or elements.

This construction explains the great strength and long life of the Edison Mine Lamp.

Let us tell you many other interesting features about the Edison Mine Lamp. Ask for Bulletin 300-C.

EDISON STORAGE BATTERY COMPANY

Factory and Main Office: ORANGE, N. J.

Distributors in

New York Boston Chicago Detroit San Francisco Seattle Los Angeles New Orleans Kansas City Washington Philadelphia

General Distributors: Mine Safety Appliances Company Chamber of Commerce Bldg., Pittsburgh, Pa.

EDISON STORAGE BATTERIES

TRADE MARK Thomas A. Edison A PRODUCT OF THE EDISON LABORATORIES



Let Us Help You Serve Effectively

Service is vitally necessary in business today that we may pull together to accomplish our common aim.

The General Electric Company has located industrial power experts at all large cities in this country to serve industry's electrical requirements. For instance, experienced textile mill electrical engineers will be found in all textile centers. Among other industries so served are the iron and steel, coal and metal mining, cement, clay and glass, lumber and woodworking, grain and sugar, canning, packing and refrigeration, shoes and rubber, paper and wood pulp, tobacco and cigars, chemicals and gas, and the construction and shipbuilding.

These experts are prepared to cooperate with industrial engineering firms to show the best way to drive a machine or a factory to get maximum production of highest quality at minimum power cost.

Back of these experts is the experience gained in supplying much of the electric power equipment now used in American industry and a corps of scientists with research facilities for pioneer work.

Call on us to help perfect your service to American business.

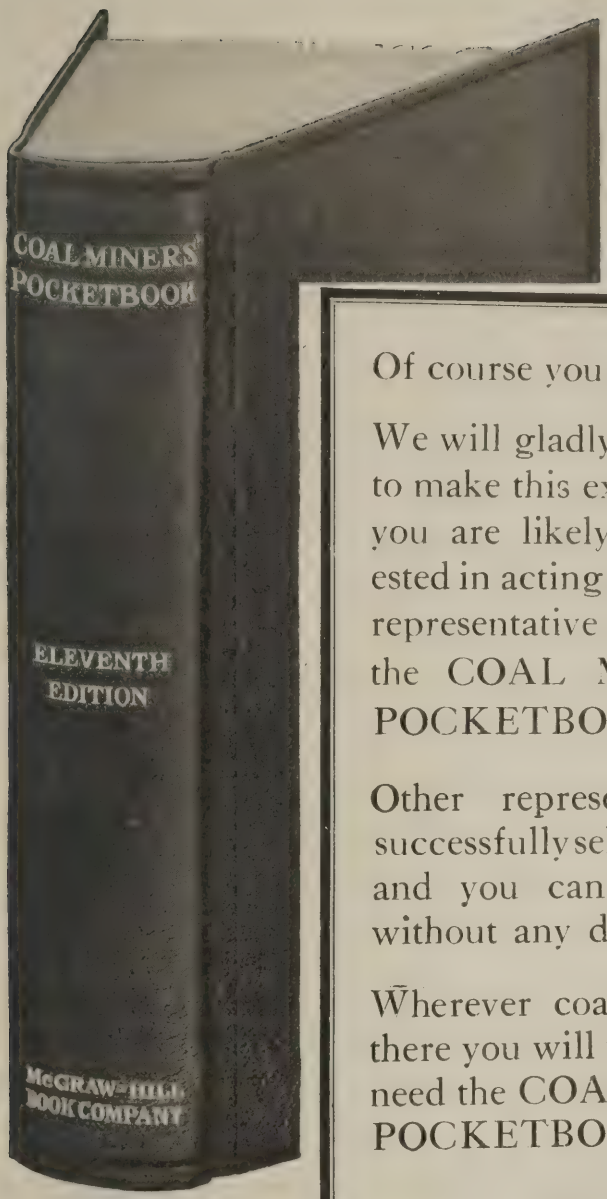
4343



GENERAL ELECTRIC COMPANY

General Office: Schenectady, N. Y. Sales offices in all large cities.

Can You Use Some Extra Money?



Of course you can.

We will gladly tell you how to make this extra money, if you are likely to be interested in acting as our special representative for the sale of the COAL MINERS' POCKETBOOK.

Other representatives are successfully selling this book and you can do likewise without any difficulty.

Wherever coal is mined—there you will find men who need the COAL MINERS' POCKETBOOK.

It is the *old reliable* in the coal mining field.

We need the spare time of someone to show these men this valuable book. It sells on sight.

That is why we want you to represent us on a liberal commission basis, with the understanding that you will not be required to make any investment or be under any obligation if you will fill out the coupon.

The compensation is liberal, and the experience valuable.

Will you act as our representative, and make some extra money?

then→

McGraw-Hill Book Co., Inc.,
239 W. 39th St., N. Y. C.

Send me your plan for selling the COAL MINERS' POCKETBOOK.

Signed.....

Address.....

Company.....

Position.....

C-6-29-18

McGraw-Hill Book Co.
Inc.
239 W. 39th St., New York

Directory of Consulting Engineers

Allen & Garcia Company

Andrews Allen, C. E., John Garcia, E. M.

Consulting and Constructing Engineers.

Designers and Constructors of complete coal mines, washers tipples, rescreening plants, etc. Electrification of Coal Mines a Specialty. Examinations, report and appraisals, coal mining and other properties.

McCormick Building, Chicago

Bayles, Frederick P.

Consulting Mining Engineer

Coal

Union Central Bldg.
Cincinnati, Ohio

Birmingham Eng. Co.

P. O. Box 591, Birmingham, Ala.
Consulting and Structural Engrs.
We design mine buildings, piers, steel and reinforced concrete structures. We cooperate with mining engineers and manufacturers Get in touch with us.

Chance, H. M. & Co.

Consulting Mining Engineers.

Coal and Iron.

Drexel Bldg., Philadelphia, Pa.

Crichton, Andrew B.

Mining Engineer.
Examine and report on Coal properties. Coal estates managed. Cost systems installed. Construction of Mining plants. Surveys and Maps.
Johnstown, Pa.

Cunningham, W. H.

Consulting Mining Engineer and Geologist. Design and Construction Coal Plants. Examination Valuation, Reports and Surveys of Coal, Oil and Metal Properties. Rooms 800-802 First National Bank Bldg., Huntington, W. Va.

Evans, C. G.

Mining Engineer

Examination and reports on coal properties. Design and Supervision of Construction Coal Plants. Surveys and maps. Rooms 5-6 First Natl. Bank Bldg., Pikeville, Ky.

Fluck & Moore

Engineers.

Somerset, Pa.

Hoyt, W. E.

Wood Preserving Engineer.
Supervision of treatment of timber and structures, supplying oils and equipment for brush, spray, and open-tank methods. Fulton Bldg., Pittsburgh, Pa.

Industrial Engrg. Corp.

Electrical and Mechanical Engineers, Installation, Reports and Appraisals.

Hazard, Kentucky

Kershaw, John B. C.

Fuel Economy Expert and Boiler Room Specialist.

Grosvenor Rd. Colwyn Bay, N. Wales, Eng.

Lewis, Harry J.

Civil Engineer.
Designs and Constructs Mechanical Equipment of Mines. Examination and Reports on Mining Properties.
336 Fourth Ave., Pittsburgh, Pa.

Means, Charles, M.

Consulting Engineer.

90 West St., New York — Oliver Bldg., Pittsburgh

Palmros, Alexander

Engineer

Mining Machinery Design, Advice and Consultation.

793 Euclid Ave., Syracuse, N. Y.

Raymond, Rossiter W.

Mining Engineer and Metallurgist

29 West 39th St., New York City.

Read, R. G.

Contracting Engineer

Coal Tipples
Coal Handling Equipment
Fisher Bldg., Chicago

Stuart, James & Cooke

Engineers

Equitable Building, New York

Wadleigh, F. R.

Consulting Engineer.
Coal and Coke
1418 Walnut St., Phila., Pa.

Wilkins Company, W. G.

Engineers and Architects.
Design and Supervision of Construction of Coal Mining and Coke Plants. Westinghouse Building, Pittsburgh, Pa. Robson-Prichard Building, Huntington, W. Va.

Inspecting and Testing Engineers

Pittsburgh Testing Laboratory

Engineers and Chemists.

Analyses and Tests of:
Coal and Coke, Gas, Water, Clay, etc.

7th and Bedford Aves.,
Pittsburgh, Pa.

Directory Rates (Yearly)

1⅓ inch Card $52.00.
(In advance $40.00)
⅔ inch Card $31.20.
(In advance $25.00).
A copy of the paper included

A Card in the Directory of Consulting Engineers Brings Results—Is Yours Here?

MARCUS HORIZONTAL
PATENT PICKING TABLE SCREEN.

Coal Tipples

RS AND COMPANY McCORMICK BLDG. CHICAGO

Coal Washeries

JACOBSEN & SCHRAEDER, Inc.
ENGINEERS
Marquette Building, Chicago.
Specialists in Coal Washeries, Tipples and Rescreening Plants
We control The Jacobsen patent horizontal balanced picking table and screen, also the Jacobsen patent grading system.

RICHARDS ENGINEERING COMPANY
Iron and Steel Fabrication
Elevator Buckets, Flights, Stacks Troughs, General Sheet Iron Work
Delaware Street, Wilkes-Barre, Pa.

WILLIS E. HOLLOWAY CO.
Engineers and Contractors
Rockefeller Bldg.
CLEVELAND, OHIO
Designers and Constructors of Complete Coal Mining Plants, Coal Tipples, Coal Washeries, Labor Saving Machinery

SHAFTS-SLOPES
The RUST ENGINEERING CO.
ENGINEERS AND CONTRACTORS
GENERAL OFFICES: PITTSBURGH, PA.
Birmingham Cleveland Philadelphia Tulsa, Okla.
Chicago New York Pittsburgh Washington, D.C.

SEARCHLIGHT SECTION

Get your Wants into the Searchlight

ADVERTISING RATES

Ads Set in Uniform Style

(Solid, in one paragraph, without display.)

THREE CENTS A WORD, minimum charge 50 cents an insertion, payable in advance, less 10 per cent if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted	Vacation Work Wanted
Evening Work Wanted	Salesman Wants Connections

FIVE CENTS A WORD, minimum charge $1.50 an insertion, for advertisement under:

Agencies Wanted	Positions Vacant
Agents Wanted	Partner Wanted
Business Opportunities	Representations Wanted
Desk Room for Rent	Salesmen Wanted
Educational	Patents for Sale
Employment Agencies	Plants for Sale
Desk Room Wanted	Sub-Contracts Wanted
Foreign Business	Work Wanted

Miscellaneous for Sale, for Rent or Want Ads.

THIRTY CENTS A LINE, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

THREE DOLLARS AND SIXTY CENTS AN INCH for advertisements for bids (Official Proposals).

Ads Set in Display Type

(Individual space, within border rules.)

Space for these advertisements is sold by the inch. Each page contains 27 inches. The rate per inch is based on the *total* number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of $2.90 an inch. A 1-inch space in 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

SCHEDULE OF RATES

1 to 3 in., $3.00 an in.	15 to 26 in., $2.70 an in.
4 to 7 in., 2.90 an in.	27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in.	50 to 99 in., 2.55 an in.

Rates for larger space furnished on request.

INFORMATION

ALLOW FIVE WORDS for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

IN REPLYING TO ADS. do not enclose original testimonials or anything that you may want returned. State your experience and qualifications in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind," ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave.,	New York
1570 Old Colony Bldg.,	Chicago
657 Leader-News Bldg.,	Cleveland
935 Real Estate Trust Bldg.,	Philadelphia
501 Ria to Bldg.,	San Francisco

WHEN ADVERTISING MACHINERY, use your own name and address—or a local address of some kind—so that the readers can wire direct and get quick replies. We advise also that you state in your advertisement the present location of plant that is offered for sale, or point of delivery provided you are in the market for equipment.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitate receiving replies. You can however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

For quick and satisfactory results tell the reader everything that he will want to know

POSITIONS VACANT

FIRST-Class electrician. One capable of taking care of machinery. Operation production 25,000 tons per month. Furnish recommendations and experience, also salary expected. P-119, Coal Age, Phila.

MINING engineer. One capable of taking care of construction and mining work. Operation production 25,000 tons per month. P-116, Coal Age, Phila.

SUPPLY clerk. One capable of taking care of correspondence and checking in and checking out supplies. Operation production 25,000 tons per month. P-117, Coal Age, Phila.

ASSISTANT mine foreman, with first or second-class papers. One capable of taking care of a section of Machine Mine. P-118, Coal Age, Phila.

MINE foreman wanted for a large coal company in West Virginia having every favorable condition. P-140, Coal Age.

MINE foreman for low coal operation, West Virginia, near large town. Want hustler capable of handling men and mining machinery. Good salary and tonnage bonus for man who can get results. State age, experience, references. Write P-141, Coal Age, Phila.

WEST Virginia licensed mine foreman wanted to take charge of new development. Address M. M. Co., 1020 First National Bank Bldg., Huntington, W. Va.

AN experienced transitman wanted for mine and outside surveying. Permanent. Single man preferred. Give age, references and salary wanted. Apply Chief Engineer, Box 42, Dunlap, Tenn.

PRACTICAL mine electrician wanted as traveling inspector by prominent company manufacturing electric coal mining machinery. We require coal mining experience with knowledge of machines and locomotives. Permanent position with good salary assured the right man. Address stating age, experience and references. P-139, Coal Age, Chicago.

TRANSITMAN, married, above draft age, for work with a large bituminous corporation in western Pennsylvania. Advise experience and salary desired. Box 511, Indiana, Pennsylvania.

POSITIONS WANTED

MINING engineer; 5 years' experience, desires change. W. Va. or Kentucky. Married. PW-127, Coal Age, Cleveland.

MINING engineer wants a position in the engineering department of a coal mining company. 12 years service in U. S. A. and abroad. Single, not in draft. Speaks foreign languages. At present employed. Would like to give the present employers at least 15 days' notice. PW-128, Coal Age, Philadelphia.

MECHANICAL and power engineer, technical graduate, with wide and varied experience in the design and construction of power, hauling, pumping, ventilating plants and general coal mining equipment, seeks an opening. PW-131, Coal Age, Philadelphia.

MAP draftsman, first-class. Coal mine or land map draftsman and general office work, more than twenty years' experience, references. Not in draft. American. State salary willing to pay. PW-133, Coal Age, Philadelphia.

SUPERINTENDENT
OF MINES OR CHIEF ENGINEER

Successful, up-to-date, experienced efficient superintendent or engineer open for position. Present superintendent of mines. Must give 3 or 4 weeks' notice.

PW 136—Coal Age
935 Real Est. Trust Bldg., Philadelphia, Pa.

POSITIONS WANTED

CHIEF electrician and mechanic, expert on power-plants and general coal mining equipments, of all systems, methods, moderns efficiency, companies needing qualified man. PW-111, Coal Age,

MINING engineer desires position. 1911 graduate, married, at present carrying the work of twelve bituminous properties. PW-130, Coal Age.

CHIEF clerk, open for position July 1st as auditor or paymaster for company having several mines; capable of systematizing; 15 years in coal business; can refer to present and past employers; married; above draft age. What have you in an executive position where there is chance for advancement? PW-135, Coal Age, Philadelphia.

SUPERINTENDENT—Have 15 years' experience as inside foreman, outside superintendent and engineer; 1 year's experience in stripping. Available Juy 1. Age, 36. Married. PW-137, Coal Age, Cleveland.

MINING engineer now general manager willing to change, age forty-three, twenty years' experience, coal mining, designing, surveying, etc., can handle men, is available immediately. PW-138, Coal Age, Phila.

FOR SALE

Developed and Undeveloped Coal Mines

Going Mines ready for immediate operation. Located on railroads and rivers. Fifteen in W. Va., ten in Va., fifteen in Penn., twenty in Ky., and Tenn. Advise of what you want and you will be suited. FS-84, Coal Age, Phila.

Correspondents Wanted

We are interested in securing correspondents in mining centers who can send us news in their spare time of new mines to be opened, equipment to be purchased, etc.

Write giving full details of present work to

L. V. FLETCHER
McGraw-Hill Co., Inc.
10th Ave. at 36th St., New York, N. Y.

TRADE CORRESPONDENT

Coal Age wants a coal trade man to write a weekly review of coal-market conditions in the Middle West and Chicago. One who is thoroughly conversant with the coal business and preferably a resident of Chicago. Ample compensation.

ALEX MOSS,
Editorial Dept., Coal Age
10th Ave. at 36th St., New York

SEARCHLIGHT SECTION

FOR SALE

Operating Coal Proposition

on Pennsylvania Railroad. Over 300 acres with siding, etc. Right price for quick buyer with reasonable cash payment.

Also a desirable field of coal for development.

BO 109—Coal Age
935 Real Estate Trust Bldg.
Philadelphia, Pa.

FOR SALE

Fully Developed COAL PLANT

Located on Norfolk & Western Railway. Shipping about 12,000 tons per month. High-grade steam and domestic coal. Fully equipped with modern plant. Bargain for quick sale. Full description and price given only parties who mean business.

Address Box 140, Bluefield, W. Va.

FOR SALE

PRODUCING BITUMINOUS COAL MINE

on Pittsburgh and Shawmut Railroad, twenty miles southwest of Brookville, Pa. Capacity 100 to 150 tons per day. Very high-grade coal. Fully equipped. Price $75,000, which includes leaseholds and lands owned in fee. Particulars on application.

Box 246, Du Bois, Pennsylvania

FOR SALE

Coal and Mason Materials Business

Established 1885

On account of health the undersigned wishes to retire. Ready to sell at once. Sales, 1917, approximately $200,000. Coal orders now on hand about 10,000 tons, also orders for considerable mason materials. Do not have to stop to drum up new trade; business can go right along. Good chance for a live man.

P. M. WELSH
239-241 Burnet St., New Brunswick, N. J.

Keep your eye on the Searchlight and your advertisements in it.

WANTED

4000 to 6000 Feet of Second Hand Double Strength

Wrought Iron or Steel Pipe

6-inch to 10-inch.

UTAH FUEL CO., Salt Lake City, Utah
P. O. Box 1386

FOR SALE OR LEASE

Anthracite Coal Dredging

Large frontage on Shamokin Creek & Penna. R.R. Near Sunbury, Pa. Complete operating washery, own private railroad siding on Schuylkill River, Pa.

Address **L. G. ROSENTHAL**
City Hotel, Sunbury, Pa.

WANTED

Construction Equipment

No plant too large, none too small. We buy for cash any place. Send list of what you have to

BECKWITH MACHINERY COMPANY
102 W. Parkway, N. S., Pittsburgh, Pa.

WANTED

Goodman Shortwall Mining Machine Runners

The Low Moor Iron Company of Va.
Kay Moor, W. Va.

FOR SALE

6—15 in. **Mule Collars**.....$1.80 each
4—16 in. **Horse Collars**..... 2.00 each
6—Pr. 16 in. **Beagle Hames**.... 1.85 pair
Above are absolutely brand new.

UTAH FUEL COMPANY
Salt Lake City, Utah

For Sale, delivery at once, 1 Complete Fairbanks Standard R.R.

TRACK SCALES

80 ton, 40 ft. Condition good. Address

C. H. THOMPSON
St. Charles, Va.

USED

Transits and Levels

FOR SALE

THE ENGINEERING AGENCY, INC.
1662 Monadnock Block, Chicago

PUMPS

Immediate Shipment

Deming Triplex
Deming Piston
Morris Centrifugal

MOTORS

BRAND NEW
1 to 100 H.P.

Write or Wire Us

Harris Pump & Supply Co.
Pittsburgh, Pa.

We Dismantle

Plants of every description. We are also in the market for equipment of scrap of all kinds. Our terms are spot cash.

What have you to offer?

Write—Wire—Phone

THE PIEDMONT IRON & METAL CO.
Baltimore, Md.

SEARCHLIGHT SECTION

BIG BARGAIN



COAL STORAGE PLANT

We have for sale and *immediate delivery*, the Coal Storage Plant formerly owned by the Susquehanna Coal Co., located at Old Bridge Storage Yard, about six miles from South Amboy, New Jersey.

This plant consists of seven complete units, each unit consisting of two trimmers and one reloader.

Each trimmer has a storage capacity of 15,000 tons of coal, with an overload of 25%, therefore each *unit* has a storage capacity of 30,000 tons plus an overload of 25%.

Each trimmer will unload 200 tons per hour, and material can be reloaded at same rate, at a cost of about 2½ c. per ton, each way.

This Plant can be operated as a whole, or in individual units. It was designed, built and erected by the Link-Belt Engineering Co., of Philadelphia. It is in perfect condition, and can be readily taken down and reconstructed.

We are prepared to furnish blueprints and photographs upon request.

If you are interested, communicate with us at once, and we will arrange for inspection.

STERLING IRON & STEEL COMPANY

10th and Hamilton Streets, Philadelphia, Pa.

SEARCHLIGHT SECTION

250-VOLT MOTORS

1—90-hp. Western Electric, 230-volt, 900-r.p.m.
1—50-hp. Western Electric, 220-volt, 950-r.p.m.
1—30-hp. Western Electric, 220-volt, 1075-r.p.m.
1—20-hp. Bullock, 250-volt, 1125-r.p.m.
1—15-hp. Westinghouse, 220-volt, 300-r.p.m.
1—10-hp. General Electric, 230-volt, 1375-r.p.m.

500-VOLT MOTORS

1—60-hp. General Electric, 500-volt, 900-r.p.m.
1—40-hp. Westinghouse, 600-volt, 660-r.p.m.
1—40-hp. General Electric, 500-volt, 975-r.p.m.
1—35-hp. General Electric, 500-volt, 975-r.p.m.
1—35-hp. Westinghouse, 500-volt, 700/875-r.p.m.
1—15-hp. C. & C., 500-volt, 825-r.p.m.
1—10-hp. Triumph, 500-volt, 1100-r.p.m.
2—7½-hp. Crocker-Wheeler, 500-volt, 950-r.p.m.
2—7½-hp. Eddy, 500-volt, 1100-r.p.m.
1—5 -hp. General Electric, 500-volt, 1200-r.p.m.
1—3 -hp. Westinghouse, 500-volt, 1050-r.p.m.
1—3 -hp. Diehl, 500-volt, 1475-r.p.m.
1—3 -hp. General Electric, 550-volt, 2000-r.p.m.
5—3 -hp. Crocker-Wheeler, 500-volt, 1150-r.p.m.
1—3 -hp. Peerless, 550-volt, 1950-r.p.m.
1—2 -hp. General Electric, 550-volt, 2350-r.p.m.

500-VOLT GENERATORS

2—250-kw. Westinghouse, 550-volt, 450-r.p.m.
1—150-kw. Westinghouse, 550-volt, 550-r.p.m.

ARCHER & BALDWIN, Inc.
114 Liberty Street, New York City
Tel. Rector 4337-8

MOTORS

REBUILT AND GUARANTEED

D.C. 250 Volts

H.P.		SPEED
55	General Electric	900
30	Northern	600
25	Fischer	500
10	Jantz & Leist	900
10	Triumph	1100
10	Browning	1000
10	Cinti. Elect.	1000
5	Triumph	1350
3	Bullock	850

Also Generators, Boilers and Engines.

THE RANDLE MACHINERY CO.
1831 Powers St., Cincinnati, O.

ROTARY CONVERTER

200-Kw., 250-Volt D.C. Allis-Chalmers 1200 R.P.M. 3-Phase, 60-Cycle, 4000- or 2300-Volt New Rotary with transformers and switchboards.

Complete Mining Substation.

Brand New—Instant Shipment

Miller-Owen Electric Co., Inc.
Pittsburgh, Pa.
"Pittsburgh's Electrical Clearing House."

MOTORS

Repaired—Rewound—Rebuilt

Quick Service

C. J. & F. E. BRINER
1007-15 Morgan St., St. Louis, Mo.

MINING MACHINES LOCOMOTIVES RAILS AND EQUIPMENT

L. A. GREEN
1610 First National Bank Bldg.
Pittsburgh, Pa.

New Boilers

Immediate Shipment

2—72-in. x 18-ft. H.R.T.—125 lb.

3—72-in. x 18-ft. H.R.T.—143 lb.

A. S. M. E. Code, all Standard Equipment and Stacks.

Boilers, Engines, Generators, Etc.

BUNTON & BOCKIUS
945 Oliver Bldg., Pittsburgh, Pa.

BOILERS

1—48 x 18 H.R.T., 125 lb.
1—54 x 12 H.R.T., 100 lb.
1—54 x 16 H.R.T., 125 lb.
3—72 x 16 H.R.T., 115 lb.
1— 50-hp. Nagle, 140-lb.
1— 60-hp. Fire Box, 100 lb.
5—229-hp. B. & W., 160 lb.
2—206-hp. B. & W., 160 lb.
7—268-hp. B. & W., 160 lb.
5—300-hp. Campbell & Zell, B. & W. type, 160 lb.
2—305-hp. B. & W., 160 lb.
1—305-hp. B. & W., 200 lb.
2—350-hp. Campbell & Zell, B. & W. type, 160 lb.
1—400-hp. Erie City, 175 lb.
2—400-hp. National Water Tube.
2—458-hp. B. & W., 160 lb.
2—500-hp. Stirling, 160 lb.
6—515 B. & W., 160 lb.
1—517-hp. Stirling, 150 lb.
4—25-hp. Stirling, 150 lb.

CROCKWELL MINE & MILL SUPPLY CO.
415 Pine St., St. Louis, Mo.

FOR SALE

2—500 hp. Rust **Water Tube Boilers** complete with all Fittings and Trimmings. Equipped with Westinghouse Stokers.

2—70 to 80 hp. Butt joint **locomotive type Boilers.**

2—72 x 16 ft. Erie City **H. T. Boilers** with Fittings and Stack.

1—66 x 16 ft. Erie City **H. T. Boiler** with Fittings.

200 ft.—8 in. Flanged **Wrought Iron Pipe.**

1—6-ton Buffalo Tandem **Steam Roller**

1—Morgan-Gardner 250-volt **Mining Machine.**

E. E. McCARTNEY
769 Wilson Ave. Youngstown, Ohio.

BOILERS

We have the following Boilers all good for 125-160 lb. pressure: 1—48 x 14, 1—60 x 16 2—66 x 16., 1—72 x 16, 2—72 x 18, 2—72 x 22, 150-hp. Heine, 225-hp. Heine, 3—350-hp. A & R, 1—400-hp. Wickes, 515-hp. Stirling.

WILSON MACHINERY COMPANY
Federal Bank Bldg., St. Louis, Mo.

FOR SALE—2 Jeffrey Trolley

LOCOMOTIVES

Track gauge 40 inches, 4½ tons, Type S.M., voltage 250 D.C. Draw bar pull, 1000 lb. at six miles per hour. Now being operated.

Can be inspected at

AJAX COAL COMPANY
Fayette, W. Va.

GASOLINE LOCOMOTIVE

(Mine Type)

5-ton WHITCOMB, 36-in. gauge. Bought new 1912; in first-class repair. Measures 12 ft. long, 3 ft. 10 in. high, 4 ft. 7 in. wide.

Price $1675 f. o. b. Scranton, Pa.

Inquiries also solicited for Dependable "Used" Steam Shovels, Locomotives, Cars, Rails, Hoists, Grab Buckets, etc.

WM. B. GRIMSHAW CO.
1050 Drexel Bldg., Philadelphia, Pa.

Electric Mine Locomotives

2—6-ton Jeffrey, 24-in. gauge Type D.M. Class 30, Form H. Equipped with 2-M.H., 64 motors, 250 volts, D.C. Extra Armatures and repair parts.

Immediate Shipment

ARTHUR S. PARTRIDGE
415 Pine St., St. Louis

FOR SALE

IMMEDIATE DELIVERY

Two 15-ton Jeffrey Haulage

LOCOMOTIVES

250 volts. 44-in. Gauge.

To be sold at cost.

Ernest M. Merrill Engineering Co.
Beckley, W. Va.

SELL your second-hand machinery through

THE SEARCHLIGHT SECTION

and get the BEST price for it.

The Biggest Circulation Gets The Best Results.

SEARCHLIGHT SECTION

EXCEPTIONAL BARGAINS

1—100-kw. Engine Generator Set

(First-Class Used)

Immediate Delivery

Generator—Goodman 250/275-volt, 360-amp., 6-pole, 250 r.p.m. Compound wound. Direct connected to McEwen, 17-in. x 16-in. Automatic engine. Good serviceable machine. Price $2250 f. o. b. cars, Oakland City, Ind.

1—200-kw. **Ideal Generator**, 250-v., D.C., direct connected to Buckeye Automatic Engine.

1—200-kw. **Fairbanks-Morse Generator**, 250-v., D.C., direct connected to Nagle, 4-valve Engine.

1—200-kw. **Crocker-Wheeler Generator**, 250-v., D.C., direct connected to Filer-Stowell Corliss Engine.

Write, wire or phone for prompt quotation.

RAILWAY & MINE SUPPLY CO
332 So. Michigan Ave., Chicago, Ill.

50-KW. GENERATORS

Two General Electric, 300 r.p.m., 125/250-volt, 50-kw., 3-wire Generators, direct connected to Ball Engines. Generators one right-hand and one left-hand. Outfit complete with all apparatus.

Everything good as new and ready for immediate shipment.

F. MAYER
1601 Monadnock Bldg., Chicago

FOR SALE
200 Volt D.C. Generators

Kw.		*Speed*
1—30	Westinghouse	950
1—30	Sturtevant	600
1—30	C. & C. to Skinner engine	250
1—30	Ft. Wayne to Skinner engine	300
1—37½	Ft. Wayne to Ideal engine	310
1—40	Westinghouse to Fleming engine	353
1—50	Triumph	900
1—50	Card	650
1—50	Ft. Wayne to Haberkorn engine	275

We buy for spot cash, sell, exhange, repair and rent. Largest stock in America.

GREGORY ELECTRIC CO. CHICAGO, ILLINOIS

16th and Linlcon Streets, Chicago

FOR SALE

BIG BARGAIN FOR QUICK ACTION

Immediate Ohio Shipment Subject to Prior Sale

1—150-kw., 250-volt, 8-pole, 600-ampere, 200 r.p.m., compound-wound Westinghouse direct-current generator, direct connected to a horizontal simple right-hand center crank Fisher engine, 18 x 18, equipped with field rheostat, generator panel and instruments; in excellent condition. Price, $3250.

If Interested—Use Wires Our Expense

WOOD & LANE COMPANY
St. Louis, Missouri.

Immediate Shipment
250-VOLT DIRECT CURRENT

500-kw. Crocker-Wheeler-Hamilton, cross compound
550-kw. Allis, vertical cross compound.
200-kw. Allis Bullock, cross compound.
250-kw. West.-Buckeye.
150-kw., 575-r.p.m., belted.
75-kw. Lycoming-Fairbanks, 275-r.p.m.
80-kw. and **50-kw. Chandler & Taylor.**

Send us your inquiries for Engines, Boilers, etc.

ROSS POWER EQUIPMENT CO.
Indianapolis, Ind.

FOR SALE

1—**Complete Header** for a battery of six 66-in. boilers, including
4—12 x 12 x 6 Ts, and
2—10 x 10 x 6 Ts,
with pipe cut to center the Ts on 6 boilers set in one bank.
6—6-in. **Valves.**
12—6-in. **Ls.**
100 ft. 12-in. **Pipe.**
50 ft. 8-in. **Pipe.**
40 ft. 10 in. **Pipe.**
1—**Bush**, 12 x 4.
1—**Bush**, 12 x 8.
3—8-in. **Ls.**

La Salle County Carbon Coal Co.
La Salle, Ill.

2—800 K.W. Direct Current Generators

250 Volts, Direct Connected with

2—CROSS COMPOUND SLOW SPEED ENGINES

Condensing or non-condensing; equal to new, capable of 25% to 50% **Overload.**

Immediate Delivery

POWER EQUIPMENT CO., Owners
1218 Chestnut St., Philadelphia, Pa.

Mining Machines

1—Type SS, 250-volt, Mrg.-Card, 42-in. gage 5-ft. cut, self-propelling trucks.

Direct Current Engine Generator Sets
230 to 250 Volts

Belted sets complete with rails, pulleys and rheostats

1—17½-kw., 230-volt, 1100-r.p.m., cp. wd., G. E. Generator, belted to 1—28-hp., 250-r.p.m., Champion gas engine, complete.
1—20-kw., 230-volt, 250-r.p.m., sh. wd. Fairbanks-Morse Generator, belted to 1—28-hp. Struthers Wells gas engine, complete.
1—30-kw., 230-volt, 1100-r.p.m., comp. wd. Westinghouse, Type M Generator, belted to Ball Engine, 300-r.p.m., complete with accessories.
1—45-kw., 250-volt, 950-r.p.m., cp. wd., Type M Westinghouse Generator, belted to 1—65-hp., 290-r.p.m., straight line steam engine, complete.
1—50-kw., 225-volt, 290-r.p.m., cp. wd. Hawthorne Generator, direct connected to 13 x 12 Skinner steam engine. Stock No. B-483. Price on application.
1—55-kw., 230-volt, 950-r.p.m., cp. wd Milwaukee Generator, belted to 12 x 14 McEwen Steam engine, 250-r.p.m., complete with all accessories.
1—90-kw., 250-volt, 550-r.p.m., cp. wd., G. E. Generator, belted to 1—125-hp., 220-r.p.m., Lord-Howler steam engine, complete.
1—75-kw., 220 to 230-volt, 270 r.p.m., Westinghouse Generator, cp. wd., 6 pole, direct connected to 1—American ball steam engine.
1—75-kw., 250-volt, 275-r.p.m., cp. wd., Northern Electric Generator, direct connected to 1—Erie Ball steam engine, complete.
1—75-kw., 230-volt, 800-r.p.m., sh. wd., Type S Westinghouse Generator, belted to 1—125-hp., Lord Howler steam engine, complete.
4—100-kw., 250-volt, 225-r.p.m., cp. wd Morgan-Gardner Generators, belted to Skinner steam engines, 16 x 18.
1—110-kw., 250-volt, 600-r.p.m., cp. wd. Burke Electric Generator, belted to National Transit gas engine. Set complete with compressor and accessories.
1—450-kw., 250-volt, 300-r.p.m., cp. wd. Westinghouse, 3-bearing Generator, belted to Allis-Chalmers Corliss steam engine, 150-lb. steam pressure.

Direct Current Belted Generators
550 Volts

Complete with rails, pulleys and rheostats

1—500-kw., 550-volt, 320-r.p.m., CP, Type M, Westinghouse Stock No. B-464, $3500.

Switchboards can be furnished with the above.

DUQUESNE Electric & Mfg Co.

Write, wire or 'phone our nearest office.
Pittsburgh, Pa., or 230 S. LaSalle St. Chicago, Ill.

DIRECT CONNECTED

GENERATING SET

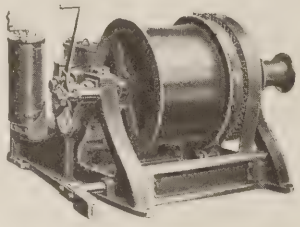
500 Kv.-a General Electric Revolving Field, 3-phase, 25-cycle, 480 volts, 107 r.p.m., direct connected to Hardie Tynes Cross Compound Corliss Engine, 22 x 44 x 44, complete with switchboard, instruments and connections, with 45-Kw. Exciter, belted to main shaft, 125 volts, Fort Wayne. This set good as new, housed, and operated less than four months. May be inspected at plant of Coosa Portland Cement Co., Ragland, Alabama.

For details and price apply

J. F. DONAHOO CO.
Birmingham, Alabama
Also other smaller plants

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ELECTRIC HOISTS



Mead-Morrison Single Drum Mine Hoists

IMMEDIATE SHIPMENT

of a few sizes from carload just received. Practically any other size shipped in 8 to 10 weeks.

Rebuilt Steam Hoists for Mine Service

Large Stock in Pittsburgh: Concrete Mixers, Pile Hammers, Derrick Equipment, and other Construction Machinery.

Tell us your requirements.

BECKWITH MACHINERY CO.
"Mine and Contractors' Equipment"
106 West Park Way, N.S., Pittsburgh, Pa.

Mine Hoisting Engine

FOR SALE

Mundy Improved Single Friction Drum Hoisting Engine, double cylinder, 8½ x 13, weight hoist on single line 5000 lb. Size of drum overall 38-in. diam. x 42-in. wide, in first-class operative condition.

MARINE METAL & SUPPLY CO.
167 South St., New York City

Subject to Prior Sale we offer the following:

Second-Hand Mining Machinery for Sale

Six 8-ton Morgan Gardner Type F, 250-volt, 34 in. and 36 in. track gauge **Locomotives,** for inspection at Ehrenfeld, Winburne and Munson, Pa.

10-ton Goodman Type 11A, 250-volt, 36 in. track gauge **Locomotive,** for inspection at Patton, Pa.

7-ton Milwaukee **Locomotive** of Manufacturing Company, gasoline **Locomotive,** 36 in. gauge and spare parts, for inspection at Gipsy, Pa.

Morgan-Gardner Type D, 250-volt, 36 in. gauge, 7½-ft. cutter, **Bar-Mining Machine,** for inspection at Amsbry, Pa.

Jeanesville boiler feed **Pump,** 5 by 8 outside packed, 4 in. suction, 3 in. discharge, 1½ in. live steam, 2 in. exhaust, for inspection at Arcadia, Pa.

Nagle Engine, 16 x 22 slide valve, throttling governor with shaft and outboard pillow block and band wheel, 96 in. by 20 in., 175 hp., at 150 r.p.m., with 100 lb. steam at throttle, 4½ in. live steam, 6 in. exhaust, for inspection at Cresson, Pa.

15 x 25 x 15 Harrisburg left hand horizontal compound Tandem **Engine,** with shaft governor and splash oiling system, live steam 6 in., exhaust 10 in., for inspection at Beaverdale, Pa.

11 x 14 Chandler & Taylor left hand slide valve **Engine,** live steam 3 in., exhaust 4 in., for inspection at Gallitzin, Pa.

12 x 16 Chandler & Taylor right hand slide valve **Engine,** live steam 3½ in., exhaust 4 in., for inspection at Gallitzin, Pa.

20 ft. x 6 ft. **Vulcan Fan,** direct connected to 18 x 24 left hand Vulcan slide valve **Engine,** live steam 5 in., exhaust 6 in., for inspection at Gallitzin, Pa.

12 ft. x 4 ft. **Capell Fan,** direct connected to 14 x 16 Chambersburg left hand piston valve **Engine,** live steam 6 in., exhaust 7 in., for inspection at Beaverdale, Pa.

Pawling & Harnishfeger, 20,000 lb. capacity **Crane,** No. 2144, span 48 ft. 3 in., length of track 78 ft., for inspection at Ehrenfeld, Pa.

PENNSYLVANIA COAL & COKE CORPORATION, Cresson, Cambria County, Pennsylvania

ANTHRACITE SCREENINGS

Any part of 300,000 tons of clean fine Anthracite for immediate shipment. Passed through one-half-inch round apertures. Contains about 80 per cent. fixed Carbon. No rock or slate. No sulphur. On Denver & Rio Grande R.R.

Address: **ANTHRACITE, 850 Equitable Bldg., Denver, Colo.**

HOISTS

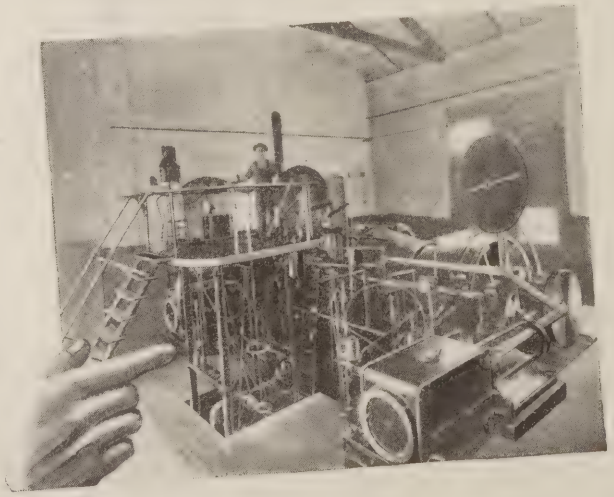
Steam or electric mine hoists—standard makes and sizes. Compressors, Boilers, Mixers, Cableways.

HOISTING ENGINE SALES CO.
Grand Central Station, N. Y. City

Mine Hoist

1—100-H.P., 14 x 18 Lidgerwood double cylinder, catalog No. 59, reversible Mine Hoist, drum 65 in. diameter, 56 in. long, grooved for 1¼-in. rope. Immediate shipment.

BECKWITH MACHINERY CO., Pittsburgh, Pa



Steam Hoisting Engine

FOR SALE

Owing to change from steam to electrical equipment, Nordberg first motion, double conical drum, duplex steam hoisting engine, Corliss gear, cylinder 18 x 42. Drum capacity grooved for one thousand feet of 1⅛-in. rope.

TENNESSEE COPPER COMPANY
61 Broadway, New York, N. Y.

SEARCHLIGHT SECTION

FOR SALE

LOCOMOTIVES

1—Goodman 8-ton single motor Haulage Locomotive, equipped with outside steel tired wheels, 42 in. track gage, 250 volts. Thoroughly overhauled and for immediate shipment.

1—New Jeffrey 4-ton Gathering Locomotive, equipped with mechanically operated cable reel, outside chilled iron wheels, 36 in. track gage.

COMPRESSOR

1—Franklin Steam Driven Compressor, size of cylinders 14 x 14 x 16 in., capacity 427 cu.ft. and 150 r.p.m.

GAS ENGINE AND GENERATOR

1—National Transit Gas Engine, size of cylinders 12½ x 24 in., belted to 1—110-kw. Burke Generator, 250 volt., D.C., with belt and switchboard.

TRANSFORMERS

3—75 Kw. each Allis-Chalmers self-cooled, oil insulated transformers 11,000 and 2300 volts primary to 250/275/300 volts secondary.

MINING MACHINE CABLE

Duplex and Concentric mining machine cable in 300 ft. lengths for immediate shipment.

PITTSBURGH MINING MACHINERY COMPANY
First National Bank Bldg., Pittsburgh, Pa.

Steam Shovels and Cars

1—New Atlantic "Type 80," 3½-yd. dipper
1—70-C Bucyrus, Shop No. 1261, 3-yd. dipper
10—Standard gage, 6-yd. K. & J. Cars
8—36-in. gage, 4-yd. Western Cars
6—36-in. gage, 2-yd. "V" shape, Koppel Cars
20—Tons 20-lb. Relayers

Many sizes **Air Compressors**, belted and steam.
Tanks to suit every purpose
Boilers, vertical, firebox and return tubular
Buckets, clamshell, orange peel and turnover.
Cableways, many sizes
Concrete Mixers
Crushers, Road Rollers, Water Wagons and **Screens**
Hoisting Engines, three-drum, two-drum and single-drum, in many sizes, with and without boilers
20—Light **Locomotives**, four-wheel saddle tank, 14 to 20 ton
Pumps of every description

Write, Wire or Phone for our list before placing your order

Pittsburgh Machinery & Equipment Co.
502 Fulton Bldg., Pittsburgh, Pa.

FOR SALE
18—1-ton
MINE CARS

36-in. gage. Very little usede. For sale account changing track gage. Price $75 each.

PRESTON COUNTY POWER CO.
Kingwood, W. Va.

USED COPPER CABLE

Ft.	Gage	Strands	Cir. Mills
2,700	6	1	26,000
5,000	14	7	28,000
1,000	3	1	52,000
1,600	11	7	59,000
150	2	1	66,000
1,000	10	7	72,000
400	9	7	94,000
1,300	8	7	115,000
1,100	000	1	167,000
2,000	10	19	197,000
10,000	11	37	300,000

RAILS: RELAYING A-1

100 ton 56-lb., with angle bars, switch points, switches, etc., at $60 f.o.b. Bedford, Ind.

STEEL DUMP CARS

20—10-ton **Atlas**, bottom dump, standard gage.

TURBINES

1000-kw. **Curtis**, vertical, 25-cycle, 3-phase, 480-volt.
800-kw. **Curtis**, vertical, 25-cycle, 3-phase, 480-volt.

BOILERS

2—300-hp. **Cahall**, vertical water tube.
4—250-hp. **Geary**, Horizontal Water Tube.
1—375-hp. **O'Brien**, Heine Water Tube.

PIPE

1000 ft. 12-in. Flanged C. I. Pipe.
1000 ft. 14-in. Flanged C. I. Pipe.
1000 ft. 16-in. Flanged C. I. Pipe.
With valves, tees, ells, etc.

Large quantity Shaft Hangers, Pillow Blocks, Shafting, couplings, Pulleys, Safety Collars, etc. Price 4c. per lb. **Conveyors:** Belt, Bucket and Screw, with troughs, all sizes. Price 4c. per lb.

Write for our complete list.

D. M. OSBORNE MACHINERY CO.
221 St. Clair Ave., N. E., Cleveland, O.

FOR SALE

1 Air Compressor
2 Hoists and Engines
3 Mine Pumps

1—Ingersoll-Rand Class AA2 Air Compressor.
1—8 x 10 D.C., Lidgerwood large single drum, 35-hp. Mine Hoist and Engine, complete.
1—7 x 12 Mundy D.C., double drum Mine Hoist and Engine, complete.
2—Deane Mine Pumps.
1—Buffalo Steam Pump.

(These can be seen in running condition. Reason for selling: changing to electricity.)

Mt. Savage-George's Creek Coal Co.
Frostburg, Md.

Rails

500 tons 40-lb. **New.**
200 tons 25-lb. **Relay.**
50 tons 25-lb. **New.**
100 tons 20-lb. **Relay.**
50 tons 20-lb. **New.**
250 tons 16-lb. **New.**
200 tons 12-lb. **New.**
Heavier sections for mine sidings.

Locomotives

Steam

1—49½-ton, 4-ft. 8½-in. gage Vulcan, 6-wheel switcher, steam pressure 180 lb. **Good as new.**
1—30-ton, 4-ft. 8½-in. gage Davenport, S.T. coal burner. **Overhauled. First-class.**
1—26-ton, 4-ft. 8½-in. Davenport S.T., oil burner. **Overhauled. First-class.**
13—14-ton, 36-in. gage Porter S. T., steam pressure 140 lb. **Overhauled.**
1—9-ton, 36-in. gage Davenport S. T., steam 160 lb. **Good.**
1—7½-ton, 36-in. gage Davenport S. T., steam 160 lb. **Good.**
2—9-ton, 24-in. gage Davenport S.T., steam 150 lb. **Good.**

Gasoline

1—5-ton, 30-in. gage Whitcomb, Class "B," two speeds in each direction. **First-class.**

Electric

2—5-ton General Electric, 24-in. gage, 250-volt.
Other Types, Weights, Gages.
30—End Dump Quarry, 36 cu.ft. **Wood Construction. Good.**

Mine Cars—*36-in. gage*

38—End dump quarry, 36 cu.ft. **Wood Construction. Good.**

Air Compressors

1—280-ft. Norwalk, straight line, simple steam, 2-stage air, 100-lb. air pressure. **Excellent.**
1—900-ft. Norwalk, straight line, simple steam, 2-stage air, 100-lb. air pressure. **First-class.**
1—500-ft. Laidlaw-Dunn-Gordon, 14½ x 16½ x 18, 80-lb. air pressure.
1—528-ft. Ingersoll-Rand, 14 x 14 x 12, 80-90-lb. air pressure.
1—1924-ft. Norwalk simple steam, 2-stage air, 100-lb. air pressure.

Generator Sets

1—60-kw. Western Electric, 250-volt, D.C., direct connection to Chuse Automatic Engine, with switchboard. **First class.**
1—75-kw. Westinghouse, 250-volt, D.C., direct connected to Payne Automatic Engine, with switchboard. **Excellent.**

Pumps

1—6 x 4 x 6 McGowan Duplex, 3 in. suc., 2 in. dis.
1—9 x 10½ x 12 Deane Duplex, 9 in. suc., 6 in. dis.
1—10 x 6 x 12 Smith-Vaile Duplex, 6 in. suc. 4 in dis.
1—10 x 6 x 12 Deane Duplex, 6 in. suc., 4 in. dis.
1—12 and 18 x 10 x 18 Deane Duplex compound, 12 in. suc. 10 in. dis., 150-lb. water pressure.
1—20 x 12 x 15 Worthington Duplex pot valve 10 in. suc., 8 in. dis., 300-lb. water pressure.
1—2000-g.p.m. against 60-ft. head Worthington 10-in. Bi-Rotor pump, with 60-h.p. Curtis, non-condensing steam turbine.
1—2-stage American Centrifugal pump, 1000 g.p.m. against 75-ft. head, coupled to 50-h.p. G.E. motor, 3-phase, 60-cycle, 440-volt.

Beams

2—Built-up plate Girders, 7 ft. 6 in. high, 80 ft. long, weight about 35,000 lb. each.
2—Built-up plate Girders, 6 ft. 4 in. high, 55 ft. long, weight about 13,000 lb. each.
8—24-in. x 80-lb. I Beams, 15 ft. 11 in. long.
4—24-in. x 80-lb. I Beams, 15 ft. 4 in. long.
4—Plate Girders, 4 ft. high, 40 ft. long.
15—15-in. x 60-lb. I Beams, 20 ft. long.
35—4-in. I Beams, 6 ft. 4 in. long.
8—12-in. x 30-lb. I Beams, 20-ft. long.
15—12-in. Channels, 12 ft. 6 in. long.
First-class

Boilers

2—72 x 18 Erie City Return Tubular, 4-in. flues, 125-lb steam.
1—60 x 16 Erie City Return Tubular, 4-in. flues, 110-lb. steam.
2—50-hp. Erie City Economic, fire-box type, 100-lb. steam.
1—40-hp. Vertical Boiler, 100-lb steam.
1—150-hp. Scotch Marine Type, single corrugated furnace, 115-lb. steam.

ZELNICKER IN ST. LOUIS
Get Bulletin 237—78 bargain pages.

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For Immediate Delivery

3 miles track, 20-lb. rails, with steel ties, 36 in. gage, space 30 in., center to center, in 15-ft. sections, including four switches. Utica, Minn.

2 miles track, 25-lb. rails, with steel ties, 36-in. gage, space 30 in. center to center, in 30 ft. sections, 10% shorter, practically new, with connection plates. Utica, Minn.

1 mile track, 25-lb., relay rails, 30-ft. lengths, 10% shorter, practically new, with connecting plates. Utica, Minn.

10 miles 35-lb. steel rails, angle bars attached. Park Rapids, Minn.

5 miles 40-lb. steel rails, angle bars attached. Park Rapids, Minn.

5 miles 45-lb. steel rails, angle bars attached. Park Rapids, Minn.

50 tons 9/16 x 5 track spikes. Park Rapids, Minn.

38 Russell Logging Cars, 40,000 lb. capacity. Park Rapids, Minn.

7 Steel Dump Cars, 36-in. gage, 2-yd. capacity. Utica, Minn. Koppel and Lakewood type.

17 3-yd. Western Cars, including 8 brake cars, 36-in. gage. Utica, Minn.

1—Climax Locomotive, 13-ton, 36-in. gage. Utica, Minn.

1—Shay Geared Locomotive, 13-ton, 36-in. gage. Utica, Minn.

1—Shay Geared Locomotive, 24-ton, standard gage. Park Rapids, Minn.

1—American Hoisting Engine, 7 x 10 cylinders. D.C., D.D.

CHICAGO HOUSE WRECKING CO. OF MINNESOTA, INCORPORATED
Stickney Bldg., St. Paul, Minn.

RAILS

RELAYERS—NEW

Write, wire or phone us if you need any. 8 lb. to 100 lb. section.

GENERAL EQUIPMENT CO.
30 Church Street, New York City

RAILS

RELAYERS—NEW

If you have any to sell, 12 lb. to 100 lb., write, wire or phone us.

GENERAL EQUIPMENT CO.
30 Church Street, New York City

RAILS

For shipment from Cleveland

NEW RAILS	RELAYING RAILS
12 lb.—100 tons.	30 lb.—100 tons.
16 lb.—125 tons.	35 lb.—100 tons.
20 lb.—130 tons.	40 lb.—100 tons.
25 lb.—175 tons.	56 lb.—150 tons.
30 lb.—180 tons.	60 lb.—100 tons.
40 lb.—140 tons.	70 lb.—250 tons.
	75 lb.—300 tons
RAILROAD TIES	80 lb.—900 tons.
	85 lb.—725 tons.

THE FISHEL & MARKS CO.
Cleveland, Ohio
Pittsburgh Detroit Chicago

Draglines for Stripping Coal

1—100-ft. boom Monighan, 3½-yd. Page Bucket, 24-ft. circle and roller turntable. Fine machine, almost new. Chicago delivery.

2—110-ft. boom, 2-yd. Monighan, fine condition. Western New York delivery.

1—100-ft. boom, Lidgerwood-Crawford, 3-yd. Bucket, good condition. Illinois delivery.

1—Class "24" Bucyrus, 4-yd. Bucket, fine condition. Southern delivery.

1—No. T-1 Monighan Walker, 40-ft. boom, 1-yd. Bucket. Minnesota delivery.

1—Browning all-steel construction, 75-ft. boom, 1-yd. Bucket (Page), will handle 2-yd. bucket. Electric light plant. Indiana delivery.

Wire or write for quotations.

THOS. J. DOLAN
76 W. Monroe St., Chicago, Ill.

RAILS! RAILS! RAILS!

We have for prompt delivery big tonnages of 52 lb., 56 lb., 60 lb., 70 lb. and 85 lb. No. 1 Relaying Rails. *Write or wire.*

NATIONAL STEEL RAIL CO.
1030 Pierce Bldg., St. Louis, Mo.

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21,000 ft. 35-lb. rail with angle bars.
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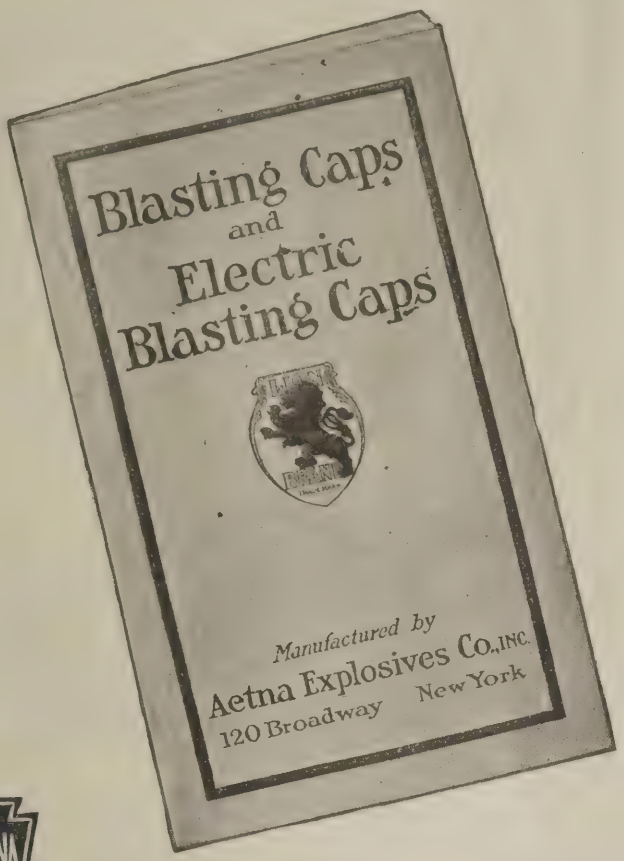
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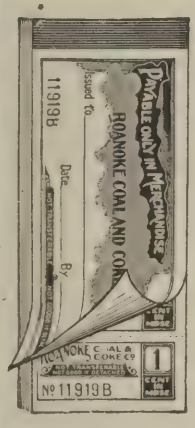
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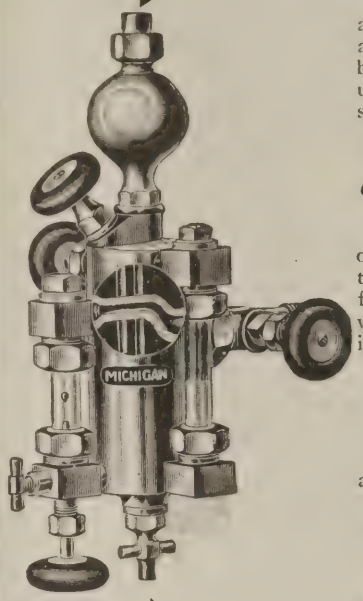
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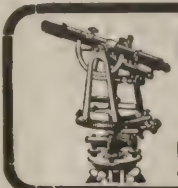
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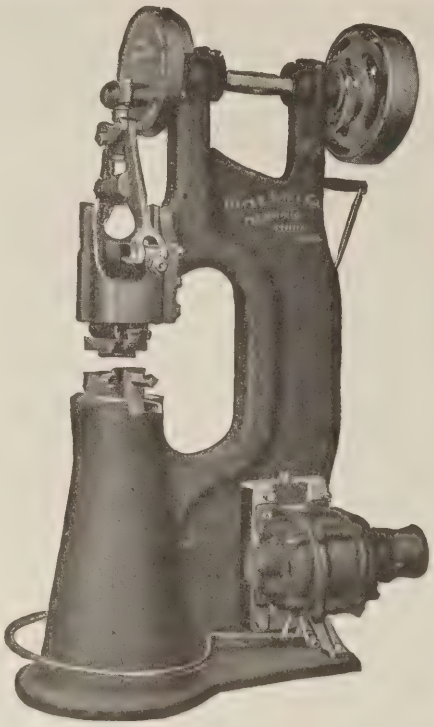
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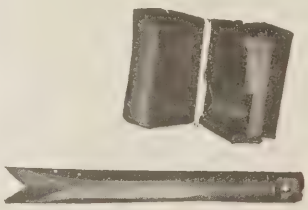
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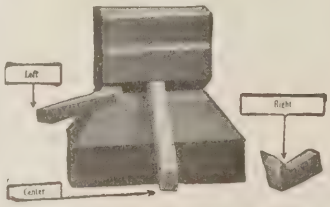
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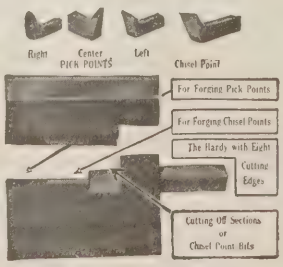
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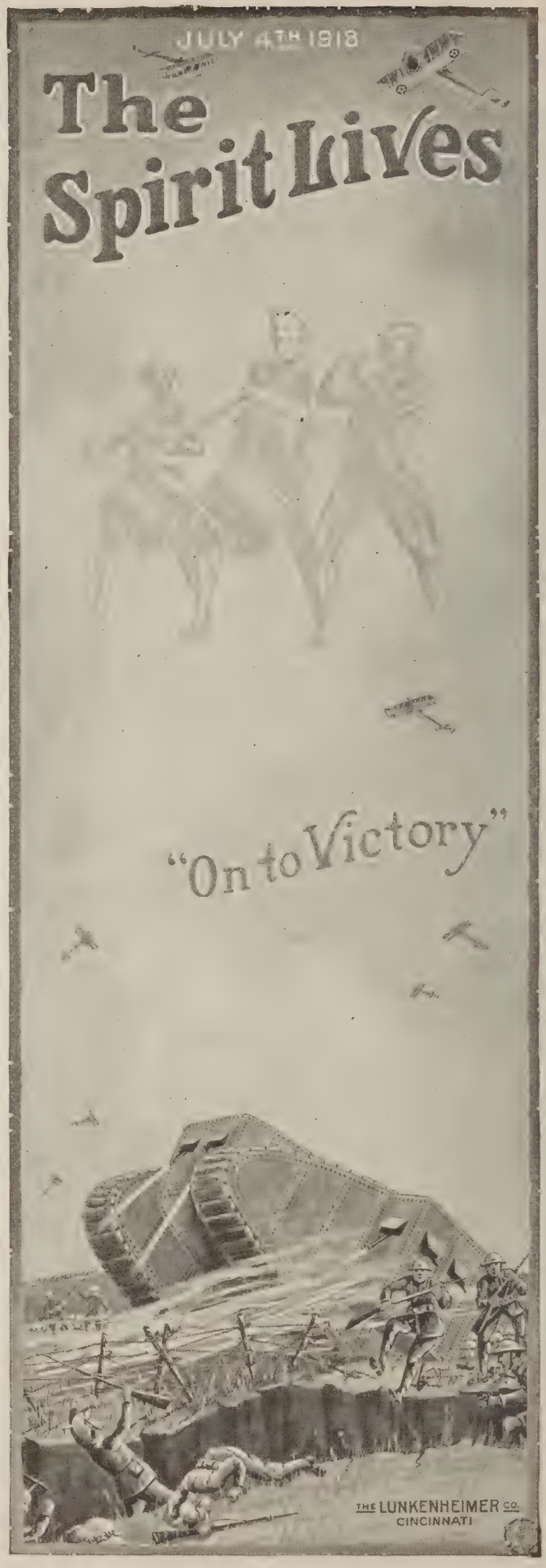


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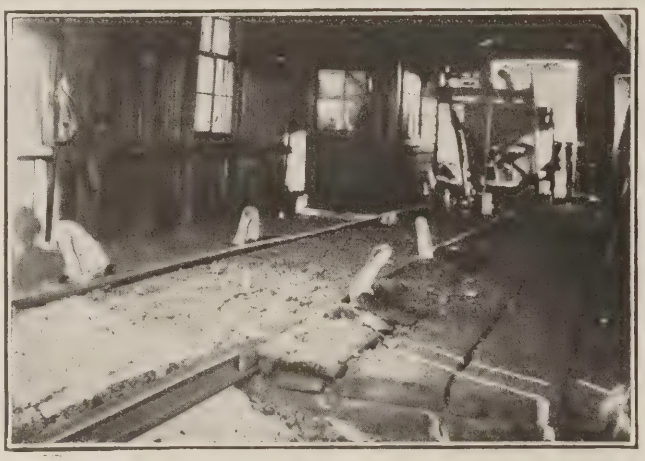
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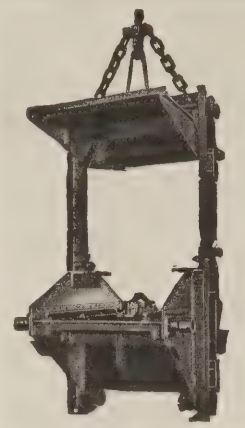
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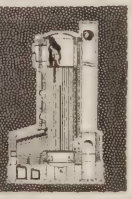
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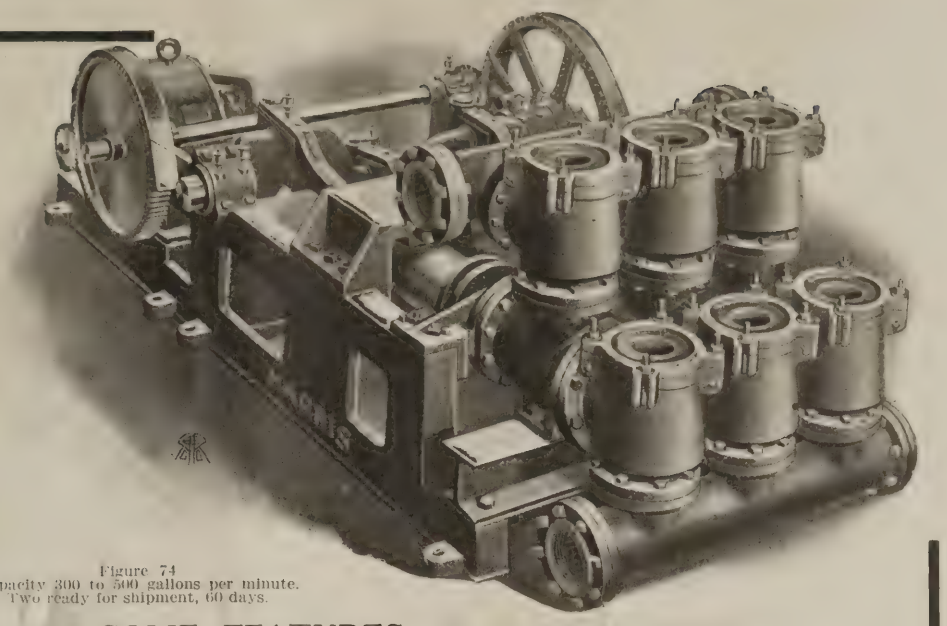


Figure 74
Capacity 300 to 500 gallons per minute.
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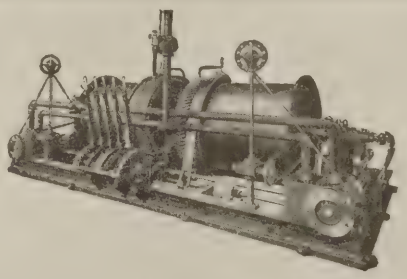
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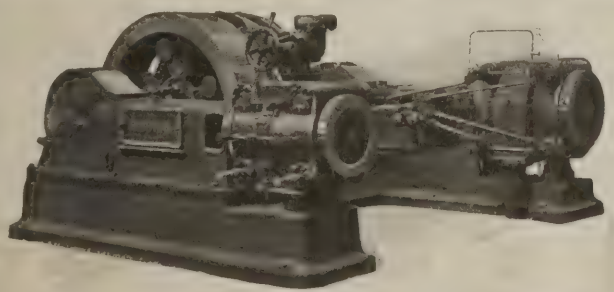
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FLORY DOUBLE-DRUM HOISTS

keep the loaded branches clear around the foot. Strong, safe, and speedy; band frictions prevent slippage; no end-thrust or torsional strain on drum shaft. Dependable brakes; levers conveniently banked. **Details on request.**

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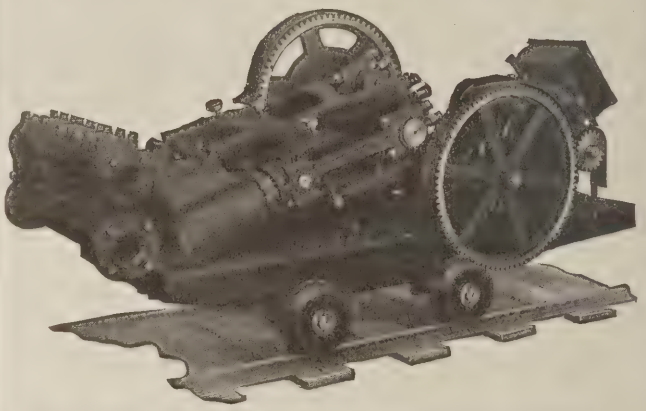
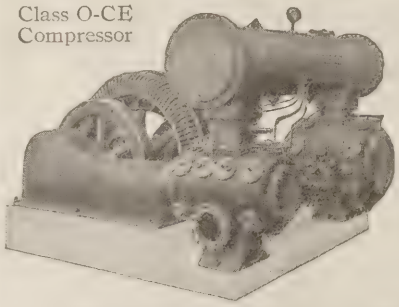


Fig. 70 Deming horizontal electric triplex mine pump. Capacities from 1,800 to 20,000 gallons per hour. Good for 300 ft. head.

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Class O-CE Compressor



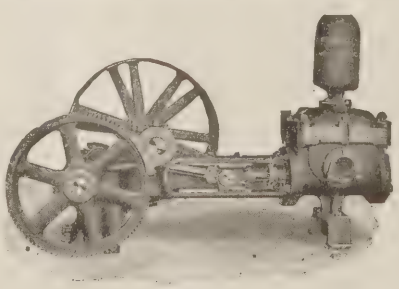
represent the most advanced design in duplex, high speed, inclosed frame, self-oiling machines of their type. **Smoothness and Noiselessness of** operation are two of their principal features. Their volumetric and mechanical efficiencies are the maximum.

Send for Bulletin 34-M

CHICAGO PNEUMATIC TOOL COMPANY
1032 Fisher Building Chicago *Branches Everywhere* **52 Vanderbilt Avenue New York A-3**

PUMPS
Electric, Steam, Boiler Feed
BOYTS, PORTER & CO.
Connellsville, Pa.

THE JOHN H. McGOWAN CO.
BUILDERS
PUMPING MACHINERY
IN ALL TYPES FOR ALL USES
M'G M'G
CINCINNATI OHIO

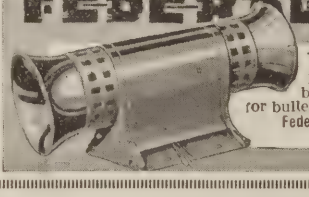


This is a strong pump fitted with our special acid-resisting bronze. We build mine pumps for all purposes.

Send for Catalog No. 113.

DEAN BROS. STEAM PUMP WORKS INDIANAPOLIS.

FEDERAL ELECTRIC SIRENS

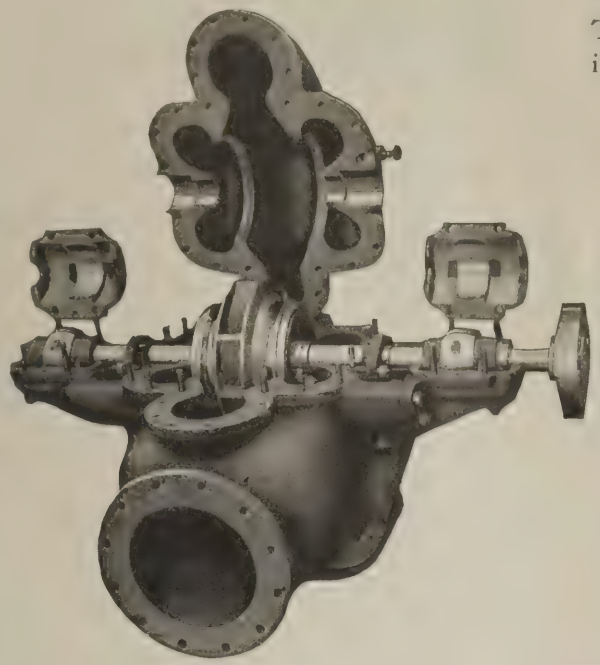


The Most Distinctive, Economical Mine Signal
Its powerful penetrating tone cannot be mistaken. Easily installed. Write for bulletin on "Mine Sirens."
Federal Sign System (Electric), Chicago, Ill.
Branches: All Large Cities

Improved Breaker Machinery for the Preparation of Coal
Simplex Jigs—Lloyd Compound Gear Driven Rolls—Parrish Flexible Arm Shakers—Keystone Rivetless Chain in High Carbon Steel, in Manganese Steel and in Malleable Iron.
WILMOT ENGINEERING CO. **HAZLETON, PENN.**
Works: White Haven, Penn.

The Slogan of the Cameron—"Character: The Grandest Thing"

SMALL DETAILS BECOME BIG



The smallest detail in a Pump becomes big and troublesome if it is skimped over in manufacture. The great point about

CAMERON CENTRIFUGALS

and why they last so long and have such low upkeeps is that every detail down to the smallest gets the greatest care in manufacture.

Examine the design and construction of the Cameron Class "DV" Centrifugal Pump, shown in the illustration. Note how every part is carefully finished to secure the greatest durability and efficiency.

Cameron Centrifugals make good on the hardest job as well as the easiest—and that's why they deserve your attention.

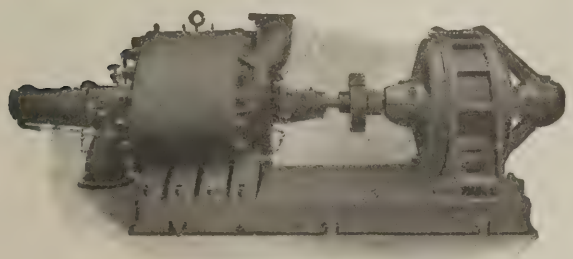
Get the Whole Story—Bulletin No. 7150.

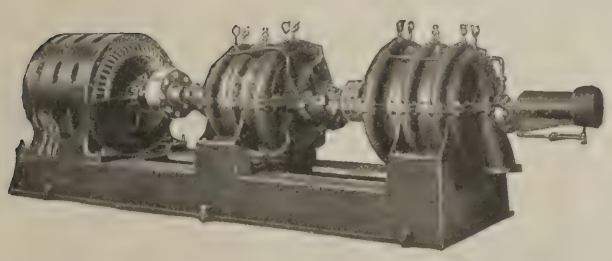
A. S. Cameron Steam Pump Works

11 Broadway, New York **Offices the World Over**

31-V

WORTHINGTON





In every important mining section the Worthington Centrifugal Mine Pumps are to be found in successful operation.

A Worthington Centrifugal Mine Pump requires comparatively small space; its extreme simplicity, low first cost, infrequent repairs, low upkeep and high efficiency are features that effect large savings in the cost of mine operation.

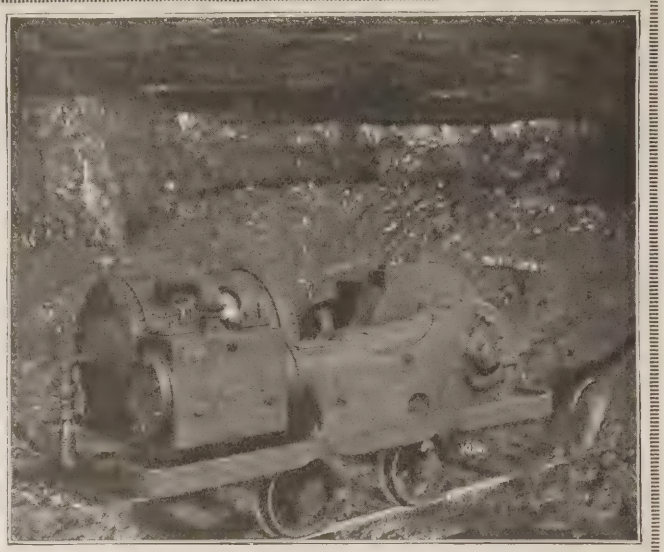
Get Bulletin W 602-73.

WORTHINGTON PUMP AND MACHINERY CORPORATION

New York Office: 115 Broadway Works: Harrison, N. J.

Branch Offices in All Principal Cities W382.4

MINE PUMPS



There's Satisfaction in an Ingersoll-Rand Mine Portable Compressor

In placing one of these self-contained units in your mine you can do so with the assurance that it is simple, sturdy, efficient and economical.

You obtain the advantage of Ingersoll-Rand Plate Valves—efficient, noiseless and long lived. Dirt and dust tight covers protect the wearing surfaces from grit. Motor drive through herring-bone gears running in an oil bath—compact and trouble proof. Automatic lubrication and self-control eliminate the need for constant attendance.

For the electrically equipped mine there is no better source of air power than these mine car mounted machines.

Shall we send you a full description? Ask for Bulletin 3015-1.

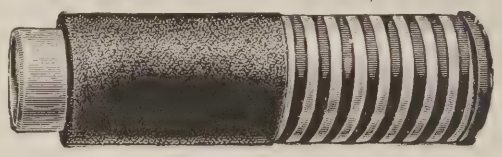
Ingersoll-Rand Company

11 Broadway, New York — **165 Q. Victoria St., London**

Offices the World Over

294-C

WYCKOFF



WOOD PIPE

Instead of renewing your costly iron pipe—

Install Wyckoff Wood Pipe, the pipe that has been making good in mine service for the last half century.

Its faculty for resisting the action of sulphurous water is the reason for this—

Incidentally, it's the reason why Wyckoff Wood Pipe is in service in 90% of the Anthracite Mines and at least 60% of the Bituminous in the country.

So if you seek a pipe of proven durability, Wyckoff Wood pipe is that pipe—

As our engineers will prove to your satisfaction if you will take advantage of their cooperation.

A. WYCKOFF & SON COMPANY
ELMIRA, N. Y.
378 Piedmont Ave., Atlanta, Ga.

WILLIAMS CRUSHERS

with Williams Patent Hinged Hammers —the hammers with five lives



Send for the Williams Crusher Book No. 5.

The Williams Patent Crusher & Pulverizer Co.
Old Colony Building
Chicago

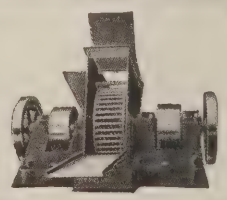
Makes Superior Coke from Inferior Coal
You do it with complete assurance with the

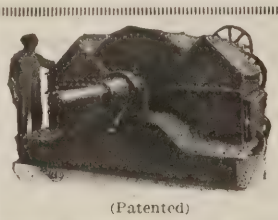
STEDMAN

COAL DISINTEGRATOR

It mixes as well as pulverizes. Insuring a uniform product. **Write us for Catalog 16.**

Stedman's Foundry & Machine Works
Aurora, Indiana





(Patented)

"PENNSYLVANIA"

Hammer Crushers, Bradford Coal Cleaners, Single Roll Crushers, Rock Crushers, Delamater Float Testers. Specialists in Coal Crushing and Cleaning Machinery for By-Product and Bee Hive Coke Plants, Coal Mines and Power Houses.

PENNSYLVANIA CRUSHER CO.
PHILADELPHIA
New York Seattle Pittsburgh
L. C. Smith Bldg.

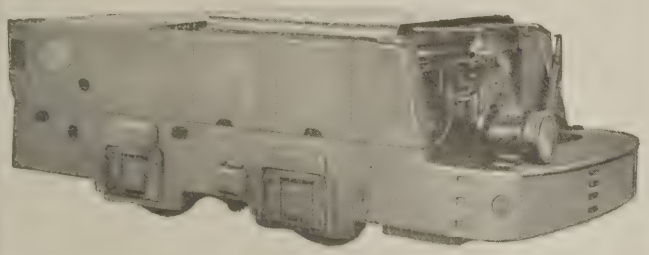
WHITCOMB
Gasoline Locomotives

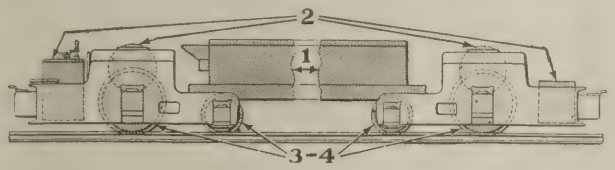
The low cost locomotives. Low haulage costs are the result of many factors. Low costs constitute the barometer by which the true value of a locomotive can safely be determined.

Over 600 mines have measured the efficiency of the Whitcomb Gasoline Locomotive. The result is that over 600 mines are *using* the "Whitcomb"—the compact, powerful, safe and economical haulage unit.

Shall we show you what the "Whitcomb" will do for *your* haulage?

Geo. D. Whitcomb Company
Rochelle, Illinois





THIS outline drawing shows four vital advantages of the

Goodman Articulated Storage Battery Locomotive

1—A storage battery of ample capacity may be accommodated between the bogy trucks.

2—One truck carries motor and controller; the other truck carries another motor and rheostat. Result—all mechanical parts are easily accessible and are located so they transmit no heat to battery.

3—The only running parts beneath battery are the idle wheels.

4—The weight is distributed onto eight wheels (not four). So the drivers are not forced to carry excess weight beyond what is necessary for desired draw-bar pull.

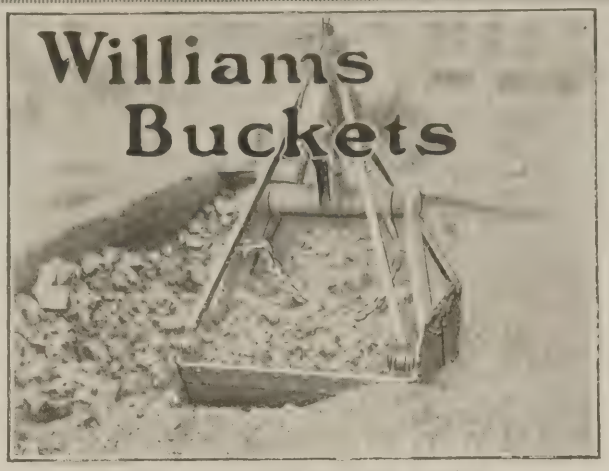
Many other exclusive merits that make the best of reasons why you should equip with Goodman Articulated Locomotives are given in Bulletin 522-A. **Write for it now.**

GOODMAN MFG. CO., Chicago, Ill.

New York, St. Louis, Pittsburgh, Cincinnati, Birmingham, Charleston, W. Va., Denver, Seattle

63

Williams Buckets



"Built to Dig and Last While Digging"

Speeding Up Unloading

Today, the individual features in bucket construction are being considered as never before. Particularly as a *coal handling bucket*, the WILLIAMS stands out *strong, economical, a digger.*

The many advantages of the WILLIAMS combination of lever and block and tackle principle, of its *triangular* construction, its few working parts, its low cost of upkeep, have each their vitally important advantage.

Let us point out why. Write.

The G. H. Williams Co.
Erie, Pa.



Mule Haulage Costs Cut Squarely in Half

THE Southern Connellsville Coke Co. used a PLYMOUTH Gasoline Locomotive for a year, keeping accurate cost records. Then they wrote us that it was doing *all* their work for *half* what they had formerly paid for horse-and-mule-haulage. Further, they say that their

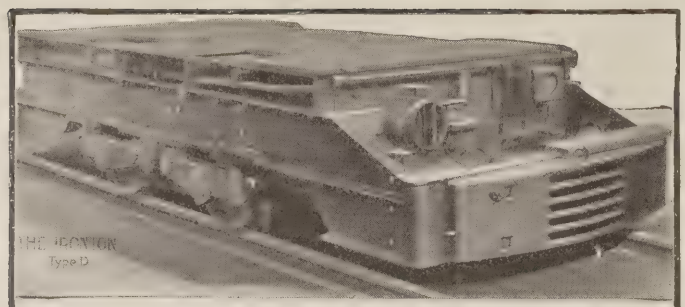
PLYMOUTH
Gasoline Locomotive

runs on 5 gallons of gasoline and 1 quart lubricating oil per day; that it hauls 400 bushels to a trip, covering each hour 3 or 4 round trips of over 1½ miles each; that it works underground successfully and *does not throw off any objectionable fumes.*

Tell us about *your* hauling. Full particulars gladly sent.

THE J. D. FATE COMPANY
219 Riggs Avenue **PLYMOUTH, OHIO**
Sales Representatives in all Principal Districts

119



Let Your *Requirements* Be Your Guide

"In the choice of a storage battery locomotive care should be exercised in choosing: (1st.) The locomotive that meets your requirements; (2nd.) That it is equipped with a storage battery of proven merit." J. O. Durkee.

Ironton Storage Battery Locomotives are built in three types, one of which will meet **your** requirements. Each type is designed for known conditions and is equipped with a battery of proven merit. Standard in construction, but vary in size and battery capacity to meet the conditions for which each type is recommended.

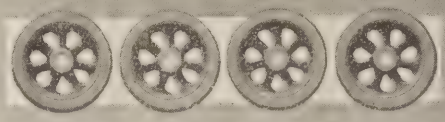
THE IRONTON—Type D-1 FOR GATHERING AND CROSS ENTRY

Easy to handle in difficult places and in low coal. Only 32 inches high, it can be operated in any room where mining is practicable. Standard Ironton Features: Sturdy reinforced frame; Radial journal bearing housings; Independent chain drive to each axle makes each wheel a direct driver; Eccentric chain adjustment.

Send for Data sheet which will enable you to determine which Ironton will best meet your working conditions.

THE IRONTON ENGINE COMPANY
Ironton, Ohio

Branch Offices: 584 Union Arcade Bldg., Pittsburgh, Pa. 112 No. Broad St., Philadelphia, Pa. 408 Gas & Electric Bldg., Denver, Colo. 69 Columbia St., Seattle, Wash. Keister, Geismer Engineering Co., Birmingham, Ala. 314 No. Fourth St., St. Louis, Mo.



LOBDELL Chilled Iron Mining Locomotive Wheels

are backed by over eighty years of experience in wheel making. They are the most economical wheel that can be used for this severe service, having built into them by special processes of manufacture the ultimate of strength and wear.

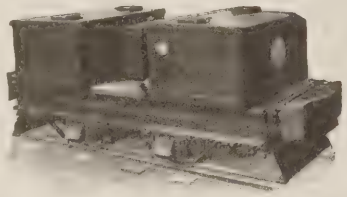
Where increased traction is desired the Lobdell High Carbon Heat Treated Steel Wheel will be found the most efficient.

Send us the sizes of your locomotive wheels and axles so that we can quote you prices and deliveries that will interest you.

LOBDELL 80 YEARS OF PROGRESS

LOBDELL CAR WHEEL COMPANY
WILMINGTON
DELAWARE

ATLAS
Storage Battery Locomotives



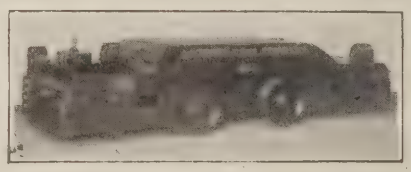
No. 5778. Storage Battery Mine Locomotive.

eliminate costly upkeep charges and are absolutely dependable.

Put your haulage problems up to Atlas Engineers. Write for your copy of "Cars and Electric Locomotives."

The Atlas Car and Manufacturing Co.
Dept. O, Ivanhoe Road, Cleveland, Ohio

IT costs $1.00 a day to feed the old mine mule, and Mancha's Electric Mule equals 6 to 10 of them.
It costs $1.00 a day to feed the MANCHA Electric MULE.



The old mine mule with his 1 M.P. (mule power) can pull a load of only 2 cars under certain conditions.
The MANCHA Electric MULE with its H. P. easily hauls a load of 8 cars under the same conditions.
How can your mine do its bit depending on the old mine mule?
Write for MANCHA FACTS and FIGURES.

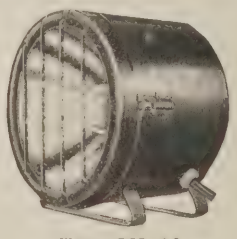
Mancha Storage Battery Locomotive Co.
1911 South Kingshighway, St. Louis, Mo.

Representatives:
Pittsburgh Mining Mchry. Co., 1611 First Nat. Bank Bldg., Pittsburgh, Pa.
C. B. Goodwin, Masonic Temple Bldg., Charleston, W. Va.
Jos. B. Noros & Co., 301 Miller Bldg., Scranton, Pa.
Tri-States Machinery Co., 408-9-10 Burwell Bldg., Knoxville, Tenn.
Carson W. Smith, 321 Empire Bldg., Denver, Colo.

Golden-Glow Mine Headlights

are used in hundreds of mines because they give a *non-blinding* light.

The greenish-yellow beams penetrate fog, smoke and dust better than white light without dazzling and enable miners to do more work.



Type ML-96

Write for Catalog.

Electric Service Supplies Co.
Railway Material and Mining Electrical Supplies
PHILADELPHIA, 17th and Cambria Streets
NEW YORK, 50 Church Street
CHICAGO, Monadnock Building



No. 332-C

The Best Costs No More

THINK about what you want your cars to accomplish. It takes brains to get the best results. Anybody can lower quality and cut prices.

We figure what strength material your job will require—we also know the cost of our product, and, therefore, customers are always charged only fair prices. Now—isn't it just as cheap to get the best, when price is figured in this manner?

Catalogues.

The Watt Mining Car Wheel Company
Barnesville, Ohio

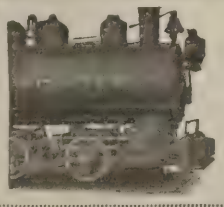
ROLLER Bearing "Automobile" Cars



Whitney Roller-Bearing Wheels

Truck for cars now in use, or complete new cars, will be furnished equipped with the "Whitney" roller bearing wheels, with the floating automobile type of axle. Your cars will then run from six to twelve months with one greasing, will run with half the haulage power of the ordinary equipment. One man can push 12,000 lb. on a level track. Cars can run through water or sand without damage to bearings. In use in 1000 mines. All wearing parts, axles, spindles, rollers, wheels, etc., fully guaranteed. Largest coal mines using them.

Sanford-Day Iron Co., Knoxville, Tenn.
CATALOG 25-C. 160 PAGES.



PORTER LOCOMOTIVES

Steam—Fireless—Compressed Air

Without cost to you let our experienced engineers serve you in selecting the best haulage system as adapted to your particular needs.

Write for Catalog
H. K. PORTER CO.
1200 Union Bldg., Pittsburgh, Pa.



SAND DRYING STOVE

Warranted to give satisfaction, also to be the simplest and most economical device on the market.

Ask us.

INDIANA FOUNDRY CO.
Indiana (C. H.) Penna.

When You Want

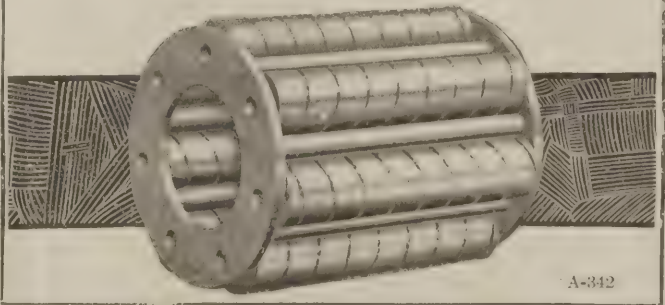
1. Mine Cars

2. Prompt Service

3. Fair Prices

Send Us Your Inquiries For Mine Cars

Hyatt Roller Bearing Company
Metropolitan Tower, New York



A-342

The Open Cap Truck

(Guaranteed)



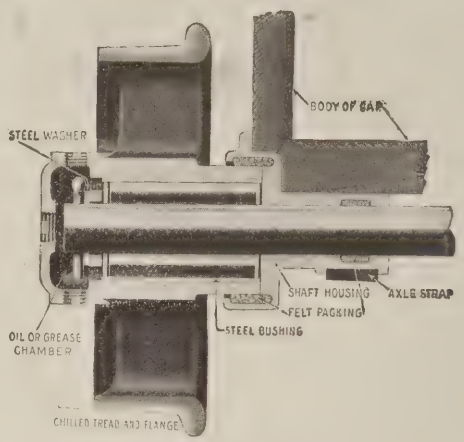
IN this Truck are combined all the essentials that go to make up a first-class Mine Car Truck. It can be lubricated with either grease or oil with long service from each lubrication—is thoroughly dustproof—runs with very little friction—has a full-floating axle with visible linch pins which can be easily replaced, and is guaranteed against internal wear.

Selected by the Atlantic Refining Co. to demonstrate, at the American Mining Congress in Philadelphia, the highest development of a self-oiling wheel using their lubricant. We'll send you details.

Phillips Mine and Mill Supply Co.

Pittsburgh Penna.

Your Mine Cars Need



OTTUMWA

Roller Bearing Car Wheels

They will run with less power and require less attention. Made of specially selected tough iron. Run on roller bearings that distribute the load and cut down the friction loss.

Let us quote you. Just state wheel diameter, weight of car loaded and distance center to center of axles. Write us now.

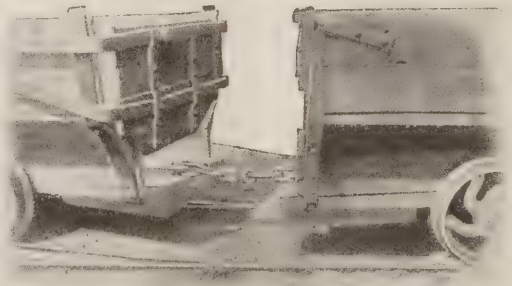
Ottumwa Iron Works, Inc.

Ottumwa, Iowa

The "Monarch" Car Hitching Eliminates Delay—and Hitches Up to Stay

When you hitch up your cars with "Monarch" car hitching you can rest assured that they won't come apart until you disconnect them.

With Monarch Hitchings you can handle more cars per day. Try them and see.



This hitching can be used on any size car and with any system of hauling.

It won't break because it is made of malleable iron with forged link and clevis. It is only 23 inches long.

Equip a few of your cars and give them a trial. You won't be sorry.

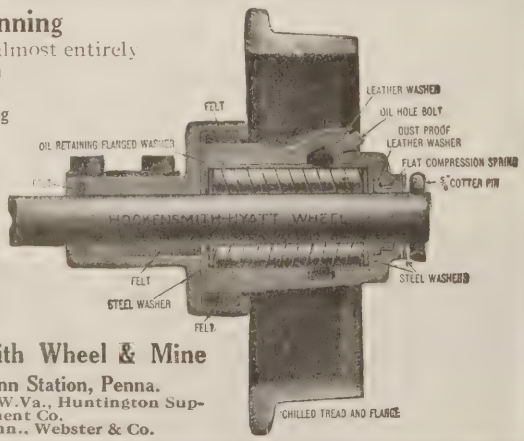
MACOMBER & WHYTE ROPE CO., KENOSHA, WIS.

Light Running

Friction is almost entirely overcome in **Hockensmith Roller Bearing Wheels**

Completely protected against dust and water.

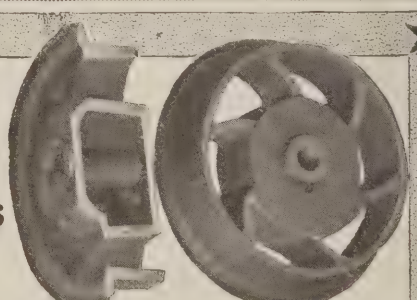
Big oil savers. Unsurpassed durability. Ask for details.



Hockensmith Wheel & Mine Car Co. Penn Station, Penna.

Huntington, W.Va., Huntington Supply & Equipment Co.
Knoxville, Tenn., Webster & Co.

Star Car Wheels Self-Oiling



Make mine cars move and keep them moving. They're semi-steel and very durable. Learn what they're doing daily.

Write for the Bulletins now.

STAR MFG. CO. LEXINGTON, OHIO.



A Large Steel Grease Gun Free

with every order for two barrels of

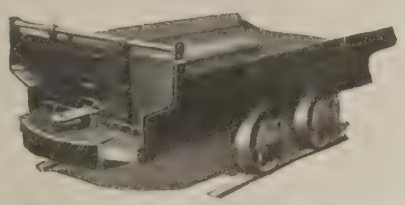
OHIO MINE CAR GREASE

And this grease is far better and more economical than any lubricant you have ever used on your cars. Try it! We'll send you a working sample free.

THE OHIO GREASE CO., Box 815, Loudonville, Ohio

Irwin Cars for Low Seams

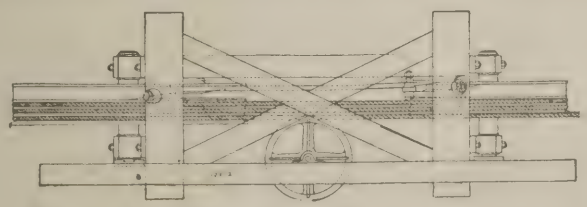
If your present cars are heavy and you are looking for new equipment, we can supply you with exactly what you need. Irwin Mine Cars are built for service. They please the men because they're so handy, comply with all the latest ideas, yet hold as much as the older, heavier patterns.



Easy to Handle—Light but Strong

For full details write

Irwin Foundry & Mine Car Co., Irwin, Pa.



Friction Drums Complete for Incline Planes. Mine Cars, Car Irons, Car Wheels and Axles.

Inquiries Solicited on all Mine Supplies

The McKaig Machine, Foundry & Supplies Works

CUMBERLAND, MD.

Steel for Service

When the time comes to replace old timbers in your mines, is there any economy in using again the same kind of material which has already required replacement?

When

Steel Mine Timbers

are put in they are there to stay as long as any timbering is necessary at that point.

Besides, the ultimate cost is usually less than for wood timbers.

Pamphlet—Steel Mine Timbers—can be secured from any district office.

The mark of quality CARNEGIE **It protects the user**

Carnegie Steel Company

General Offices—Pittsburgh, Pa.

941

WHITE STAR COAL COMPANY



The White Star Coal Company, located at White Star, Harlan County, Ky., is using for general hauling a 12 in. x 18 in. engine built by the American Locomotive Company.

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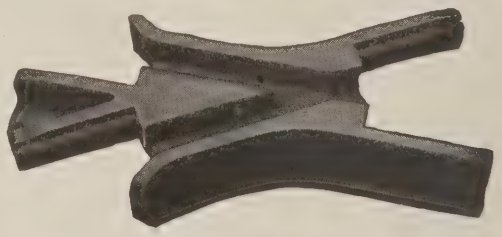
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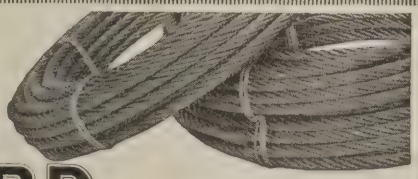
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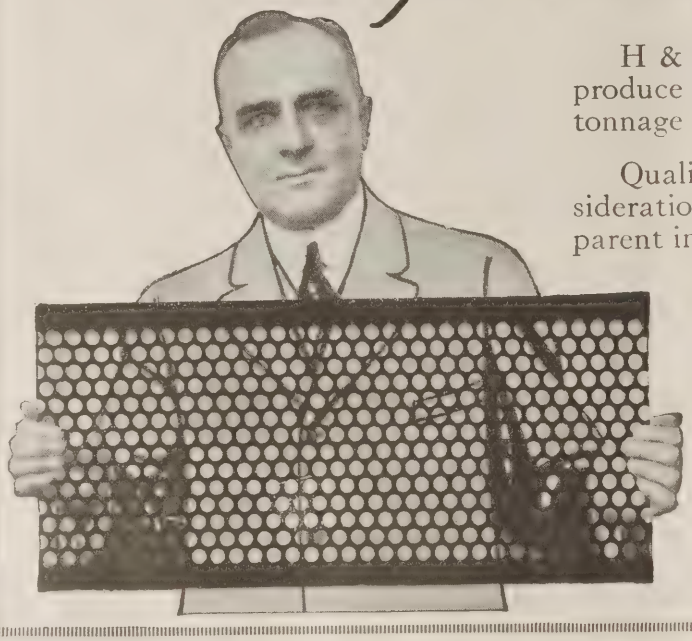
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Abendroth & Root Mfg. Co., 45 Broadway, N. Y.

Pipe, Steel
National Tube Co., Pittsburgh, Penn.

Pipe, Wood
Michigan Pipe Co., Bay City, Mich.
Wyckoff & Sons Co., A., Elmira, N. Y.

Plates
American Rolling Mill Co., Middletown, Ohio.
Carnegie Steel Co., Pittsburgh, Penn.

Powder, Blasting
Aetna Explosives Co., 120 Broadway, N. Y. City.

Powder, Permissable
Aetna Explosives Co., 120 Broadway, N. Y. City

Power Transmission Machinery
Jeffrey Mfg. Co., 912 N. 4th St., Columbus, O.

Pulleys, Shafting & Hanger
Gurney Ball Bearing Co., Jamestown, N. Y.

Pulverizers, Coal and Coke
Williams Pat. Crusher & Pulv. Co., Chicago, Ill.

Pump Plungers
Lobdell Car Wheel Co., Wilmington, Del.
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Pumps, Air Driven
Cameron Steam Pump Works, A. S., N. Y. City.

Pumps, Boiler Feed
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Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Worthington Pump & Machy. Corp., N. Y. City.

Pumps, Centrifugal
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Cameron Steam Pump Works, A. S., N. Y. City.
Dravo Contracting Co. Engineering Wks. Dept., Pittsburgh, Pa.
Stine, S. B., Box H, Osceola Mills, Penn.
Worthington Pump & Machy. Corp., N. Y. City.

Pumps, Power
Boyts, Porter & Co., Connellsville, Penn.
Cameron Steam Pump Works, A. S., N. Y. City.
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Deming Co., The, Salem, Ohio. Cable Address: "Deming."
Dravo Contracting Co. Engineering Wks. Dept., Pittsburgh, Pa.
Fairmont Mining Machry. Co., Fairmont, W. Va.
Harris Pump & Supply Co., Pittsburgh, Penn.
McGowan Co., J. H., Cincinnati, Ohio.
Pneumelectric Mch. Co., Syracuse, N. Y.
Worthington Pump & Machy. Corp., N. Y. City.

Pumps, Sinking
Cameron Steam Pump Works, A. S., N. Y. City.
Worthington Pump & Machy. Corp., N. Y. City.

Pumps, Steam
Cameron Steam Pump Works, A. S., N. Y. City.
McGowan Co., J. H., Cincinnati, O.

Pumps, Vacuum
Cameron Steam Pump Works, A. S., N. Y. City.
Worthington Pump & Machy. Corp., N. Y. City.

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General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

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Keasbey & Mattison Co., Ambler, Penn.

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Broderick & Bascom Rope Co., St. Louis, Mo.
Leschen & Sons Rope Co., A., St. Louis, Mo.
Macomber & Whyte Rope Co., Kenosha, Wis.

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Broderick & Bascom Rope Co., St. Louis, Mo.
Leschen & Sons Rope Co., A., St. Louis, Mo.
Webster Mfg. Co., The, Tiffin, Ohio.

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Hazard Mfg. Co., Wilkes-Barre, Penn.
Leschen & Sons Rope Co., A., St. Louis, Mo.
Macomber & Whyte Rope Co., Kenosha, Wis.
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Waterbury Co., 80 South St., New York City.
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Harrington & King Perforating Co., 628 North Union Ave., Chicago, Ill. Branch Office: 114 Liberty St., New York City.
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Jeffrey Mfg. Co., 912 N. 4th St., Columbus, O.
Link-Belt Company, Chicago, Philadelphia.
Webster Mfg. Co., The, Tiffin, Ohio.

Second-Hand Equipment
(See Searchlight Section)
Archer & Baldwin, 114 Liberty St., N. Y. C.
Atlantic Equipment Co., 149 Broadway, N. Y. C.
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Crockwell Mine & Mill Supply Co., 415 Pine St., St. Louis, Mo
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Miller-Owen Electric Co., 217 First Ave., Pittsburgh, Pa.
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Payne, H. B., 1003 House Bldg., Pittsburgh, Pa.
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Randle Machy. Co., 1731 Powers St., Cincinnati, O.
Ry & Mine Supply Co., 332 So. Michigan Ave., Chicago, Ill.
Sherwood, E. C., 50 Church St., New York City.
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Wood & Lane, St. Louis, Mo.
Zelnicker Supply Co., St. Louis, Mo.

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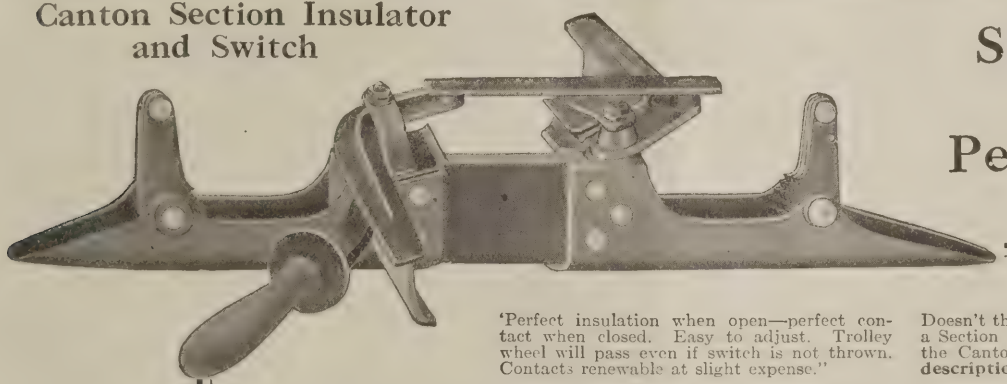
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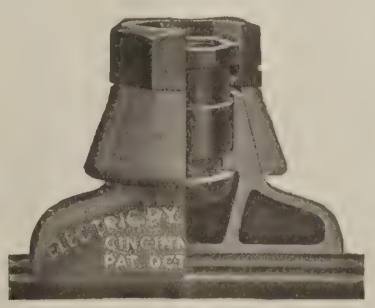
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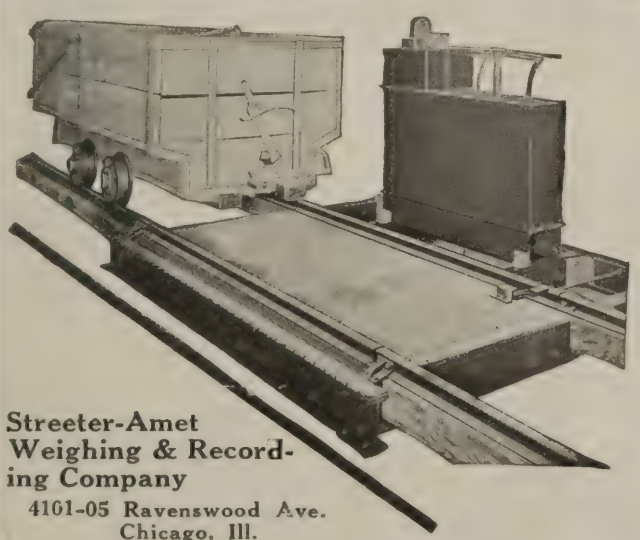
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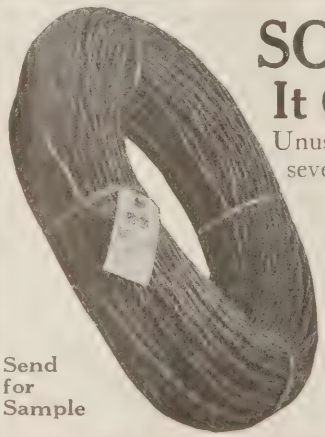
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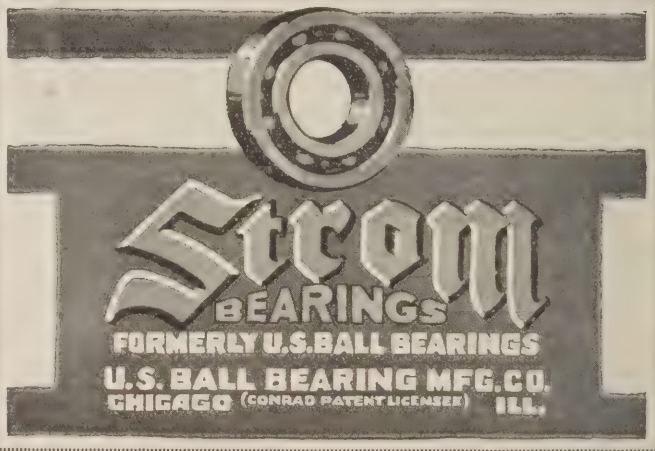
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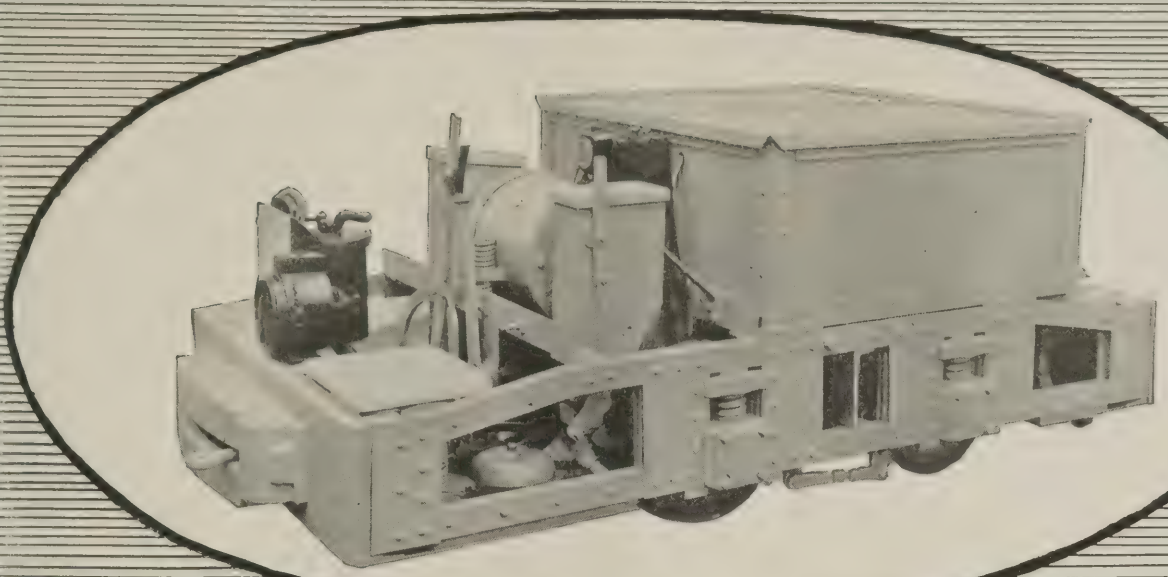
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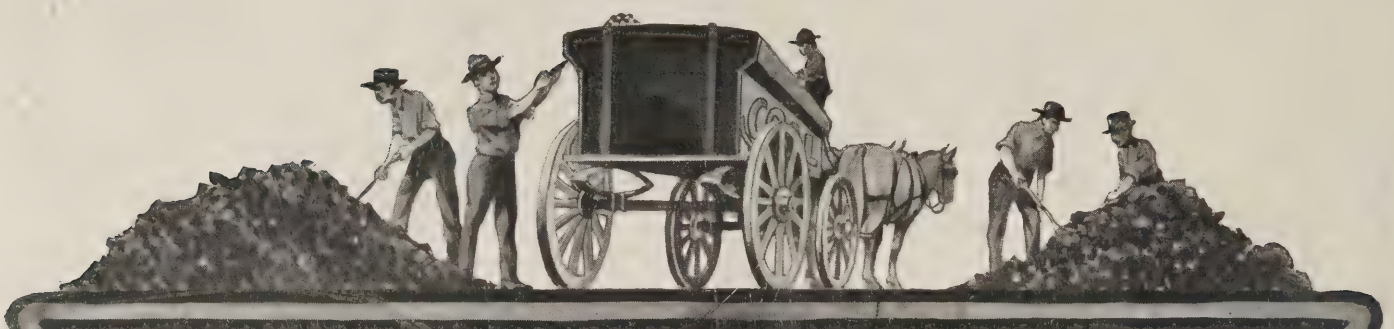
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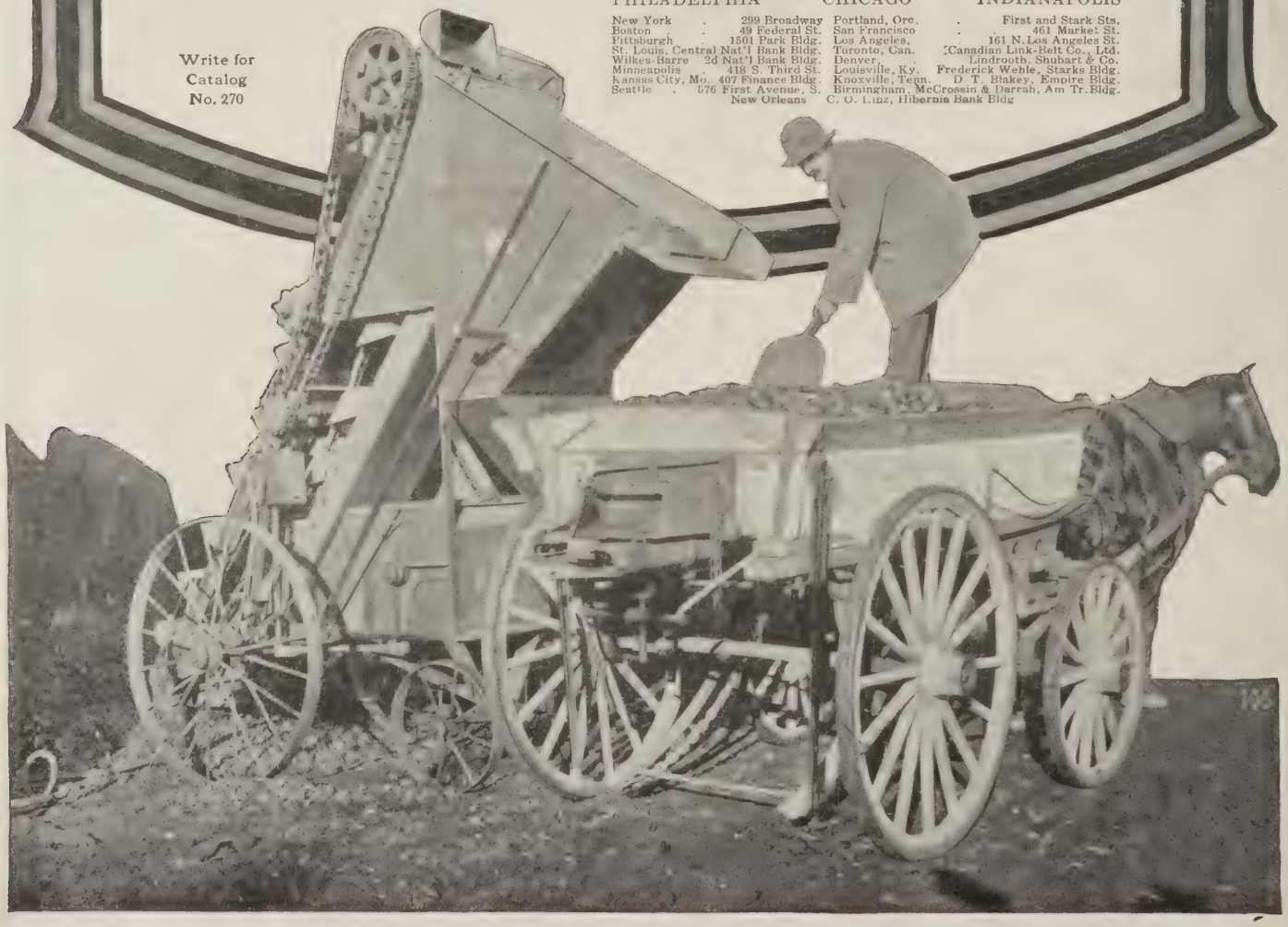
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